

THE INFLUENCE OF EARLY CHILDHOOD EDUCATION TEACHERS' BELIEFS  
ON CURRICULUM IMPLEMENTATION AND CLASSROOM PRACTICE

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THE INFLUENCE OF EARLY CHILDHOOD EDUCATION TEACHERS' BELIEFS  
ON CURRICULUM IMPLEMENTATION AND CLASSROOM PRACTICE  
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*Thanks....*

To Gene Dooley

*Who's only response to every crazy request I've made in the last 4 years was "YES." This achievement belongs to us!*

And to my personal cheerleading squad:

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## ABSTRACT

One response to educational reform initiatives has been the utilization of professional development programs designed to introduce teachers to new or alternative curricula for implementation in the classroom (Loucks-Horsley, 1999). Yet, Carless (2003) comments on the tendency for teachers to be exposed to an innovative pedagogic intervention and then to be expected to implement the intervention with little consideration for their viewpoints or for the operative classroom context. This mixed methods study considers the influence of early childhood education teachers' beliefs on classroom practice, especially in relationship to their willingness to implement a constructivist based curriculum in their classroom. Teachers' expectancy x value beliefs were related to the level at which participant teachers implemented the curriculum in their classrooms, as measured by observer ratings. Teachers were assigned to groups, based on quantitative findings, for subsequent qualitative analysis. Teacher interviews were conducted to explore how teachers decide what to do in their classroom, as well as whether or not exposure to the constructivist based curriculum influenced their beliefs about learning and teaching.



# The Influence of Early Childhood Education Teachers' Beliefs on Curriculum Implementation and Classroom Practice

## CHAPTER I: INTRODUCTION

One response to educational reform initiatives has been the utilization of professional development programs designed to introduce teachers to new or alternative curriculum for implementation in the classroom (Loucks-Horsley, 1999). However, a teacher's ability to implement an instructional method is not always sufficient to guarantee consistent and comprehensive implementation of that practice (Stein & Wang, 1988). In fact, Abrami, Poulsen and Chambers (2004) note that, "implementation of educational innovation often meets with limited success" (p. 202). While some teachers enthusiastically apply an educational innovation and are persistent in their implementation attempts, others avoid implementation of the innovation all together and/or abort their efforts after only a few initial attempts (Abrami, Poulsen and Chambers, 2004). Varying levels of implementation impact the consistency of instruction across classrooms, challenging the fidelity of program implementation and subsequently compromising efforts to measure the effectiveness of educational innovation.

Such was the observation of the new director of a Head Start program in the school district of a large mid-western city. The director was curious about why teachers, when provided with extensive training, necessary materials and ongoing support for the implementation of a new and innovative curriculum, would elect to either not implement the curriculum or implement it at what she perceived as low levels. This director's curiosity and practical concern was the impetus for this applied research project, designed to identify explanations for the variability in curriculum implementation within Head

Start classrooms at this local school district. While this investigation was initiated to address a practical concern within a local Head Start program, the study was designed with consideration for other Head Start and/or early childhood programs that might also benefit from the results. This chapter provides a brief introduction and description of the study, the study constructs, and the study design.

### Project Design

Carless (2003) comments on the tendency for teachers to be exposed to an innovative pedagogic intervention and then to be expected to implement the intervention with little consideration for their viewpoints or for the operative classroom context. Yet, results drawn from previous educational research examining the role of teacher thinking and beliefs in curriculum implementation decisions suggest that teachers' beliefs are strong determinants of classroom practice (Guskey, 1988; Murphy, 2004; Silva, 1999; Stein & Wang, 1988). These studies set a precedent for one focus of interest in the current project; specifically, the study of the influence of early childhood education teachers' specific beliefs on the level at which they implemented a locally endorsed, constructivist based curriculum in their classroom.

While specific beliefs of interest to the study include teachers' (a) epistemological beliefs, (b) sense of efficacy beliefs, and (c) expectancy x value beliefs, an additional focus of the study included an exploration into how teachers' mental models of learning and teaching were operative in their classroom decision-making processes. The dual focus of this study represents investigative interests that are both confirmatory (the former stated interest) and exploratory (the latter stated interest) in nature.

The functions of confirmatory and exploratory research differ in that the primary objective of confirmatory research is to test hypotheses (Stebbins, 2001). For semantic clarification, the term “confirmatory” is used here as a label for investigations that state alternative hypotheses (from the null hypotheses) and then conduct a study with interest in rejecting or accepting the null hypotheses. The term does not refer to an “act” or “intention” to confirm hypotheses.

The primary objective of exploratory research is to inductively derive “generalizations about a group, process, activity or situation under study” (Stebbins, 2001, p. 6). Since classroom decision-making represents a complex process and the foci of this study share both confirmatory and exploratory interests, a mixed methods approach was selected as the most functional method for capturing the complexity of the target phenomena. As noted by Tashakkori and Teddlie (2003), “the major advantage of mixed methods research is that it enables the researcher to simultaneously answer confirmatory and exploratory questions, and therefore verify and generate theory in the same study” (p. 15).

