EPISTEMOLOGICAL BELIEFS OF ADMINISTRATORS: A COMPARISON

OF BELIEFS AND ACTIONS OF ELEMENTARY

AND SECONDARY SCHOOL LEADERS

by

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ABSTRACT

Epistemology is the study of knowledge and learning and is a branch of philosophy

dealing with the nature of knowledge, scope, general basis, and justification of belief

(Honderich, 1995). Epistemological beliefs refer to an individual's beliefs about the nature of

and knowledge of learning. Schommer (1992) contended that the study of epistemological

beliefs could help identify the impact schooling may have on an individual's beliefs about the

nature of knowledge and learning. Arredondo and Rucinski (1998) questioned "whether

epistemological beliefs of principals might affect their support of certain innovations or their

involvement of teachers in school decision processes and other supervisory practices" (p. 294).

This study described what principals' beliefs about knowledge and learning are, and examined

how they enact their beliefs in schools. The study was guided by two research questions: (1)

What are the epistemological beliefs of elementary and secondary school administrators? (2)

How do administrators perceive they enact these beliefs in their schools?

The Epistemological Beliefs Questionnaire developed by Marlene Schommer (1990) was

used to answer research question 1. The questionnaire was sent to 126 administrators in five

school districts in a southern state. Seventy-eight administrators responded to the survey. Data

from the study were analyzed by examining the factor scores for each administrator as well as

finding mean scores for high and low scoring participants. Results showed significant differences

between high and low scoring participants on each of the identified factors.

Information for research question 2 was obtained by conducting 16 purposefully selected

individual interviews with elementary and secondary administrators. Interviews began with a

discussion of epistemology and simple and complex learning. Interviewees were then asked

questions about their beliefs and actions. After transcription, emergent themes and categories

were examined to determine what administrators' epistemological beliefs are and what

administrators perceive they do in their schools to enact their epistemological beliefs.

Implications for practitioners, researchers and policy developers were included.

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CHAPTER I

INTRODUCTION TO THE STUDY

Background

Epistemology is the theory of knowledge and knowing. It is a branch of philosophy which deals with the nature of knowledge, its possibility, scope, general basis, and justification of belief (Honderich, 1995). In this study, the cognitive psychological perspective is used to ground the research. Reybold (2002) discusses the cognitive definition of epistemology as established by Belenky, Clinchy, Goldberger, and Tarule (1986) and Baxter Magolda (1992), as follows:

> The concept of epistemology presumes a cognitive definition. Established as 'ways of knowing' (Belenky et al., 1986; Luttrell, 1989; Baxter Magolda 1992a, 1992b, 1995; Goldberger et al, 1996), epistemological perspectives embody how individuals 'view reality and draw conclusions about truth, knowledge, and authority' (Belenky et al. 1986). This definition of personal epistemology as an individual's way of knowing remains relatively unchallenged, leaving theories of epistemology firmly situated in the fields of cognition and psychology. (p. 537)

Epistemological belief systems have been studied across many domains through the years. Simultaneous and intersecting lines of research have addressed the process by which individuals come to know, the theories and beliefs they hold about knowing, and the manner in which such epistemological premises are a part of the cognitive processes of thinking and reasoning. Much of this work suggests a developmental stage model, in which beliefs about knowledge and knowing are integrated hierarchically and cut across disciplines and domains. (Baxter Magolda 1992; Belenky et al., 1986, King & Kitchener, 1994, Perry, 1970, Schommer, 1990). The term *epistemological beliefs* refers to an individual's beliefs about the nature and

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knowledge of learning. Hofer and Pintrich (1997) described epistemological thinking as a cognitive process that involves the ways in which individuals think about the process of knowing. Anderson (1984) has suggested that epistemological beliefs are a product of home and formal education and that children acquire experience as well as interpretations of experience. "It stands to reason that the beliefs about knowledge that a child develops will be influenced by those of his parents. Parents' beliefs about knowledge will be conditioned by educational and occupational status" (p. 9). This stands to reason, as children are certainly influenced by their parents. However, Anderson also said that teachers will later become mediators of experience. According to this notion of teachers becoming mediators of experience, teachers' beliefs of knowledge could be conveyed to students, thus the teacher, administration, and school entity as a whole could impose their belief systems on to the student and the student could begin to develop those same epistemological beliefs.

Schommer (1992) contended that the study of epistemological beliefs could help to "identify the potential impact schooling may have in enhancing individual's beliefs about the nature of knowledge and learning" (p. 3). Schools having strong influences on academic beliefs of students could possibly help students become more complex, integrated thinkers and makers of knowledge instead of a storehouse of facts handed down by authority. Schraw (2001) noted that schools "as purveyors of knowledge and as epistemological training grounds for developing students" (p. 460) have the ability to change and shape the beliefs of students. Schraw cited Kuhn (1991) and Perry (1970) for the idea that epistemological beliefs and their effects on learning are important to educators. One reason is that epistemological beliefs are related to a wide variety of complex cognitive outcomes. The second is that beliefs change over time due to educational experiences. This change over time could be applied to Anderson's (1984) notion

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that epistemological beliefs are a reflection of parental beliefs and experiences and thus eventually these beliefs are influenced by teachers. Clark (1998) told us that teachers' beliefs about learners, curriculum, and numerous factors directly influence classroom practice, and their epistemologies influence how reform efforts are enacted in classroom practice (Prawat, 1992). Schommer (1992) noted an individual's academic performance could be affected by his or her epistemological beliefs. For example, epistemological beliefs have been found to affect comprehension in mathematics (Schommer, Crouse, & Rhodes, 1992) and comprehension of text in social and physical science (Schommer, 1990).

Educational and instructional psychologists have become interested in how a student's beliefs about knowledge and learning are a part of the process of learning, and how their beliefs affect the knowledge acquisition and knowledge construction process (Hofer, 2001). Hofer questioned what educators might do in regard to epistemology and argued that "epistemological thinking is related not only to school learning but is a critical component of life-long learning in and out of school" (p. 354). Hofer cited King and Kitchener (1994) and Kuhn (1991) to note that "epistemological understanding helps us to understand how individuals resolve competing knowledge claims, evaluate new information, and make fundamental decisions that affect their lives and the lives of others" (p. 354). If students and adults are expected to engage in such complex thinking activities, it seems that they would need to possess sophisticated epistemological beliefs. King (1992) noted that higher order thinking and the ability to make reasoned judgments have long been the hallmarks of liberal education, and knowing more about the role of epistemological thinking as a part of intellectual development can help create a path toward important educational goals. Because current literature contends that schools and educators play a role in developing epistemological beliefs of students (Hofer, 2001; Schraw,

2001) we may ask how this influence takes place. This study poses the question of what administrators believe about knowledge and learning (epistemological beliefs) and how they enact these beliefs in their schools, thereby influencing those with whom they interact.

Statement of the Problem

Epistemology and the effects on learning have been studied in students, adults, and teachers as well as in relation to specific disciplines. Schommer (1992) argued that "age and schooling have unique effects on adult development of epistemological beliefs. As individuals grow older, [they] become more convinced that the ability to learn can be improved" (p. 14). Studies by Dweck and Leggett (1988) on children's beliefs about intelligence indicated that some children believe that intelligence is a fixed entity and other children believe intelligence can be improved. Baxter-Magolda (1992) noted that epistemological beliefs are socially constructed and students' epistemological beliefs are shaped by the way they interact with peers, instructors, and the world. With these ideas in mind, we may question how schools are influencing the development of epistemological beliefs in students. Schommer (1993) challenged teachers to consider how they may be unconsciously influencing their students' beliefs. She questioned some teaching practices such as testing to teach facts or to understand concepts and assigning tasks that are quick to complete or challenging tasks that take time. These various types of assignments influence students' epistemological beliefs. As mentioned previously, a study by Prawat (1992) showed that teachers' epistemological beliefs influence how reform efforts are enacted in classroom practice. Although most of the research on epistemological beliefs has been conducted on young adults and adults at the high school (Schommer, 1993) and college levels (Perry, 1968; Ryan, 1984a, 1984b; Schommer, 1990, 1992; Schommer & Walker,

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1995), Johnston, Woodside-Jiron, and Day (2001) studied teacher epistemology, classroom interactions and student epistemologies at the fourth grade level. The study revealed that teachers who possess beliefs in received knowledge conduct their classrooms using practices that are a transmission of facts and are largely monological. Those teachers who possess beliefs in constructed knowledge expect complexity and ambiguity and view knowledge as being constructed by the individual. As the students' learning was guided under these influences, their behaviors in the classroom reflected the epistemologies of their teacher. In conclusion, certain environments may have powerful effects on children's epistemologies, which, over time, could change the course of their development. Children are acquiring routines of behavior and patterns of values, beliefs, roles, and identities, which, in the long run, could become problematic (Johnston et al., 2001). The idea that epistemological beliefs change over time was presented by Perry in 1968:

> Students go through stages of development of epistemological beliefs. In the early stages, students see knowledge as either right or wrong and believe that authority figures know the answers. When students reach the late stages of development they realize there are multiple possibilities for knowledge and there are times when one must make a strong tentative commitment to some ideas. (Schommer, 1990, p. 498)

Schommer (1993) indicated that "there is some epistemological development that occurs during high school. Belief in simple knowledge, certain knowledge, and quick learning changed significantly from freshman to senior year" (p. 410).

Given that research shows changes in epistemological beliefs over time (e.g., Perry, 1968; Schommer 1993) and that teachers' beliefs could influence students' beliefs (Johnston et al., 2001), Arredondo and Rucinski (1998) questioned "whether epistemological beliefs of principals might affect their support of certain innovations or their involvement of teachers in school decision processes and other supervisory practices" (p. 294). Studies to determine the

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epistemological beliefs of principals and interviews of how these beliefs are enacted in schools could show how students' beliefs may be influenced at school.

Purpose of the Study

The purpose of this study was to describe what effective principals believe about learning and how they enact their beliefs in the school environment. The research questions for this study were designed to collect information that described how such principals enact their epistemological beliefs and provide examples of these beliefs and behaviors in their schools.

Research Questions

The following were the research questions for this study:

1. What are the epistemological beliefs of elementary and secondary school principals and assistant principals?

2. How do these administrators perceive that they enact their beliefs in their schools?

Conceptual Framework

The study is driven by the theory that administrators carry out their duties with actions that are based on their beliefs. Arredondo and Rucinski (1998) questioned "whether epistemological beliefs of principals might affect their support of certain innovations or their involvement of teachers in school decision processes and other supervisory practices" (p. 294). Studies to determine the epistemological beliefs of principals and interviews of how these beliefs are enacted in schools could show how students' beliefs may be influenced at school.

Methods

The information needed was obtained using an epistemological beliefs questionnaire to assess principal beliefs, and conducting interviews with identified elementary and secondary principals at diverse points on the epistemology scale. The Schommer Epistemological questionnaire was used to assess the epistemological beliefs of each principal prior to the interviews. The interviews were based on research dealing with epistemological beliefs, behaviors, and practices of administrators. Audio taped interviews were analyzed using qualitative methods and used to write case reports for each participating principal. The case reports described the professional background, beliefs, and actions of the participating principals, and then compared to actions other researchers have identified as being associated with certain epistemological beliefs of educational leaders.

Limitations and Assumptions

The assumptions of this research included the following:

1. Epistemological beliefs of principals were discovered.

2. The Epistemological Beliefs Questionnaire showed actual beliefs of administrators.

3. Administrators told the truth.

4. Sophisticated beliefs were held by administrators.

5. Principals provided accurate information about practices enacted in their schools based on their epistemological beliefs.

6. Common themes of beliefs and practices emerged among principals at the elementary level, secondary level, and across levels.

7. Higher epistemological scores are better.

The limitations for this research included the following:

1. The sample size was small, and it was selected from five school districts in a Southern state based on convenience, due to the need for proximity to the researcher for face-to-face interviews.

2. The epistemological assessments were based on self-reported data.

3. The practices described may not be what the principals actually do.

4. School location (urban, suburban, rural).

5. The study contextualized the belief system. It was based on Schommer's (1990) viewpoint of epistemological beliefs being based on knowledge and learning. It was different from and does not consider the perspectives of Belenky et al. (1986).

Definitions of Key Terms

Epistemological beliefs. Beliefs about the nature of knowledge and learning (Schommer, 1992).

Dualism. A two-part structure of the world between good and bad, right and wrong, we and others (Perry, 1999).

Relativism. The position where an individual comes to understand that knowledge is constructed and not given; it is contextual and not absolute and mutable, not fixed (Belenky et al., 1986).

Received knowledge. A perspective in which individuals view themselves as capable of receiving and reproducing knowledge from authorities but not capable of creating knowledge on their own (Belenky et al., 1986).

Constructed knowledge. A position in which individuals experience themselves as creators of knowledge and view knowledge as contextual (Belenky et al., 1986).

Innate ability. Learning cannot be improved with instruction (Schommer, 1989).

Simple knowledge. Knowledge is isolated facts (Schommer, 1989).

Quick learning. Learning is quick or not at all (Schommer, 1989).

Certain knowledge. Knowledge is certain; knowledge is absolute (Schommer, 1989).

Omniscient authority. Knowledge is handed down by authority (Schommer, 1989).

Reflective Judgment Model. A framework in which adolescents and adults understand and attempt to solve ill-structured problems (King & Kitchener, 1994)

Pre-reflective stage. A stage of thinking in the Reflective Judgment Model where individuals do not perceive that knowledge is uncertain. They do not understand that real problems exist for which there may not be an absolutely correct answer (King & Kitchener, 1994).

Quasi-reflective stage. A stage of thinking in the Reflective Judgment Model where individuals recognize that some problems are ill-structured and that knowledge claims about these problems contain an element of uncertainty (King & Kitchener, 1994).

Reflective. A stage of thinking in the Reflective Judgment Model where knowledge is actively constructed and claims of knowledge are understood contextually (King & Kitchener, 1994).

Chapter Summary

Chapter I introduced the study of epistemology and explained how it plays an important role in students' knowledge development and learning. Perry (1968) and Schommer (1992) noted

that epistemological beliefs can change over time and it is possible that their beliefs can be influenced by social interactions. Johnston et al. (2001) argued that teachers' beliefs could influence students' beliefs, and Arredondo and Rucinski (1998) argued that the principals' epistemological beliefs might affect the schooling process. The purpose of this study was to determine the epistemological beliefs of principals and how they enact those beliefs in their individual schools.

