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entitled

An Investigation of High School Teachers' Epistemic Beliefs in an Urban District

by

Richard Thomas Montgomery, II

Submitted to the Graduate Faculty as partial fulfillment of

the requirements for the Doctor of Education Degree in Educational Administration and

Supervision

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An Abstract of

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Investigations in the field of teacher epistemology have been informative in that they have provided a framework for identifying which epistemic beliefs are associated with student- and teacher centered instruction (Schraw & Olafson, 2002) and which beliefs prevent teachers from adopting student centered instructional practices (Gill, Ashton, & Algina, 2004). Understanding teachers' epistemic beliefs is an important asset to school districts because it provides insight on which teachers may require additional intervention to adopt new teaching practices. However, few studies have examined the epistemic beliefs of high school teachers. There were three objectives of this investigation: (1) to identify the proportions of high school teachers in one urban district whose epistemic beliefs reflect resistance to change teaching practices (Gill et al., 2004; Patrick & Pintrich, 2010) versus those with beliefs amenable to adopting new practices (Feucht, 2010); (2) to identify the proportion of teachers with teacher- and student centered epistemic beliefs by area of certification, and (3) to establish whether relationships exist between high school teachers' epistemic beliefs and selected demographic variables. Findings showed that 57.9% of teachers surveyed held epistemic beliefs that reflect a student centered orientation. Few relationships were found between high school teachers' epistemic beliefs and selected demographic factors. Implications for teacher epistemology research and school district leaders were discussed.

I would like to dedicate this document to my parents, Nikki, Richie, and Micayla, the Brothers of Gamma Alpha Chi Fraternity Incorporated, and to my East Akron (Ohio) community.

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Chapter One

Introduction

Research Problem

Epistemology is a key area of philosophy that has existed for centuries. Over the years, epistemologists have sought to better understand what people believe knowledge is and how people acquire new knowledge (Britannica, 2014). This journey has been influential to our development of theories on the epistemology of teachers. Teacher epistemology is a field of study focused on the beliefs teachers have about the nature of knowledge used in teaching and how those beliefs influence classroom instruction. Interest in this area has surged over the past decade, particularly among district leaders; as more researchers (Hofer, 2001; Pajares, 1992; Marzano, Zafron, Zrail, Robbins, & Yoon, 1995) acknowledge the alignment of teachers' epistemic beliefs with their classroom practice. However, few studies have examined high school teachers.

Teacher epistemology has also been influenced by more than 40 years of study on teacher beliefs. While the rich history of epistemology as a field of study has enumerated various positions an individual may take in interpreting what knowledge is and how it should be acquired, teacher belief researchers describe teacher's preferred teaching orientation as either teacher centered or student-centered; with both positions having varied approaches to acquiring new knowledge (Peabody, 2011; Pajares, 1992; Gill, Ashton, & Algina, 2004)). According to Peabody (2011), teachers who are teacher centered have a classroom orientation that emphasizes the role of the teacher to transmit knowledge in the learning process versus the student centered teacher who serves as a facilitator who "guides students towards constructing their own understandings" (p.

182). The impact of these two orientations in the classroom has been examined to identify their influence on student achievement. Studies have shown (e.g., Johnston, Woodside-Jiron, & Day, 2001; Paris, 1997; Saxe, Gearhart, & Nasir, 2001) that teachers who employ a teacher centered approach in the classroom have a negative influence on student learning. In contrast, students with access to a teacher who engages in student centered teaching are more likely to make gains in academic achievement; even if they were previously underperforming academically (Blachman, Fletcher, Clonan, Schatschnieder, Francis, & Shaywitz, 2004; Mathes, Denton, Fletcher, Anthony, & Francis, 2005). It should be noted that both teacher centered and student centered teachers have the same expectations for students, however these teachers view the pathway to student learning through different lenses (Perry, 1970).

Projects in the field of teacher epistemology have focused on identifying the specific beliefs that influence teachers' classroom orientation. Findings have provided frameworks for understanding teacher centered teachers' resistance to adopting student centered practices; and the relationships teachers' epistemic beliefs have to specific demographic factors (i.e., teaching experience, educational level, etc.). The problem is that few studies (Table 1.) have focused on high school teachers; particularly those in urban public school districts. Among the two studies available, one (Fives & Buehl, 2008) contained a sample size that was considerably small compared to the total population of the study (e.g., 9 high school teachers out of a sample of 110 elementary and middle school teachers), and the second study (Tsai, 2002) was performed in a Taiwanese high school setting; making generalizability incongruent to urban public schools in the United States.

Rational for the Study

The proposed study will examine high schools in urban districts. The rationale for this focus is that over the past 30 years, research on urban schools has displayed consistent clusters of teacher centered teachers (Anyon, 1981; Gilbert, 1997; Peabody, 2011; Song, 2007; Winfield, 1985); which as previously noted has a negative impact on student achievement. Studies of teachers' beliefs about teaching (i.e., epistemic beliefs) have compared teachers from high-income suburban districts with those from lowincome urban districts (Anyon, 1981), and in their findings, teachers from suburban schools reported beliefs that were more aligned with student centered teaching, while teachers from the urban schools reported teacher centered teaching. In limited studies of elementary and middle school teachers within urban districts, teachers with both teacher centered and student centered beliefs were present (Anyon, 1981; Gilbert, 1997; Peabody, 2011; Song, 2007; Winfield, 1985). Findings from these investigations illustrate that urban districts show consistent variability in terms of their composition of teachers with teacher centered and student centered beliefs.

It is also worth noting that urban public school districts produce two-thirds of the high school graduates in the United States (Brimley & Garfield, 2010); and these districts also account for the largest proportion of students underprepared for college or the workforce (NAEP, 2010; Brimley & Garfield, 2010). Therefore, it is important for urban districts to explore to what extent teacher centered teachers are represented in the district and their potential impact on student learning.

Table 1

Studies o	f Teacher	· Epistemol	logy and	Selected	Samples
	/	1	(1./		

Brownlee (2001)	Preservice
Chan and Elliot (2000)	Preservice
Johnston, Woodside-Jiron, & Day,	Practicing Elementary School Teachers
(2001)	
Findlan (2011)	Practicing Elementary School Teachers
Schraw and Olafson (2002)	Practicing Elementary and Middle School
	Teachers
Sinatra and Kardash (2004)	Preservice
Tsai (2002)*	Practicing Secondary School Teachers
White (2000)	Preservice
Brownlee, Purdie, & Boulton-Lewis,	Preservice
(2001)	
Howard et al. (2000)**	Preservice and Practicing Teachers
Gill et al. (2004)	Preservice
Feucht (2006)	Practicing Elementary School Teachers
Fives and Buehl (2010)	Preservice and Practicing Elementary and
× /	Secondary
Wyre (2007)	Preservice
• ` ` /	

Note. *Tsai's (2002) was based on a sample of Taiwanese high school teachers.

**Howard et al., (2000) the study sample reported gender, years of experience,

and residence, but did not define the grade levels taught by participants.

Conceptual Framework

Researchers have used studies of teachers' epistemology as a heuristic for understanding the dichotomy between teacher centered and student centered teaching orientations. In teacher epistemology, teacher centered and student centered teaching is a multidimensional (Schommer, 1990), developmental (Schraw & Olafson, 2002), and contextual construct (Palmer & Mara, 2004). Teachers' beliefs about (a) where knowledge comes from (i.e., source of knowledge); (b) whether or not knowledge changes over time (i.e., stability of knowledge); and (c) whether knowledge is considered disconnected or interrelated (i.e., structure of knowledge) are associated with the three dimensions of teacher epistemology (i.e., source of knowledge, structure of knowledge, and stability of knowledge). On each of these three dimensions (Table 2) teachers can vary developmentally (i.e., from realist to relativist on any of the three dimensions). According to Schraw and Olafson (2002) this developmental continuum has three points beginning with: (a) realist, (b) contextualist, and (c) relativist. Realist teachers have an orientation that is characterized as teacher-centered, and contextualist and relativist teachers have an orientation that is closely associated with student centered teaching. Since contextualist and relativist have a tendency towards student centered teaching, here forward references to student centered teaching will be assumed to encompass both contextualist and relativist stances. There is evidence (Muis, Bendixen, & Haerle, 2006; Palmer & Mara, 2004) that teachers beliefs may also differ in certain contexts (e.g., content, classroom management, etc.).

Underlying Assumptions

Teacher beliefs relate to their use of teacher centered versus student centered instructional practices (Schraw & Olafson, 2002). Experiemental studies have demonstrated that teachers with student centered epistemic beliefs (i.e., contextualist and relativist) have a more positive impact on student achievement (Hofer, 2000; Yoon, Duncan, Scarloss, & Shapley, 2007) because they adhere to a student centered orientation to teaching, and those with realist epistemic beliefs (i.e., teacher-centered) negatively influence student achievement because they tend to emphasize teacher centered classroom practices (Johnston et al., 2001; Peabody, 2011). In addition, teachers with realist epistemic beliefs are typically less amenable to changing their beliefs about

teaching than are contextualist or relativist teachers (Gill, Ashton, & Algina, 2004;

Howard, Schwartz, & Purcell, 2000).

Table 2

Teacher's Developmental Levels Across the Three Dimensions of Personal Epistemology

	Dimensions			
Developmental Levels	Source	Structure	Stability	
Realist	Teachers view teaching knowledge as coming from or transmitted by experts.	Teachers view teaching knowledge as a set of discrete facts.	Teachers view teaching knowledge as fixed or unchanging.	
Contextualist	Teachers believe that teaching knowledge is an artifact of an individual's opinion.	Teachers begin to transition from the idea that teaching knowledge is a discrete set of facts.	Teachers begin to transition from the idea that teaching knowledge is static to one where they acknowledge teaching knowledge changes.	
Relativist	Teachers believe that teaching knowledge is constructed through individual experience and inquiry.	Teachers view teaching knowledge as a set of interrelated concepts or theories.	Teachers view knowledge as tentative or evolving.	

Note. This table was adapted from Kuhn's (1999) and Schraw and Olafson's (2002)

characterization of personal epistemology and teacher epistemology.

As Gill et al. (2004) found in their investigation, teachers with realist epistemic beliefs tend to view teaching knowledge as fixed and unchanging which precludes them from acknowledging new strategies when introduced to them. Also, teachers with realist epistemic beliefs about the source and stability of knowledge may devalue professional development opportunities. According to Fives and Buehl (2008), the belief that knowledge does not change (i.e., stability of knowledge) or that professors are experts (i.e., source of knowledge) rather than peer teachers or the school principal can influence receptivity to adoption of new instructional strategies. Based on investigations of teachers in urban schools over the past 30 years, there appears to be variable clusters of teachers with teacher centered beliefs (i.e., realist epistemic beliefs; Anyon, 1981; Gilbert, 1997; Peabody, 2011; Song, 2007). Though urban high schools are populated with both teacher centered (i.e., realist) and student centered (i.e., relativist) teachers, a considerable number of teachers with realist epistemic beliefs (e.g., Peabody, 2011) could pose a challenge to a district's efforts to facilitate teachers' adoption of student centered instructional practices. For urban districts to improve student learning at the high school level, it will be necessary to know what proportions of high school teachers' with realist epistemic beliefs exist and to further our understanding of these dynamics by examining how these beliefs are related to the individual demographics of teachers.

Purpose Statement

The purpose of this study was to examine the proportions of high school teachers in one urban public school district with teacher centered (i.e., realist) and student centered (i.e., contextualist and relativist) epistemic beliefs about the source, structure, and stability of teaching knowledge. More specifically, the proportions of teachers with teacher centered (i.e., realist) and student centered (i.e., contextualist and relativist) epistemic beliefs on the source of knowledge were reported; the proportions of teachers with teacher centered (i.e., realist) and student centered (i.e., contextualist and relativist) epistemic beliefs about the structure of knowledge were reported, and the same format

was used to report findings on the stability of knowledge. In addition, the relationships between teacher's general epistemic beliefs and specific demographic factors of teachers were explored. This study differs from past research in that this study focused solely on high school teachers in an urban school district. Additionally, a focus on urban districts has not been the goal of other projects in the field of personal epistemology. This study will investigated the following research questions.

Research Questions

- What are the proportions of high school teachers in an urban school district with teacher centered (i.e., realist) and student centered (i.e., contextualist and relativist) general epistemic beliefs about the source of knowledge?
- 2. What are the proportions of high school teachers in an urban school district who hold teacher centered (i.e., realist) and student centered (i.e., contextualist and relativist) general epistemic beliefs about the structure of knowledge?
- 3. What are the proportions of high school teachers in an urban school district who hold teacher centered (i.e., realist) and student centered (i.e., contextualist and relativist) general epistemic beliefs about the stability of knowledge?
- 4. What are the proportions of high school teachers in an urban school district who hold teacher centered (i.e., realist) and student centered (i.e., contextualist and relativist) general epistemic beliefs across each area of content certification?
- 5. Is there a relationship between high school teachers' years of experience, attitudes about professional development, and educational levels and their beliefs about the source, structure, and stability of knowledge?

Hypothesis

Question five was answered using the following hypotheses:

Hypothesis 1

H0: There is a relationship between urban high school teachers' years of experience and their general epistemic beliefs.

H1: There is no relationship between urban high school teachers' years of experience and their general epistemic beliefs.

Hypothesis 2

H0: There is a relationship between urban high school teachers' educational level and their general epistemic beliefs.

H1: There is no relationship between urban high school teachers' educational level and their general epistemic beliefs.

Definition of Terms

The terms applicable to the field of personal and teacher epistemology are defined.

- General Epistemic Beliefs Schommer's (1990) model divides knowledge beliefs into two areas: (1) beliefs about learning (innate ability and quick learning), and (2) beliefs about knowledge (structure, source, stability). Beliefs about knowledge are also described as general epistemic beliefs.
- Source of Knowledge is a dimension among the general epistemic beliefs that describes whether an individual believes knowledge is handed down by authority figures or derived from reason (Schommer, 1990).
- 3. *Structure of Knowledge* is a dimension among the general epistemic beliefs that describes whether an individual believes that knowledge is composed of simple,

disconnected facts or composed of complex interrelated concepts (Schommer, 1990).