Mixed methods designs “combine qualitative and quantitative approaches into the research methodology of a single study” (Onwuegbuzie & Teddlie, 2003). Beyond the advantage noted above, Tashakorri and Teddlie (2003) describe additional advantages in utilizing mixed methods designs. For example, mixed methods designs expedite investigative inquiry and address research questions that other methodologies cannot, since the researcher is able to examine multiple research questions from multiple perspectives concurrently. This ability to adopt multiple methods for examining phenomena broadens the scope of the investigative inquiry and allows the researcher “to

capture a more complete picture of human behavior and experience” (Tashakkori & Teddlie, 2003). Additionally, the utilization of mixed methods design strengthens investigative inference, allowing research findings to be supported, challenged and/or more comprehensively understood through the full complement of adopted research strategies (Creswell, Plano Clark, Gutmann, & Hanson, 2003). With the adoption of mixed methods designs, the researcher is able to “generate better understandings of the inquiry problem” (Greene & Caracelli, 2003) and “*do our work better*, developing understandings that are broader, deeper, more inclusive and that more centrally honor the complexity and contingency of human development” (Greene, 2005).

#### *Mixed Method Design - Paradigmatic Assumptions*

A source of much controversy in both philosophical and methodological literature is the reality that the adoption of a mixed methods design typically results in a combination of methods that originated from different philosophical assumptions and stances. Attempting to address this controversy in their own work, Greene and Carracelli (2003) presented four stances that embraced different assumptions regarding the use of mixed methods designs. The philosophical assumptions for the present work are congruent with the assumptions of one of these four stances - the *dialectic stance*. The dialectic stance is described by Greene and Caracelli (1997) as a “synergistic” (p. 10) inquiry approach where all paradigms are important, all paradigms are valuable; all paradigms have something to contribute to our overall understanding and most importantly, the “use of multiple paradigms leads to better understanding” (Greene, Caracelli, & Graham, 1989). The term “better understanding” concisely summarizes the nature of the overall goals for this study.

The dialectical stance engages the reciprocal relationships, between philosophy and methodology, between paradigmatic constructs, practice and contextual demands (Greene & Caracelli, 1997), in order to guide and shape inquiry decisions. Inquiry decisions are purposefully made in order to actualize identified sets of assumptions or models. All assumptions and models identified in inquiry are valued because of their contribution, though partial, to the overall picture of the phenomenon under investigation (Greene & Caracelli, 2003).

### Strategy of Inquiry

While the quantitative and qualitative data are considered with equal significance in this project, the overall strategy of inquiry was drafted from the qualitative tradition, specifically the case study. Hatch (2002) provides a summarized description of a case study previously depicted by two writers, Yin (1994) and Merriam (1988), noting both writers “argue that case studies are a special kind of qualitative work that investigates a contextualized contemporary (as opposed to historical) phenomenon within specified boundaries” (Hatch, 2002, p. 30, parenthesis in the original). Bounded phenomena within educational settings may include “a program, an event, a person, a process, an institution, or a social group” (Merriam, 1988).

The current study examined processes within a bounded phenomenon at two levels. At a macro level, the process of interest included comparisons of early childhood education teachers’ specific beliefs and the level at which they implemented a locally endorsed, constructivist based curriculum in their classroom, housed within one school district’s Head Start program. At a micro-level, two additional processes were considered, the participant teachers’ classroom decision-making and noted changes in the

teachers' original perceptions of the endorsed curriculum. To examine the process of interest at the macro level, quantitative research techniques were selected in order to explore previously established links between specific beliefs and the classroom practices of teachers working in elementary, secondary and post-secondary settings (Benson, 1989; Brownlee & Berthelsen, 2006; Johnston, Woodside-Jiron, & Day, 2001; Kember & Gow, 1994; Morge, 2005; Schraw & Olafson, 2002). Research techniques from the qualitative tradition were adopted to explore the processes of interest at the micro level.

*Phase 1: Interests at the macro - level*

The primary objective for this phase of the study was to establish links between early childhood education teachers' specific beliefs and the level at which they implemented a locally endorsed, constructivist based curriculum. The beliefs of interest in this phase include teachers' beliefs about the value of the constructivist based curriculum (expectancy x value beliefs), teachers' beliefs about knowledge and knowledge acquisition (epistemological beliefs), and teachers' beliefs about their own sense of efficacy as teachers (efficacy beliefs). Relationships between participant teachers' specific beliefs and the level at which they implemented a locally endorsed, constructivist based curriculum in their classroom were identified using bivariate correlational analysis. Differences in beliefs, between teachers who implemented the curriculum more extensively and teachers who implemented the curriculum less extensively, were investigated using independent samples *t*-test. Due to the small sample size of the study and in order to address concerns regarding the prevention of both type I and type II errors, relationships between beliefs and practice, as well as differences

between teachers' beliefs and practice in the high and low implementer groups, were investigated at both the .05 and the .10 alpha levels (Keppel, 1991).

### *Study Constructs*

*Epistemological beliefs.* The focus on epistemology in education encompasses beliefs about “the definition of knowledge, how knowledge is constructed, how knowledge is evaluated, where knowledge resides, and how knowing occurs” (Hofer, 2001). While initial research in epistemological beliefs focused on the beliefs of students, the focus eventually expanded to include the role of teachers' epistemological beliefs and how teachers' beliefs affect classroom practice (Kang & Wallace, 2004). Consistent with this focus, the current project examined the relationship between teachers' epistemological beliefs and the level at which they implemented a locally endorsed curriculum in their classroom. It was expected that the teachers who endorsed more sophisticated epistemological beliefs would demonstrate higher levels of curriculum implementation in their classrooms.