Chapter II provides a review of the literature, which describes epistemological theories as well as educational effects and implications. Chapter III describes the methodology of this study and includes the problem and purpose, the research questions, population and sample size, instrumentation for data collection, data analysis, limitations, and a summary of the chapter. Chapter IV will include the findings and analysis of the data gathered to answer each research question. It will present interview responses from principals. Chapter V will include a summary of key findings and conclusions and will relate the findings to the review of the literature. Common themes of beliefs and practices among principals will also be presented.

CHAPTER II

REVIEW OF THE LITERATURE

The purpose of this study is to describe how public school principals and assistant

principals enact their epistemological beliefs in their schools. It is hoped that the findings will

uncover modern, innovative practices that will help students become great thinkers.

Chapter II contains an overview of epistemological theories from four of the major

researchers in this field. These researchers include among others Perry (1999), Schommer

(1989), Belenkly et al. (1986) and King and Kitchener (1994). The chapter will also include a

discussion of the effects of epistemologies on students, teachers, and administrators. A summary

will conclude the chapter.

Epistemology Explained

Research on personal epistemology addresses students' thinking and beliefs about

knowledge and knowing. Beliefs about the definition of knowledge, how knowledge is

constructed, how knowledge is evaluated, where knowledge resides, and how knowing occurs

are some of the elements typically included in this area of research (Hofer & Pintrich, 1997).

Individual thinking about epistemological concerns has been conceptualized in various ways.

The early studies of epistemology assumed that personal epistemology is uni-dimensional and

develops in a fixed progression of stages (Perry, 1968; Ryan, 1984b). Other views of personal

epistemology give way to the notion that it is composed of several independent dimensions

(Dweck & Leggett, 1988, Schoenfield, 1983; Schommer, 1990). However, all of the models

include content related to the nature of knowledge and the processes of knowing. The nature of knowledge involves what one believes knowledge is, and this is the basis of most of the models. The nature of knowledge is viewed as "a progressive understanding that moves from the view of knowledge as absolute to a relativistic view and then to a contextual, and constructivist stance" (Hofer & Pintrich, 1997, p. 119). The nature of knowing involves the beliefs about the process by which one comes to know. "This includes the beliefs about the source of knowledge and the justification for knowing, which includes evaluation of evidence, the role of authority, and the process of justification" (Hofer & Pintrich, 1997, p. 120).

The following sections will explain the epistemological theories of Perry (1999), Schommer (1989), Belenkly et al. (1986), and King and Kitchener (1994) and provide comparisons of their models. The last portion of the chapter will be devoted to epistemological implications for education.

Epistemological Theories

Perry's Scheme of Intellectual and Ethical Development

William G. Perry was a pioneer in epistemological beliefs research. According to Hofer and Pintrich (1997), "nearly all the existing psychological work on epistemological beliefs can be traced to two longitudinal studies by Perry (1970) that began in the early 1950s at Harvard's Bureau of Study Counsel" (p. 90). In 1953, Perry and the staff of the Bureau of Study Counsel at Harvard College set out to document descriptive accounts of students' experiences and how they appeared to be responding to the pluralistic intellectual and social environment of the university (Hofer & Pintrich, 1997; Perry, 1999). The motivation for Perry's study could be contributed partially to counseling sessions at the Bureau of Study Counsel. Perry (1999) wrote:

In our daily counseling with students whose presenting concerns centered on their academic work, we had been impressed with the variety of the ways in which the students responded to the relativism which permeates the intellectual and social atmosphere of a pluralistic university. Among the students who consulted us, a few seemed to find the notion of multiple frames of reference wholly unintelligible. (p. 4)

Perry's study began with the development of the checklist of Educational Values (CLEV), which he administered to a random sample of first-year students from Harvard and Radcliff. He then progressed with annual interviews for selected students during their 4 years of college.

Perry's (1999) study showed us that there is a basic progression in ways of thinking. Perry devised four categories or stages of development: dualism, multiplicity, relativism, and commitment with relativism. Within these four categories or stages, there are nine positions through which development passes. The four stages of Perry's model overlap the nine positions making it possible for an individual to be between two stages in the developmental process. Knefelkamp (1999) reminded us that,

Perry stressed the student's ability to construct meanings and to shift or change those constructions or standpoints to developmentally accommodate uncertainty, paradox, and the demands of greater complexity in knowledge and learning. He even suggested that students could be in several different positions at the same time with respect to different subjects or experiences. (Perry, 1999, p. xii)

In the early stages of epistemological development, students view knowledge as right or wrong and depend on authority figures to know and convey the answers. As students advance to the later stages, they realize there are multiple possibilities for knowledge (Schommer, 1990).

Perry's (1999) scheme contains nine positions that flow over four categories. Perry's first stage is dualism. The category of dualism extends from position one through position four, tapering off at position five. Position one is completely enveloped in dualism. Perry (1999) defines dualism as "a bifurcated structuring of the world between good and bad, right and wrong, we and others" (n.p.). Hofer and Pintrich (1997) explained that this category is characterized by

an absolutist, right and wrong, view of the world in which authorities are expected to know the truth and convey it to the learner. Dualists believe that right answers for everything exists in the absolute and are known to authority. The authority's role is to teach them.

Perry's (1999) second stage is multiplicity and encompasses positions two through four. Perry defined multiplicity as follows:

> A plurality of "answers," points of view, or evaluations with reference to similar topics or problems. This plurality is perceived as an aggregate of discretes without internal structure or external relation, in the sense, "anyone has a right to his own opinion," with the implication that no judgments among opinions can be made. (p. 286)

As explained by Hofer and Pintrich (1997) and Perry (1999), individuals in this stage begin to recognize diversity and uncertainty. Students view this diversity and uncertainty as exercises set by authority so they may find the answers themselves. Moving toward the end of the stage, around position four, individuals believe that each person has a right to his or her own opinions yet the absolute answers, right and wrong, are still held in the realm of authority.

Perry's (1999) third stage is relativism and spans positions five through nine; however, Hofer and Pintrich (1997) only included positions five and six in this stage. Perry defined relativism as "a plurality of points of view, interpretations, frames of reference, value systems, and contingencies in which the structural properties of contexts and forms allow for various sorts of analysis, comparison, and evaluation in multiplicity" (p. 286). Position five includes a major shift in the individual as being an active maker of meaning. The perspective of the individual transforms from a vision of the world as dualistic to one with a growing number of exceptions to the rule then to a relativistic view that is context bound with a few right-wrong exceptions (Hofer & Pintrich 1997). In position six, the student becomes aware of the need to orient himself in a relativistic world through personal commitment (Perry, 1999).

The final stage of Perry's scheme is commitment with relativism and encompasses

positions seven through nine. According to Perry (1999), the student in position seven makes an

initial commitment in some area. Moving to position eight, the student "experiences the

implications of commitment and explores the subjective and stylistic issues of responsibility" (p.

11). Finally, in position nine, individual "experiences affirmation of their identity among

multiple responsibilities and realizes commitment as an ongoing, unfolding activity through

which he expresses his lifestyle" (p. 11).

Hofer and Pintrich (1997) provided a good summary of the Perry scheme. The Perry

scheme reflected two central interwoven dynamics. One dynamic deals with "confronting and

coping with diversity and uncertainty with respect to new learning" and the second deals with

"the attendant evolution of meaning-making about learning and self" (p. 22). As learners move

through Perry's nine positions their meaning-making shifts and evolves in predictable ways.

Learners' views of the instructor move from an authority as the source of truth to an authority as

a resource. Their view as role of student shifts from a passive reception of facts to an active

agent in creating new knowledge.

Epistemological Beliefs

Schommer's (1990) study of epistemology focused on epistemological beliefs being

multidimensional. She proposed a belief system with more or less independent beliefs as

opposed to Perry's scheme of beliefs being uni-dimensionsal and developed in fixed stages. In

her 1990 study, Schommer suggested that,

> epistemological beliefs be conceived as a system of more or less independent beliefs. By
> system she meant that more than one belief composed personal epistemology. By more or
> less independent, she meant that these beliefs could, but not necessarily would develop in
> synchrony. (Schommer-Aikins, Duell, & Hutter, 2005, p. 290)

Schommer (1989) provided three more or less independent beliefs about the structure and source of knowledge: (a) knowledge is simple, (b) knowledge is certain, and (c) knowledge is handed down by authority. These beliefs align with Perry's stage of dualism. Schommer also thought that beliefs about the acquisition of knowledge should be addressed. She proposed five dimensions of beliefs in this area: (1) structure of knowledge, (2) certainty of knowledge, (3) source of knowledge, (4) speed of acquisition, and (5) control of acquisition. The dimension of the structure of knowledge views knowledge as isolated rather than interrelated facts (Schommer 1989). This dimension is also termed simple knowledge (isolated facts), meaning that knowledge is simple rather than complex (Schommer, 1989). The dimension of certainty of knowledge views knowledge as absolute (certain) versus tentative. Certain knowledge is characterized by absolute facts (Schommer, 1989). Duell and Schommer-Aikins (2001) termed this dimension as stability of knowledge, which described knowledge as unchanging to continually changing. The dimension of source of knowledge is described as knowledge handed down by authority versus derived from logic and reasoning. Schommer(1989) also calls this omniscient authority. The fourth dimension is the speed of acquisition. This dimension views learning as quick versus a gradual process. This can also be termed as quick learning where learning is quick or not at all. The fifth, and last, dimension is control of acquisition, which refers to the ability to learn as innate versus being acquired. Schommer (1989) called this innate ability where individuals believe learning cannot be improved with instruction. Throughout her studies, Schommer used the term *fixed ability* to describe this dimension. Fixed ability is a term she may have borrowed from Dweck and Leggett (1988) and refers to the belief that intelligence is a fixed entity versus the belief that it can be improved.

Schommer(1989) developed a questionnaire that characterized epistemological beliefs. Respondents rated the statements on a Likert-type scale from 1 (*strongly disagree*) to 5 (*strongly agree*). The questionnaire and alternate versions of it have been used in various studies in groups of undergraduate college students (Schommer, 1990, 1992), junior college students (Schommer, 1993a), high school students (Schommer & Dunnell, 1994), and adults (Schommer, 1992). In her studies, Schommer used her questionnaire on epistemological beliefs to measure the relation between beliefs about knowledge, strategy, use, and performance. Studies of college undergraduates and junior college students revealed a strong effect of their beliefs on simple knowledge and quick learning. However, it was discovered that the more classes the students had completed in higher education the more likely they were to believe that the ability to learn is acquired and that knowledge is tentative (Schommer 1990, 1992).

Schommer's (1998) findings aligned with Perry's (1968) study of Harvard undergraduates. Based on the interviews and questionnaires, Perry theorized that students come to college thinking knowledge is simple, certain, and handed down by authority. By the time they are seniors, most students come to believe knowledge is complex, tentative, and derived through reason (Schommer, 1998).

The same belief was found true in Schommer's (1993b) study of high school students. The results of the study indicated that there is some epistemological development that occurs during the high school years. From freshman to senior year, belief in simple knowledge, certain knowledge, and quick learning changed significantly and the epistemological development must be a change to tentative knowledge.

Schommer's (1992) study of adult learning showed that education has effects on adult development of epistemological beliefs. "As individuals grow older [they] become more

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convinced that ability to learn can be improved. The more education adults obtain, the more likely they are to believe that knowledge is highly complex and constantly evolving" (p. 14). Schommer's studies (1990, 1992, 1993a; Schommer & Dunnell, 1994) revealed large percentages of students who believed in absolute facts, certain knowledge and dependence of authority. These findings aligned with Perry's (1999) findings that students generally believe in certain answers handed down from authority.

Women's Ways of Knowing

Like Perry (1999), Belenky et al. (1986) focused their study on the nature of intellectual growth. However, Belenky et al. refined Perry's work by focusing on women. Perry's research sample consisted of many more men than women. In a preliminary study in 1954-1955, of the cohort of 313 students who participated in Perry's study, 27 men and only 4 women were invited for annual interviews. In a second study, a randomly selected group of 109 first-year students were selected from the entering classes of 1958-1959 and 1959-1960. Of these, 85 were men and 24 were women; of the 24 women, only 2 were included in the results of this study. Perry did report that the experiences of the women essentially fit the scheme of development. He provided no rationale for eliminating the other women (Hofer & Pintrich, 1997). Although Perry (1999) claimed that there was no significant difference in men's and women's pattern of development, Belenky et al. (1986) were interested in women as knowers and learners. Building on Perry's work, their research led them in pursuit of themes that might emerge when women were the source of the study (Hofer & Pintrich, 1997).

In addition to Perry's (1999) influence, Belenky et al. (1986) were influenced by Gilligan's (1982) work on women's moral development. Belenky et al. (1986) stated, "We also

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become aware of the fact that, for many women, the 'real' and valued lessons learned did not necessarily grow out of their academic work but in relationships with friends and teachers, life crises, and community involvements" (p. 4).

The study conducted by Belenky et al. (1986) used an interview-case study approach. They interviewed 135 women, 90 of whom were enrolled in or recent alumnae of one of six academic institutions. The additional 45 women were from family agencies where they were seeking information or assistance with parenting (Belenky et al., 1986; Hofer & Pintrich, 1997). Out of the interview study came the development of five different perspectives from which women view reality and draw conclusions about truth, knowledge, and authority (Belenky et al., 1986). The five epistemological perspectives were grouped into categories: silence, received knowledge, subjective knowledge, procedural knowledge, and constructed knowledge.

Silence, as defined by Belenky et al. (1986), is a position in which "women experience themselves as mindless and voiceless and subject to the whims of external authority" (p. 15). Duell and Schommer-Aikins (2001) described these women as feeling ignorant and needing to rely on outside authority to determine what to know.

Second in the categories of epistemological perspectives is received knowledge. This is described as "a perspective from which women conceive of themselves as capable of receiving, even reproducing knowledge from the all-knowing external authorities but not capable of creating knowledge on their own" (Belenky et al., 1986, p. 15). Received knowledge is parallel to Perry's stage of dualism. This is a perspective of either or thinking. Knowledge is right or wrong, true or false. It is typically thought that there is only one right answer to be handed down by authority. These women can reproduce and speak about this knowledge unlike those who are silenced (Duell & Schommer-Aikins, 2001; Hofer & Pintrich, 1997).