- Stability of Knowledge is a dimension among the general epistemic beliefs that describes whether an individual believes knowledge is certain or tentative (i.e., knowledge changes over time; Schommer, 1990).
- 5. *Omniscient Authority* is a subscale on the Epistemic Beliefs Inventory that measures the *source of knowledge* dimension.
- 6. *Simple Knowledge* is a subscale on the Epistemic Beliefs Inventory that measures the *structure of knowledge* dimension.
- 7. *Certain Knowledge* is a subscale on the Epistemic Beliefs Inventory that measures the *stability of knowledge* dimension.
- Realist epistemic beliefs describe teacher centered teachers who "assume that knowledge is independent of the knower, universal, and relatively unchanging" (Schraw & Olafson, 2002, p. 8).
- 9. Contextualist epistemic beliefs describe student centered teachers who believe that "knowledge is situational in nature and is important to the extent that it is necessary to succeed in one's environment" (Schraw & Olafson, 2002, p. 9). This set of beliefs is ascribed to student centered teachers.
- Relativist epistemic beliefs describe student centered teachers who believe "that knowledge is idiosyncratic to the knower and that one person's knowledge cannot be assumed to be superior to another person's knowledge" (Schraw & Olafson, 2002, p. 9). This set of beliefs is ascribed to student centered teachers.

- Teacher centered teaching is an orientation to teaching that focuses on the teacher as the source of academic knowledge and is aligned with realist epistemic beliefs (Peabody, 2011; Schraw & Olafson, 2002).
- 12. *Student centered teaching* is an orientation to teaching wherein the teacher serves as a facilitator of student inquiry; this orientation is aligned with contextualist and relativist epistemic beliefs (Schraw & Olafson, 2002; Peabody, 2011).

Chapter Two

Review of the Relevant Literature

Teacher Beliefs Research

Decades of research on teachers' beliefs about teaching (Cadenhead,

1971; Rupley & Logan, 1977; Duffy & Metheny, 1978; DeFord, 1985) suggest that

teachers' beliefs manifest as teaching styles or orientations.



Figure 1. Comparison of Teacher- and Student centered Approaches to Teaching (Maldonado, 2014).

Teacher- and student centered teaching beliefs. Studies of teachers' beliefs assert that teachers have either a teacher centered or student centered orientation to classroom instruction (Kagan, 1992; Peabody, 2011). As Peabody (2011) suggests, there

are two indices for teachers' beliefs about teaching that should be discussed: (a) *teacher centered beliefs about teaching*, and (b) *student centered beliefs about teaching*. Teachers with *teacher centered approaches to teaching* are characterized by classrooms that emphasize (Figure 1) formal authority, teacher expertise and personal modeling. In teacher centered classrooms, teacher dialogue is focused on providing information to students (Johnston et al., 2001); teaching focuses on the teacher demonstrating the correct way to solve a problem (Schraw & Olafson, 2002), and the students respond by copying the teacher's actions (Moldanado, 2014).

In contrast, teachers with *student centered approaches to teaching* emphasize thinking and reasoning in the classroom by creating inquiry-based and cooperative learning environments (Figure 1). Teachers with *student centered approaches to teaching* place strong emphasis on the teacher-student relationship, and students have opportunities to engage in hands-on learning through active investigation and collaboration. Peer-centered and self-learning activities are components of student centered teaching (Schraw & Olafson, 2002).

Studies of teachers' epistemic beliefs have reported an alignment between the beliefs that realist, contextualist, and relativist teachers espouse and the research on teacher and student centered beliefs discussed in the teacher belief research. For example, realist epistemic views are associated with the belief that knowledge is held and transmitted by authority figures, and it relates to teaching practices in which the teacher is an authority figure who transmits knowledge to students. The belief in an authority figure as the transmitter of knowledge extends to sources such as textbooks and curricular materials. Therefore, teachers with realist epistemic beliefs are likely to depend on, and to

teach students to consult, such materials as a source of knowledge. In the findings by Schraw and Olafson (2002), teachers with realist epistemic beliefs were likely to espouse beliefs that were aligned with a teacher centered approach to teaching, "whereas teachers endorsing a contextualist or relativist worldview" were likely to describe beliefs that were aligned with a student centered approach to teaching (p. 8). Contextualist and/or relativist view inquiry and experience as sources of knowledge, which is also a characteristic of student centered teaching. Henceforth, the terms teacher centered (realist) and student centered (contextualist/relativist) will be used interchangeably to maintain consistency with other projects (e.g., Schraw & Olafson, 2002) in the field of teacher epistemology. In addition, it should be noted that the terms teacher centered and student centered refer to a variety of practices, and should not be considered as two specific instructional approaches.

Teachers' beliefs and classroom practice. In observational studies of classroom teachers, results show that teachers beliefs about teaching have an influence the instructional strategies they use in the classroom. For example, in mathematics, Stipek, Givin, Salmon, and MacGyvers, (2001) investigated the contrasting beliefs about teaching that teachers had by examining the classroom instruction of both teacher centered and student centered teachers. Stipek and colleagues investigated two hypotheses based on studies that compared traditional (i.e., teacher-centered) teachers with teachers who engaged in inquiry-based learning activities (i.e., student-centered). First, they hypothesized that teachers with teacher centered beliefs about teaching would embrace an instructional orientation that emphasized students' speed in finding the correct answer as well as students' ability to reduce the number of mistakes made in

finding the correct answer. Stipek and colleagues further posited that teachers with student centered beliefs about teaching would have a classroom orientation that emphasizes "effort, creativity, and independence" (Stipek et al., 2001, p. 217). In their sample of 21 elementary school teachers from grades four through six, the investigators surveyed teachers on their beliefs about teaching mathematics. They subsequently videotaped the teachers to evaluate the association between teachers' beliefs about teaching and their classroom practices. Results showed that there was alignment between teachers' beliefs about teaching and their classroom instruction.

Teacher centered teachers' classroom practices focused primarily on getting the correct answers and extrinsic rewards such as "getting good grades" (Stipek et al., 2001, p. 223). The investigators contend that teacher centered teachers place significant emphasis on prescribed sources of academic knowledge such as textbooks and worksheets. In addition, they note that teachers with teacher centered instructional orientations have a tendency towards following fairly rigid procedures to facilitate student learning. Teachers with student centered beliefs about teaching had negative correlations with classroom activities that focus on extrinsic rewards such as grades and were positively associated with teaching for understanding.

In another study, Paris (1997) examined teachers' beliefs about teaching in the area of English language arts and literacy. In her three year longitudinal study, Paris was interested in identifying whether preservice teachers' beliefs about teaching would change once they began teaching. Nine preservice teachers were given a survey to assess their beliefs about teaching English language arts and literacy. Their responses showed that preservice teachers possessed both teacher centered and student centered beliefs

about teaching English language arts and literacy. Paris followed the teachers three years into their careers. At the conclusion of her investigation, she confirmed two important findings. First, she was able to demonstrate that teachers' beliefs were consistent over time and did not change as a result of experience in the classroom. Second, her findings show that teachers' beliefs are influenced by school policies and school leadership. The findings by Stipek et al. (2001) and Paris (1997) are important because they demonstrate that teachers' beliefs about teaching tend to be consistent over time and are associated with their classroom practices.

Teachers' beliefs and student achievement. Studies have demonstrated that student centered instruction can have a significant positive influence on the academic performance of students with historically low levels of academic achievement on standardized achievement tests (Moats, 2009; Yoon et al., 2007; Mathes et al., 2005), which is why facilitating teachers adoption of a student centered orientation is important for urban districts where there are remarkable numbers of students underperforming in English and mathematics. Student centered instruction has been used effectively in both mathematics and English language arts and literacy to increase the achievement of underperforming students.

In a quasi-experimental investigation by Saxe (2001), mathematics teachers from urban schools were studied to identify what impact a yearlong professional development program would have on their students' achievement in mathematics. The IMA Professional Development Program trains teachers to become facilitators in inquiry-based mathematic lessons. The sample was composed of 23 elementary school mathematics teachers who populated one treatment group and two comparison groups. The treatment

group of nine teachers was called the IMA group. The SUPP group of 18 teachers was a comparison group that met to discuss teaching strategies. The final comparison group was labeled the TRAD group. This group of six teachers focused much of the classroom time on book-related activities. Findings showed that teachers in the control group had a significant negative impact on students' mathematics achievement on the post-test, while student centered teachers (i.e., IMA group) had a positive influence on students' post-test scores.

In the area of English language arts and literacy, Mathes et al. (2005) examined the influence of student centered teaching on the academic achievement of elementary school students at-risk for reading failure, by providing professional development to elementary teachers. The investigators contend that "even when classroom instruction is of high quality, approximately 5% to 7% of students do not meet benchmarks associated with reading proficiency in the early grades" (p. 151). In their experimental study, the researchers administered the Texas Primary Reading Inventory (TPRI) and the Woodcock Johnson III to kindergarteners at the conclusion of the school year. Teachers were provided professional development training over the summer; teachers were assigned to one of three groups where each teacher received training on a different approach to student centered teaching. Students deemed the most at-risk were placed into one of the three groups at the beginning of the first grade. While positive effects were found for all three groups, the notable outcome of this study is that by the end of first grade, students at risk for reading problems (i.e., the 5% to 7% expected to underperform) attained normative levels of reading achievement.

In another example, Blachman et al. (2004) examined the impact of student centered teaching on struggling readers. The objective of their experimental study was to evaluate the effectiveness of student centered teaching on the reading outcomes of elementary school students at-risk for reading failure. Students at 11 schools who were performing in the bottom 20% of readers were identified. The researchers randomly selected 88 second- and third-grade students (41 in the control group and 47 in the treatment group) from these 11 schools. Students in the control group were given remedial services in reading offered by the school, and the treatment group was provided instruction by teachers whose instruction was aligned with student centered practices. The teacher's use of student centered strategies was the result of professional development participation and the support of ongoing coaching in the classroom. There were two important findings from this study. First, students in the treatment group made significant gains in achievement during the eight-month treatment period, which confirms that student centered teaching has a significant effect on the most at-risk readers. Secondly, the researchers followed the students for a year after the treatment concluded and found that student growth between the treatment group and the control group was negligible. The researchers contend that struggling readers need ongoing instruction from student centered teachers to reach and maintain progress in grade-level reading achievement. The results from Saxe (2001), Mathes, et al. (2005), and Blachman, et al. (2004) support the notion that districts can ameliorate the circumstances of student underperformance by increasing the numbers of student centered teachers.

Teachers' Beliefs in Urban Districts

While there is variation in the percentage of teachers with teacher centered and student centered beliefs about teaching among any population of teachers, studies of K-8 teachers in urban districts report consistent clusters of teachers with teacher centered beliefs about teaching (Song, 2006; Anyon, 1981; Winfield, 1985). For example, Anyon (1981) investigated teachers' beliefs about teaching knowledge. She was interested in whether the instructional strategies employed by teachers using a common curriculum differed between urban and suburban schools. In her yearlong qualitative study, the investigator observed teachers in five elementary schools, each with student populations of various socioeconomic statuses. The socioeconomic statuses of the students in the schools were defined as working-class (household income \$12,000 or less), middle class (income of \$13,000-\$25,000), affluent (income of \$40,000-\$80,000), and executive elite (income of \$100,000+). Key results of her study showed differences between the beliefs about teaching among elementary school teachers in the two urban, working-class schools versus those in the suburban schools that were considered affluent and executive elite.

In the two urban working-class schools studied, teachers were largely characterized as having teacher centered beliefs about teaching. Urban and working-class teachers believed that teaching was a process of delivering facts and developing simple skills. Instruction was defined by following strict procedures or steps directed by the teacher. In contrast, teachers in both affluent and executive elite schools demonstrated student centered beliefs about teaching. Teachers at affluent and executive elite schools believed that teaching should focus on individual discovery, creativity, and reasoning;

and that knowledge is co-constructed between the teacher and the learners. The instructional strategies in both affluent and executive elite schools focused on creating problem solving environments so that students could build their skills for reasoning and critical thinking. The findings of this study suggest that urban teachers, when compared to suburban teachers, have a tendency towards teacher centered instructional approaches. This phenomenon has also been evidenced in a number of other studies related to urban teachers (Gilbert, 1997; Winfield, 1985; Song, 2006); where again the majority of these studies have focused on elementary and middle school grades.

In another example, Gilbert (1997) examined teachers' beliefs about teaching in urban schools. The investigator surveyed 345 preservice teachers in six states to ascertain their beliefs about teaching in an urban district. There were two important findings related to teachers' beliefs about teaching in an urban school district. First, the majority of teachers expressed beliefs about teaching that were teacher centered. Teachers believed that the curriculum in urban schools should focus solely on attainment of basic skills. The assumption was that urban students could be kept under better control in the classroom if they were kept busy on activities that promote skills development; as the researcher described "a straight from the book, very structured curriculum presented the means of control of student behaviors" (p. 90). Finally, there was an assumption among the teachers in the sample that suburban students should in fact receive a more comprehensive education when compared to urban students. While Anyon (1981) and Gilbert (1997) present the case that preservice and practicing teachers in urban school districts have historically shown a tendency towards teacher centered beliefs about teaching, more recent studies (Peabody, 2011; King & Heurer, 2006; Love & Kruger,

2005) provide support that urban districts vary in their population of teacher centered and student centered teachers.

In contrast to both Anyon (1981, 1994) and Gilbert (1997), Peabody's (2011) investigation provided research support to conclude that urban districts are populated with both teacher centered and student centered teachers. The investigator examined teachers with teacher centered and student centered beliefs about teaching in an urban Florida school district. The purpose of his study was to identify the differences between teachers' beliefs about teaching in high versus low performing urban high schools. The investigator selected four tenth-grade English language arts and literacy teachers at four urban schools in which there was a majority of low income minority students. The schools were classified as either high or low performing based on their passage rates on the Florida Comprehensive Reading Assessment. The high performing schools had a passage rate of at least 65%, and the low performing schools had passages rates of lower than 40 percent. The investigator conducted interviews and classroom observations over a period of four weeks. Findings showed that in the urban schools that were considered high performing, teachers held student centered beliefs about teaching. For example, teachers articulated that students need to be given "real choices, decision making power, and ownership over aspects of curriculum planning" (p. 186). In contrast, the lower performing urban schools were populated with teachers who demonstrated teacher centered beliefs about teaching. These teachers believed the curriculum was linear and should be delivered in a direct transmission approach (i.e., teacher-centered). Their instruction focused on skill building activities such as the completion of worksheets. This study compliments more recent research (King & Heurer, 2006; Love & Kruger,

2005) that suggests urban districts have a variable population of teachers with teacher centered teachers. In fact, districts may vary considerably in their populations of teachers with teacher centered and student centered beliefs about teaching. Over the past 30 years, much of the research (e.g., Yoon et al., 2007) on classroom instruction in the United States has supported student centered instruction an effective method for improving student achievement. Therefore, it is important for school leaders to know what proportions of teacher centered teachers are represented in the district, as a benchmark for leveraging school change.