*Efficacy beliefs.* Tschannen-Moran and Hoy (2001) describe teacher efficacy beliefs as judgments about one's capacity to bring about desired outcomes for student engagement and learning, even if students are difficult or unmotivated. According to Tschannen-Moran and Hoy (2001), the study of teachers' efficacy beliefs has contributed much to the educational field, with links established between teacher efficacy and students' achievement, motivation and personal perceptions of efficacy. The current study adopted a similar investigative focus by exploring the determinative role of teachers' efficacy beliefs and varying levels of curriculum implementation. It was

expected that teachers who endorsed higher levels of teacher efficacy would also demonstrate more extensive levels of curriculum implementation in their classrooms.

*Expectancy x Value Beliefs* – The motivational model described by Abrami, Poulson and Chambers (2004) was adopted to explore how teachers' perceptions of the locally endorsed curriculum might influence their decision to use or not use the curriculum. According to Abrami et al., a teacher's decision to implement educational innovation is related to:

- Value: The value the teacher places on the innovation.
- Expectancy: How successful the teacher expects to be if the innovation is implemented.
- Cost: The teacher's perceived benefit of the innovation in relationship to the teacher's perceived cost of the innovation.

Abrami et al. (2004) used this motivational model to differentiate teachers who elected to use or not use cooperative learning (CL) in their classroom and reported that teachers' perceived expectations for success and cost of the innovation, as well as the value they placed on the innovation, explained 40% of the variance in the degree to which teachers incorporated CL in their classroom. Similar utilization of the expectancy x value model adds a practical element to the current examination of the role of teacher beliefs in determining classroom practice. For example, it is possible that teachers who demonstrate lower levels of curriculum implementation also attribute less value to the curriculum, believe that the cost of implementing the curriculum outweighs the benefits, and/or don't expect that implementation will result in success. Therefore, it was expected that teachers who implemented the curriculum at more extensive levels would also



attribute more value to the curriculum, expect to succeed by implementing the curriculum, and/or believe the benefits of curriculum implementation outweigh the costs.

### *Phase 2: Interest at the micro - level*

As previously mentioned, this investigation is framed as a case study with the boundaries of the case defined as a Head Start program within one school district in a large mid-western city. The conceptual framework for this phase of the study is drawn from Strauss and colleagues (2001) utilization of Johnson-Laird's (1983) depiction of mental models. According to Johnson-Laird, mental models are internal representations or 'working models' of a phenomenon in the mind. Mental models are works in progress, under continuous modification until they produce a workable representation of experienced reality and are functionally (though not necessarily technically) accurate (Norman, 1983). Norman (1983) presents additional characteristics of mental models, describing them as parsimonious but incomplete, unstable, and unscientific. He further notes that mental models lack firm boundaries and that "people's abilities to "run" their models are severely limited" (Norman, 1983, p. 8, quotations in original).

Combining Schon's (1983) description of theories held by professionals, Shulman's (Shulman, 1986, 1993) classification of types of knowledge, and Johnson-Laird's (1983) conceptualization of mental models, Strauss and his colleagues (2001) investigated participant teachers' implicit, in-action theories underlying their professional behavior. They developed a two-tiered categorization system for classifying units of analysis that allowed them to infer in-action mental models based on teachers' instructional practices. The first tier classified explicit teaching behaviors and the second

tier classified *inferred* assumptions based on observed teachers' behaviors. This second tier, with slight modifications, was adopted for use in organizing both the data analysis and report of findings for this phase of the study. Strauss's originally established units of analysis for the second tier were:

- 1) Cognitive goals which teachers want their pupils to achieve.
- 2) Cognitive processes which teachers think lead to these cognitive goals.
- 3) Basic assumptions about how teaching in a particular way leads to these processes, that in turn, lead to cognitive goals.
- 4) The "mother" of all assumptions (meta-assumptions) about learning and teaching (Strauss, 2001, p. 228).

The spirit of Strauss's (2001) categories structure the qualitative phase of this project, with the categories modified in order to be more congruent with learning objectives in early childhood education. For example, it is difficult to separate cognitive from physical processes with children in early childhood, as children in this age range spontaneously construct their own mental representations as they experience the world (Piaget, 1970). Additionally, curricular goals in early childhood education typically include some focus on skill building, such as the gross and fine motor skill development. To focus only on cognitive goals would prevent focus on skill development, which represents important learning goals in an early childhood setting. Therefore, Strauss's category, cognitive goals, was changed to learning goals and included both cognitive and skill goals. The rest of the categories were utilized as described above.