The third category is subjective knowledge. Belenky et al. (1986) described subjective knowledge as "a perspective from which truth and knowledge are conceived of as personal, private, and subjectively known or intuited" (p. 15). This category is characteristic of both Perry's stages of dualism and multiplicity. Subjectivism is dualistic in that there is still the conviction that there are right answers and the shift of truth residing in authority to residing within the person gives way to multiplicity. In describing subjectivism, Love and Gutherie (1999) wrote,

> The recognition of the self as an authority was the most dramatic aspect of the shift. . . . Instead of seeing oneself as passive, static, and silent, the subjective knower became active and growing and developed a protesting inner voice. Some of these women still may have been silent to the outer world, and all still had a dualistic orientation of right-wrong; but they all experienced a shift in whom they perceived to be right and to whom they listened. In subjective knowing, women became their own authority. (p. 21)

Hofer and Pintrich (1997) provided a description of gender difference in the stage of multiplicity and the perspective of subjective knowing. Perry's men asserted a "right" (p. 95) to their own opinion, wresting authority from others. The women in the study by Belenky et al. (1986) were more likely to see truth as an intuitive reaction and personally experienced.

Procedural knowledge is the fourth category. Belenky et al. (1986) described this perspective as "a position in which women are invested in learning and applying objective procedures for obtaining and communicating knowledge" (p. 15). Procedural knowledge is concerned with acquiring and applying procedures for obtaining and communicating knowledge. Procedural knowledge takes on two forms: separate knowing and connected knowing. Belenky et al. described separate knowing as the opposite of subjectivism:

> While subjectivists assume that everyone is right, separate knowers assume that everyone--including themselves--may be wrong. If something feels right to subjectivists, they assume it to *be* right. Separate knowers, on the other hand, are especially suspicious of ideas that feel right; they feel a special obligation to examine such ideas critically, whether the ideas originate in their own heads or come from someone else. (p. 104)

Separate knowing is the "doubting game" (Belenky et al., 1986, p. 104). "Instead of believing that all people had a right to their own opinion, all knowledge claims were doubted until proven worthy through critical analysis" (Love & Gutherie, 1999, p. 24).

The second branch of procedural knowing is connected knowing. According to Belenky et al. (1986), "Connected knowing builds on the subjectivists' conviction that the most trustworthy knowledge comes from personal experience rather than the pronouncements of authorities" (pp. 112-113). In contrast to the "doubting game" (p. 104), this is the "believing game" (p. 113). The connected knower takes on the perspective of another through empathy. "Since knowledge comes from experience, the only way they can hope to understand another person's ideas is to try to share the experience that has led the person to form the idea" (p. 113). Both the separate and connected learner learns another person's perspective in the procedural category. For the separate learner, the process is driven by academic disciplines. For the connected learner, it is driven by the viewpoint of another person (Duell & Schommer-Aikins, 2001).

The last category of the perspectives by Belenky et al. (1986) is constructed knowledge. Constructed knowledge is "a position in which women view all knowledge as contextual, experience themselves as creators of knowledge, and value both subjective and objective strategies for knowing" (p. 15). In this category there is an attempt to integrate knowledge that is felt intuitively personally important with knowledge that is learned from others. "All knowledge is constructed and the knower is an intimate part of the known" (p. 137). Duell and Schommer-Aikins (2001) described constructivist thinking as thinking "outside the box" (p. 438). Individuals in this category have a high tolerance for ambiguity, embrace complexity, and, in their attempt to understand, they try to integrate all aspects of life.

Reflective Judgment Model

The King and Kitchener (1994) study focused on epistemic cognition or "the ways that people understand the process of knowing and in the corresponding ways they justify their beliefs about ill-structured problems" (p. 13). Fifteen years of interview studies with individuals from high school students to middle-age adults led to the reflective judgment model. Hofer and Pintrich (1997) noted that "reflective judgment is an ultimate outcome and developmental endpoint of reasoning and the ability to evaluate knowledge claims" (p. 99). Although King's and Kitchener's work emerged from the work of William Perry, they believed that there were structural and epistemic aspects that exist beyond Perry's stage of relativism. The reflective judgment model claimed that reflective judgment is the outcome of a developmental progression. Kitchener (1983) suggested that this three-level model of cognitive processing was necessary to explain the complex monitoring involved when older adolescents and adults are faced with ill-structured problems. Ill-structured problems are those that cannot be solved by mechanical application. They require making judgments based on the strength of the evidence available (King & Kitchener, 2002).

The reflective judgment model identifies a framework in which adolescents and adults understand and attempt to solve ill-structured problems. The model contains seven sets of assumptions about knowledge and how a person justifies beliefs or decisions. The seven stages of the model are arranged in three levels: pre-reflective, which contains stages one, two, and three; quasi-reflective, which contains stages four and five; and reflective, which contains stages six and seven.

Pre-reflective

In the pre-reflective stages, individuals do not acknowledge or perceive that problems exist for which there may be no correct answers (Hofer & Pintrich, 1997; King & Kitchener, 1994).

Stage one. Stage one is depicted by a concrete, single category belief system of "what I have seen is true. . . . This represents a 'copy' view of knowledge; the belief that there is an absolute correspondence between what is seen or perceived and what is" (King & Kitchener, 1994, pp. 47-48). Knowledge is viewed as absolute and the existence of alternatives is denied. Problems are not acknowledged because such acknowledgment would give way to the ability to consider and relate two views of the same issue. In this stage, beliefs are not constructed they are simply held and not open to criticism or doubt. "Knowledge and belief are not distinguished; they are simply assumed to exist" (King & Kitchener, 1994, p. 48). There is no justification of beliefs in stage one. No alternatives are perceived between what is believed to be true and what is true. Any discrepancies are denied. "What the individual believes to be true is not differentiated from what authorities say is true" (King & Kitchener, 1994, p. 49). Because of the failure to differentiate distinct categories, thinking in stage one appears to be naïve and egocentric. Stage one may be compared to Perry's (1999) stage one dualism and Belenky et al.'s (1986) perspective of silence and received knowledge.

Stage two. Stage two posits a true reality that is known with certainty but is not known by everyone. Certain knowledge is viewed as the domain of authorities who know the truth and those who disagree with these authorities are wrong (King & Kitchener, 1994). "Knowledge is

assumed to be absolutely certain or certain but not immediately available" (King & Kitchener, 1994, p. 53). In stage two, the existence of alternative views is now acknowledged, but belief in absolute knowledge is still held by the individual. "The admission that truth may not be directly and immediately known by oneself allows for the possibility that someone else may have the truth" (King & Kitchener, 1994, p. 51). The belief that not everyone may know the truth provides a separation of beliefs into right and wrong beliefs. This belief system, in which beliefs about a particular situation are right and other beliefs are wrong, represents an advancement over stage one.

According to King and Kitchener (1994), stage two beliefs are either unexamined and unjustified or justified by correspondence with beliefs of an authority figure. Because issues are assumed to have right answers, there is little or no conflict in making decisions about disputed issues.

> Individuals who express this point of view explain that there is a "right" way to believe, thus express little or no conflict in making decisions about controversial issues, and often try to align evidence with their beliefs by distorting the evidence. When they do perceive differences in views they assume that the differences can be resolved simply. (King & Kitchener, 1994, p. 54)

Stage two reflects a dualistic epistemology, as described by Perry (1999). Individuals who reason in the manner posited by stage two characteristics maintain the belief that knowledge is certain and possible to attain. They also assume that someone must have the knowledge and typically turn to authority figures as the source.

Stage three. "Knowing in this stage advances to include the acknowledgement that authorities may not currently have the truth in all areas; however, it is held that at some future point, the truth will be discernible" (Love & Gutherie, 1999, p. 45). In stage three, knowledge is

viewed as absolutely certain or temporarily uncertain. Knowledge that is viewed as absolutely

certain is obtained from authorities. The areas where knowledge is viewed as temporarily

uncertain allow for judgments based on personal opinion. With this view of knowledge, people

are able to believe what they want to believe in areas where authorities do not yet know the truth.

"In areas in which answers exist, beliefs are justified by reference to authorities' views. In areas

in which answers do not exist, beliefs are defended as personal opinion because the link between

evidence and beliefs is unclear" (King & Kitchener, 1994, p. 57). King and Kitchener (1981)

noted that confusion stems from having to make decisions without absolutely certain knowledge

and without understanding that belief and evidence are separate entities that must be coordinated

in justifying beliefs. Individuals in this realm wait for the right answer to emerge and until this

happens it is just as correct to believe one thing as another so it does not matter what you believe

(Kitchener & King 1981).

Quasi-reflective

King's and Kitchener's (1994) second level of the Reflective Judgment Model is quasi-

reflective. Quasi-reflective thinking is marked by a growing realization that one cannot know

with certainty (Hofer & Pintrich, 1997). Love and Gutherie (1999) noted that the move from pre-

reflective to quasi-reflective takes place when individuals can no longer deny the discrepant data

they encounter. The framework for sense making becomes challenged for individuals in the pre-

reflective stages when they encounter diversity of opinion, different points of view, or

differences in culture. This incongruity may force them to seek answers elsewhere and thus

move into quasi-reflective thinking. "Individuals using the assumptions associated with these

stages recognize that some problems are ill-structured and that knowledge claims about them

contain an element of uncertainty. As a result, they understand that some issues are truly

problematic" (King & Kitchener, 1994, p. 58). The quasi-reflective level contains stages four and

five. Quasi-reflective thinking crosses several different positions of other models. Quasi-

reflective thinking encompasses the positions of multiplicity and relativism from Perry (1999)

and subjective knowing from Belenky et al. (1986).

Stage four. Stage four takes place with the advancement over the stage three belief that

uncertainty is temporary to the belief that one cannot know with certainty. Kitchener and King

(1981) described stage four as having an objective reality that can never be known without

uncertainty. Neither authorities nor amount of evidence can be relied upon to lead to absolute

knowledge. This, too, is an advancement over stage three where beliefs simply exist or are based

on accumulation of evidence that leads to absolute knowledge (Kitchener & King, 1981).

Individuals in stage four begin to recognize the need to relate evidence to belief and start to

separate beliefs and evidence for those beliefs; however, the relation is idiosyncratic. "People

using stage four assumptions do not reason that evidence entails a conclusion but use personal

beliefs to choose the evidence used to support preconceived beliefs" (King & Kitchener, 1994, p.

59). Because the evaluation of evidence is idiosyncratic, individuals often dismiss authorities'

views as biased, assuming that experts' opinions are no different from their own. "Because

individuals using stage four assumptions see knowing and justification as idiosyncratic, they do

not acknowledge qualitative differences between the opinions of experts and their own opinions

or between experts' opinions" (King & Kitchener, 1994, p. 61). Stage four of the reflective

judgment model aligns with Perry's (1999) position of multiplicity where individuals hold the

view that each person is entitled to his or her own opinion.

Stage five. Stage five is contextual and relative. Stage five is characterized by the "belief that while people may not know directly or with certainty, they may know within a context based on subjective interpretations of evidence, a belief they sometimes call relativism" (King & Kitchener, 1994, p. 62). The major advancement of stage five over stage four is the ability of the idiosyncratic justifications of stage four to view justification as the process of making legitimate interpretations within a particular perspective (King, Kitchener, Davison, Parker, & Wood, 1983). The perspectives of the person making the interpretation determine what is known and beliefs are understood as strictly relative to a particular context or domain. Knowledge and reality exist to the knower. "Reality exists only subjectively and what is known of reality reflects a strictly personal knowledge" (Kitchener & King, 1981, p. 97).

Absolute knowledge is abandoned in stage five and replaced with subjective knowledge. Subjective knowledge assumes there are as many notions of reality as there are people perceiving it. "Since knowledge is subjective, the individual seeks understanding by examining different conceptual frameworks or perspectives and by cautiously testing each perspective against empirical reality and the judgments of others" (Kitchener & King, 1981, p. 98). The act of comparing perspectives against each other and against one's personal experience allows new categories to begin to emerge for stages six and seven.

Reflective

King and Kitchener (1994) noted that the label reflective was used to describe reasoning characteristics of stages six and seven. Reflective thinking is prompted when the individual needs to be able to compare and contrast evidence and to make judgments that remain valid in various contexts. According to King and Kitchener (1994), the move from the quasi-reflective

level to the reflective level takes place when quasi-reflective thinkers are forced to seek new ways to justify their knowing and resolve contradictions in their own thinking. When individuals begin to be able to relate evidence and arguments to knowing, they also begin to accept knowledge as contextual (Love & Gutherie, 1999). In stages six and seven, knowledge is actively constructed and must be understood contextually. "People who reason with the assumptions of these stages argue that knowledge is not a 'given' but must be actively constructed and that claims of knowledge must be understood in relation to the context in which they were generated" (King & Kitchener, 1994, p. 66).

Stage six. Hofer and Pintrich (1997) noted in stage six that the action of knowing shifts. The knower moves from spectator to active constructor of meaning. Stage five involved the skill of balancing one view against another, which helped the individual understand issues more fully. Moving to stage six, the spectator view of the knower is no longer sufficient. The knower realizes that ill-structured problems require solutions that must be constructed and experts may even engage in similar processes. "The major development of stage six is the recognition that problems that are complexly understood require some kind of thinking action before a resolution can be constructed" (King & Kitchener, 1994, p. 67). Knowledge is still uncertain but it is now possible to draw conclusions by coordinating knowing and justification. Love and Gutherie (1999) noted that "individuals who reason using stage six assumptions report that, to come to a stance on an issue, they look at different perspectives, identify the common elements, and form a new perspective by integrating those elements" (p. 47).

Stage seven. Individuals in stage seven take on the role of inquirers, they are agents involved in constructing knowledge. These individuals view the process as ongoing, noting that new constructions and understandings depend on time, experience, and new data (King & Kitchener, 1994). Hofer and Pintrich (1997) noted that "through this process, individuals are able to determine that some judgments are more reasonable or valid than others, but with an awareness that all conclusions may be reevaluated" (p. 101). According to King and Kitchener, reevaluation occurs when relevant new evidence, perspectives, or tools of inquiry become available.

Stage seven thinking is an improvement over stage six thinking in its display of intelligent, reflective choice. Stage seven allows for a generalization of assumptions and clarity of judgment. King and Kitchener (1994) noted that judgment in stage seven "demonstrates individuality constrained by reason and a willingness to critique one's own reasoning" (p. 71). Stage seven views knowledge as the outcome of a process of reasonable inquiry; where solutions to ill-structured problems are constructed. Beliefs are justified by a variety of considerations such as the weight of the evidence and value of interpretations. King and Kitchener (1994, p. 73) quoted Baron (1988, p. 286) for recognizing that the highest stages of reflective judgment encourage "actively open-minded thinking [where] beliefs can always be improved; this encourages openness to alternatives and to counterevidence." Love and Gutherie (1999) reminded us that individuals are not thought to be in a particular stage at a particular time but that their thinking may be described as a developmental range made up of several stages within which they may operate. King and Kitchener (1994) suggested that the "development of reflective judgment is the outcome of an interaction between the individuals' conceptual skills"

(p. 18) and that "engaging in reflective thinking that culminates in a reflective judgment helps people become better problem solvers" (p. 18).