Teachers who ascribe to a teacher centered orientation are typically less amenable to changing their beliefs about teaching through traditional professional development programs (Marzano & Waters, 2005; Patrick & Pintrich, 2001; Gill et al., 2004; Howard et al., 2000). Patrick & Pintrich, (2001) demonstrate this resistance to change in their review of the research on changing teachers' beliefs about teaching. The researchers describe teachers with teacher centered beliefs about teaching as those who believe learning is "a relatively mechanical reception of information and is characterized in the classroom by following procedures correctly, mastering skills through direct instruction, independent practice, and remembering" (p. 120). They contend that teachers who follow this line of thinking do not respond to traditional instruction in the form of professional development; thus, changing beliefs requires more specific intervention. This assertion has been corroborated by researchers interested in teacher belief change (Sinatra & Kardash, 2004; Gill et al., 2004; Howard et al., 2000).

Previous findings (e.g., Anyon, 1981) assert that urban districts are primarily populated with teacher centered teachers, but more recent studies (e.g., King & Heurer,

2006; Love & Kruger, 2005) confirm that there is indeed variability in the representation of teacher and student centered teachers within a district. This distribution is important to school leaders in light of the recent studies (e.g., Gill et al., 2004; Howard et al., 2000) that suggest teacher centered teachers may be resistant to adopting new teaching knowledge.

Personal Epistemology and Teaching

A key contribution from the field of Personal Epistemology to research in education has been the conceptualization of teacher centered and student centered beliefs as two points on a continuum.

Developmental Models of Personal Epistemology. One of the first conceptualizations of personal epistemology was that individuals have a general belief system about the nature of knowledge that moves along a predictable developmental trajectory. This notion has served as the basis for most of the theoretical work in this area. William Perry is acknowledged as the architect of the initial framework for personal epistemology. In Perry's (1970) study, participants were randomly selected from 154 students who had taken the Checklist for Educational Views (CLEV). Using interviewees from Harvard and Radcliffe's class of 1962, Perry and his colleagues ended the investigation with 67 complete interviews recorded over four years. They evaluated these cases using a phenomenological approach, which focuses on describing the psychological dynamics of the lived experience (Creswell, 2007).

In the summation of his results, Perry (1970) contended that in the students' academic work, social life, extracurricular activities, and employment, their approach to dealing with challenges "seemed to represent a coherent development in the forms in

which they functioned intellectually, in the forms which they experienced values, and in the forms in which they construed their world" (p. 9). Interviews revealed four themes that Perry describes as positions. These positions occured sequentially on a continuum: (a) dualism, (b) multiplicity, (c) relativism, and (d) commitment with relativism. At the beginning of the continuum is dualism, which is characterized by the belief of absolute right and wrong. In this position, a person views authority figures as the holders of knowledge. In this perspective, experts (e.g., professors) have a responsibility for disseminating the truth. As the individual gains new information, he/she eventually make a structural shift from the position that knowledge can be absolute. The second position is multiplicity. In this position, there is a recognition that uncertainty in knowledge exists. Knowledge is considered knowable (i.e., all questions have an answer), but the individual believes the authority figures have not found the correct answer; and therefore everyone can have an opinion that differs by individual. In the relativism position, the individual begins to believe that he/she is responsible for making meaning from knowledge because truth for the Relativist is based on numerous forms of evidence weighed and justified by the individual. The last position, commitment with relativism is considered to be a qualitative shift in knowing and is not considered a structural change (i.e., dualist to multiplist). The commitment to a certain belief describes this position. Commitment is a matter of refining the justification for a particular belief. This stage was not commonly reached by the students in the sample; however Perry's findings support the likelihood that this stage is attainable with increasing education and experience. Perry's work provided an early framework for understanding how beliefs about knowledge evolve in a developmental sequence.

Kuhn (1999, 2000) elaborated on Perry's work by examining lay (i.e., people from various segments of the community) people's beliefs about knowledge in nonacademic settings to better understand how people's beliefs about knowledge influenced their reasoning and thinking in their everyday lives. In her study, she examined a sample from the lay community that ranged in age from 20 to 40 with level of education and gender being equally distributed. Kuhn and her colleagues interviewed participants, asking three questions pertaining to urban social problems (e.g., (1) What causes children to fail in school? (2) What causes prisoners to return to a life of crime after they are released? (3) What causes unemployment?). Kuhn's findings were consistent with Perry's. In her framework, Kuhn reduced Perry's epistemic positions from four to three. Responses to the researcher's questions fell within three categories: (a) absolutist, (b) multiplist, and (c) evaluativist. Respondents who were categorized as absolutists (Perry's dualism position) viewed knowledge as absolute, using facts or expertise to justify their beliefs. Multiplists were generally skeptical about the facts of experts and viewed knowledge as being inconsistent over time. Multiplists also felt that their own views were as valid as those of experts. Finally, evaluativists (Perry's Relativist and relativist with commitment position) denied the existence of certainty. Evaluativists used argumentation to weigh varying beliefs; however, conclusions by this group were based on the merits of multiple points of view. These three positions are developmental in nature. Increased years of education, age, and experience were found to contribute to the development of more advanced epistemic beliefs. Both Kuhn's (1999, 2000) and Perry's (1970) research shows a coherent developmental sequence across multiple contexts that is influenced by age, education, and experience.

Domain specific and multidimensional aspects of personal epistemology. The original conceptions of personal epistemology as a general developmental phenomenon assumed that an individual's epistemic beliefs evolved uniformly across contexts (i.e., domain general; Perry, 1972; Kuhn, 1999). More recent studies show that individuals also have beliefs that are context dependent or domain specific. For example, Muis and colleagues (2006) examined 19 empirical studies to evaluate the representations of domain specificity in the personal epistemology literature. They classified the studies as either between-subjects or within-subjects studies. Between-subjects studies evaluated two groups of students separated by discipline or major (e.g., science versus English majors) and their beliefs about a particular academic domain. Within-subjects groups consisted of one group of people (e.g., mathematics majors) from a particular discipline and how they described their beliefs about two contrasting disciplines (e.g., social studies and science). There were eight between-subjects studies (i.e., students from different majors) and eleven within-subjects studies (i.e., students in one major). In the betweensubjects investigations, all eight studies demonstrated domain specificity in their findings. Similarly, in the within-subjects studies, there was evidence of domain specificity. In short, these findings present strong evidence that individuals have domain specific epistemic beliefs.

In another example of domain specificity, Palmer & Mara (2004) launched a qualitative investigation to validate whether the epistemologies of undergraduates in the sciences differed across knowledge domains such as science versus the humanities. The researchers selected 60 juniors and seniors from a sample of 220 undergraduates who were participating in a larger study related to intellectual development. Palmer & Mara

(2004) altered their original interview protocol to ascertain more specific information about the students' epistemologies. In their study, the interviewers asked students:

What stood out to them in college so far, about their definition of the ideal college education, their preferences for learning, their definitions of knowledge and truth, how they solve open-ended problems, how they made decisions in the face of conflicting information, their experience as learners in science and engineering courses as compared to humanities, and their encounters with people who held views different from themselves (Palmer and Mara, 2004, p. 315).

In the final analysis, the researchers compared the students' epistemic beliefs in both the science and humanities domains. Results showed distinct differences in the patterns of knowing between the science and humanities domains. The investigators stated "indeed it was common for a single student to exhibit a fairly complex epistemology in one area while expressing a simple epistemology in the other" (p. 323).

Other theorists (Schommer, 1990; Hofer & Pintrich, 1997) have sought to illuminate this phenomenon. For example, Schommer (1990) has argued that epistemic beliefs are a multidimensional construct, consisting of a series of more or less independent beliefs about knowledge. In her framework, she contends that epistemic beliefs have five dimensions that are concurrently operating in a particular domain that can be divided into two categories: (a) beliefs that refer to the nature of knowledge (i.e. source, structure, and stability of knowledge), and (b) beliefs that refer to the learning process and the acquisition of knowledge (i.e., control of learning processes and speed of knowledge acquisition, Schommer, 1990).
In her mixed methods study, Schommer (1990) examined 265 college students to assess the relationship between their epistemic beliefs and their comprehension of social and physical science texts. The last paragraph of a selected text was removed, and students were asked to finish the essay based on their understanding of the reading. A questionnaire developed from Schommer's (1990) pilot study of personal epistemology was used to assess five dimensions of personal epistemology:

- 1. Simple Knowledge Dimension Knowledge is simple rather than complex.
- 2. Omniscient Authority Dimension Knowledge is handed down by authority rather than derived from reason.
- 3. Certain Knowledge Dimension Knowledge is certain rather than tentative.
- 4. Innate Ability Dimension The ability to learn is innate rather than acquired.
- 5. Quick Learning Dimension Learning is quick or not at all.

Results from factor analysis showed loadings on all factors except Omniscient Authority. In this five-factor model, Schommer examined the likelihood of intercorrelations. No significant intercorrelations were established between factors, leading Schommer to conclude that these five factors were mutually exclusive. In addition, correlations were found between students' epistemic beliefs and their text comprehension. "Belief in quick learning predicted oversimplified conclusions, poor performance on the mastery test, and overconfidence in test performance. The belief in certain knowledge predicted inappropriately absolute conclusions" on the text (Schommer, 1990, p. 498).

Correlations also showed an association with answers on the text that illustrated tentative thinking. Schommer's (1990) work was seminal in that it was the first conceptualization of personal epistemology as domain specific. More specifically, Schommer's work

created a platform for thinking about an individual's epistemologies in a way that identifies the multiple dimensions that influences thinking in domain specific contexts. This discovery has become important in understanding how teachers conceptualize their approaches to teaching in different subject areas (Palmer & Mara, 2004) and in different school contexts (Anyon, 1981).

The link between personal epistemology and teaching. The developmental, domain specific and general, multidimensional characteristics found among the lay community and college students' epistemic beliefs have also been found in studies of the professional knowledge used by teachers (Feucht, 2010; Fives & Buehl, 2008; Hofer & Pintrich, 1997). For example, Schraw and Olafson (2002) examined the epistemic beliefs of practicing teachers. The objective of their mixed methods study was to understand "teachers' epistemological worldviews" (p. 1) as compared to findings from studies of college students (Perry, 1970). As they describe, an epistemological worldview is defined as a "set of beliefs about knowledge and knowledge acquisition that influences the way teachers think and make important instructional decisions" (p. 1). The investigators surveyed and interviewed 24 practicing teachers participating in a summer graduate course. The teachers' years of experience ranged from one to 15 years and represented elementary and middle school grade levels. Results showed that teachers' worldviews followed a developmental continuum from naïve to more sophisticated beliefs.

Accordingly, teachers' epistemic beliefs about teaching were categorized into three categories: (a) *realist*, (b) *contextualist*, and (c) *relativist*. The *realist* worldview "assumes that there is an objective body of knowledge that is best acquired through

experts via transmission and reconstruction" (p. 8). Teachers in this category view students as "passive recipients of prepackaged knowledge" (p. 8). This orientation is akin to the teacher centered instructional orientation. In the second category, the contextualist worldview contends that "learners construct shared understanding in collaborative contexts" (p. 9). In this category, the teacher serves as a facilitator of knowledge development among groups of students. In the third and final category, the *relativist* worldview was defined by a student centered approach also, where "each learner constructs a unique knowledge base that is different but equal to that of other learners" (p. 9). Schraw & Olafson's investigation confirmed that teachers' beliefs about teaching (i.e., epistemic beliefs) were consistent with the developmental trajectories found among college students (Perry, 1970) and the lay community (Kuhn, 2002). More importantly, the investigators confirmed the alignment of teachers' orientation with their epistemic beliefs about teaching. As Schraw & Olafson (2002) state, "we expect teachers endorsing a realist worldview to adopt a teacher centered approach to teaching, whereas teachers endorsing a contextualist or relativist worldview should adopt a student centered approach" (p. 8).

Domain specific and multidimensional aspects of teacher epistemology. In addition to the developmental characteristics of teachers' epistemology, researchers (Tsai, 2002; Fives & Buehl, 2008) demonstrated that teachers have domain/context specific beliefs about teaching, which includes knowledge beliefs about content. For example, Tsai (2002) examined the domain (i.e., content) specific epistemic beliefs of physics and chemistry teachers. The objective of his study was to characterize science teachers' epistemic beliefs about teaching science. In his sample, he interviewed 37

secondary school teachers ranging in experience from two to 20 years of teaching. Results showed that teachers' beliefs about teaching science followed a developmental path consistent with other studies of teacher epistemology (Schraw & Olafson, 2002). At the beginning of the continuum, *traditional* teachers believed that science is "taught by transferring knowledge from teachers to students" and science knowledge is characterized by "scientific truths and facts" (Schraw & Olafson, 2002, p. 774). At the intermediate or *process* stage, teachers believe that science should be taught by focusing on the processes and problem-solving procedures of science such as scientific method or experiential learning. The more sophisticated or advanced epistemic beliefs about science knowledge were labeled as *constructivist*. *Constructivist* teachers believed science is "best taught by helping students construct knowledge" (p. 774).

Fives & Buehl (2008) examined the multidimensional aspects of teacher's epistemic beliefs. In their study, the investigators found a number of other domains to be included. In their investigation of teachers' epistemic beliefs, the objective was to "understand how these beliefs manifest and articulated by practioners (p.476)." The researchers gathered qualitative data on 110 preservice and inservice teachers. Data were analyzed using Schommer's-Aikins (2004) multidimensional model of epistemic beliefs. Five themes emerged from their data. They were teachers' epistemic beliefs about a) classroom management and organization, b) pedagogical knowledge, c) children, d) content knowledge, and e) teacher qualities. Results showed that within each of the five domains, teachers articulated both naïve and sophisticated beliefs about the source, structure and stability of knowledge (i.e. epistemic beliefs). Both Tsai, (2002) as well as

Fives & Buehl (2008), provide evidence of teachers' domain specific beliefs about teaching as well as their multidimensionality.