Mevorach and Strauss (1995) inferred teachers' mental models based on observations of teachers' in action and argued that in-action mental models "direct

teachers' teaching" (p. 6). While the current project utilized observational (in action) measures in phase one, Argyris and Schon's (1974) description of professional's *espoused* theories was utilized in order to capture descriptions of participant teachers' mental models in phase two of the study. According to Argyris and Schon, "when someone is asked how he would behave under certain circumstances, the answer he usually gives is his espoused theory of action for that situation" (p. 7). According to Strauss (1993), teachers' pedagogical content knowledge or their "knowledge about the nature of children's minds, how those minds work when learning takes place, and the roles instruction plays in fostering learning" (p. 280), can be inferred from teachers' descriptions of their teaching. For this phase of the project, mental models were generated based on teachers' descriptions of their practice. Comparative case analysis was conducted in order to highlight the similarities and differences between the teachers who implemented the locally endorsed, constructivist based curriculum at varying levels in their classroom.

### *Integration stage – phase 3*

A concurrent triangulation (Creswell et al., 2003) research design structured the data collection and analysis stages of the study. The identifying features for concurrent triangulation designs include concurrent data collection and equivalent data status with the primary stages of integration initiated at the analysis or interpretation phases. Sequential quantitative-qualitative analysis (Tashakkori & Teddlie, 1998), specifically contrasting case analysis (Onwuegbuzie & Teddlie, 2003), was adopted as the method for structuring both the data analysis and the results reported here.

According to Tashakkori and Teddlie (1998) sequential quantitative-qualitative analysis involves “forming groups of people/settings on the initial basis of [quantitative] data and then comparing the groups on [qualitative] data (subsequently collected or available) (p. 135, brackets and parenthesis in the original). In qualitative contrasting case analysis, quantitative data analysis on relevant construct(s) is conducted first. A proportion or a specific number of participants are then assigned to groups based on the numerical measures established in the quantitative analysis. Subsequent qualitative analysis is conducted to explain the discrepancies/similarities between the groups (Onwuegbuzie & Teddlie, 2003). Do and Schallert (2004), Onwuegbuzie (1997) and Taylor and Tashakkori (1997) have all applied this approach to their mixed methods investigations.

### Summary

This study was designed to examine influential factors in teachers' classroom decision-making processes, specifically in relationship to how they respond to innovative ideas, and the level at which they implement an innovation. Questions of interest to the study include the following:

1. Are factors such as the teachers' beliefs about knowledge and learning important in the classroom decision-making process?
2. Does a teacher's perception of personal efficacy as a teacher play a role?
3. Do teachers' beliefs about the innovation itself affect the level of implementation in the classroom?

4. Additionally, if a teacher chooses to implement an innovation at some level in the classroom, does added exposure or experience with the innovation shift the original perceptions of the innovation?

The following hypotheses correspond with the quantitative data-driven questions above:

1. (H1) It was expected that teachers who implemented the locally endorsed, constructivist-based curriculum in their classroom at extensive levels would have more sophisticated epistemological beliefs.
2. (H2) It was expected that teachers who implemented the locally endorsed, constructivist-based curriculum in their classroom at extensive levels would endorse higher levels of teacher efficacy.
3. (H3) It was expected that teachers who implemented the locally endorsed, constructivist-based curriculum in their classroom at extensive levels would endorse beliefs indicating that (a) the benefits of implementing the curriculum outweigh the costs, (b) they value the curriculum, and (c) they expect to succeed by implementing the curriculum.
4. Additionally, it was expected that the information attained in phase one of the project, along with the descriptions of participant teachers' espoused mental models as captured in retrospective accounts of classroom practice during phase two of the project, would elucidate the cognitive processes that both encourage and inhibit teachers' willingness to implement innovations in their classroom. Such findings can inform professionals in educational leadership, in teacher education, and in professional development if they wish to pursue optimization of

teacher effectiveness through professional development initiatives as one avenue of educational reform.

In his discussion of the need for the use of multiple methods, Weisner (2005) suggests that four questions organize empirical studies; (a) What are the findings, (b) how were they obtained, (c) in what ways are they believable, and (d) and in what ways do they matter? These questions will be addressed in the remainder of this presentation with (a) what are the findings addressed in chapter 4, (b & c) how were the findings obtained, as well as the believability of the findings addressed in chapter 3 and (d) in what ways the findings matter discussed in chapter 5. Prior to these discussions, a review of literature related to the important constructs of the project is presented.

## CHAPTER II: STUDY CONSTRUCTS

### Introduction

The current study examined the influence of early childhood education teachers' beliefs on classroom decision-making, specifically in relationship to how participant teachers respond to innovative ideas, and to the level at which they implement a locally endorsed, constructivist based curriculum. Specific beliefs of interest to the investigation include teachers' beliefs about the value of the constructivist based curriculum (expectancy x value beliefs), teachers' beliefs about knowledge and learning (epistemological beliefs), and teachers' beliefs about their own sense of efficacy as teachers (efficacy beliefs). Teachers' beliefs about learning and teaching were additionally clarified by capturing descriptions of early education teachers' espoused mental models, (Argyris & Schon, 1974; Haim, Strauss, & David, 2004) as inferred from their reports of classroom decision-making and practice.

The discussion in this chapter is dedicated to the presentation of various constructs selected as variables for the project, including teachers' sense of teacher efficacy, epistemological beliefs, and teachers' perceptions of the constructivist based curriculum, as framed within an expectancy x value motivational model. A brief description of the curriculum is presented first.