Each model of epistemological development discussed in this chapter has similarities across stages and positions. Perry's (1999) position of dualism, Belenky et al.'s (1986) perspectives of silence and received knowledge, and King's and Kitchener's (1994) pre-reflective thinking depend on authority figures to provide knowledge. Knowledge is viewed as right-wrong, simple, and absolute. In the position, perspective, and stage of multiplicity (Perry, 1999), subjective knowledge (Belenky et al., 1986), and quasi-reflective thinking (King & Kitchener, 1994), uncertainty and the view that each person is entitled to his or her own opinion emerges. Perry's position of relativism; Belenky et al.'s perspective of procedural knowledge including both connected knowing and separate knowing; and the upper stage of King's and Kitchener's quasi-reflective thinking, thinking becomes contextual. Knowing is personal and emphasizes understanding over judgment. Perry's commitment to relativism, Belenky et al.'s constructed knowledge, and King's and Kitchener's reflective thinking involve the individual becoming an active part of the process of knowing. Knowledge is constructed and understood contextually. Schommer's (1989) model does not follow a general stage sequence; however, the first three dimensions of structure, certainty, and source of knowledge are similar to Perry's work. The dimensions of control and speed to knowledge acquisition were based on Dweck and Leggett's (1988) work on beliefs about the nature of intelligence (Hofer & Pintrich, 1997).

All of the epistemological models presented in this chapter include content related to the nature of knowledge and the process of knowing. Most of these models have concluded that there is some developmental progression of beliefs in the movement to adulthood. In these models, the view of knowledge is transformed from the view as being right or wrong to a

position of relativism and then to a position in which individuals are constructors of meaning (Hofer & Pintrich, 1997).

Epistemological Studies and Education

Epistemology has been studied in many areas. Epistemological studies have shown that epistemological beliefs affect numerous aspects of learning. Studies have been conducted in regard to age, effects on comprehension, specific domains, study strategies, and epistemological development. The theories discussed in the first portion of this chapter organize epistemological beliefs into categories ranging from basic beliefs, which include simple knowledge and dualistic thinking, to more complex thinking, which involves integration of knowledge (Belenky et al., 1986; King & Kitchener, 1994; Perry, 1999, Schommer, 1989). These researchers also contended that individuals begin with basic epistemological beliefs and progress to higher levels of thinking through time. This progression leads to epistemological development.

Perry's (1968) study of college undergraduates concluded that students enter college believing that knowledge is simple, certain, and handed down by authority. However, by the time they become seniors many students believe knowledge is complex, tentative, and derived through reason. King and Kitchener (1994) also devised a seven-stage developmental path called the Reflective Judgment Model. Early in the developmental process, students believe that reality is concrete and knowledge is absolute. What is seen is true and there is little need for justification. Midway through the path of development, students believe that one person's opinion is as good as another and at the final stages students recognize that knowledge is tentative and reason and evidence can help discern the quality of knowledge. Where students are

in the developmental pathway also affects other educational aspects such as comprehension and study strategies.

Schommer (1990) claimed that epistemological beliefs affect comprehension in important ways. These beliefs affect student's processing of information and interpretation of knowledge. This processing of information and interpretation of knowledge also incorporates study strategies. The type of study strategies one chooses and the comprehension of material one obtains depends on the stage or position of epistemological beliefs of an individual (Schommer, 1990; Schommer, Crouse, & Rhodes, 1992). Several studies noted that individuals who hold more simplistic beliefs tend to oversimplify conclusions and select simple study strategies (Schommer, 1990, 1993a; Schommer et al., 1992), and individuals who were less likely to believe in quick learning, simple knowledge, and fixed ability performed better on mastery tests and earned higher GPAs (Schommer, 1993a; Schommer et al., 1992). "When one encounters complex information, belief in quick, all-or-none learning appears to affect the degree to which students integrate knowledge. This same belief affects students' accuracy in assessing their own comprehension" (Schommer, 1990, p. 503). Ryan's (1984) study of the criteria undergraduates used to decide whether or not they had comprehended textbook chapters revealed that students believing in simple knowledge reported using fact-oriented procedures such as recall of information to determine their comprehension, and students believing in complex knowledge reported using context- oriented procedures such as paraphrasing and application of material. "Epistemological beliefs appear to affect the critical interpretation of knowledge; that is, it was a question not of students being able to recall prominent information in the passages but rather of what they concluded from the information" (Schommer, 1990, p. 503). These studies and others show that individuals whose epistemological beliefs center around simple knowledge, quick

learning, dualism, and other basic forms of thinking tend to view knowledge as facts handed

down by authority and rely on recall of information as a claim to comprehension of material.

Schommer et al. (1992) also noted that belief in simple knowledge not only has an effect

on comprehension but also on study strategies. One's epistemological beliefs could affect the

ways in which a learner plans to study and one's selection of study strategies. Schommer et al.

claimed that learners who believe that knowledge is simple and characterized by isolated facts,

tend to engage in study that is consistent with this belief. Schommer et al. argued,

> If learners believe that knowledge is simple, that is, that knowledge is best characterized
> as isolated facts, then learners would engage in study that is consistent with this belief.
> They would plan to memorize the facts and avoid integrating the facts. Furthermore, this
> same belief would influence the ways in which learners assess their comprehension. In
> this example, learners would be convinced that they "knew" the material if they could
> recite a list of facts. Once the recitation of facts was accurate, studying would cease. (p.
> 435)

In agreement with Schommer et al. (1992), Dweck and Leggett (1988) found that students who

believed in fixed intelligence displayed helpless behavior when faced with a difficult task.

However, students who believed that learning could be improved persisted in effort and varied

their study strategies when faced with a difficult task. Ryan (1984b) also noted that students who

believed in complex learning reported using context-oriented standards such as applying facts to

new situations as evidence of comprehension.

Studies have also been conducted in relation to epistemological beliefs and academic

domains. The question is whether or not epistemological beliefs are similar across domains or

are they domain specific? Most of the research conducted on epistemological beliefs has been

done under the assumption that the beliefs are domain independent or that epistemic beliefs are

generalized across domains. For example Muis, Bendixen, and Haerle (2006) noted students hold

the same beliefs about mathematics knowledge and knowledge in psychology. "The study of

epistemological beliefs is evident in that these beliefs have been found to affect comprehension of tests in the social and physical sciences (Schommer, 1990) as well as in the area of mathematics" (Schommer, 1992, p. 442). Schommer and Walker (1995) tested the assumption of domain independence and found support for the assumption that epistemological beliefs are predominantly similar across domains. In their study, epistemological beliefs about social sciences and mathematics predicted comprehension both within and between domains. However, Schommer and Walker (1995) suggested that students may have beliefs about knowledge in general that are adjusted when they reflect on a specific domain. For example, they may believe that knowledge is generally uncertain but, on the other hand, they may believe more stable facts exist in mathematics than social sciences. Some studies suggest that epistemological beliefs may vary depending on the domain under consideration. Alexander and Judy (1988) define domain specificity as the declarative procedural or conditional knowledge one possesses relative to a particular field of study.

Beliefs relative to knowledge in one domain, such as mathematics, could conceivably vary from beliefs relative to another domain such as history (Beuhl & Alexander, 2001). Beuhl and Alexander also noted that between subject comparisons conducted by Jehng, Johnson, and Anderson (1993), Paulson and Wells (1998), and Lonka and Lindblom-Ylanne (1996) indicated that students majoring in different academic areas vary by terms of their general epistemological beliefs. This suggested that different fields of study may promote diverse epistemological stances or may attract students with a particular view of knowledge.

CHAPTER III

METHODOLOGY

The purpose of this study was to describe what principals' beliefs about knowledge and learning are and to examine how they enact their beliefs in their schools. This chapter describes the methods that were used, the study participants, study design, study instruments, sources of data, data analyses, interview procedures, and interview questions.

Research Questions

The study revolved around two research questions involving administrator beliefs and administrator practices:

1. What are the epistemological beliefs of elementary and secondary school principals and assistant principals?

2. How do administrators perceive that they enact their beliefs in their schools?

Study Design

The study used multiple methods. The quantitative portion of the study used a questionnaire based on a Likert-type scale to assess the epistemological beliefs of administrators (Research Question 1). The qualitative portion of the study was comprised of personal interviews and the information gathered was used to understand how administrators with certain beliefs enact those beliefs in their schools (Research Question 2).

Participants

Participants in the study were principals and assistant principals selected from elementary, middle, and high schools in five districts in a Southern state. Permission to conduct the study in each of the selected districts was obtained from the district's superintendent. The districts in this study were selected based on proximity to the researcher (a convenience sample) because of the need to travel in order to conduct interviews. The projected number of participants for the questionnaire was 100. The enrollment of each school dictated the number of administrators employed to serve that school; therefore, an individual school might have one principal and several assistant principals. The questionnaire was sent to each administrator (principal and assistant principal) in each school in the five selected systems. The number of participants for the interviews was based on those who agreed to participate in that portion of the study. The questionnaire provided a section for the administrator to elect to participate in the interview portion of the study. The interviews were conducted at the schools where the administrators were employed. The maximum number of interviews was 16.

The five school systems were given the pseudonyms of Redbud School District, Cherry Oak School District, Blue Creek School District, Green Ridge School District, and Harvest Lane School District. Most of the schools in each district had a similar composition of grades taught. Elementary schools in the Redbud School District, the Cherry Oak school district, and the Harvest Lane School District serve students in Grades K-5. Middle schools in these districts serve students in Grades 6-8, and high schools serve students in Grades 9-12. Elementary schools in the Green Ridge and Blue Creek school districts serve students in Grades K-4 and K-6, respectively. The Green Ridge middle schools serve students in Grades 5-8, and high schools serve students in Grades 9-12. The Blue Creek school district has one middle school with

students in Grades 6-8, two high schools with Grades 9-12, and one high school with Grades 7-12.

The Redbud School District is a large system comprised of schools in suburban and rural areas. The system consists of 19 elementary schools. Each has one principal and 8 of the 19 schools have an assistant principal. There are 27 elementary administrators in the Redbud School District. There are 8 middle schools in the system and 7 of those schools have one assistant principal each for a total of 15 middle school administrators. The system has 6 high schools each with 1 principal and a total of 11 assistant principals for a total of 17 high school administrators. As previously noted, the number of assistant principals employed at a particular school depends on the enrollment of the school, resulting in some schools having more assistant administrators than others. There are a total of 59 school administrators in the Redbud School District.

All of the schools in the Cherry Oak School District are located in urban areas. The Cherry Oak School District has 14 elementary schools with three of those having assistant principals. There are 17 elementary administrators. There are 6 middle schools with 6 principals and 5 assistant principals and 3 high schools with 3 principals and 6 assistant principals. There are a total of 37 administrators in the Cherry Oak School District.

The Blue Creek School District serves students in rural areas. The system contains 3 elementary schools with 3 principals and 2 assistant principals. The system only has 1 middle school housing Grades 6-8 with 1 principal and 1 assistant principal. There are 4 high schools in the system. Three of these are comprised of Grades 7-12 and one is comprised of Grades 9-12. In these 4 high schools there are a total of 6 administrators. There are a total of 13 administrators in the Blue Creek School District.

The Green Ridge School District serves students in suburban and rural areas. The system has 4 elementary schools each with 1 principal and only 1 school having an assistant principal. There are 5 elementary school administrators in the system. There are 2 middle schools in the system, each having 1 principal and 1 assistant principal for a total of 4 middle school administrators. The system also has 2 high schools, each with 1 principal and 1 assistant principal for a total of 4 high school administrators. There are a total of 13 administrators in the Green Ridge School District.

The Harvest Lane School District is a small suburban school district containing only 4 schools. There are 2 elementary schools each with 1 principal. There is 1 middle school with 1 principal and 1 assistant principal. The high school has 1 principal and 2 assistant principals. There are a total of 7 administrators in the Harvest Lane School District.

Study Instruments

The Epistemological Beliefs Questionnaire developed by Schommer (1990), and slightly modified by Arredondo and Ruscinski (1996), was used to assess the administrators' epistemological beliefs. The questionnaire is based on a 5-point Likert-type scale in the following order: 1 = *strongly disagree* to 5 = *strongly agree*. The questionnaire contained 63 questions (Appendix A). Duell and Schommer-Aikins (2001) described the assessment as focusing on the following four dimensions: the structure of knowledge also referred to as simple knowledge; the stability of knowledge or certain knowledge; the speed of learning or quick learning; and the ability to learn, also known as fixed ability. The structure of knowledge ranges from isolated bits and pieces to integrated concepts. A sample from the questionnaire is "Most words have one clear meaning" (Schommer, 1990). The stability of knowledge ranges from

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unchanging to continually changing. A sample from the questionnaire is "I don't like movies that don't have an ending" (Schommer, 1990). The speed of learning ranges from quick, all or none, to gradual. A sample from the questionnaire is "Successful students learn things quickly" (Schommer, 1990). The ability to learn ranges from fixed at birth to improving with experience and over time. A sample from the questionnaire is "Self-help books are not much help" (Schommer, 1990). The four hypothesized beliefs were generated using exploratory factor analysis (Schommer, 1990) and mean scores from the subsets of items. The factor structure has been replicated with college students (Schommer et al., 1992), adults (Schommer, 1998), by Arredondo and Rucinski (1996), and by Garcia (2004). Data from the present study were analyzed by finding a factor score for each factor as well as finding mean scores for high and low scoring participants.

Interviews were conducted to discover the ways in which administrators report they enact their beliefs in their schools. Interviewees were selected based on those who volunteered to be interviewed. Each interview began with a discussion of epistemology and simple and complex learning. The interviewees were then asked a series of interview questions (Appendix A) for further discussion.

Data Collection

The questionnaire was mailed to each administrator in each of the selected school districts. Administrators were given 3 weeks to complete and return the questionnaire. If the questionnaire was not returned by the specified date, a second questionnaire was sent to remind them of the original mailing and request that they complete the second questionnaire and return it by a specified date, which was another 3-week time period. Administrators who did not return

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the questionnaire after the second 3-week period were eliminated from the list of participants and subtracted from the total number of administrators in the study. A total of 126 questionnaires were mailed individually to each administrator in the five selected districts. Seventy-eight individuals returned the questionnaire for a 61.9% return rate.