Epistemic beliefs to district change. Past research on classroom teaching (Blachman et al., 2004; Mathes et al., 2005) acknowledges that the preferred orientation for classroom teachers would be Tsai's (2002) constructivist or Schraw & Olafson's (2002) relativist teacher, however teachers with realist (Schraw & Olafson, 2002), traditional (Tsai, 2002), or teacher centered (Peabody, 2011) epistemic beliefs often have beliefs across one or more dimensions of beliefs that impede the adoption of more advanced beliefs. For example, Howard et al., (2000) "sought to investigate how teachers' epistemological beliefs might be changed as a result of the training program" (p. 458). Howard and colleagues selected 41 practicing teachers from a national pool of Master Teachers to participate in a residential professional development program. Teachers ranged in experience from less than five years of teaching to between 10 and 20 years of teaching experience. The participants spent four weeks living in a residential university campus. At the beginning of the experience, the teachers were administered Schommer's Epistemic Beliefs Questionnaire, which is a 63-item questionnaire that outlines the five beliefs factors proposed in her framework. Each day, the participants participated in professional development workshops that involved constructivist instructional methodologies designed to promote conceptual change. At the end of the experience, the teachers were administered the Epistemic Beliefs Questionnaire a second time. Findings show that "teachers demonstrated significant changes on three of the four factors measured" (p. 459). More specifically, teachers demonstrated significant change on the factors of Simple Knowledge, Quick Learning, and Certain Knowledge. As the

investigators point out, the significance of these findings is that teachers "moved from objectivist epistemological orientations to more constructivist ones (p. 459)." To parallel the developmental levels espoused by Schraw & Olafson (2002), teachers moved from more realist to more contextualist and relativist worldviews. However, on the dimension of fixed ability (i.e., the ability to learn is innate rather than acquired), teachers with realist epistemic beliefs did not respond to the intervention. This is important to note because realist epistemic beliefs in the dimension of fixed ability is characterized by teachers who view ability as fixed at birth and they tend to describe student's underperformance as the fault of the learner (Fives & Buehl, 2008). Also, these teachers believe that their ability to teach is fixed. A fixed ability belief (i.e., teacher centered belief) may influence these teachers' level of engagement in professional development activities that attempts to alter their classroom practice.

In an additional example, Gill et al. (2004) hypothesized that if they could assist preservice teachers in developing more sophisticated general epistemic beliefs about teaching knowledge, preservice teachers would develop more sophisticated epistemic beliefs about mathematics content knowledge. In their study of preservice mathematics teachers, the investigators selected 161 undergraduate elementary education majors. Eighty-four students were assigned to the control group and 77 to the treatment group. The researchers used two techniques poised to promote epistemic belief change in the treatment group. The techniques were *augmented activation* and *refutational text*. Augmented activation is a technique in which the researcher focuses the attention of the participants on "salient information in instructional text that conflicts with their own beliefs" (p. 168). Refutational text is "designed to stimulate conceptual change by

fostering students' dissatisfaction with their current beliefs through rebuttal of those beliefs using scientific evidence" (as cited by Guzzetti et al., 1993). In comparison, the teachers in the control group were given expository text. Expository text is a form of writing used for informational purposes. The goal of this type of literature is to provide the reader with a description, explanation, information, or a definition. Both techniques were implemented during the inservice workshops (i.e., intervention).

Following the intervention, significant findings were reported. Overall, teachers in the treatment group demonstrated greater change in their epistemological beliefs about mathematics than did teachers who were exposed to expository texts. However, change in general beliefs about teaching knowledge was not associated with change in the domain-specific belief about teaching mathematics. The failure to change was associated with teachers having realist epistemic beliefs on the dimension structure of knowledge. The investigators explain this phenomenon by stating "teachers who hold beliefs about knowledge as simple and certain are less likely to engage in deep thinking about the ideas presented in the refutational text and in turn are less likely to develop sophisticated beliefs about the nature of mathematics and how understanding of mathematics is developed" (p. 180).

Summary

The dichotomy between teacher and student centered beliefs (Table 3) has been conceptualized as two points on a continuum in the field of teacher epistemology (Schraw & Olafson, 2002). The consistencies seen between teacher's epistemic beliefs and their classroom practice suggests that teachers' with teacher centered (Peabody, 2011) or realist (Schraw & Olafson, 2002) beliefs can adopt more advanced

epistemological perspectives (i.e., contextualist or relativist) with the proper interventions (Gill et al., 2004). For urban schools, a key problem to consider is that 30 years of peerreviewed research on urban teachers has shown consistent clusters of teachers with teacher centered (i.e., realist) epistemic beliefs, primarily in elementary and middle school settings (Winfield, 1985; Anyon, 1981; King, 1998; Peabody, 2011). Much is still unknown about the developmental, domain specific-general, and multidimensional aspects of high school teachers' epistemic beliefs.

Further, teachers with realist epistemic beliefs show a resistance to adopting new approaches (Gill et al., 2004). The etiology of this dilemma can be due in part to realist epistemic beliefs in one or more of the three dimensions that characterize teachers' beliefs about the nature of knowledge (Schommer, 1990). In particular, realists see knowledge as static, which might affect the adoption of new teaching strategies. Regardless, a cluster of teacher centered teachers of significant size within a given district could impede progress toward improving student learning outcomes. There is a need to identify the proportions of teachers with realist epistemic beliefs, specifically at the high school level, where little research has been performed.

In order to activate reform in urban school districts, teachers must learn student centered instructional practices to improve student learning (ASCD, 2012). The ability to identify teachers at the high school level who may need specific training to shift their epistemic beliefs about knowledge toward student centered epistemic beliefs could support the progress towards district reform and student achievement in the schools.

Table 3

Teacher's Enistemic	Teaching Orientation	Role of the Student	Teacher		
Beliefs			Deneis		
Realist	Teachers tend to see themselves as experts who transmit universal	Teaching focuses on the teacher as the source of academic knowledge.	Teacher- centered		
	knowledge.	The role of the student as a more or less passive recipient of knowledge.			
		Students' learning is based on the student's ability to memorize facts disseminated by the teacher.			
Contextualist and Relativist	Teachers see themselves as facilitators of knowledge development.	Teaching is a shared activity, with the teacher as a facilitator of student inquiry.	Student- centered		
	Each learner's unique knowledge base is constructed as different but equal to those of other learners	Teachers focus on developing the students skills that shape how to approach critical thinking, and how that thinking can be applied in their day to day lives.			
		Students learn best by finding solutions to problems on their own.			
Note. Schraw,	Note. Schraw, G., & Olafson, L. (2002). Teachers' epistemological world views and				

The Alignment between Teacher and Student centered Teaching Orientations with Teacher's Epistemic Beliefs

educational practices. Issues in Education, 8(2), 99-49; Peabody, D. (2011,

Spring). Beliefs and instructional practices among secondary teachers within

selected high and low performing high schools. Florida Journal of Educational

Administration & Policy, 4(2), 182-192.

Chapter Three

Methodology

Research Design

The investigation used a phenomenological design to examine high school teachers' epistemic beliefs. According to Creswell, (2007) phenomenological studies are important for researchers interested in a particular research topic such that they can "write a description of the phenomenon, maintaining a strong relation to the topic of inquiry and balancing the parts of the writing to the whole" (p. 59). Furthermore, the phenomenological approach is "an in interpretive process in which the research makes an interpretation of the meaning" of the phenomenon under study (Creswell, 2007 p. 59). This investigation gathered quantitative data on the epistemic beliefs of high school teachers in one urban district. Descriptive statistics were used to describe the proportions of teachers with teacher centered (i.e., realist) and student centered (i.e., contextualist/relativist) epistemic beliefs about source, structure, and stability of knowledge (i.e., multidimensionality). Inferential statistics were used to analyze the relationships between high school teachers' epistemic beliefs and their demographics characteristics.

Participants

Site Selection. The district under study was selected for two reasons. First, this district like many other urban districts across the United States has a high percentage of students who are underperforming academically. According to the State Department of Education's data on this district, More than 80 percent of schools were listed as low achieving (NYS Report Card, 2011). Therefore, studies that support improvement in

student learning are important. Also, the district in this study shares key characteristics (e.g., city size, school population, student performance) with other schools on the Council of Great City Schools. Though findings from the current investigation can only be generalized to the district currently under study, discoveries from this investigation may provide insights to other member districts that can be used in future research.

Sampling procedure. The researcher used a *convenience sample* to survey secondary school teachers from one urban school district. This form of sampling focuses on "selecting individuals and sites for study because "they are willing and available to be studied" (Creswell, 2002, p. 167). This strategy was useful in making generalizations about the general epistemic beliefs of secondary teachers teaching in this specific urban school district. Teachers were recruited from one metropolitan city with a minimum population of 250,000 residents. Secondary teachers were selected based on their involvement teaching in grades nine through twelve.

Materials and Instruments

Instruments. The Epistemic Beliefs Inventory (EBI) is a 32-item self-report survey developed by Schraw, Bendixen, & Dunkle (2002) that assesses the five-factor epistemic beliefs framework reported by Schommer (1990). The five factors are (a) Simple Knowledge (knowledge is simple rather than complex); (b) Omniscient Authority (knowledge is handed down by authority rather than derived from reason); (c) Certain Knowledge (knowledge is certain rather than tentative); (d) Innate Ability (the ability to learn is innate rather than acquired); and (e) Quick Learning (learning is quick or not at all). Schommer's framework examines two dimensions of epistemic beliefs, the nature of knowledge and the nature of the ability to learn. The nature of knowledge subscales

includes Simple Knowledge, Omniscient Authority, and Certain Knowledge, and the epistemic beliefs about the ability to learn are assessed on the Quick Learning and Innate Ability subscales. For the purpose of this study, the three factors that target the nature of knowledge (i.e., Simple Knowledge, Omniscient Authority, and Certain Knowledge) were used. Among the three epistemic beliefs scales, Simple Knowledge examines the structure of a person's beliefs, Omniscient Authority focuses on the individual's beliefs about the source of knowledge, and the Certain Knowledge scale addresses the individual's beliefs about the stability of knowledge. On the survey, students respond to each of the 32 statements by selecting a number on a five-point Likert scale, with one corresponding to "strongly disagree" and five corresponding to "strongly agree." The Simple Knowledge scale includes items 1, 10, 11, 13, 18, 22, and 24. The Certain Knowledge scale includes items 2, 14, 19, 23, 25, and 31, and the Omniscient Authority scale included items 4, 7, 27, and 28. The scales for each factor have demonstrated statistical reliability. Each of the subscales was tested using the Cronbach alpha coefficient test. The Cronbach coefficient is used to examine the internal consistency of psychometric test (Chronbach, 1951). Cronbach scores above .70 are consistent with "good" reliability. The reliability of the three scales show Simple Knowledge with a Cronbach's Alpha of .76, the Certain Knowledge factor shows a Cronbach's Alpha of .79. For the Omniscient Authority scale, the reliability was confirmed with a Cronbach's Alpha of .70.

The Individual Demographics Form was used to gather information pertaining to teachers' levels of education, areas of certification, years of experience teaching, and attitudes about professional development,. The researcher explored the relationships

between teachers' educational level, years of teaching, attitudes about professional development, and areas of certification with their general epistemic beliefs (i.e., the source, structure, and stability of knowledge).

Data Collection

Teachers ranging in experience and educational level were recruited through the district's central office, to participate in an online survey. The researcher sent a letter (Appendix A) to the Superintendent of the district, requesting permission to perform a survey of all high school teachers in their district. The letter also included a copy of the Letter of Invitation/Informed Consent Form (Appendix C), and two Friendly Reminder Emails (Appendix E) that were sent to the high school teachers in the district. Permission was granted to the researcher to perform the study on November 28, 2013, the researcher distributed the Electronic Letter of Invitation to 843 high school teachers in the district. In the Electronic Letter of Invitation, teachers were invited to participate in a study that furthers our knowledge of high school teacher's epistemic beliefs. Teachers were informed that their participation entered them into a drawing to win one of four \$25 gift cards. A link to the survey was included in the Electronic Letter of Invitation. Once the link was clicked, teachers were forwarded to the Letter of Invitation/Informed Consent Form (Appendix C), The Epistemic Beliefs Inventory (Appendix G), and the Individual Demographics Form (Appendix F). To increase response rates, the researcher emailed two previously formatted Friendly Reminder Emails. One email was sent two weeks after the initial invitation, and a second email was sent two weeks later. The anticipated response rate was set at 17% of the high school teachers in the district (Visser, Krosnick, Marquette & Curtin, 1996). According to Visser et al. (1996) surveys demonstrate

acceptable levels of accuracy in this range. The following research questions and hypotheses were used to guide data analyses.

Research Questions

- What are the proportions of high school teachers in an urban school district with teacher centered (i.e., realist) and student centered (i.e., contextualist and relativist) general epistemic beliefs about the source of knowledge?
- 2. What are the proportions of high school teachers in an urban school district who hold teacher centered (i.e., realist) and student centered (i.e., contextualist and relativist) general epistemic beliefs about the structure of knowledge?
- 3. What are the proportions of high school teachers in an urban school district who hold teacher centered (i.e., realist) and student centered (i.e., contextualist and relativist) general epistemic beliefs about the stability of knowledge?
- 4. What are the proportions of high school teachers in an urban school district who hold teacher centered (i.e., realist) and student centered (i.e., contextualist and relativist) general epistemic beliefs across each area of content certification?
- 5. Is there a relationship between high school teachers' educational level, years of experience, and attitudes about professional development with their beliefs about the source, structure, and stability of knowledge?

Hypothesis

Question five was answered using the following hypotheses:

Hypothesis 1

H0: There is a relationship between urban high school teachers' years of experience and their general epistemic beliefs.

H1: There is no relationship between urban high school teachers' years of experience and their general epistemic beliefs.

Hypothesis 2

H0: There is a relationship between urban high school teachers' educational level and their general epistemic beliefs.

H1: There is no relationship between urban high school teachers' educational level and their general epistemic beliefs.