### Project Construct Curriculum and Assessment

*The Head Start Path to Positive Child Outcomes* (2003) mandates that each Head Start program “in partnership with parents, select and adapt or develop a curriculum” (p. 2) for its program. The intended goal of the curriculum is to “promote children’s cognitive development and language skills, social and emotional development, and

physical development” (p. 2). In response to this initiative, one school district, in a large mid-western city, adopted the Project Construct curriculum and assessment system to both enhance and measure students’ learning outcomes within their Head Start program.

Project Construct is an approach to teaching preschool, primary, and elementary grades that is based on “what we know about learning” (Project Construct National Center website). Initiated in 1986 by the Missouri Department of Elementary and Secondary Education (MDESE), the project links theory and research based curriculum to state and national standards. According to *Project Construct: The Early Childhood Framework for Curriculum and Assessment (2002)*, the Project Construct approach is based on constructivist learning theory, “which states that children actively construct their own knowledge and values as a result of interactions with the physical and social worlds” (p.1). In the description of constructivism provided in *Project Construct: the Early Childhood Framework for Curriculum and Assessment (2002)*, comparative descriptions of three approaches to learning are provided, including the maturational, the behaviorist and the constructivist approaches. The *maturational approach* assumes that human development represents the unfolding of innate, predetermined stages. In this approach, as long as children are in a nurturing environment where they are encouraged to play, skills and knowledge will develop as the child is developmentally ready. In the maturational approach, the teacher’s role is to provide a safe and caring environment where children can develop naturally. Preschools that adopt this view are likely to emphasize social-emotional development and endorse activities such as block building, painting, pretend play, singing and sand play.



The *behaviorist approach* assumes that an individual accumulates information as it is transmitted from the environment. In this approach, children are viewed as blank slates that need to be filled. Learning is promoted best by introducing, through guided practice, new knowledge and skills in small sequential steps. Support of this view is observed in preschools that focus on preparation for elementary school and emphasize word and number drills. The teacher's role is to transmit information and reinforce values that are important to the culture. Typical activities in the preschool classrooms adopting this approach include shape matching, sounding out letters, and rote counting, with positive reinforcement provided for appropriate responses and consequences administered in response to inappropriate behavior.

In contrast, according to *Project Construct: The Early Childhood Framework for Curriculum and Assessment* (2002), the *constructivist approach*, “combines the best arguments of the two approaches and assumes that knowledge is determined neither by nature alone nor by environment alone” (p. 3). Instead, individual knowledge construction is the result of a dynamic interaction with the physical and social environment. While many constructivist based activities in a preschool classroom are similar to those utilized in preschool classrooms adopting the maturational approach, the constructivist activities are selected to target cognitive objectives. The behavioral interest in breaking knowledge into isolated bits is not utilized in constructivist based preschool classrooms, nor is there an interest in eliminating all errors before moving to the next level of instruction. Rather, in the constructivist based preschool classroom, teachers use student errors and mistakes to formatively assess student development. The role of the teacher is, “to guide children in their construction of knowledge-challenging them to

make predictions about their world, to try things out, and to rethink their own beliefs in light of new evidence” (Project Construct: The Early Childhood Framework for Curriculum and Assessment, 2002, page 3).

To aid in implementation efforts, the Head Start teaching staff initially received extensive training (30 hours) from the Project Construct staff. Follow-up trainings, for teachers who had completed the initial training, were provided on a regular basis. In addition, Head Start teachers could request consultations with Project Construct staff, which included room visits, observations and subsequent feedback. For this project, the level of Project Construct implementation in participant teachers’ classrooms was compared to their epistemological, teaching efficacy and expectancy x value beliefs. Descriptions of these constructs, as well as a brief history of their use in previous research, are provided in the following sections.

### Teacher Beliefs

#### *Epistemological Beliefs*

Burr and Hofer (2002) highlight the difference between the term *epistemology*, traditionally a philosophical construct, and *personal epistemology*, a psychological construct of interest to educational researchers and psychologists. The former is defined as, “the nature and justification of human knowledge” (p. 200), while the latter represents “individual conceptions and theories of the nature of knowledge and knowing” (Burr & Hofer, 2002). In the interest of semantic clarification, personal epistemology, as defined by Burr and Hofer, represents the construct of interest for this work.

Hofer and Pintrich (1997) provide a comprehensive review of the various epistemological belief models presented in the literature. Many of the early

epistemological models, established using qualitative and/or mixed methods research designs, were unidimensional and developmental in perspective. Schommer was the first investigator to apply primarily quantitative methods to the exploration of epistemological beliefs. Her model represented a multidimensional, versus a unidimensional, perspective of personal epistemology (Hofer & Pintrich, 1997).