Participants for the interview portion of the study were selected according to those who elected to participate by indication on their questionnaire. Each interview was recorded and transcribed in order to find themes and commonalities of beliefs and activities enacted in the school environment. Sixteen administrators were interviewed for the study. Interviews were conducted in each administrator's office. Most administrators were relaxed and the atmosphere was casual. These interviews were the ones that occurred after school around 3:30. These administrators were waiting on me to arrive, understanding that I was traveling, and were simply working in their offices on paperwork. One administrator requested to meet at 7:40 a.m. because her morning was free until 9:30. She did not have any pressing tasks to tend to on this particular day and her interview was quite relaxed and she provided ample information. About four administrators were rushed at the beginning of the interview due to taking care of incidents that occurred at the end of the school day or trying to complete the interview before the school day began. The late starts were not a problem for me; however, the administrators seemed to be rushed and kept apologizing for being late. They were rushing to get started and seemed to keep that pace once the interview began. One secondary administrator was only available before school at 7:00 a.m.; however, she needed to be at morning bus duty at 7:35. Afternoon interviews were late starting due to administrators dealing with students at the end of the school day. One administrator had to complete paperwork and contact the parents of students who had gotten into a fight on the way to the bus and another had to help tennis coaches solve an issue with a

rescheduled tournament and finding substitutes at the last minute. While I waited he talked to the coaches and during the beginning of the interview we were interrupted when he had to take two phone calls pertaining to the issue. Although these interviews were not perfect, each interview was completed in its entirety.

Although each interview began with a review of epistemological beliefs and the questionnaire that proceeded, some interviewees were not as prepared to discuss knowledge and learning as others. A little discussion had to be provided in order for some administrators to begin to freely discuss the topic of knowledge and learning. Prompts for discussion typically occurred when administrators were asked to give their definition of knowledge. In this area I tried to prompt discussion by restating the question with, "What is knowledge?" or "What do you think knowledge is?" Another area that required prompting concerned the discussion of types of knowledge. I had to provide an example in order to get the conversation started. Once these administrators were on track they were able to continue the discussion openly.

<center>Data Analysis</center>

The scoring of the questionnaires sorted the administrators into two groups: those who were believers in simple knowledge and those who were believers in complex knowledge. The data also enabled limited comparisons across educational levels. Participants for the interviews were selected based on those who agreed to participate.

Questionnaires were scored using the SPSS statistical analysis program. Scores were then calculated by finding factor scores for each participant on each factor. Mean scores were then calculated for the top 15 scores and the bottom 15 scores in order to determine whether there were significant differences in the group's beliefs.

The interview was used to uncover what administrators do in their schools to enact their epistemological beliefs. After transcription, themes among administrator's interviews concerning beliefs about knowledge and practices integrated into the school were retrieved.

Chapter Summary

The multiple methods of this study were used to describe the reported beliefs of principals and assistant principals of selected elementary and secondary schools and how they enact those beliefs in their schools. The Schommer Epistemological Beliefs Questionnaire provided information about beliefs concerning simple and complex knowledge. The SPSS statistical analysis was used to determine factor scores and mean scores for participants. The interviews were used to describe the reported beliefs and actions of the administrators who chose to participate at each educational level. Chapter IV will provide detailed explanations of the study.

CHAPTER IV

STUDY RESULTS

The purpose of this study was to describe what principal's beliefs about knowledge and learning are and to examine how they enact their beliefs in their schools. The study was guided by two research questions: (1) What are the epistemological beliefs of elementary and secondary school administrators? (2) How do administrators perceive they enact their beliefs in their schools? This chapter describes the demographic data and presents and discusses the results of the study.

The study consisted of multiple methods. The quantitative portion of the study consisted of a 63-question survey based on a Likert-type scale. The survey was the Epistemological Beliefs Questionnaire developed by Marlene Schommer (1990) and modified by Arredondo and Rucinski (1996) and was used to determine the epistemological beliefs of each administrator. Questionnaires were sent to each administrator in the five chosen districts. Out of 126 administrators, 78 returned surveys for a total of 61.9%. This portion of the study answered Research Question 1.

The qualitative portion of the study consisted of 16 individual interviews with administrators who chose to participate in this part of the study. The interviews were used to discover the ways in which administrators enact their beliefs in their schools. The interviews were used to answer Research Question 2.

Demographic and Descriptive Data

Participants in the study were principals and assistant principals from elementary, middle, and high schools in five school districts in a Southern state. The initial population of the study consisted of 126 administrators. The actual numbers of administrators responding to the Epistemological Beliefs Questionnaire was 78 for a total of 61.9% return rate. Gender specific data indicated that there were equal numbers of male and female respondents.

Table 1

Gender of Participants

Gender	*F*	%	Valid %	Cumulative %
Male	39	50.0	50.0	50.0
Female	39	50.0	50.0	100.0
Total	78	100.0	100.0	

In order to be employed as an administrator in the chosen state, one must obtain certification beyond the bachelor's degree level. The level of education was reported as ranging from master's degree to doctoral degree. Of the 78 participants, 25.6% held a master's degree, 23.1% held a master's degree plus 30 credit hours, 29.8% held a specialist degree, and 21.8% held a doctoral degree.

Table 2

Education Level of Participants

Education level	F	%	Valid %	Cumulative %
Master's degree	20	25.6	25.6	25.6
Master's degree plus 30 credit hrs.	18	23.1	23.1	48.7
Specialist	23	29.5	29.5	78.2
Doctorate	17	21.8	21.8	100.0
Total	78	100.0	100.0	

Work experience data indicated that of the 78 participants, 9% had 6-10 years of experience, 23.1% had 11-15 years of experience, 24.4% had 16-20 years of experience, 12.8% had 21-25 years of experience, and 30.8% had more than 25 years of experience.

Table 3

Participants' Years of Work Experience

Years of work experience	F	%	Valid %	Cumulative %
6-10 years	7	9.0	9.0	9.0
11-15 years	18	23.1	23.1	32.1
16-20 years	19	24.4	24.4	56.4
21-25 years	10	12.8	12.8	69.2
>25 years	24	30.8	30.8	100.0
Total	78	100.0	100.0	

Of the 78 participants, the primary work experience for 48.7% was at the elementary level. The primary work experience for the remaining 51.3% was at the secondary level.

Table 4

Participants' Primary Work Experience

Primary work experience	*F*	%	Valid %	Cumulative %
Elementary education	38	48.7	48.7	48.7
Secondary education	40	51.3	51.3	100.0
Total	78	100.0	100.0	

The age of the respondents ranged from 28 years to more than 58 years old, 9% were 28-35 years old, 34.6% were 36-43 years old, 28.9% were 44-51 years old, 23.1% were 52-58 years old, and 5.1% were greater than 58 years old.

Table 5

Participants' Age

Age of participants	*F*	%	Valid %	Cumulative %
28-35 years old	7	9.0	9.0	9.0
36-43 years old	27	34.6	34.6	43.6
44-51 years old	22	28.2	28.2	71.8
52-58 years old	18	23.1	23.1	94.9
>58	4	5.1	5.1	100.0
Total	78	100.0	100.0	

Questionnaire Scoring

The Epistemological Beliefs Questionnaire was used in the study to answer research Question 1, "What are the epistemological beliefs of elementary and secondary school administrators?" The questionnaire was based on a 5-point Likert-type scale in the following order: 1 = *strongly disagree* to 5 = *strongly agree* and contained 63 questions. Duell and Schommer-Aikins (2001) described the questionnaire as focusing on four factors: the structure of knowledge also referred to as simple knowledge; the stability of knowledge or certain

knowledge; the speed of learning or quick learning; and the ability to learn, also known as fixed ability. Most questions in the survey loaded on one of the four factors. Scores for the questionnaires were determined by obtaining a score for each factor for each participant. Factor scores were then sorted from high to low. The scores in each factor determined where the participant fell in the range of beliefs of each factor. Mean scores were determined using the 15 highest scoring participants and the 15 lowest scoring participants for each factor. The mean was calculated using a *t* test in order to determine whether there was a significant difference between the two groups.

Research Questions

The first research question posed in this study was, "What are the epistemological beliefs of administrators?" This question was answered by discussing the results of each factor.

Factor 1 Results

As mentioned previously, each question in the survey was loaded on one of the four factors. Factor 1 is the ability to learn, or fixed ability. Questions from the survey loaded on this factor were 8, 47, 55, 57, 4, 15, 25, 28, and 62. The mean for the low group was 16.93 and the mean for the high group was 25.93. The *t* test indicated a significant difference between the groups with $p = <.05$ for each group. The ability to learn factor ranges from the belief that knowledge is fixed at birth to knowledge improves with experience and over time. Participants who scored low on factor 1 held the belief that the ability to learn is innate and learning cannot be improved with instruction. Those who scored high on factor 1 believed that learning can be improved with experience and overtime.

Table 6

Group Statistics for Factor 1

Factor 1	N	M	SD	Std. error mean
Low	15	16.93	1.280	.330
High	15	25.93	1.981	.511

Table 7

Independent Samples t Test for Factor 1

	t test for equality of means			
	t	df	Sig. (2-tailed)	Mean difference
Equal variances assumed	-14.780	28	.000	-9.000
Equal variances not assumed	-14.780	23.954	.000	-9.000

Factor 2 is simple knowledge, also known as the structure of knowledge. Questions from the survey that loaded on factor 2 were 11, 16, 17, 19, 22, 23, 33, 56, 58, and 59. The mean for the low group in factor 2 was 26.2000 and the mean for the high group was 34.9333. The *t* test indicated a significant difference between the groups with $p = <.05$ for each group. Simple knowledge refers to knowledge being unambiguous. Simple knowledge ranges from knowledge as isolated bits to integrated concepts. Participants who scored low on Factor 2 believed that knowledge is simple and based on isolated facts. Participants who scored high on Factor 2 tended to believe knowledge is more complex and comprised of highly interrelated facts.

Table 8

Group Statistics for Factor 2

Factor 2	N	M	Std. error mean
Low	15	26.2000	.44934
High	15	34.9333	.34457

Table 9

Independent Samples t Test for Factor 2

| | *t test for equality of means* | | | |
	t	*df*	Sig. (2-tailed)	Mean difference
Equal variances assumed	-15.423	28	.000	-8.73333
Equal variances not assumed	-15.423	26.235	.000	-8.73333

Factor 3 Results

Factor 3 is the speed of learning or quick learning. Questions from the survey that loaded on this factor were 1, 10, 30, 39, 50, 60, 20, 24, and, 52. The mean score for the low group was 20.27 and the mean for the high group was 27.67. The *t* test indicated a significant difference between the groups with $p = <.05$ for each group. The speed of learning factor ranges from learning being a quick process to learning being a gradual process. Participants who scored low on Factor 3 held the belief that learning is quick or not at all. Participants who scored high on Factor 3 believed that learning is gradual and can be improved over time.

Table 10

Group Statistics for Factor 3

Factor 3	*N*	*M*	*SD*	Std. error mean
Low	15	20.27	2.154	.556
High	15	27.67	1.543	.398

Table 11

Independent Samples t Test for Factor 3

| | *t test for equality of means* | | | |
	t	*df*	Sig. (2-tailed)	Mean difference
Equal variances assumed	-10.818	28	.000	-7.400
Equal variances not assumed	-10.818	25.376	.000	-7.400

Factor 4 Results

Factor 4 is knowledge is certain, also known as the stability of knowledge. Questions from the survey loaded on this factor were 2, 12, 21, 34, 48, and 61. The mean for the low group in Factor 4 was 12.73 and the mean for the high group was 21.27. The t test indicated a significant difference between the groups with $p = <.05$ for each group. The factor of knowledge is certain ranges from knowledge being absolute and unchanging to knowledge being tentative. Participants who scored low on factor 4 believed that knowledge is absolute facts and that it is unchanging. Participants who scored high on factor 4 believed knowledge is tentative.

Table 12

Group Statistics for Factor 4

Factor 4	*N*	*M*	*SD*	Std. error mean
Low	15	12.73	.961	.248
High	15	21.27	1.870	.483

Table 13

Independent Samples t Test for Factor 4

	t test for equality of means			
	t	*df*	Sig. (2-tailed)	Mean difference
Equal variances assumed	-15.722	28	.000	-8.533
Equal variances not assumed	-15.722	20.917	.000	-8.533

Summary of Statistical Study

By looking at the scores for each factor in the study, one can determine the significant differences of beliefs between the groups. Those who scored low on the survey in each factor tended to believe knowledge is simple, quick, absolute, and fixed at birth. Participants scoring

high on the survey tended to hold the belief that knowledge is evolving, complex, tentative, and gradual. This portion of the study shows us what individuals believe about knowledge.

Research Question 2

Research Question 2 was answered using the interview portion of the study. The question asked: "How do administrators perceive they enact their beliefs in their schools?" The transcriptions uncovered four themes in the study, each with major and/or minor categories. The themes of the study were; beliefs about knowledge, administrator practices promoted in schools, beneficial but unattainable activities, and hindrances to advancement. Each theme and its categories will be discussed in order. Interviewee comments will be provided for each.

The first theme discussed is beliefs of knowledge. This theme contains four major categories each with three to four minor categories (subcategories). Question 1in the interview asked the participant to describe his or her definition of knowledge which is the first major category in this theme. Subcategories included knowledge is application, knowledge is experience, and knowledge is background.

Table 14

Subcategories Concerning the Definition of Knowledge from Interviews

Subcategory	Interviewee comments	Interviewee #
Knowledge is application	"It's not just what you are cognizant of or aware of or memorize or things you've heard and learned but more of how you can take those things and apply them." "…being able to use that knowledge to solve problems or develop theories."	Interviewee #16, #14
Knowledge is experience	"Peoples' experiences, whether it's life experiences or academic study, knowledge is those things that you gain through life experience"	Interviewee #20
Knowledge is background	"A kid who comes from a home where education is valued and books are abundant and reading is encouraged generally has had opportunity for a lot of experiences. When that child comes to school they appear to be very bright compared to the child who has not had the same experiences, has not been read to and whose family does not value education. But, once given the opportunity, the other child may turn out to be just as bright."	Interviewee #15

Most interviewees described knowledge as information but not just information alone. They also

incorporated application of that information and how one's experiences help create knowledge.

Participants reported beliefs that knowledge is experiential and included day-to-day activities as

well as academic settings as experiences. Elementary administrators also noted the importance of

background and how it affects knowledge. They noted that kids come to school with certain background knowledge based on their family and experiences and that this particular factor can cause students to be inappropriately labeled as gifted or as having a learning disability.

Interview question 2 led the discussion of different types of knowledge, the second major category in this theme. Administrators provided various areas in which people gain knowledge. Three subcategories identified in this theme were; academic or book knowledge, social knowledge, and street knowledge.