Data Analysis

The demographic information and the scores from the Epistemic Beliefs Inventory were analyzed using the Statistical Package for the Social Sciences (SPSS) version 17.0. Demographic information about the participants included teachers' years of experience, educational level, and attitudes about professional development. Grouped frequencies and percentages of teachers' developmental levels across the three dimensions of epistemic beliefs were calculated using the Statistical Package for the Social Sciences. Scores for the three dimensions came from the Simple Knowledge, Omniscient Authority, and Certain Knowledge subscales of the Epistemic Beliefs Inventory (Schraw et al., 2002). As stated in the Materials and Instruments section of this report, the Simple Knowledge, Omniscient Authority, and Certain Knowledge subscales measure the multidimensionality of an individual's general epistemic beliefs (i.e., source, structure, and stability of knowledge) about the nature of knowledge. Two subscales (Fixed ability and Innate ability) on the EBI measure an individual's beliefs about the ability to learn, and were not in the purview of the current investigation, and therefore these subscales were not included in the data analysis.

Research questions one through four sought to identify the proportions of teachers with teacher centered (i.e., realist) and student centered (i.e., contextualist and relativist) general epistemic beliefs across the source, structure, and stability of knowledge. A relative frequency table was developed to show the proportions.

Research question five assessed the relationships between high school teachers' scores on the Source, Structure, and Stability of Knowledge subscales on the EBI with teachers' and individual factors. To determine the relationship between teachers' individual demographics with their scores on the EBI, the Pearson product-moment correlation coefficient was used. According to Creswell (2007), the Pearson product-moment correlation coefficient measures the degree of a relationship between two continuous variables. If the correlation statistic (*r*) is between +1.00 and +0.50, the variables have a strong positive relationship. A correlation value between -1.00 and -0.50 is indicative of a strong negative relationship. An R-value between -0.30 and +0.30 indicates that there is a weak relationship between variables (Coolidge, 2006). For this study, the researcher established an a priori a minimum significance level of 0.05. Researchers (Creswell, 2006; Coolidge, 2006) recommend this as the conventional minimum level of significance for social science research.

Researcher Bias

Since the methodology of this investigation took a phenomenological approach, it should be considered that the researcher's examination of teachers' epistemic beliefs about knowledge was being performed with a preexisting understanding of the literature on teacher beliefs and personal epistemology. On the one hand, studies in the field of teachers' beliefs suggest that teachers have a particular orientation (i.e., teacher centered

or student-centered) that is influenced by their beliefs (Duffy, 1985; DeFord, 1985;

Grant, Young, & Montibrand, 2001).

Table 4

The Alignment of the Research Questions with the Instruments

Research Questions/Hypotheses	Epistemic Beliefs Inventory	Individual Demographics Form
1. What are the proportions of high school teachers in an urban school district who hold teacher centered (i.e., realist) and student centered (i.e., contextualist and relativist) general epistemic beliefs about the source of knowledge?	Omniscient Authority scale included items 4, 7, 27, and 28.	
2. What are the proportions of high school teachers in an urban school district who hold teacher centered (i.e., realist) and student centered (i.e., contextualist and relativist) general epistemic beliefs about the structure of knowledge?	Simple Knowledge scale includes items 1, 10, 11, 13, 18, 22, and 24.	
3. What are the proportions of high school teachers in an urban school district who hold teacher centered (i.e., realist) and student centered (i.e., contextualist and relativist) general epistemic beliefs about the stability of knowledge?	Certain Knowledge scale includes items 2, 14, 19, 23, 25, and 31.	
4 What are the proportions of high school teachers in an urban school district who hold teacher centered (i.e., realist) and student centered (i.e., contextualist and relativist) general epistemic beliefs across each area of content certification?	Certain Knowledge, Omnisicient Authority, and Simple Knowledge Subscales	What is your primary area of certification?
5. Is there a relationship between high school teachers' demographic background and their general epistemic beliefs about the source, structure, and stability of knowledge?		
Hypothesis 1 H0: There is a relationship between urban high school teachers' years of experience and their general epistemic beliefs.	Simple Knowledge scale (Structure of Knowledge) includes items 1, 10, 11, 13, 18, 22, and 24.	How many years have you been teaching?
H1: There is no relationship between urban high school teachers' years of experience and their general epistemic beliefs.	Certain Knowledge scale (Stability of Knowledge) includes items 2, 14, 19, 23, 25, and 31.	
	Omniscient Authority scale (Source of Knowledge) included items 4, 7, 27, and 28.	

Table 4 Continued

The Alignment of the Research Questions with the Instruments

Research Questions/Hypotheses	Epistemic Beliefs Inventory	Individual Demographics Form
Hypothesis 2 H0: There is a relationship between urban high school teachers' educational level and their general epistemic beliefs.	Simple Knowledge scale (Structure of Knowledge) includes items 1, 10, 11, 13, 18, 22, and 24.	What is your educational level?
H1: There is no relationship between urban high school teachers' educational level and their general epistemic beliefs.	Certain Knowledge scale (Stability of Knowledge) includes items 2, 14, 19, 23, 25, and 31.	
	Omniscient Authority scale (Source of Knowledge) included items 4, 7, 27, and 28.	
Hypothesis 3 H0: There is a relationship between urban high school teachers' attitudes about professional development and their general epistemic beliefs.	Simple Knowledge scale (Structure of Knowledge) includes items 1, 10, 11, 13, 18, 22, and 24.	How many hours of professional development programming did you participate in over the
H1: There is no relationship between urban high school teachers' attitudes about professional development and their general	Certain Knowledge scale (Stability of Knowledge) includes items 2, 14, 19, 23, 25, and 31.	past school year? -In workshops
epistemic beliefs.	Omniscient Authority scale (Source of Knowledge) included items 4, 7, 27, and 28.	-In a graduate or certificate program

On the other hand, the conceptualization of teacher centered and student centered beliefs as developmental, domain general/specific, and multidimensional (i.e., as they are articulated in the field of personal epistemology) were also influential aspects of the researcher's prior knowledge in this study (Kuhn, 1998; Hofer, 2000; Muis et al., 2006; Schommer, 1990, 1994).

Chapter Four

Results

Overview of Study

The objective of this study was to examine the proportion of high school teachers with teacher centered (i.e., realist) and student centered (i.e., contextualist and relativist) epistemic beliefs about the source, structure, and stability of knowledge in a single urban school district, and to identify potential relationships between high school teachers' demographic characteristics with their general epistemic beliefs. Researchers have shown that teachers with student centered (i.e., contextualist and relativist) epistemic beliefs positively influence student achievement (e.g., Blachman et al., 2004; Mathes et al., 2005) because they enact student centered teaching practices in the classroom, and those with teacher centered epistemic beliefs (i.e., realist) negatively influence student achievement because they tend to emphasize teacher centered classroom practices (Johnston et al., 2001). Additionally, studies have shown that teachers with realist epistemic beliefs are typically less amenable to changing their beliefs about teaching than are contextualist or relativist teachers (Gill et al., 2004; Howard et al., 2000). Therefore it is important for district leaders to know what proportions of high school teachers with realist epistemic beliefs are represented in the district and to establish identifiers (e.g., teachers of a certain age or experience level) for student centered and teacher centered epistemic beliefs.

Concepts under Review

- Source of Knowledge is a dimension among the general epistemic beliefs that describes whether an individual believes knowledge is handed down by authority figures or derived from reason (Schommer, 1990).
- Structure of Knowledge is a dimension among the general epistemic beliefs that describes whether an individual believes that knowledge is composed of simple, disconnected facts or composed of complex interrelated concepts (Schommer, 1990).
- Stability of Knowledge is a dimension among the general epistemic beliefs that describes whether an individual believes knowledge is certain or tentative (i.e., knowledge changes over time; Schommer, 1990).
- 4. *Omniscient Authority* is a subscale on the Epistemic Beliefs Inventory that measures the *source of knowledge* dimension.
- *5. Simple Knowledge* is a subscale on the Epistemic Beliefs Inventory that measures the *structure of knowledge* dimension.
- 6. *Certain Knowledge* is a subscale on the Epistemic Beliefs Inventory that measures the *stability of knowledge* dimension.

Instruments

Two instruments were used. The first instrument used in this analysis was the Epistemic Beliefs Inventory (EBI), a 32-item self-report survey developed by Schraw and colleagues (2002). The EBI (Appendix F) assesses the five-factor epistemic beliefs framework reported by Schommer (1990). The five factors are (a) Simple Knowledge, the belief that knowledge is simple rather than complex; (b) Omniscient Authority, the

belief that knowledge is handed down by authority rather than derived from reason; (c) Certain Knowledge, the belief that knowledge is certain rather than tentative; (d) Innate Ability, the belief that the ability to learn is innate rather than acquired; and (e) Quick Learning, the belief that learning occurs quickly or not at all. For the purpose of this study the three factors that target the nature of knowledge (i.e., Simple Knowledge, Omniscient Authority, and Certain Knowledge) will be used. Among the three epistemic beliefs scales, Simple Knowledge examines the structure of a person's beliefs, Omniscient Authority focuses on the individual's beliefs about the source of knowledge, and Certain Knowledge addresses the individual's beliefs about the stability of knowledge. Teachers respond to each of the 32 statements by selecting a number on a five-point Likert scale, with 1 corresponding to "strongly disagree" and 5 corresponding to "strongly agree." Low scores on each subscale represent contextualist/relativist epistemic beliefs, which are associated with student centered teaching. High scores are demonstrative of realist or teacher centered epistemic beliefs. The Simple Knowledge subscale includes items 1, 10, 11, 13, 18, 22, and 24. The Certain Knowledge subscale includes items 2, 14, 19, 23, 25, and 31, and the Omniscient Authority subscale included items 4, 7, 27, and 28. Reverse coding was used for items 2, 6, 14, 20, 24, 30, 31. The implications of reverse coding the items means that scores of five represent relativist epistemic beliefs and scores closer to one would illustrate realist epistemic beliefs.

The second instrument utilized was the Individual Demographic Questionnaire (Appendix F) which was used to gather information related to teachers' age, areas of certification, years of teaching experience, attitudes about professional development, and levels of education.

Descriptive Analysis

Characteristics of the district. The district in this study was located in a city with more than 250,000 residents, and more than 40,000 students enrolled in the district.

Number of high school teachers. There were 1,034 high school teachers assigned to 21 schools. Two schools were excluded because their focus was on non-traditional students and vocational training. The population was further reduced according to the number of teachers with email addresses listed. The final population of teachers available to participate in this study was 843.

Education, certification, and experience. In this state, a Masters' degree must be obtained to be eligible for a *professional license* (i.e., permanent license). This requirement has been in place for nearly 10 years. Therefore it was anticipated that a large number of participants in the sample would have at least a masters' degree. In addition, the educational requirements (e.g., attain a Masters' degree) led the researcher to conclude that the majority of teachers would also be certified in the area where they currently teach. Data from the District's Report Card showed that 97 percent of teachers were certified in their area of instruction. Also, reports indicate that more than 96 percent of teachers had more than three years of experience teaching.

Table 5

(n=95)	Frequency	Participants	District
		Percent	Percent
Content Area Teaching			
Yes	90	94.7	97
No	5	5.3	3
Student Population Taught			
African American	69	72.6	53
Asian	6	6.3	6
Bi-Racial	5	5.3	2
Latino	3	3.2	16
Native American	0	0	1
White	12	12.6	22
Student's Income Level			
Low-Income	81	85.3	77
Middle-Income	14	14.7	33
High-Income	-	-	-

Participant and District Characteristics

Student's ethnicity and income. District data showed that the majority of students in the district were African American (53%). White (22%) and Latino (16%) students comprised the largest portion of the student population behind African American students. According to the report 77 percent of students qualify for free/reduced lunch. This qualification means that these students come from families who meet the Federal poverty guidelines. Overall, the student population was one that was composed of mostly low-income minority students.

Characteristics of sample. Eight hundred forty-three high school teachers from an urban district in the northeastern United States were invited to participate in an online survey. One hundred fifteen high school teachers (N = 115) responded to the online survey between December 1, 2013 and January 31, 2014. Of the 115, ninety-five surveys

were complete. The 95 (11.3% of the total sample population) completed surveys were used for descriptive and statistical analyses.

Descriptive analysis of the sample yielded the following information about the teachers, their student population, and their participation in, satisfaction with, and attitudes about professional development opportunities in the district.

Teacher's characteristics. Data from the Individual Demographic Questionaire (Appendix F) provided the following information on the teachers' educational level, teaching experience, and certification information (Table 5).

Among the respondents (N=95), 30 were male, and 65 were female. The substantial majority of the sample held a Master's degree (94.7%) as anticipated. The remaining 5.3% had either a bachelor's (2.1%) or doctoral (3.2%) degree. Among the survey respondents, years of teaching experience ranged from one to 40. As shown in Table 7, the mean number of years teaching was 13.84, with a standard deviation of 8.76 (which means 84.1% of the sample had 22.6 years of teaching experience or less). Table 6

 N
 M
 SD
 Range

 N
 M
 Minimum

13.84

Participant Years of Teaching

Years taught

95

Respondents were asked to report their primary areas of certification. Table 6 shows that more than one-third of the respondents (34.7%) were certified in the area of English/Language Arts. Teachers certified in science (16.8%) or mathematics (16.8%) accounted for another third of the sample, and those certified in social science (12.6%) or

8.76

1

Maximum

technical areas (13.7%) accounted for considerable proportion of the remaining respondents. Teachers were also asked whether they were currently teaching in the subject area in which they are certified. Responses indicated that 94.7 percent of teachers were teaching in their areas of certification.

Student population taught. Responses from the Individual Demographic Questionnaire (Appendix F) provided the following information on the income level and ethnicity of the student population taught by teachers in the sample. Respondents were asked whether their students were from low-income, middle-income, or high income families. Eighty-five percent of the teachers indicated that their student population was primarily low-income. The remaining 14.7 percent indicated that their primary student population was in the middle-income range. Teachers were asked to report the primary ethnic background of their school's student population. The majority of respondents reported that their school's student population was primarily African American. Nearly 73% of teachers indicated that the students they taught were primarily African American students. White students (12.6%) were the next largest population of students.