Despite their varied approaches and perspectives, these epistemology models generally share four dimensions: (a) certainty of knowledge, (b) simplicity of knowledge, (c) source of knowledge, and (d) ways of justifying knowledge. Certainty of knowledge refers to an individual's belief about how fixed or fluid knowledge is over time. Most of the epistemological belief models propose that individuals with beliefs that knowledge is fixed, are at lower levels of epistemological sophistication or development. In contrast, individuals with more sophisticated beliefs about the certainty of knowledge view knowledge as amenable to change. Simplicity of knowledge refers to a continuum of beliefs that, at the one end, purport that one's knowledge is simple and consists of discrete facts and holds, and at the other end, that one's knowledge is complex and best considered from a contextual, situational or relational perspective. The source of knowledge dimension is also considered on a continuum, with one side representing individual's beliefs that knowledge originates outside of the self and is transmitted from external authorities and the other side representing individual's beliefs that individuals construct knowledge through interactions with others and exposure to different theories, models, and evidence. The justification of knowledge dimension relates to how individuals verify knowledge, what qualifies as evidence of valid knowledge, and the level of dependence on experts and authorities for confirmation of valid knowledge. It is

suggested that views of knowledge justification that challenge evidence and consider alternative viewpoints, versus views of knowledge that adopt a dualistic position of knowledge justification, represent higher levels of epistemological sophistication (Hofer & Pintrich, 1997).

In the last 35 years, research interest in epistemological beliefs has primarily focused on the epistemological beliefs of high school and college level students (Hofer, 2002; Hofer & Pintrich, 1997; Schommer, 1994; Schraw, 2001) with more recent work exploring connections between epistemological beliefs and theory of mind constructs (Burr & Hofer, 2002). Focus on the identification of teachers' epistemological beliefs and/or exploratory studies investigating the role of those beliefs in classroom practice represents a relatively new focus of inquiry in educational research.

*Studies exploring teachers' epistemological beliefs.*

This section provides a brief review of previous investigations that examined the relationship between teachers' beliefs about knowledge and learning and their classroom practices.

*Effect of teachers' epistemological beliefs on students' learning experiences -*

While the constructs in Kember and Gow's (1994) work were not labeled specifically as epistemological beliefs, their investigation of college teacher lecturers' views of knowledge identified consistent and/or significant relationships between the participant teachers' views of knowledge and their students' adopted learning and/or study habit approaches for the course. Students of teachers with a "knowledge transmission" view of knowledge (role of teacher is to transmit knowledge) adopted less desirable study habits,

while students of teachers with a “facilitation orientation” (role of teacher is to facilitate learning) adopted deeper learning approaches.

Johnston, Woodside-Jiron and Day (2001) identified links between teachers’ literate epistemologies, how those epistemologies were manifested in the classroom and how students perceived both knowledge and their role as students. They described the classroom discourse in “received knower classrooms” (where the teacher views knowledge as a series of external facts transmitted by authorities) as primarily monologic, with a major focus placed on correctness. Students in these classrooms defined success by level of technical expertise and performance. They compared their work and ideas to those of other students and perceived their role as that of either a knowledge producer or knowledge consumer.

In the constructed knower classroom (in which a teacher believes that learners construct knowledge through language or semiotic interactions), the discourse was more dialogic and students were encouraged to actively participate and take command of their own knowledge construction. These students knew they were expected to participate, valued both their own and others’ experiences in the learning process, and shared more collegial relationships with their peers.

*Epistemological beliefs and teachers’ responses to students* - Morge (2005) theorized that teachers’ epistemological and pedagogical assumptions influenced science teachers’ responses to student inquiry during the conclusion phases of science instruction (the point in the teacher student interaction when the pupils’ production during inquiry is to be accepted or rejected). According to Morge (2005), teachers responded to students during conclusion phases of instruction in one of two ways. They either focused on the

correctness of the student's response or they assessed the validity of the student's response based on how well it addressed the question presented and whether or not it was in keeping with knowledge related to the class theme. Morge (2005) associated the former with dogmatic or positivist views of science and the later with constructivist views of science.

*Epistemological beliefs and curriculum utilization* - Benson (1989) was interested in associations between teachers' epistemological beliefs and curriculum utilization. He reported that, although actual curriculum decisions and/or classroom activities were heavily influenced by situational constraints, the teachers in his study who endorsed realist beliefs about science (aspects of science studied in the classroom actually exist in the real world) used primarily a text-based science curriculum and supported the text with primarily teacher-centered classroom activities.

*The introduction of epistemological world views.* Schraw and Olafson's work (2002) represents one of the most comprehensive attempts to examine the relationship between teachers' attitudes about knowledge and knowledge acquisition and their reported practices. Schraw and Olafson (2002b) differentiated between epistemological beliefs, or "specific beliefs about a particular dimension of knowledge such as certainty, simplicity, or origin" (p. 101) and epistemological world views, or "attitudes about the nature and acquisition of knowledge" (p. 101) and described three epistemological world views for use in their study, the realist, the contextualist, and the relativist. Schraw and Olafson (2002) reported inconsistencies between teachers' reported classroom practices and their epistemological beliefs. While teachers reported strong beliefs about the importance of a student-centered, contextualist pedagogy, they often reverted to

traditional transmission practices. Similarly, while teachers identified their classrooms as student-centered, they endorsed preferences for teacher-centered classroom activities. Schraw and Olafson also reported findings similar to Benson's, noting that external variables, such as time limits, mandated curriculum and standardized tests, influenced teachers' reported classroom practices .