Table 15

Subcategories Concerning Types of Knowledge

Subcategories	Interview comments	Interviewee
Academic or book knowledge	"Your academic knowledge is based on your exposure to education and how much you have had the opportunity to gain that knowledge." "Textbooks, classes you've taken in school or college."	Interviewee #20, #19
Social knowledge	"There is social knowledge like etiquette and how you respond in certain situations, rules based on the different classes of society." "One is social knowledge, for example how to react in your neighborhood versus at a restaurant or in a classroom."	Interviewee #20, #21
Street knowledge	"Street knowledge is survival. I once read a book that gave the example of knowing which dumpster to go to in order to get the best scrap food. That is a type of knowledge that is important for someone who has to live in that situation."	Interviewee #20

Most administrators hold the belief that the experiences and amount of exposure one has with each of these types of knowledge and how one applies the knowledge they have combines to define what one knows and the knowledge they have obtained. Some administrators provided specific examples of the different types of knowledge. For example, academic knowledge was described as books and research. Social knowledge was described as etiquette and how you respond in certain situations and various extracurricular activities. Street knowledge was described as how to get by and survive in society. One's background and surroundings are thought to play a role in one's experience and exposure to certain kinds of knowledge as well. No matter what kind of knowledge each administrator discussed they all seemed to believe that experience plays a big part in each type.

Given the various types of knowledge, interview question 5 asked administrators how they believed people learn different types of knowledge. This is the third major category in this theme. Subcategories identified were; exposure, experience and traditional learning styles.

Table 16

Subcategories Concerning How People Learn Different Types of Knowledge

Subcategories	Interview comments	Interviewee
Exposure	"Exposure to different avenues where they might get that knowledge, such as their neighborhood, the cafeteria, school, and so forth." "Being exposed to things that are new helps to gain knowledge."	Interviewee #19, #12
Experience	"To me the best knowledge is gained through experience." "Everyday living, different experiences people go through on a daily basis helps to learn different types of knowledge." "I think different types of knowledge come from different experiences, every student doesn't learn the same way."	Interviewee #16, #18, #17
Traditional learning styles	"I think people learn differently based on the type of learner they are. I think we have visual learners, auditory learners, and kinesthetic learners, so based on the way they learn, they learn different things." "We do a pretty good job of presenting instruction to several different learning styles."	Interviewee #12, #14

Once again, exposure and experience were noted to play a part in the knowledge process. It is

believed that one's experience and exposure to various life activities and situations add to one's

knowledge. Other administrators commented on the traditional learning styles: visual, auditory,

and kinesthetic and their role in learning.

Interview question 6 provided further discussion in the major category of how different types of knowledge are used in different types of learning situations. Subcategories identified were; direct experiences, application of knowledge, prior knowledge, and knowledge base.

Administrators seemed to think the use of knowledge in different situations is, in fact, situational and experiential. Application was also mentioned as a way people use knowledge in different situations and the way one applies knowledge is vastly different based on the situation one encounters. Each person has a vast array of knowledge but how he or she applies it is also important. Several secondary administrators commented on how prior knowledge and one's knowledge base can affect how one uses one's knowledge in various situations and could perhaps help with future situations one encounters.

In addition, some elementary administrators discussed how teachers can tap into a child's prior knowledge to help them make connections in their learning and build upon it. They compared education to a building block; you start out with the foundation and continue to build on it. The knowledge base that an individual has formed also contributes to how one might handle knowledge in different situations.

Table 17

Subcategories Concerning the Use of Different Types of Knowledge in Various Situations

Subcategories	Interview comments	Interviewee
Direct experiences	"I think a learning situation is anything we are encountering during the day that presents itself as a learning situation. You learn a lot from what you are involved in and direct experiences and those that affect you most. We don't give credit to some things that don't affect us."	Interviewee #15
Application of knowledge	"The application of knowledge is vastly different based on the situation." "A person can have a vast array of knowledge but how he or she applies it is key to whether their use of knowledge is beneficial and useful to society and themselves."	Interviewee #20, #11
Prior knowledge	"It comes from your background; you use your prior knowledge to deal with different situations. What you have experienced previously will help you to be able to deal with new experiences or you may handle a similar situation differently if it comes up again based on what you learned previously."	Interviewee #18
Knowledge base	"To me you have to create a knowledge base first then use that knowledge to solve problems, handle various issues, and so forth." "Children come to us with a knowledge base they have already and then we add to that with experiences we create for them here at school."	Interviewee #14, #12

As we see from the views of these administrators, most defined knowledge as more than textbook learning. Knowledge, according to these administrators, is experience and exposure to various aspects of life. Administrators felt that the experiences and exposure one has in life contributes to the knowledge base one develops and builds upon.

After discovering what administrators believe knowledge is, they were asked how they believed knowledge is acquired. This discussion involved interview question 10 which inquired about the participants' belief of knowledge being innate or changeable. This discussion also involved factors 1 and 4 from the questionnaire. Factor 1 is the ability to learn and ranges from knowledge being fixed at birth to knowledge improving over time. Those scoring low on factor 1 in the survey portion of the study reported beliefs that knowledge was innate and those who scored high reported beliefs that knowledge was changeable. Factor 4 is the stability of knowledge. This factor ranges from the belief that knowledge is certain (unchanging) to knowledge is tentative (can change over time). Factor 4 is also included here for the concept of knowledge being tentative. Those reporting that knowledge is changeable scored high on the survey. This discussion developed the major category concerning how knowledge is acquired and three subcategories which included; knowledge is genetic, knowledge is acquired through experience, and knowledge is acquired through brain activity and exercise.

Table 18

Subcategories Concerning How Knowledge is Acquired

Subcategories	Interviewee Comments	Interviewee #
Knowledge is genetic	"I have book smarts, unlike my brother who is more mechanically intelligent. He can work on cars and lawn mowers but I have never been able to grasp that type of knowledge." "I do think a lot if it is innate, genetics plays a part. For example, I've had a kid who was really, really bright from two parents who were not so bright. So I think that was genetic, not necessarily having the same skills their parents had, they may be totally different."	Interviewee #20, #12
Knowledge is acquired through experiences	"Knowledge is changeable and can be improved due to the types of experiences you may encounter." "The main thing is to give the child different types of experiences so that if one type of learning style presentation doesn't help them to gain that knowledge, then perhaps another will."	Interviewee #18
Knowledge is acquired through brain activity and exercise	"Intelligence is innate in the sense of brain activity and that can be affected by exposure to environmental factors." "I do think it is somewhat changeable but that also depends on if they continue to exercise their brain."	Interviewee #11, #12

Through the interview information we see that some beliefs exist that knowledge is innate and

that one is born with a certain ability to learn. Those who held beliefs in a certain level of ability

also believed that knowledge could change due to experiences and brain activity.

The discussion of the structure of knowledge in factor 2 involved interview questions 2 and 10. Factor 2 is the structure of knowledge also known as simple knowledge and refers to knowledge being unambiguous. Simple knowledge ranges from knowledge as isolated bits to integrated concepts. Participants who scored low on factor 2 reported beliefs that knowledge is simple and based on isolated facts. Participants who scored high on factor 2 reported beliefs of knowledge being more complex and comprised of highly integrated concepts. Interview information provides us with evidence that some administrators believe in simple knowledge and others believe in complex knowledge. This discussion developed the major category of declarative and procedural knowledge. Subcategories identified were; knowledge as facts and knowledge is complex and involved.

This report shows us that some administrators held beliefs that knowledge is simple and others held the belief that knowledge is more complex. Knowledge requires the individual to be more involved in the process of knowing as well as creating the knowledge.

Interview questions 10 and 11 inquired about the participant's views of knowledge and beliefs of whether or not knowledge can be improved. Factor 3, the speed of learning, falls into this discussion. Factor 3 ranges from learning being quick or not at all to gradual and improving over time. Those who scored low on factor 3 believe that learning is quick or not at and those who scored high believe that learning is gradual and improves with time. Interview information allows us to see the differences in these beliefs. The major category developed here is the rate of learning and contains two subcategories; speed of learning based on specific factors and knowledge improves over time.

Table 19

Subcategories Concerning Procedural and Declarative Knowledge

Subcategories	Interviewee comments	Interviewee
Knowledge as facts	"From my standpoint, you have the facts, your knowledge about an area, you've got the ability to use facts to solve issues and problems and know where to go to find those facts." "Facts that we use every day to guide our thinking."	Interviewee #14, 13
Knowledge is complex and involved	"You can have knowledge on different levels, some things are very simple concepts and things are very easy to grasp; some things are more abstract, things you kind of have to work through." "A lot of people think knowledge is just regurgitating facts, I think it is deeper than that, I think it is knowing that you know certain things about a lot of things but if you don't have the specific details you know how to go about finding those things, so I guess it's more investigative than just recall." "Some think knowledge is all the books and research but it is also how we apply our knowledge to make life better for everyone."	Interviewee #16, #12, #11

Table 20

Subcategories Concerning the Rate of Learning

Subcategories	Interviewee comments	Interviewee #
Speed of learning based on specific factors	"Some people have the ability to make connections very, very quickly and grasp more complex, abstract type concepts, however, this can change because you might have some genetic predisposition to have a certain ability to learn but you may not have some of the experiences to build upon that knowledge." "I do think you are born with a certain ability to learn quickly or slowly, but I do think it is changeable in terms of use and continuing to exercise the brain."	Interviewee #16, #12
Knowledge improves over time	"Yes I think it can be improved. I think there is a certain level that some people are born with but one can also build on previous levels." "I think you gain intelligence, I think you are born with a certain amount, but I think you gain based on what you learn, your intelligence is going to improve and increase. I think I know more now than I did ten years ago."	Interviewee #13, 17

None of the administrators reported a strict belief in quick learning but rather the speed of

learning being based on innate abilities and affected by outside circumstances. Several of the

interviewees reported beliefs that one is born with a certain ability to learn but other factors can

affect that ability. Others reported a belief that knowledge is changeable and one can gain knowledge.

In response to Research Question 2, "How do administrators believe they enact their beliefs in their schools?" interview question 9 asked administrators what types of learning activities they promoted in their schools. It was interesting to see that all but one administrator responded in a like-minded manner as to what activities they promoted in their schools to promote and improve knowledge. The theme developed here involved administrator practices promoted in schools and contained one major category.

Table 21

Category Concerning Administrator Practices Promoted in Schools

Category	Interviewee comments	Interviewee
Differentiated instruction	"Schools can and we try to differentiate instruction to try to meet the needs of all learners. Our teachers try to tailor their instruction to meet the needs of all the learners in their class." "You have to identify what type of learner someone is and incorporate those learning styles into lesson plans. Our teachers try to incorporate five or six learning style activities into each subject area each week. We hope to engage the learner by identifying learning styles."	Interviewee # 16, #20

Differentiation stems from beliefs about differences among learners, how they learn, learning preferences and individual interests (Anderson, 2007). Administrators reported practices that would provide students with various learning experiences.

To conclude the interview, participants were asked what kinds of activities they would like to enact in their school but were unable to carry out (Interview question 12). This discussion developed a theme concerning beneficial activities that are need but are not attainable. Items in this theme are very real to the needs of students in school and their advancement in learning.

Most administrators noted that more and various types of technology were something they wished they could implement in their schools. Administrators also reported that they wished for more individual learning time for improving academic skills as well as skills for tasks such as organization. Other administrators wished for the ability to provide active engaged learning where students could be exposed to real world application and use what they are learning in the classroom.

Table 22

Categories Concerning Beneficial Activities Needed Are Not Attainable

Subcategories	Interviewee comments	Interviewee #
Technology	"More technology. Having student computers in every classroom, that way we could implement more technology on a daily basis and students could have access at any time of the day. Students seem to respond to technology more than anything." "More technology, I would like to see IPADs and things that the kids could get their hands on and use every day."	Interviewee #18, #17
Individual Learning Opportunities	"I would like to have a math intervention teacher to help those students who are struggling in that area." "I would love to have some remedial periods where a teacher could work with kids who are struggling or in danger of failing. They could have small quality time monitoring homework, helping them get organized, doing some of those things to help kids become successful because in a class of 30 it is extremely hard for a teacher in a one hour lesson to teach a lesson, touch base with those who are struggling and help them get organized and really make a difference."	Interviewee #12, #19
Learning opportunities with real world application	"I would like to see our students be able to make connections between what they are learning in school and the real world. For example how algebra is used in the world, outside of the classroom, perhaps in engineering or architecture." "As a school I would like for us to get outside the walls, out into the community to see how what we are learning inside is used outside of the school. Such as math, how measurements are used in building various things."	Interviewee #16, 20

As we see the desires for more tactics to effectively reach students, we also see the

reasons these tactics are just wishful thinking. Hindrances to advancement is the last theme

developed from the interview information. The three subcategories identified were; funding, lack

of time in the day, and lack of personnel.

Table 23

Categories Concerning Hindrances to Advancement

Categories	Interviewee comments	Interviewee #
Funding	"Financially we are limited and looking at more lean times to come. Active engaged learning takes a lot of supplies and technology and right now we just don't have it." "Budget cuts, but we work through it the best we can."	Interviewee #18, #15
Lack of time in the day	"Barriers are money and time. We already do an extra thirty minutes of math instruction a day on top of their hour. We are asked to do more and more each year, but I just don't know how much more you can ask."	Interviewee #12
Lack of personnel	"Barriers would be funding and not having enough teacher units." "Additional personnel and of course funding. It would take extra personnel and money to implement community based projects."	Interviewee #19, #16

All administrators reported funding as the number one barrier to not being able to implement these activities in the classroom. The lack of funds leads to less technology, less personnel, and fewer supplies needed to implement such practices. Extra time during the school day was also a problem. If there were more time in the day, instructional activities could be adequately fulfilled.

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Summary of Interview Study

The themes and categories presented in this chapter show that administrators in this study agree that knowledge is innate to some degree, changeable, and can be improved based on exposure, experiences, and building on prior knowledge. Many administrators were also in agreement with their definitions of knowledge, which were based on experiences and types of knowledge ranging from book knowledge to social knowledge to street knowledge. Administrators also agreed that people learned these types of knowledge mainly through their experiences but also through traditional teaching methods in formal educational settings. Interviews also discovered that administrators incorporate the same types of learning practices in their schools in order to reach each individual. Administrators agreed that due to lack of funding they were unable to implement much needed learning activities to help students advance.