Table 7

Participant Characteristic

(n=95)	Frequency	Percent
Educational Level		
Bachelor's	2	2.1
Master's	90	94.7
Doctorate	3	3.2
Teaching Experience		
1-5	14	14.0
6-11	31	32.7
12-17	25	26.4
18-23	10	10.7
24-29	8	8.6
30-34	4	4.3
35-40	3	3.3
Content Certification		
English/Language Arts	33	34.7
Social Science	12	12.6
Science	16	16.8
Mathematics	16	16.8
Visual and Performing	5	5.3
Arts		
Technical	13	13.7

Professional development. Data from the Individual Demographic Questionnaire provided the following information on the teacher's participation in, satisfaction with, and attitudes about professional development. On the questionnaire (Appendix F), teachers were asked about their participation in professional development workshops and graduate programs. As shown in Table 8, the average number of hours teachers spent in workshops over the past year was 46.92 hours, compared to 10.99 hours in graduate coursework. When asked about the helpfulness (i.e. satisfaction) of their professional development experiences, the majority of respondents (Table 9) found their professional development experiences either somewhat helpful (75.8%) or very helpful (20%).

Table 8

				Range	
	Ν	М	SD	Minimum	Maximum
Workshops	95	46.92	46.50	0	300
Graduate Courses	95	10.99	24.87	0	120

Number of Hours of Participation in Professional Development

Very few respondents (4.2%) reported that their professional development experiences were not at all helpful. On the questionnaire (Appendix F), teachers were queried on their attitudes about participating in professional development. Responses ranged from not at all, expressing a desire to avoid professional development, to "anything I can get my hands on," denoting a continuous interest in acquiring new knowledge. The majority of teachers (62.1%) selected "anything I can get my hands on." More than a third (36.8%) of teachers indicated a desire to "only do what is required" (Table. 8) in terms of professional development.

Table 9

n=95	Frequency	Percent
Participation		
Not at all	1	1.1
Only what's required	35	36.8
Anything I can get	59	62.1
Satisfaction		
Not at all	4	4.2
Somewhat helpful	72	75.8
Very helpful	19	20.0

Participation in and Satisfaction with Professional Development

Research Question 1

What proportions of high school teachers in an urban school district hold teachercentered (i.e., realist) and student centered (i.e., contextualist and relativist) general epistemic beliefs about the source of knowledge? The Omniscient Authority (OA) subscale measures the extent to which a teacher believes knowledge is handed down by authorities rather than derived from reason. Teachers who believe knowledge is derived from reason are aligned with contextualist/relativist or student centered teaching. Teachers who believe that knowledge is handed down by authorities are considered realist or teacher centered teachers. Possible scores range from 1 to 5. Subscale scores from 1 to 3.5 represent relativist and contextualist general epistemic beliefs, which are associated with student centered teaching. Scores from 3.51 to 5 represent realist general epistemic beliefs, which are associated with teacher centered teaching.

Sample-wide. Sample-wide, the majority of teachers (57.9%) appear to be student centered on the Omniscient Authority subscale. As shown in Figure 1, the scores on the Omniscient Authority subscale fit reasonably within the normal distribution. The actual score ranges for this sample (n=95) were 1.60 (relativist) to 4.60 (realist). The mean score was 3.36, which is in the contextualist score range. The score distribution showed that 7.4% of the Omniscient Authority subscale scores were in the relativist range (1-2.50), 50.5 % were in the contextualist range (2.51-3.5), and 42.1% were in the realist range (3.51 to 5). Notably, a striking proportion of teachers in this sample (42.1%) scored in the teacher centered range. This score indicates that more than forty percent of all teachers in this sample believe that knowledge is handed down by authorities.



Figure 2. Omniscient Authority Subscale Score Distribution

Subscale scores in the realist range are indicative of teachers whose classroom practices are teacher centered (Johnston et al., 2001) and require specific intervention (Howard et al., 2000; Gill et al., 2004) to adopt new practices (Fives & Buehl, 2008).

Research Question 2

What are the proportions of high school teachers in an urban school district who hold teacher centered (i.e., realist) and student centered (i.e., contextualist and relativist) general epistemic beliefs about the structure of knowledge?

The Simple Knowledge subscale measures the extent to which a teacher believes knowledge is composed of simple, disconnected facts or composed of complex,

interrelated concepts (Schommer, 1990). Teachers who believe that knowledge is composed of complex, interrelated concepts would be aligned with contextualist/relativist or student centered beliefs. Teachers who subscribe to the belief that knowledge is comprised of simple, disconnected facts would be considered realist or teacher centered teachers. Possible score ranges are from 1 to 5. Subscale scores from 1 to 3.5 represent relativist (scores from 1-2.50) and contextualist (2.51-3.5) general epistemic beliefs, which are associated with student centered teaching. Scores from 3.51 to 5 represent realist general epistemic beliefs, which are associated with teacher centered teaching.

Sample-wide. One hundred percent of teachers in this sample would be considered student centered on the Simple Knowledge subscale. As shown in Figure 2, the scores on the Simple Knowledge subscale fit reasonably within the normal distribution. The actual score ranges for this sample (n=95) were 1.25 (relativist) to 3.50 (Contextualist). The mean score was 2.56, which is in the contextualist score range. As shown in Table 9, 44.2% of the Simple Knowledge subscale scores were in the relativist range (1-2.50) and the remaining scores 55.8% were in the contextualist score range (2.51-3.5). Simple Knowledge subscale scores in the relativist range indicates sample-wide agreement with the belief that knowledge is composed of complex interrelated concepts.



Figure 3 Simple Knowledge Subscale Score Distribution

Research Question 3

What are the proportions of high school teachers in an urban school district who hold teacher centered (i.e., realist) or student centered (i.e., contextualist and relativist) general epistemic beliefs about the stability of knowledge?

The Certain Knowledge subscale measures the extent to which a teacher believes knowledge is certain or changes over time (Schommer, 1990). Teachers who believe knowledge is tentative and changes over time would be aligned with contextualist/relativist or student centered beliefs. Teachers who subscribe to the belief that knowledge is certain and unchanging would be considered realist or teachercentered. Possible score ranges are from 1 to 5. Subscale scores from 1 to 3.5 represent relativist (scores from 1-2.50) and contextualist (2.51-3.5) general epistemic beliefs, which are associated with student centered teaching. Scores from 3.51 to 5 represent realist general epistemic beliefs which are associated with teacher centered teaching.

Sample-wide. Sample-wide, the majority of teachers (97.9%) would be considered student centered on the Certain Knowledge subscale. As shown in Figure 3, the scores on the Certain Knowledge subscale fit reasonably within the normal distribution. The actual score ranges for this sample (n=95) were 1.00 (relativist) to 3.57 (realist). The mean score was 2.28, which is in the relativist score range. The score distribution showed that 68.4% of the Certain Knowledge subscale scores were in the relativist range (1-2.50), 29.5% were in the contextualist range (2.51-3.5), and 2.1% were in the realist range (3.51 to 5). Notably, a considerable proportion of teachers in this sample (97.9.1%) scored in the student centered range. This score indicates that most teachers in this sample believe that knowledge is tentative and changes over time. Subscale scores in the relativist range have been indicative of teachers whose classroom practices are student centered (Johnston et al., 2001), and these teachers tend to adopt new knowledge through traditional means (Gill et al., 2004; Howard et al., 2000; Fives & Buehl, 2008).



Figure 4 Certain Knowledge Subscale Score Distribution

Research Question Four

What are the proportions of teachers with teacher- and student centered epistemic beliefs by content area?

Content certification and Omnisiceint Authority. Table 10 illustrates the

Omniscient Authority subscale scores related to teachers' areas of certification. Subscale scores show that teachers in the student centered range populated the majority of the certification areas: English/Language Arts (60.6%), Social Science (66.6%), Visual/Performing Arts (80%), and Mathematics. A majority of teachers certified in the

Technical area (53.8%) scored in the teacher centered range. Scores for teachers certified in Science were split between teacher centered (50% realist) and student centered (50% contextualist/relativist). Notably, in each certification area, anywhere from 20% to 53% of teachers believe that knowledge is handed down by authorities.

Table 10

Percentage of Teachers with Teacher centered or Student centered General Epistemic Beliefs by Content Certification

	Simple Knowledge			Certain Knowledge			Omniscient Authority		
	Relat	Context	Real	Relat	Context	Real	Relat	Context	Real
Content Certification	n								
English/Lang	54.5	45.5	-	72.7	24.2	3	6.1	54.5	39.4
Arts									
Social Science	25	75	-	75	25	-	8.3	58.3	33.3
Science	62.5	37.5	-	62.5	37.5	-	12.5	37.5	50
Technical	30.8	69.2	-	46.2	46.2	7.7	-	46.2	53.8
Visual and	60	40	-	100	-	-	40	40	20
Perform.									
Mathematics	25	75	-	68.8	29.5	2.1		56.3	43.8

Content certification and Simple Knowledge. Table 10 illustrates the Simple

Knowledge subscale scores related to teachers' areas of certification. Notably, across each area of certification, the scores on the simple knowledge subscale indicate 100% agreement with the belief that knowledge is composed of complex interrelated concepts (Table 10).

Content certification and Certain Knowledge. Table 10 highlights the Certain Knowledge subscale scores related to teachers' areas of certification. Subscale scores show that the majority of certification areas were populated with teachers in the student centered range: English/Language Arts (97%), Social Science (100%), Science (100%), Technical (93.3%), Visual/Performing Arts (100%), and Mathematics (98.3%). Three

areas of certification had small percentages of teachers who were teacher-centered: Technical (7.7%), English/Language Arts (3%), and Mathematics (2.1%). Based on scores across certification areas, a remarkable proportion of teachers in this sample, regardless of their areas of certification, believe that knowledge is tentative and changes over time.

Statistical Analysis

To answer question five, demographic data from the Individual Demographic Questionnaire (Appendix F) and the Simple Knowledge, Omniscient Authority, and Certain Knowledge subscales of the Epistemic Beliefs Inventory (Appendix G) were examined using statistical software. The specific software utilized was the Statistical Package for the Social Sciences, version 21. Figures 2-4 show histograms of the score distributions for the Simple Knowledge, Certain Knowledge, and Omniscient Authority subscales. Each distribution fits reasonably within the normal probability line. Because the distribution fits within the normal curve, the Pearson Product Moment Correlation test was used to examine potential relationships between the demographic characteristics (i.e., education, experience, professional development attitudes) of the sample and their general epistemic beliefs.

Research Question Five

Is there a relationship between high school teachers' years of experience, attitudes about professional development, and educational level and their beliefs about the source, structure, and stability of knowledge?

Table 11

	Simple Knowledge		Certain K	Knowledge	Omniscient Authority	
N=95	Correlation	Significance	Correlation	Significance	Correlation	Significance
Educational Level	259	.011	156	.132	140	.176
Years of Experience	041	.695	158	.127	160	.121
Prof. Dev. Attitudes	023	.824	026	.805	080	.439

Correlation Coefficients and Significance Levels for EBI Subscale Scores and Selected Demographic Factors

Hypothesis 1

H0: There is no relationship between urban high school teachers' educational level and their general epistemic beliefs.

H1: There is a relationship between urban high school teachers' educational level and their general epistemic beliefs.

As shown in Table 11, this investigation failed to reject the null hypothesis between high school teacher's educational level and their general epistemic beliefs on the Omniscient Authority and Certain knowledge subscales, and therefore the researcher concluded the research finding was not statistically significant. However, the research findings rejected the null hypothesis for the relationship between teachers' educational level and their general epistemic beliefs on the Simple Knowledge subscale; it therefore can be concluded that a statistically significant relationship exists. The Simple Knowledge subscale showed a weak negative correlation with teachers' educational levels. This finding suggests that as respondents with higher educational level increases
were likely to demonstrate lower scores on the Simple Knowledge subscale. Notably, lower scores on the Simple Knowledge subscale are indicative of a belief that knowledge is composed of complex interrelated concepts, which suggests that teachers adopt contextualist or relativist epistemic beliefs as they acquire additional education.

Hypothesis 2

H0: There is no relationship between urban high school teachers' years of experience and their general epistemic beliefs.

H1: There is a relationship between urban high school teachers' years of experience and their general epistemic beliefs.

This investigation failed to reject the null hypothesis between high school teacher's years of experience teaching and their general epistemic beliefs on the Omniscient Authority, Certain Knowledge, and Simple Knowledge subscales, therefore the researcher concluded the research finding is not statistically significant.

Hypothesis 3

H0: There is a relationship between urban high school teachers' attitudes about professional development and their general epistemic beliefs.

H1: There is no relationship between urban high school teachers' attitudes about professional development and their general epistemic beliefs.

This investigation failed to reject the null hypothesis between high school teacher's attitudes about professional development and their general epistemic beliefs on the Omniscient Authority, Certain Knowledge, and Simple Knowledge subscales, therefore the researcher concluded the research finding was not statistically significant. As shown in Table 11, the Simple Knowledge, Certain Knowledge, and Omniscient Authority subscales were negatively correlated with high school teachers' attitudes about professional development. There were no statistically significant correlations.

Chapter Five

Discussion

Summary of Findings

The first objective of this investigation was to identify the proportion of teachers in an urban public school district with teacher centered (i.e., realist) and student centered (i.e., contextualist and relativist) general epistemic beliefs about the source, structure, and stability of knowledge (i.e., general epistemic beliefs). Three of the subscales from the Epistemic Beliefs Inventory were used to measure high school teachers' general epistemic beliefs. The source of knowledge was measured using the omniscient authority subscale, the structure of knowledge was measured using the simple knowledge subscale, and the stability of knowledge was measured using the certain knowledge subscale.

Overall, the majority of teachers scored in the contextualist range on all three epistemic beliefs subscales. The certain knowledge subscale measures whether a teacher believes that knowledge is certain and stable or changes over time. Ninety-seven percent of teachers scored in the contextualist/relativist range, which means that nearly all of teachers agree that knowledge changes over time. The simple knowledge subscale measures the extent to which a teacher believes knowledge is composed of simple, disconnected facts or of complex, interrelated concepts. One hundred percent of the teachers in the study scored within the contextualist/relativist range. These scores suggest that high school teachers believe knowledge is composed of complex, interrelated concepts. Lastly, scores from the omniscient authority subscale were examined. The omniscient authority subscale measures an individual's beliefs about the source of knowledge – whether it is handed down by authority figures or developed through reason. The scores on this scale were most remarkable among the subscales. While 57.9% of the teachers in this sample scored within the student centered (i.e., contextualist/relativist) epistemic beliefs range, 42.1% scored within the teacher centered (i.e., realist) epistemic beliefs range. This finding demonstrates that more than forty percent of teachers in the sample believe knowledge is handed down by authority figures.