Shraw and Olafson's (2002b) work met with a great deal of criticism regarding both their assumptions and their methodology, with a whole issue of *Issues in Education* dedicated to both the presentation of their study, the critiques and responses to their study, (Derby, 2002; Hofer, 2002; Martinez, 2002; McCombs, 2002; Minstrell & Anderson, 2002; Pape & Hoy, 2002; Schoenfeld, 2002; Schommer-Aikens, 2002) and a subsequent submission by Shraw and Olafson (Schraw & Olafson, 2002), that addressed the various criticisms of their work and provided updates on changes being made in their current research by exploring the relationship between teachers' world views and practices.

While the above studies represent a wide variety of paradigmatic research focus (qualitative, quantitative, and mixed methods) and were designed to explore the relationship of teachers' epistemological beliefs with both general and more specific educational components, they were all conducted primarily with either middle school, junior high, and high school science teachers (Benson, 1989; Morge, 2005), college teachers (Kember & Gow, 1994), or elementary education teachers (Johnston, Woodside & Day, 2001; Schraw & Olafson, 2002). The following review highlights investigations exploring the relationship of preschool teachers' knowledge and learning beliefs to classroom practices.

*Epistemological beliefs in early childhood education settings.* Berthelsen, Brownlee and Boulton-Lewis (2002) investigated the link between early childhood educators' epistemological beliefs and their conceptions of good caregiving. They compared the caregiving conceptions between teachers who held one of three identified knowledge perspectives: (a) the multiplistic view, (b) the mixed view, and (c) the relativistic view. The teachers with the multiplistic perspective (knowledge encompasses multiple perspectives that may have equal value but go unevaluated by individuals holding this view) were more 'care-giver-centered' and stressed more of the affective, versus the cognitive, dimensions of their role. The teacher with a mixed view of knowledge (individuals with this view are more evaluative regarding opinions and sources of knowledge and believe that knowledge encompasses multiple perspectives) also utilized a strong affective focus with an interest in promoting student autonomy. The teachers with the relativist perspective (with the commitment to a personal, reasoned interpretation of different sources of knowledge) demonstrated a strong commitment to the use of both affective and cognitive roles to support student learning.

Similar to Kember and Gow (1994), Stipek and Byler (1997) did not label the beliefs addressed in their study as 'epistemological beliefs,' though the focus of their study examined the relationship between teachers' beliefs about learning, their classroom practices and their goals for the students. Specifically relevant to this project was their interest in determining whether or not early childhood, Kindergarten and first grade teachers held coherent views of how children learn, the teachers' beliefs about the role of adults in the learning process, and whether or not the teachers' views were congruent with either a "basic skills" or a "child-centered" approach to learning. According to



Stipek and Byler (1997), the more preschool and Kindergarten teachers endorsed basic skill beliefs, the less they endorsed the child-centered beliefs and vice versa. Teachers who endorsed a basic skills approach to learning demonstrated classroom practices consistent with that approach, with less emphasis on more social, child-centered approaches. Teachers who endorsed child-centered and positive social climate beliefs were less likely to demonstrate the basic skills approach to learning in their classroom. Associations between early childhood education and Kindergarten teachers' beliefs, practices, and goals were also noted; with child-centered beliefs and practices associated with different goals than basic skills beliefs and practices. Interestingly, no significant relationships between teachers' espoused beliefs, observed classroom practices, and goals were identified for the first grade teachers in the study.

This brief review of studies designed with a focus on the role of teachers' epistemological beliefs, highlights some of the inconsistencies identified by previous researchers attempting to understand the influence of teachers' epistemological beliefs in classroom practice. While many of the qualitative studies identified relationships between teachers' beliefs about knowledge and/or knowledge acquisition and various classroom practices, the results from other studies, especially studies that used quantitative approaches to assess teachers' epistemological beliefs, were less consistent in their reports of this relationship. It appears that, for now, a strong connection between teachers' epistemological beliefs and various educational components has not been demonstrated. Even less is known about the role of epistemological beliefs in early childhood education settings. As Brownlee and Berthelson (2006) note, "no research has investigated the nature of early childhood teachers' epistemological beliefs and its

relationship to classroom practice” (p. 20). Brownlee and Berthelson cite their own work as one exception, but their sample included only caregivers working with infants and toddlers (children aged 18 months to 3 years). Studies identifying and/or exploring the impact of epistemological beliefs among teachers who actually work in early childhood education (children aged 3-5) settings are not currently represented in the professional literature. The intent of this study is to contribute to the current knowledge of practicing teachers’ epistemological beliefs by extending inquiry to include early childhood education teachers and identifying links between their epistemological beliefs and classroom practices, specifically in relationship to their willingness to implement innovation.

For this project, participant teachers’ epistemological beliefs were assessed using the epistemological dimensions, as described by Schraw, Bendixen, and Dunkle (2002) which included: (a) Certain Knowledge - the continuum of personal views that conceptualize knowledge as absolute and unchanging, to views that conceptualize knowledge as evolving; (b) Simple Knowledge – the continuum of personal views that knowledge is unambiguous, possessing isolated bits of knowledge, to views that conceptualize knowledge as highly interrelated; (c) Quick Learning – the continuum of beliefs that knowledge is either learned quickly or not at all, to beliefs that knowledge is attained gradually; (d) Innate Ability or Fixed Ability - the continuum of beliefs regarding one’s ability to learn, whether it is fixed at birth or changeable. These dimensions were compared to the level at which teachers’ implemented the Project Construct curriculum in their classroom, as measured by observer ratings. Details

regarding another belief of interest to the project, teacher efficacy, are provided in the next section.