Chapter Summary

As we can see from the study information, the selected group of administrators appears to view knowledge as based on experience and exposure to various life activities. The activities they promote in their schools include exposing students to various kinds of experiences and learning styles in order to reach each type of learner as well as those who have not had the same experiences as others. Most agree that an individual's background and surroundings affect their experiences but that does not mean that person is any less intelligent than another, they just need the opportunity to have similar experiences in life. Chapter V will provide a discussion of each portion of the study, limitations of the study and recommendations for future research.

CHAPTER V

DISCUSSION AND RECOMMENDATIONS

The purpose of this study was to describe what principals believe about knowledge and how they enact their beliefs in the school environment. This study contributed to the advances in epistemological research by providing information concerning the beliefs of administrators and their practices. It is the hope of the researcher that this study would provide information concerning epistemological beliefs and activities that could be implemented into schools to promote more complex learning outcomes. The research questions used in this study were as follows: (1) What are the epistemological beliefs of elementary and secondary school principals and assistant principals? (2) How do administrators perceive they enact their beliefs in their schools? This study was influenced by the research of Marlene Schommer(1989) and William Perry(1999). Schommer (1992) contended that the study of epistemological beliefs could help to "identify the potential impact schooling may have in enhancing individual's beliefs about the nature of knowledge and learning" (p. 63). Chapter IV described the results of the study, including demographic data, results of the Epistemological Beliefs Questionnaire and interview information concerning themes about beliefs and practices of administrators. Chapter V will provide a summary of the research findings, discuss the limitations of the study and provide recommendations for future study.

Summary of Results of the Epistemological Beliefs Questionnaire

The Epistemological Beliefs Questionnaire was used to uncover the epistemological beliefs of administrators. Those who scored low in each factor believe that knowledge is innate and cannot be improved with instruction, it is simple and based on isolated facts, and that it is quick, unchanging, and based on absolute facts. These beliefs align with Perry's (1999) stage of dualism, the category of received knowledge by Belenky et al. (1986) and King and Kitchener's (1994) pre-reflective stage. Epistemological beliefs studies conducted by Schommer (1990, 1993); Schommer et al. (1992); and Ryan (1984b) show that individuals whose epistemological beliefs center around simple knowledge, quick learning, and dualism tend to view knowledge as facts handed down by authority and rely on recall of information as a claim to comprehension of material.

Those who scored high on each factor of the Epistemological Beliefs Questionnaire believe that knowledge is complex and comprised of highly interrelated facts, knowledge is tentative, learning can be improved with experience and over time, and that learning is gradual. These beliefs align with Perry's (1999) stage of relativism, Belenky's et al. (1986) stage of constructed knowledge, and Stage 3 of King's and Kitchener's (1994) Reflective Judgment Model. Johnston, Woodside-Jiron, and Day (2001) noted that those who possess beliefs in constructed knowledge expect complexity and ambiguity and view knowledge as being constructed by the individual.

Summary of Interview Information

The interview portion of the study was used to uncover themes of epistemological beliefs and practices. According to interview information, most administrators in the study hold the

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same beliefs concerning knowledge, how it is acquired and the different types of knowledge and how that knowledge is used. Both elementary and secondary administrators believe that knowledge can be changed and improved based on one's experiences. Prior knowledge, background, and surroundings were thought to play a role in one's experience and exposure to certain kinds of knowledge. Anderson (1984) suggested that epistemological beliefs are a product of home and formal education, and that children acquire experience as well as interpretations of experience. Schraw (2001) cited Kuhn (1991) and Perry (1970) for the idea that epistemological beliefs and their effects on learning are important to educators for the reason that beliefs change over time due to educational experiences. Administrators described experiences as "day-to-day activities" and "academic experiences." One interviewee noted that we learn most from what we are involved in and direct experiences affect you most. Belenky et al. (1986) noted that lessons learned did not necessarily grow out of their academic work but also in relationships with friends, teachers, life crises, and community involvement.

As previously mentioned, Schommer's (1989) research suggests epistemological beliefs may be multi-dimensional and that individuals may hold sophisticated beliefs in one factor and naïve beliefs in others. A speculation for the inconsistency in beliefs for this particular study was that participants may have reported that they hold sophisticated beliefs in one factor and naïve beliefs in others. A speculation for the inconsistency in scores on individual factors and beliefs reported for this particular study was that participants may have reported what they thought the researcher wanted to hear, thus leaving their survey scores different from their verbal explanations. Another speculation is that the participants did not have the ability to vary one way or the other on the survey questions but were able to explain their positions during the interviews to provide a more qualified answer.

Factor 1 is the ability to learn. This factor ranges from knowledge being fixed at birth to improving over time. Factor 4 is the stability of knowledge. This factor ranges from knowledge being certain (unchanging) to knowledge being tentative (changing over time). Scores from survey results for factor 1 and 4 showed little belief that knowledge is innate. Results showed more belief that knowledge is changeable and can improve over time. Themes for factors 1 and 4 were the belief that knowledge is innate, knowledge is changeable and can be improved over time, and that knowledge is innate based on brain activity and exercise. Those who scored low on the survey held beliefs that knowledge is innate. These participants fell into the following categories: dualism (Perry, 1999), control of acquisition also known as the ability to learn (Schommer, 1989), the category of received knowledge (Belenky et al. 1986), and pre-reflective (King & Kitchener, 1994). Interview participants in this area referred to knowledge as "genetics" (Interviewee #12) and being "able to grasp" certain concepts (Interviewee #20). Participants scoring high on the survey for factors 1 and 4 believe that knowledge is changeable and can improve. These participants fall into the following categories: relativism (Perry, 1999), stability of knowledge and ability to learn (Schommer, 1989), constructed knowledge (Belenky et al., 1986), and reflective stage (King & Kitchener, 1994). Participants scoring high described knowledge as changeable and improving over time due to "experiences" one encounters (Interviewees #18 & #19).

Factor 2 is the structure of knowledge, also known as simple knowledge. Factor 2 ranges from knowledge as isolated bits to integrated concepts. Themes from factor 2 were knowledge being comprised of facts and knowledge being comprised of integrated facts. Those scoring low on the survey for factor 2 hold the belief that knowledge is isolated facts. These participants fall into the following categories: dualism (Perry, 1999), structure of knowledge (Schommer, 1989),

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received knowledge (Belenky et al., 1986), and pre-reflective (King & Kitchener, 1994). Interviewees in this category described knowledge as the "ability to use facts to solve problems" (Interviewee #14) and "facts that we use every day to guide our thinking" (Interviewee #23). Those who scored high on factor 2 reported beliefs of knowledge being more complex and comprised of integrated facts. These participants fall into the categories of: relativism and commitment to relativism (Perry, 1999), structure of knowledge (Schommer, 1989), procedural knowledge (Belenky et al., 1986), and quasi-reflective (King & Kitchener, 1994). Interviewees described knowledge as being "investigative" (Interviewee #12) and being more "abstract" (Interviewee #16). Schommer and Dunnell (1994) noted, "the less students believe in simple knowledge, the better they performed on a mastery test" (p. 208).

Factor 3 is the speed of learning or quick learning. Themes for factor 3 were the speed of learning based on specific factors and being gradual. Those scoring low on factor 3 believed that learning is quick or not at all. These participants fell into the categories of dualism (Perry, 1999), speed of acquisition (Schommer, 1989), silence and received knowledge (Belenky et. al., 1986), and pre-reflective (King & Kitchener, 1994). Interviewees in this category described knowledge as having "the ability to make connections very, very quickly" (Interviewee #16) and being "born with a certain ability to learn quickly or slowly" (Interviewee #12). Participants who scored high on factor 3 reported beliefs that knowledge is gradual and improving. These participants fell into the following categories: multiplicity and relativism (Perry, 1999), speed of acquisition (Schommer 1989), procedural knowledge (Belenky et al., 1986), and quasi-reflective (King & Kitchener, 1994). Interviewees described this knowledge as being changeable due to experiences and being able to build on previous levels (interviewee # 18 and #13). Schommer-Aikins (2004) notes, "The more students believe in quick learning, the more poorly

they perform academically as measured by grade point average and reading comprehension tests" (p. 21).

Research notes that educators could have influence on the epistemological beliefs of students (Anderson, 1984; Schommer, 1992; Schraw 2001). Thus it is relevant to mention the importance of developing more sophisticated epistemological beliefs. Scores from the Epistemological Beliefs Questionnaire indicated a significant difference between low scoring and high scoring participants. "As individuals grow older, they become more convinced that the ability to learn can be improved. The more education adults obtain, the more likely they are to believe that knowledge is highly complex and constantly evolving" (Schommer, 1998, p. 557). Scores in this study indicated that more administrators' hold more sophisticated beliefs. In regard to Schommer's findings about the education level of adults, we cannot ignore the fact that 29.5% of participants in this study hold a Specialists degree and 21.8% hold a doctoral degree.

Limitations of Research

There are several limitations surrounding this study. Although this data contributes to the research of epistemological beliefs by providing information concerning the beliefs of administrators and their practices, additional studies could definitely improve the information presented in this study. The reader should consider the following limitations. First, this study was limited to administrators in five school districts in a southern state. The limitation of the sample coupled with the unit of analysis limits the discussion to administrators only in these particular schools.

Another limitation is that the practices reported by administrators may not be what they actually do. The answers to the interview questions may have been based on what the

interviewee thought the correct answer should be or what they thought the researcher wanted to hear based on current research and best practices in general. Perhaps an observational study would be helpful in this area.

A third limitation in the study was the location of individual schools in each district. For the most part, each district was comprised of schools in urban, suburban, and rural areas. Therefore administrators serving in all types of locations were compiled into one study. Separation of the types of schools may have provided different responses and may help to provide ideas for similar schools to implement in their day-to-day activities.

An additional limitation of the study was the contextualization of the belief system. This study was based on the viewpoint of epistemological beliefs being based on knowledge and learning. It is different from and does not consider the perspective of Belenky et al. (1986).

Recommendations for Future Research

According to Schommer and Dunnell (1994), "research evidence is accumulating that suggests that epistemological beliefs may help or hinder students' cognition" (p. 209). With this in mind we must acknowledge the importance of educators possessing and promoting sophisticated epistemological beliefs. This particular study explored the beliefs and actions of public school administrators. Future researchers could perhaps use the findings in this study to further investigate the specific types of activities occurring in schools and categorize those activities into areas of administrators who possess sophisticated epistemological beliefs and administrators who possess less sophisticated beliefs. Going a step further; researchers could also track the progress of these specific activities and compare the influences they may or may not

have on student achievement. They may also determine whether these specific activities cause changes in student epistemological beliefs.

Further studies may explore the types of professional development activities needed for policymakers to develop and implement in their school districts. The development of these activities and study strategies could be centered on more sophisticated epistemological beliefs that would expose administrators, teachers, and students to these beliefs. Also, if administrators began to consider their own epistemological beliefs and got their faculty to consider their own individual beliefs, it might be beneficial to the understanding of their own teaching. Johnston et al. (2001) indicated that if educators are familiar with the concepts of epistemological beliefs and recent research identifies instructional strategies, then practices may be addressed proactively. Perhaps if practitioners (educators) were to make a connection between epistemological beliefs, activities, and educational outcomes, they would better understand the importance of sophisticated epistemological beliefs and more complex learning. The understanding of these beliefs and understanding what and how to implement specific activities and beliefs could lead to better student understanding of materials and promote students to be life learners.

It is recommended that a similar study be conducted with a larger sample in order to uncover a broader variety of activities promoted by administrators. This study also included school districts in urban, rural, and suburban locations. It may be beneficial for future researchers to compare beliefs of administrators and their practice among schools in one type of location or cross-compare schools in different locations. Comparisons of student achievement may also be compared in this area.

Summary

This chapter presented a summary of the results of the Epistemological Beliefs Questionnaire and interview information in this study, limitations of the study, and recommendations for future research. This study has revealed that there are significant differences in administrators who score low and those who score high on the Epistemological Beliefs Questionnaire. The data in this particular study showed there to be more administrators in the chosen schools who believed that knowledge is complex, changeable, and can be improved. It is recommended that future studies be conducted with a larger sample to further explore the beliefs of administrators and the activities they promote in their schools. These future studies may provide information for educator training and development of programs to enhance sophisticated epistemological beliefs. This study has provided information that may assist researchers in addressing future questions regarding the relationship between administrator beliefs and practices in schools.

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APPENDIX A

QUESTIONNAIRE

Epistemology Questionnaire

<u>Directions</u>: There are no right or wrong answers for the following items. We only want to know what you really believe. For each statement, indicate the degree to which you agree or disagree.

1 = *Strongly Disagree*, 2 = *Disagree*, 3 = *No Opinion*, 4 = *Agree*, 5 = *Strongly Agree*

Statement	1	2	3	4	5
1. If you are ever going to be able to understand something, it will make sense to you the first time you hear it.	1	2	3	4	5
2. The only thing that is certain is uncertainty itself.	1	2	3	4	5
3. For success in school, it's best not to ask too many questions.	1	2	3	4	5
4. A course in study skills would probably be valuable.	1	2	3	4	5
5. How much a person gets out of school mostly depends on the quality of the teacher.	1	2	3	4	5
6. You can believe almost everything you read.	1	2	3	4	5
7. I often wonder how much my school leaders really know.	1	2	3	4	5
8. The ability to learn is innate.	1	2	3	4	5
9. It is annoying to listen to a speaker who cannot seem to make up his/her mind as to what he/she really believes.	1	2	3	4	5
10. Successful students understand things quickly.	1	2	3	4	5
11. A good teacher's job is to keep his/her students from wandering from the right track.	1	2	3	4	5
12. If scientists try hard enough, they can find the truth to almost anything.	1	2	3	4	5
13. People who challenge authority are overconfident.	1	2	3	4	5
14. I try my best to combine information from several sources or even across classes.	1	2	3	4	5
15. The most successful people have discovered how to improve their ability to learn.	1	2	3	4	5
16. Things are simpler than most professors would have you believe.	1	2	3	4	5
17. The most important aspects of scientific work are precise measurement and careful work.	1	2	3	4	5
18. To me, studying means getting the big ideas from the text rather than details.	1	2	3	4	5
19. Educators should know by now which is the best method, lecture or small group discussions.	1	2	3	4	5
20. Going over and over a difficult textbook chapter usually won't help you understand it.	1	2	3	4	5
21. Scientists can ultimately get to the truth.	1	2	3	4	5
22. You never know what a book means unless you know the intent of the author.	1	2	3	4	5
23. The most important part of scientific work is original thinking.	1	2	3	4	5
24. If I find the time to reread a textbook chapter, I get a lot more out of it the second time.	1	2	3	4	5
25. Students have a lot of control over how much they can get out of a textbook.	1	2	3	4	5
26. Genius is 10% ability and 90% hard work.					
27. I find it refreshing to think about issues that authorities can't agree on.	1	2	3	4	5
28. Everyone needs to learn how to learn.	1	2	3	4	5
29. When you first encounter a difficult concept in a textbook, it's best to work it out on your own.	1	2	3	4	5
30. A sentence has little meaning unless you know the situation in which it is spoken.	1	2	3	4	5
31. Being a good student generally involves memorizing facts.	1	2	3	4	5
32. Wisdom is not knowing the answers but knowing how to find the answers.	1	2	3	4	5
33. Most words have one clear meaning.	1	2	3	4	5
34. Truth is unchanging.	1	2	3	4	5
35. If a person forgot details, and yet was able to come up with new ideas from a text, I would think they were bright.	1	2	3	4	5
36. Whenever I encounter(ed) a difficult problem in teaching, I consult(ed) with my principal or department chair.	1	2	3	4	5
37. Learning definitions word for word is often necessary to do well on tests.	1	2	3	4	5
38. When I study, I look for specific facts.	1	2	3	4	5