The second objective of this investigation was to examine the proportion of teachers with teacher centered (i.e., realist) and student centered (i.e., contextualist and relativist) general epistemic beliefs about the source, structure, and stability of knowledge in each of the teacher's specific area of content certification. Results showed that between 20 and 53 percent of teachers had teacher centered (i.e., realist) epistemic beliefs on the Omniscient Authority subscale. Between two and seven percent of teachers had realist, teacher centered (i.e., realist) epistemic beliefs on the Certain knowledge subscale, and 100 percent of teachers held student centered (i.e., contexualist/relativist) epistemic beliefs. Overall, the majority of teachers held student centered epistemic beliefs. However, in each content area there were remarkable percentages of teacher centered teachers on the Omniscient Authority subscale.

The third objective of the study was to establish whether teachers' demographic characteristics (e.g., educational level, years of experience teaching, and attitudes about professional development) were related to their general epistemic beliefs. Score distributions were within the normal probability line, leading the researcher to use the Pearson Product Moment Correlation test. Results showed a significant (p>.01) weak

negative correlation between high school teachers' education levels and their scores on the simple knowledge subscale. This outcome suggests that as high school teachers' levels of education increase, so too does the belief that knowledge is composed of complex interrelated concepts. No other correlations were found between high school teachers' demographic factors and their subscale scores on the Epistemic Beliefs Inventory.

These findings have implications for the fields of teacher epistemology and urban school district leadership.

Implications for Teacher Epistemology Research

Few empirical investigations have examined the epistemic beliefs of practicing teachers (Findlan, 2006; Schraw & Olafson, 2002), and even fewer have studied practicing high school teachers (Tsai, 2002). Therefore, the present investigation is important to increasing our empirical knowledge of the epistemic beliefs of high school teachers in an urban public school district. In particular, two noteworthy observations from this study are important for teacher epistemology research.

Graduate school and professional development policy. This investigation discovered a previously undocumented phenomenon in the empirical research on teachers' epistemic beliefs. Past studies of college students and community members (e.g., Perry, 1970; Kuhn, 2002) have reported that education is influential in the adoption of contextualist/relativist epistemic beliefs. Among the empirical studies of teacher epistemology, two investigations (Tsai, 2002; Schraw & Olafson, 2002) did not include educational level as a specific variable. Although Findlan's (2006) study of elementary school teachers included educational level, this variable was not found to be significant.

In the present investigation, results showed a significant (p>.01) weak negative correlation very weak between high school teachers' educational level and their scores on the simple knowledge subscale. The results demonstrated that high school teachers are more likely to adopt student centered (i.e., contextualist/relativist) epistemic beliefs that knowledge is composed of complex, interrelated concepts as they attain higher levels of education. This finding provides substance to speculate that graduate education can be influential in developing student centered epistemic beliefs among teachers in this district.

Practicing teachers' beliefs about the source of knowledge. This investigation also adds to our understanding of practicing teacher's epistemic beliefs about the source of knowledge. As noted previously, teacher centered teachers view knowledge as coming from authority figures (e.g., experts, professors, or books; Fives & Buehl, 2008). Findlan (2006) adds that authority figures can include school administrators and district policies. In contrast, student centered teachers view authority as something that derives from their personal experiences and reason (Fives & Buehl, 2008). Both Findlan's (2006) study of elementary school teachers and the recent findings from the current investigation report remarkable numbers of teachers with teacher centered epistemic beliefs about the source of knowledge.

In Findlan's (2006) investigation of elementary school English/Language Arts teachers, the majority of teachers who reported scores in the realist range (i.e., teacher centered) on the omniscient authority subscale of the Epistemic Beliefs Inventory. On the simple and certain knowledge subscales, teachers reported contextualist (i.e., student centered) epistemic beliefs. In the present study, more than forty percent (42.1%) of

teachers reported realist epistemic beliefs (i.e., teacher centered) on the omniscient authority subscale, while teachers were mostly contextualist or relativist (i.e., student centered) on the simple knowledge subscale and were distributed among realist, contextualist and relativist on the certain knowledge subscale.

While it was not the focus of the current investigation, Findlan (2006) conducted interviews with respondents to further explore their beliefs about the source of knowledge. In her interviews, she asked teachers about the level of influence that the "administration," at both the district level and school levels, had on their instruction. The majority of respondents indicated that the administration did not influence their classroom practices. However, Findlan found a number of inconsistencies in their responses. Respondents indicated that district policy (e.g., mandated curriculum) and school administrators restricted the materials they used as well as the time and approaches they preferred to use in the classroom. These findings are consistent with findings from other investigations.

Sources of authority and teachers' epistemic beliefs. Studies have reported (e.g., Blasé and Anderson, 1995; Paris, 1997; Feng et al., 1993) that teachers' beliefs about state and school-level policies (i.e., sources of authority) are generally related to their deviations from the teachers' reported teaching beliefs in the classroom. For example, in their descriptive study of teachers' instructional orientation in English/Language Arts, Feng et al. (1993) investigated the practices of 259 first grade teachers. In their research, 219 of the teachers had a realist orientation. Teachers who had a realist orientation were observed in their classrooms simply holding "the teacher's

manual in their hands" and going through it "strictly step by step when teaching reading" (p. 18). When asked about their reasons for this practice, the teachers reported that they believed the material was supposed to be taught in that way. This study highlights that, among teachers with realist epistemic beliefs, district-mandated curriculum fosters the belief that teachers should conform to the perceived expectations of the district's policies rather than engage their preferred orientation.

At the school level, teachers' beliefs about administrative support (i.e., authority) appeared to be relevant to the approaches they used in the classroom. In their comprehensive case study of school micropolitics, Blase and Anderson (1995) found that teacher's beliefs about the politics of their school "contribute to the development of a calculative orientation in teachers" (p. 48). For example, in her case study Paris (1997) examined this issue more closely, asking "what enabling or constraining factors did the participants identify as having influenced their instructional orientations?" (p. 91). While teachers' reported orientations remained stable over time, the one teacher who digressed epistemically from a contextualist (i.e., student centered) to a realist (i.e., teacher centered) orientation reportedly did so as a result of the lack of administrative support. Most interesting among Paris's observations about administrative support was one teacher in the study who had a relativist orientation. In the three-year follow up, this teacher had maintained the relativist orientation and reportedly did so as a result of the belief that the administration was supportive of flexibility in the classroom.

The empirical findings from the present investigation provide theoretical support for the educational psychology and teacher education research (e.g., Schommer, 1994; Fuecht, 2011) that suggests teachers' epistemic beliefs are more or less independent and develop asynchronously. In this investigation, teachers with student centered epistemic beliefs on the stability and structure of knowledge dimensions, but may still possess teacher centered epistemic beliefs about the source of knowledge. Additionally, the correlations between high school teachers' educational levels and their scores on the simple knowledge subscale provide support for Gill et al.'s (2004), Howard et al.'s (2000), and Sinatra and Kardash's (2004) assertions that more advanced general epistemic beliefs can be developed through educational programming.

Implications for School District Leaders

The district in this investigation, like others across the United States, is in the process of implementing the Common Core State Standards. The Common Core State Standards support the use of student centered instruction as the chief method for teaching (ASCD, 2012); therefore teacher's flexibility in adopting new instructional practices will be a key concern for school leaders.

The Common Core State Standards requires a shift in teaching. The Common Core State Standards (CCSS) are national standards for curriculum and teaching developed by the National Governor's Association and the Council of Chief State Officers. The CCSS began as an effort to reduce the number of high school graduates who were unprepared for college and the global workforce by implementing a state-led educational policy that aligns state-level curriculum standards with international standards for college and career readiness. According to the ASCD (2012), formerly the Association for Supervision and Curriculum Development, "these internationally benchmarked K-12 academic standards for mathematics and English language arts and literacy establish what students are expected to have learned when they graduate from high school" (2012, p. 7). Full implementation is expected by 2014.

The national standards for teaching in the Common Core are highly supportive of instruction that emphasizes inquiry-based and cooperative learning (i.e., student centered instruction) in the classroom (ASCD, 2012; Alliance for Education, 2012). The Alliance for Education (2012) reports:

The new culture and digital learning provide opportunities to shift the teacher's role from a disseminator of knowledge to a facilitator of learning or "education designer." In the past, teachers and/or textbooks provided the majority of information and content to students. With the internet, digital content, and the ever-growing body of technological resources, students now have access to material on demand. This contributes to a shift in how teachers can spend the time they have with their students and the interaction and assignments when they are not together. Teachers can guide students in their learning and help them navigate information and create their own knowledge base. A teacher can focus efforts on asking questions, pushing students to develop their own products or knowledge, and providing opportunities for students to collaborate and utilize higher-level thinking skills (Alliance for Education, 2012, p. 13).

As the passage above suggests, the teacher's role shifts from *formal authority* and *personal role model* (i.e., teacher centered) to the student centered role of *facilitator* and *delegator* (Maldonado, 2014). As the implementation of the Common Core State Standards advances over the next few years, it will be important for the district leadership

to assess the number of teachers with epistemic beliefs that are teacher or student centered; to appropriately develop a district strategy for professional development.

In the current study, the majority of teachers held student centered beliefs (Table 12) across the three general epistemic beliefs dimensions. This finding is an important benchmark for district leaders because it is consistent with recent findings (e.g., Peabody, 2011) that there are significant representations of student centered teachers within an urban public school district. This result may also reveal that previous findings (e.g., Anyon, 1981) which suggest urban schools are largely populated with teacher centered teachers are no longer valid claims about urban public schools.

Arguably, the remarkable number of student centered teachers reported in this study would lead the researcher to speculate that there would be a similar majority of high performing students; considering the positive effect that student centered instruction has on student achievement. However, inspection of the State Department of Education's data on this district shows that more than 80 percent of schools were listed as low achieving (NYS Report Card, 2011). A potential explanation for this phenomenon has been discussed by a number of researchers (e.g., Feucht, 2010; Fives and Buehl, 2010). Table 12

Dimensions	Student Centered	Teacher Centered	
Source of Knowledge	57.9	42.1	
Structure of Knowledge	100	-	
Stability of Knowledge	97.9	2.1	

The Representation of Student Centered and Teacher Centered Teachers in the District

According to Fives and Buehl (2010) and Feucht, (2010) teacher's epistemic beliefs develop asynchronously, but more importantly they are interdependent. Fives and

Buehl (2010) contend that the three dimensions are integral to understanding how teachers learn new instructional strategies and integrate teaching knowledge in the classroom. They argue that the stability and source of knowledge dimensions influence teacher's receptivity to learning new teaching approaches. Teacher's beliefs "about the structure of teaching knowledge may affect the extent to which new information is elaborated on and connected to prior knowledge" during instruction (Fives and Buehl, p. 476, 2010). The interdependent nature of these dimensions suggests that a teacher with realist epistemic beliefs on one dimension (e.g., source of knowledge) can present teaching behaviors in the classroom that are teacher centered even though their beliefs are student centered on the other two dimensions. For teachers to make the epistemic shift from teacher to student centered teaching district leaders must develop resources for assessing teacher's epistemic beliefs. Researchers have addressed this issue successfully with elementary and middle school teachers through intervention based professional development projects however more studies are needed at the high school level (Gill et al., 2004; Howard et al., 2000; Sinatra & Kardash, 2004).

Limitations

There were a number of limitations to this investigation that should be enumerated. First, the sample contained teachers primarily with master's degrees, which may not provide an entirely accurate snapshot of districts that do not require a masters' degree for permanent licensure or as a vehicle for pay increases. According to the Huffington Post (2012) "twenty-four states have policies in place that promote teachers' acquisition of master's degrees. Of those, 16 require extra pay for having an advanced degree, while the remaining eight require an advanced degree for full professional licensure."

The second limitation was the lack of personal contact with respondents. The collection of data through email eliminated the kind of personal contact that might have elicited a higher response rate. To address this limitation, high school teachers received reminders at two-week intervals. In addition, a gift card drawing was added as an incentive for participation.

The third limitation relates to the use of surveys and questionnaires. According to Creswell (2002), self-report data is associated with three points of potential bias that should be considered: (a) selective memory, (b) attribution, and (c) exaggeration. Selective memory pertains to remembering or not remembering experiences or events that occurred in the past. Attribution is the act of attributing positive events and outcomes to ones' own agency and attributing negative events to external forces. The final point of bias is exaggeration. In this component, the participant misrepresents outcomes or embellishes events as more significant than actually evident.

The fourth and final limitation is location. The findings of this investigation can only be generalized to this single school district.

Future Research

More studies of practicing teachers' epistemic beliefs are needed. Findings from the current investigation point to three areas where more research is necessary. First, this study examined urban districts to identify the proportion of teachers in an urban district with teacher centered epistemic beliefs. Results showed that the majority of teachers held beliefs that were student centered. This outcome suggests that previous research (e.g.,

Anyon, 1981; Gilbert, 1997) suggesting urban teachers are primarily teacher centered may need to be revisited. A comparative study of urban versus suburban schools is needed to better understand the relevancy of previous claims.

Secondly, the district selected for this study was situated in a state that requires an advanced degree for permanent licensure. Findings from the current study showed a relationship between teachers educational level and their beliefs about the structure of knowledge (i.e., knowledge is composed of simple, disconnected facts or complex, interrelated concepts). The weak negative correlation between the two variables indicates that as high school teachers' educational level increases the more likely they are to adopt student centered epistemic beliefs about the structure of knowledge. This correlation has implications for professional development policy. Future studies should examine the epistemic beliefs of teachers from states where there is an advanced degree requirement for permanent licensure with those states where no requirement is necessary for permanent licensure.

Lastly, qualitative studies should be launched to understand the how high school teacher's epistemic beliefs are manifested in the classroom. Much of the observational studies have been documented for the K-8 grades, therefore observations and interviews should be conducted to better understand the nuances between what high school teachers believe and actually do in the classroom. As a result of these pursuits, potential theories can be formed to enumerate much of what remains unknown in the field of teacher epistemology, particularly where it concerns high school teachers.