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Epistemology Questionnaire

39. If a person can't understand something within a short amount of time, he/she should keep on trying.	1	2	3	4	5
40. Sometimes you just have to accept answers from a teacher even though you don't understand them.	1	2	3	4	5
41. If teachers would stick more to the facts and do less theorizing, students could get more out of school.	1	2	3	4	5
42. I don't like movies that don't have an ending.	1	2	3	4	5
43. Getting ahead takes a lot of work.	1	2	3	4	5
44. It's a waste of time to work on problems which have no possibility of coming out with a clear-cut and unambiguous answer.	1	2	3	4	5
45. Students should evaluate the accuracy of information in a textbook, if they are familiar with the topic.	1	2	3	4	5
46. Often, even advice from experts should be questioned.	1	2	3	4	5
47. Some people are born good learners, others are just stuck with limited ability.	1	2	3	4	5
48. Nothing is certain but death and taxes.	1	2	3	4	5
49. The really smart students don't have to work hard to do well in school.	1	2	3	4	5
50. Working hard on a difficult problem for an extended period of time only pays off for really smart students.	1	2	3	4	5
51. If a person tries too hard to understand a problem, he/she will most likely just end up being confused.	1	2	3	4	5
52. Almost all the information you can learn from a textbook you will get during the first reading.	1	2	3	4	5
53. Usually you can figure out difficult concepts if you eliminate all outside distractions and really concentrate.	1	2	3	4	5
54. A really good way to understand a textbook is to reorganize the information according to your own personal scheme.	1	2	3	4	5
55. Students who are "average" in school will remain "average" for the rest of their lives.	1	2	3	4	5
56. A tidy mind is an empty mind.	1	2	3	4	5
57. An expert is someone who has a special gift in some area.	1	2	3	4	5
58. I really appreciate instructors who organize their lectures meticulously and then stick to their plan.	1	2	3	4	5
59. The best thing about science courses is that most problems have only one right answer.	1	2	3	4	5
60. Learning is a slow process of building up knowledge.	1	2	3	4	5
61. Today's facts may be tomorrow's fiction.	1	2	3	4	5
62. Self-help books are not much help.	1	2	3	4	5
63. You will just get confused if you try to integrate new ideas in a textbook with knowledge you already have about a topic.	1	2	3	4	5

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Would you please provide the following information about yourself?

1. Gender: _____ Female _____ Male

2. Highest level of education: _____ Bachelor's Degree
    _____ Master's Degree
    _____ Master's plus 30 credit hours
    _____ Specialist
    _____ Doctorate

3. Number of graduate courses taken since last degree: _____

4. Undergraduate major: _____

5. Graduate major: _____

6. Work experience:
    _____ NA   _____ < 1 year
    _____ 1-5 years   _____ 6-10 years
    _____ 11-15 years _____ 16-20 years
    _____ 21-25 years _____ > 25 years

7. Administrative or leadership positions held: _____

    _____

    _____

8. Your primary work context has been in:
    _____ Elementary Education _____ Secondary Education

9. Age:
    _____ < 21 years   _____ 21-27 years   _____ 28-25 years
    _____ 36-43 years _____ 44-51 years   _____ 52-58 years
    _____ > 58 years

APPENDIX B

INTERVIEW QUESTIONS

Interview questions

1. What is your definition of knowledge?
2. Please describe your views of the different types of knowledge.
3. Do you think your definition of knowledge fits what you do on a daily basis?
4. Describe the activities dealing with knowledge that occur in your school on a daily basis?
5. How do people learn different types of knowledge?
6. How are different types of knowledge used in different types of learning situations?
7. What are your views of knowledge that is not used?
8. What type of learner are you?
9. What types of learning activities do you promote in your school?
10. What are your views about intelligence? Is it innate? Is it changeable?
11. Do you think learning can be improved and if so what types of activities do you promote in your school to improve learning?
12. What is one of the most innovative changes you have brought about during your administrative years?
    a.   Why did you want to do this?
    b.   What, if any, resistances did you encounter?
    c.   How's it going now?
13. What learning activities would you like to enact in your school but are not able to carry out?
    a.   Why do you think this would be good for your school?
    b.   What barriers exist that prevent you from enacting different learning activities in your school

APPENDIX C

IRB APPROVAL

November 5, 2010

Office for Research

Institutional Review Board for the
Protection of Human Subjects

Sharon Seales
ELPTS
College of Education
The University of Alabama

THE UNIVERSITY OF
ALABAMA
R E S E A R C H

Re: IRB # 10-OR-348 "Epistemological Beliefs of Administrators: A Comparison of Beliefs of Elementary and Actions of Elementary and Secondary School Leaders"

Dear Ms. Seales:

The University of Alabama Institutional Review Board has granted approval for your proposed research

Your application has been given expedited approval according to 45 CFR part 46. You have also been granted the requested waiver of written documentation of informed consent. Approval has been given under expedited review category 7 as outlined below:

(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.

Your application will expire on November 3, 2011. If your research will continue beyond this date, complete the relevant portions of Continuing Review and Closure From. If you wish to modify the application, complete the Modification of an Approved Protocol Form. When the study closes, complete the appropriate portions of FORM: Continuing Review and Closure.

Should you need to submit any further correspondence regarding this proposal, please include the above application number.

Good luck with your research.

Sincerely,

████████████████████████

Carpantato T. Myles, MSM, CIM
Director & Research Compliance Officer
Office for Research Compliance
The University of Alabama

152 Rose Administration Building
Box 870117
Tuscaloosa, Alabama 35487-0117
(205) 348-8461
FAX (205) 348-8882
TOLL FREE (877) 820-3066

IRB Project #:

UNIVERSITY OF ALABAMA
INSTITUTIONAL REVIEW BOARD FOR THE PROTECTION OF HUMAN SUBJECTS
REQUEST FOR APPROVAL OF RESEARCH INVOLVING HUMAN SUBJECTS

I.   Identifying information

	Principal Investigator	Second Investigator	Third Investigator
Names:	Sharon Seales	Dr. Daisy Arredonod-Rucinski	
Department:	Educational Leadership	Educational Leadership	
College:	Education	Education	
University:	The University of Alabama	The University of Alabama	
Address:			
Telephone:	372-7864		
FAX:			
E-mail:	rsti@charter.net	darredo@bamaed.ua.edu	

Title of Research Project: Epistemological Beliefs of Administrators: A Comparison of Beliefs of Elementary and Actions of Elementary and Secondary School Leaders.

Date Submitted:
Funding Source: None

Type of Proposal	☒ New	☐ Revision	☐ Renewal Please attach a renewal application	☐ Completed	☐ Exempt

Please attach a continuing review of studies form

Please enter the original IRB # at the top of the page

UA faculty or staff member signature: *Daisy Arredondo Rucinski* 9/13/10

II. NOTIFICATION OF IRB ACTION (to be completed by IRB):
Type of Review: _____   Full board __✓_ Expedited

IRB Action:
___ Rejected   Date: _____
___ Tabled Pending Revisions   Date: _____
___ Approved Pending Revisions   Date: _____
_✓_ Approved-this proposal complies with University and federal regulations for the protection of human subjects.
    Approval is effective until the following date: //-3-//
    Items approved: ___ Research protocol   (dated_____)
                       ___ Informed consent   (dated_____)
                       ___ Recruitment materials (dated_____)
                       ___ Other   (dated_____)

Approval signature ███████████████████ Date //4/2010

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University of Alabama Human Research Protection Program

You are being asked to be in a research study. This study is called "Epistemological Beliefs of Administrators: A Comparison of Beliefs and Actions of Elementary and Secondary School Leaders." This study is being done by Sharon Seales, a doctoral student in the department of Educational Leadership, Policy, and Technology Studies at The University of Alabama and Dr. Daisy Arredondo Rucinski, professor and dissertation chairperson.

What is this study about?
The purpose of this study is to describe what principals believe about knowledge and learning and how they enact their beliefs in the school setting.

Why is this study important – What good will the results do?
The results will show how administrators believe knowledge is acquired and what practices they enact in their schools that support these beliefs. Practices could be shared among administrators so others will be able to employ some of these practices in their own schools.

Why have I been asked to be in this study?
You have been asked to be in this study because you are currently a practicing administrator.

How many other people will be in this study?
There will be around one-hundred participants in this study.

What will I be asked to do in this study?
If you agree to participate in this study, you will complete the enclosed questionnaire and return it by mail in the enclosed self-addressed envelope. At the end of this questionnaire you will be asked if you would like to participate in the interview portion of the study. Please understand that participating in the questionnaire portion of the study is just as important as the interview and by participating in the questionnaire in NO way requires you to participate in the interview.

How much time will I spend being in this study?
The questionnaire should take around fifteen minutes. If you choose to participate in the interview portion you will spend 30-45 minutes in a one on one interview with the researcher.

Will being in this study cost me anything?
There will be no cost to participants of this study.

What are the risks (problems or dangers) from being in this study?
There are no known risks with this survey.

What are the benefits of being in this study?
Although we cannot promise direct benefits to you, it is possible that you, your co-workers and other administrators may learn about practices that could benefit your school and its stakeholders.

How will my privacy be protected?
All information will be kept confidential. The researcher will be the ony person with access to your information.

How will my confidentiality be protected?
I will protect your confidentiality by assigning your questionnaire a number.

What are the alternatives to being in this study?
The only alternative is not to participate. Please remember that participating in the questionnaire does not require you to participate in the interview portion of the study.

What are my rights as a participant?
Being in this study is totally voluntary. It is your choice. You may choose to participate in the questionnaire and not the interview or you may choose to participate in both. If you start the study, you can stop at anytime. Not participating or stopping participation will have no effect on your relationship with the University of Alabama.

The University of Alabama Institutional Review Board is a committee that looks out for the ethical treatment of people in research studies. They may review the study record if they wish. This is to be sure that people in research studies are being treated fairly and that the study is being carried out as planned.

Who do I call if I have questions or problems?
If you have any questions about this study, you may contact Sharon Seales at rsti@charter.net or Dr. Daisy Arredondo Rucinski at darredo@bamaed.ua.edu. If you have questions or complaints about your rights as a sresearch participant call Ms. Tanta Myles, the Research Compliance Officer of The University of Alabama at 348-8461.

You may also ask question, make a suggestion, or file complaints and concerns through the IRB Outreach website at http://osp.ua.edu/site/PRCO welcome.html. After you participate, you are encouraged to complete the survey for research participants that is online at the above site. You may also e-mail us at participantoutreach@bama.ua.edu.

Proceeding to the attached questionnaire constitutes your consent to participate and certifies that you are 19 years of age or older. Please keep a copy of this informed consent form for your records.

October 4, 2011

Sharon Seales
ELPTS
College of Education
Box 870231

Re: IRB # 10-OR-348-R1 "Epistemological Beliefs of Administrators: A
Comparison of Beliefs of Elementary and Actions of Elementary and
Secondary School Leaders"

Dear Ms. Seales:

The University of Alabama Institutional Review Board has granted
approval for your renewal application.

Your renewal application has been given expedited approval according to
45 CFR part 46. You have also been granted the requested waiver of
informed consent. Approval has been given under expedited review
category 7 as outlined below:

*(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.*

Your application will expire on October 3, 2012. If the study continues
beyond that date, you must complete the IRB Renewal Application. If you
modify the application, please complete the Modification of an Approved
Protocol form. Changes in this study cannot be initiated without IRB
approval, except when necessary to eliminate apparent immediate hazards
to participants. When the study closes, please complete the Request for
Study Closure form.

Should you need to submit any further correspondence regarding this
application, please include the assigned IRB application number.

Good luck with your research.

Sincerely,

Carpantato T. Myles, MSM, CIM
Director & Research Compliance Officer
Office for Research Compliance
The University of Alabama

UNIVERSITY OF ALABAMA
INSTITUTIONAL REVIEW BOARD FOR THE PROTECTION OF HUMAN SUBJECTS
REQUEST FOR APPROVAL OF RESEARCH INVOLVING HUMAN SUBJECTS

I. **Identifying information**

	Principal Investigator	Second Investigator	Third Investigator
Names:	Sharon Seales	Dr. Daisy Arredondo-Rucinski	
Department:	Educational Leadership	Educational Leadership	
College:	Education	Education	
University:	The University of Alabama	The University of Alabama	
Address:	235 Hampton Hills Drive Moundville, Al 35474		
Telephone:	372-7864		
FAX:			
E-mail:	rsti@charter.net	darredo@bamaed.ua.edu	

Title of Research Project: Epistemological Beliefs of Administrators: A Comparison of Beliefs and Actions of Elementary and Secondary School Leaders.

Date Submitted: 9-28-11
Funding Source:

Type of Proposal	☐ New	☐ Revision	☒ Renewal Please attach a renewal application	☐ Completed	☐ Exempt
			Please attach a continuing review of studies form		
		Please enter the original IRB # at the top of the page			

UA faculty or staff member signature: _____

II. NOTIFICATION OF IRB ACTION (to be completed by IRB):
Type of Review: _____ Full board _X__ Expedited

IRB Action:
___ Rejected   Date: _____
___ Tabled Pending Revisions   Date: _____
___ Approved Pending Revisions   Date: _____
_X_Approved-this proposal complies with University and federal regulations for the protection of human subjects.

Approval is effective until the following date: 10/3/12

Items approved: _X_ Research protocol   (dated 10/4/11   )
                  ___ Informed consent   (dated_____   )
                  ___ Recruitment materials (dated_____   )
                                             (dated_____   )

Approval signature ▮▮▮▮▮▮▮▮▮▮   Date 10/4/2011