Summary

As one of the initial investigations of high school teacher's epistemic beliefs, this investigation found a number of unique and confirmatory findings that have implications for the fields of teacher epistemology and school district leadership. In regard to teacher epistemology research, this investigation found a weak negative correlation between high school teacher's educational level and their epistemic beliefs about the structure of knowledge. This finding was unique because in a similar study of elementary school teacher's epistemic beliefs (Findlan, 2006) educational level was not statistically significant. This divergence suggests that elementary and high school teachers may adopt teaching beliefs differently which has implications for teacher education. Another important finding was related to the remarkable number of teachers (42.1%) with teacher centered (i.e., realist) epistemic beliefs about the source of knowledge. In Findlan's (2006) investigation, a substantial number of teachers also held teacher centered epistemic beliefs about the source of knowledge. This combination of findings suggests that a representative proportion of both elementary and high school teachers view authority figures as sources of knowledge. A number of studies were highlighted that discussed the potential influence of school administrators and district policies (as sources of authority) on teacher's deviation from their preferred classroom orientation. In conclusion, it was noted that a teacher's epistemic beliefs are interdependent; and therefore a teacher may have student centered epistemic beliefs and demonstrate a teacher centered classroom orientation. A number of limitations and directions for future research were also highlighted.

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Appendix A

School District Superintendent Request for Consent

Fall 2013

Dear Superintendent,

Please accept this letter as my written request for permission to involve your secondary school's teachers in a survey as part of my dissertation research. The purpose of this study is to identify how teachers conceptualize their beliefs about the knowledge. It is hoped that this investigation will: (a) inform the field of teaching by describing how teachers conceptualize the beliefs, and (b) shed light on how teachers' beliefs differ across various dimensions that influence teaching. Discoveries from this study may contribute to our overall understanding of how to develop interventions for teacher professional development. This investigation is being launched with the expressed consent and approval of The University of Toledo Human Subjects Review Board (Study#).

There is a survey and a demographic background form to be completed between October 30, 2013 and March 15, 2013. The survey and demographic background forms are available online. The total time commitment to complete both forms is 12-15 minutes. To encourage participation, teachers who complete the survey will be entered into a raffle to win one of four \$25 Visa gift cards. Winners will be identified using four identifiers, school location, birth-year, year of graduation from their undergraduate program, and a random 4-digit number that the teacher selects.

If granted permission, I will need you to complete the permission form authorizing me to conduct research with consenting secondary teachers in your district. This process can be performed electronically (<u>https://www.surveymonkey.com/s/2KWM7TQ</u>). Teachers will be informed that their participation in this study is strictly voluntary and that they may withdraw at any time. Teachers will also be informed that participation or non-participation will not affect their relationship with their employer or the Principal Investigator's relationship with The University of Toledo. The cover letter to teachers will convey that findings will be reported as aggregate data and confidentiality will be maintained. A copy of the letter of consent for secondary school teachers who select to participate is attached for your review.

If you have any questions or require any additional information, do not hesitate to contact the Principal Investigator by phone, email, or at the physical address listed at any time. Permission to conduct this survey will provide the opportunity for your teachers to become active participants in educational research, and the findings will contribute to the body of research on effective professional development activities. Your time and cooperation are highly valued and deeply appreciated.

Sincerely,

Richard Montgomery, Principal Investigator The University of Toledo Health Science Campus 3000 Arlington Ave., Mail Stop 1014 Health Education Building, Room 155-H Toledo, OH 43614-2598 419-530-5191 (phone); 419-383-1994 (fax) rmontgo@utnet.utoledo.edu

Dr. Nancy Staub, Sponsoring University Faculty Member The University of Toledo Main Campus Department of Educational Foundations and Leadership Gillham Hall 1000D Phone: 419.530.8438 nancy.staub@utoledo.edu

Appendix B

Letter of Invitation/Informed Consent Form

Fall 2013

Dear Secondary School Teacher,

I would like to invite you to participate in a study that examines high school teachers' beliefs about teaching. The purpose of this study is to identify how teachers conceptualize their beliefs about the knowledge. It is hoped that this investigation will: (a) inform the field of teaching by describing how high school teachers conceptualize the beliefs, and (b) shed light on how high school teachers' beliefs differ across the various dimensions that influence teaching. Discoveries from this study may contribute to our overall understanding of how to develop interventions for teacher professional development.

The information included in this letter is provided to assist you in making an informed decision about whether or not to participate in this research study. If you have questions about the details of this research, you are free to ask at any time. Contact information for the Principal Investigator and the Sponsoring University Faculty member are listed below. You are eligible to participate in this study because you are a secondary school teacher in a metropolitan district.

This investigation is being launched with the expressed consent and approval of The University of Toledo Human Subjects Review Board (Study#). The University of Toledo supports the practice of protection for human subjects participating in this research. You should be aware that there are no known risks or discomforts associated with this research. Your participation in this study is strictly voluntary. You may withdraw from this study at any time by contacting the Principal Investigator or Sponsoring University Faculty member at any time via email, phone, or the physical address below. Your decision will not result in any loss of benefits to which you would be otherwise entitled. Participation or non-participation in this study will not affect your relationship with our employer or the Principal Investigator at the university sponsoring this research.

Participation in this study will require between 12-15 minutes of your time. The Demographic Profile Sheet available online and survey are at (https://www.surveymonkey.com/s/2KWM7TQ). The Demographic Profile Form will take five minutes to complete. The survey being used for this study is the Epistemological Beliefs Inventory. The survey portion will take approximately 10 minutes. Your participation will qualify you to win 1 of 4 \$25 gift cards that will be issued on December 16, 2013. Please respond thoughtfully and honestly to each question. Your name will never be divulged or associated with any findings in any way. All personal information obtained from this study will be kept confidential and incorporated into grouped data. The findings of this study may be published in academic journals or presented at academic conferences, but your identity will be kept strictly confidential.

A summary of the findings from this study will be made available to you upon request. If you have any questions or require additional information, please feel free to contact the Principal Investigator. Your participation in this investigation will make a positive contribution to the body of research on effective professional development programs. Your time and professional responses are highly valued and deeply appreciated.

Sincerely,

Richard Montgomery, Principal Investigator The University of Toledo Health Science Campus 3000 Arlington Ave., Mail Stop 1014 Health Education Building, Room 155-H Toledo, OH 43614-2598 419-530-5191 (phone); 419-383-1994 (fax) rmontgo@utnet.utoledo.edu

Dr. Nancy Staub, Sponsoring University Faculty Member The University of Toledo Main Campus Department of Educational Foundations and Leadership Gillham Hall 1000D Phone: 419.530.8438 nancy.staub@utoledo.edu

Appendix C

Participant Informed Consent Form

I have read and understand the information regarding this research study. I consent to volunteer to be a subject in this study. I understand that my responses on the questionnaire are completely confidential and that I have the right to withdraw at any time. I am aware that all data will be maintained for three years, in compliance with federal regulations on human subjects. I have received a copy of the Informed Consent Form by email, to keep in my possession.

____ I agree to participate.

____I do not agree to participate.

Appendix D

Friendly Reminder Email

Greetings,

This is a friendly reminder that if you would like to participate in a survey of high school teachers in your district, there is still time. Your participation will qualify you to win one of four \$25 gift cards.

The purpose of this study is to identify how teachers conceptualize their beliefs about the knowledge they use in the classroom. It is hoped that this investigation will: : (a) inform the field of teaching by describing how teachers conceptualize the beliefs about instruction, and (b) shed light on how teachers' conceptualizations on teaching differ across the various dimensions of teaching. Discoveries from this study may contribute to our overall understanding of how to develop interventions for teacher professional development.

The survey can be accessed from the following link: (https://www.surveymonkey.com/s/2KWM7TQ).

Sincerely,

Richard Montgomery, Principal Investigator The University of Toledo Health Science Campus 3000 Arlington Ave., Mail Stop 1014 Health Education Building, Room 155-H Toledo, OH 43614-2598 419-530-5191 (phone); 419-383-1994 (fax) rmontgo@utnet.utoledo.edu

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Appendix E

Individual Demographic Questionaire

Gender

____ Male

____ Female

How many years have you been teaching?

_____0-3 years

_____ 4-7 years

_____ 8-12 years

____ 13-17 years

Do you consider your students to be from: ____ low-income ____ middle-income or _____ high-income homes?

Would you consider your student population primarily?

____ African American ____ Asian ____ Latino ____ Native American

____ White ____ Bi-racial

What is your educational level?

Bachelors

Master's Degree

___Doctorate

What is your primary area of certification?

____ English

Language Arts

____ Mathematics

____ Science

_____ Social Science

_____ Technical

Visual/Performing Arts

Are you currently teaching in the areas that you are certified to teach in?

____Yes No

How much have you participated in professional development?

____ Not at All ____ Only What is Required ____ Anything I can Get My Hands On

Have you found your professional development experiences to be helpful?

____ Not Helpful at All ____ Somewhat Helpful ____ Very Helpful

Have you participated in professional development in the past 24 months?

In workshops: Number of hours _____

In a graduate or certificate program: Number of hours

Respondents to this survey automatically qualify to win 1 of 4 \$25 gift cards. If you would like to participate in the drawing please type your email in the box below.

Appendix F

The Epistemic Beliefs Inventory

Please indicate how strongly you agree or disagree with each of the statements listed below. Please circle the number that best corresponds to the strength of your belief.

1. It bothers me when instructors don't tell students the answers to complicated problems. Strongly Disagree 3 5 Strongly Agree 1 2 4 2. Truth means different things to different people. Strongly Disagree 3 5 Strongly Agree 1 3. Students who learn things quickly are the most successful. Strongly Disagree 4 5 3 Strongly Agree 1 2 4. People should always obey the law. Strongly Disagree 5 3 4 Strongly Agree 1 2 5. Some people will never be smart no matter how hard they work. Strongly Disagree 2 3 4 5 Strongly Agree 1 6. Absolute moral truth does not exist. Strongly Disagree 5 Strongly Agree 2 3 4 1 7. Parents should teach their children all there is to know about life. Strongly Disagree Strongly Agree 1 2 3 5 8. Really smart students don't have to work as hard to do well in school. Strongly Disagree Strongly Agree 2 3 4 5 1 9. If a person tries too hard to understand a problem, they will most likely end up being confused. Strongly Agree Strongly Disagree 2 3 4 5 1 10. Too many theories just complicate things. Strongly Disagree 5 Strongly Agree 1 2 3 4 11. The best ideas are often the most simple. Strongly Disagree 5 Strongly Agree 1 2 3 12. People can't do too much about how smart they are. Strongly Disagree 2 Strongly Agree 1 3 4 5 13. Instructors should focus on facts instead of theories. Strongly Disagree 1 2 3 5 Strongly Agree 14. I like teachers who present several competing theories and let their students decide which is best. Strongly Disagree 1 2 3 4 5 Strongly Agree 15. How well you do in school depends on how smart you are. Strongly Disagree 1 2 3 4 5 Strongly Agree 16. If you don't learn something quickly, you won't ever learn it. Strongly Disagree 1 2 3 5 Strongly Agree 17. Some people just have a knack for learning and others don't. Strongly Disagree 2 3 Strongly Agree 1 18. Things are simpler than most professors would have you believe. Strongly Disagree 1 2 3 4 5 Strongly Agree 19. If two people are arguing about something, at least one of them must be wrong.

Strongly Disagree Strongly Agree 20. Children should be allowed to question their parents' authority. Strongly Disagree Strongly Agree 21. If you haven't understood a chapter the first time through, going back over it won't help. Strongly Disagree Strongly Agree 22. Science is easy to understand because it contains so many facts. Strongly Disagree Strongly Agree 23. The moral rules I live by apply to everyone. Strongly Disagree Strongly Agree 24. The more you know about a topic, the more there is to know. Strongly Disagree Strongly Agree 25. What is true today will be true tomorrow. Strongly Disagree Strongly Agree 26. Smart people are born that way. Strongly Disagree Strongly Agree 27. When someone in authority tells me what to do, I usually do it. Strongly Disagree Strongly Agree 28. People who question authority are trouble makers. Strongly Disagree Strongly Agree 29. Working on a problem with no quick solution is a waste of time. Strongly Disagree Strongly Agree 30. You can study something for years and still not really understand it. Strongly Disagree Strongly Agree 31. Sometimes there are no right answers to life's big problems. Strongly Disagree Strongly Agree 32. Some people are born with special gifts and talents. Strongly Disagree Strongly Agree

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Appendix A: Epistemic Beliefs Inventory

SK = simple knowledge (1,10,11,13,18,22,24,30)

CK = certain knowledge (2,6,14,19,23,25,31)

IA = innate ability (5,8,12,15,17,26,32)

OA = omniscient authority (4,7,20,27,28)

QL = quick learning (3,9,16,21,29)

Reverse code to 5 = na ve beliefs: 2,6,14,20,24,30,31

1. It bothers me when instructors don't tell students the answers to complicated problems SK

2. Truth means different things to different people CK

3. Students who learn things quickly are the most successful QL

4. People should always obey the law OA

5. Some people will never be smart no matter how hard they work IA

6. Absolute moral truth does not exist CK

7. Parents should teach their children all there is to know about life OA

8. Really smart students don't have to work as hard to do well in school IA

9. If a person tries too hard to understand a problem, they will most likely end up being confused QL

10. Too many theories just complicate things SK

11. The best ideas are often the most simple SK

12. People can't do too much about how smart they are IA

13. Instructors should focus on facts instead of theories SK

14. I like teachers who present several competing theories and let their students decide which is best CK

15. How well you do in school depends on how smart you are IA

16. If you don't learn something quickly, you won't ever learn it QL

17. Some people just have a knack for learning and others don't IA

18. Things are simpler than most professors would have you believe SK

19. If two people are arguing about something, at least one of them must be wrong CK

20. Children should be allowed to question their parents' authority OA

21. If you haven't understood a chapter the first time through, going back over it won't help QL

22. Science is easy to understand because it contains so many facts SK

23. The moral rules I live by apply to everyone CK

24. The more you know about a topic, the more there is to know SK

25. What is true today will be true tomorrow CK

26. Smart people are born that way IA

27. When someone in authority tells me what to do, I usually do it OA

28. People who question authority are trouble makers OA

29. Working on a problem with no quick solution is a waste of time QL

30. You can study something for years and still not really understand it SK

- 31. Sometimes there are no right answers to life's big problems CK32. Some people are born with special gifts and talents IA