### *Teacher Efficacy*

Tschannen-Moran, Woolfolk-Hoy, and Hoy (1998) define teacher efficacy as a “teacher’s belief in his or her capability to organize and execute courses of action required to successfully accomplish a specific teaching task in a particular context” (p. 233). In their review of literature investigating teacher efficacy, Tschannen-Moran et al. (1998) refer to publications linking teacher efficacy to a variety of teacher processes. For example, teachers with high teacher efficacy exhibit greater levels of planning and organization, greater enthusiasm for teaching, greater commitment to teaching, and increased likelihood to stay in the teaching field. Additionally, according to the studies reviewed by Tschannen-Moran et al. (1998), teachers with high efficacy work longer with students experiencing difficulty, are less critical when students make errors and less likely to make special education referrals for students who are having difficulty. These teachers are also more open to new ideas, more willing to experiment with new methods to meet their students’ needs, demonstrate persistence when faced with difficulty and resilience when faced with setbacks. Soodak and Podell (1996) list studies suggesting relationships between teacher efficacy and instructional decision-making, such as the use of class time, classroom management strategies, and questioning techniques.

Interest in teacher efficacy, as a focus in educational research, originated with the publication of two studies conducted by the Rand Corporation in the mid 1970s (Woolfolk, Rosoff, & Hoy, 1990). One of the Rand studies (Armor et al., 1972) as cited in Hughes (1999), explored the success of a variety of reading interventions and noted

strong relationships between teacher efficacy and variations in reading achievement for minority students as measured by project goals achieved, amount of teacher change and continued use of the interventions after the program concluded. The other Rand study (Berman, McLaughlin, Bass, Pauly, & Zellman, 1977) reported powerful relationships between teachers' sense of efficacy and the percentage of project goals achieved, improved student performance, teacher change, continuation of project methods, and use of project materials after the implementation of the project was initiated.

Ashton and Webb expanded on the Rand methodology by using interviews and classroom observations, as well as Rand items, in their study of teacher efficacy (Woolfolk et al., 1990). Ashton and Webb (1986) reported relationships between low teacher efficacy and a tendency to de-emphasize instruction and learning, to sort and classify students by ability, to be uncomfortable in low-achieving classrooms and to distrust, as well as ignore, low-achieving students. In addition, Ashton and Webb noted links between low teacher efficacy and the inability to engage students' academic interest, an unwillingness to push students and/or to monitor their work and the use of classroom management practices that utilize positional authority and control orientations, such as embarrassment, in order to manage student behavior. In contrast, the teachers with high efficacy in their study tended to perceive students as capable and trustworthy and to believe that students both want to and can learn. These teachers reportedly make efforts to establish warm relationships with their students and believe that students will behave appropriately when treated fairly, firmly, and with consistency. In terms of classroom management, high efficacy teachers in the Ashton and Webb study are reluctant to use strategies that potentially embarrass their students, relying instead on

personal authority and direct, non-emotional behavior management strategies. Unwilling to accept student failure, these teachers strongly emphasize instruction and learning, are willing to teach all students in the classroom and make efforts to engage student interest, to monitor student work, to push students, to keep students on task and to keep track of students' individual accomplishments. As might be expected, Ashton and Webb (1986) also noted relationships between teacher efficacy and student achievement.

Tschannen-Moran et al. (1998) recommend a new model of efficacy for consideration in their teacher efficacy research. Their model combines the conceptualizations of the construct, as measured in the Rand (Armor et al., 1972; Berman et al., 1977) and the Ashton and Webb (1986) studies, but further suggests that teacher efficacy is likely context specific, highlighting the possibility that teachers may experience varying levels of efficacy based on the subject being taught and/or the circumstances in which the teaching takes place.

Henson (2002) suggests that Tschannen-Moran et al.'s (1998) model "attempts to take a broader, more comprehensive look at self-efficacy as it relates to teachers" (p. 139) and thus, represents an important advancement in considerations of teacher efficacy. According to Henson, previous considerations of teacher efficacy tended to capture more global aspects. In contrast, Tschannen-Moran et al.'s model recognizes how the contextual nature of efficacy judgments can influence teacher efficacy from situation to situation.

Henson, Bennett, Sienty and Chambers (2002) were among the first to explore the viability of using the Tschannen-Moran et al. (1998) model for use in assessing teacher efficacy. Henson et al. examined the relationship of teachers' perceptions of teaching

competence and teachers' perceptions of task analysis to both global and specific measures of teacher efficacy. Henson et al. subsequently reported some support for Tschannen-Moran et al.'s model and confirmed the usefulness of specificity in measuring and predicting teacher efficacy.

*Teacher efficacy in early childhood settings.*

Much of the research on the efficacy beliefs of early childhood educators has been conducted outside of the United States (Gorrell & Hwang, 1995; Lin & Gorrell, 1998, 2001). This research, as well as much of the research conducted in the United States on efficacy beliefs of early childhood educators, has primarily focused on the efficacy beliefs of pre-service teachers (Li & Zhang, 2000; Watters & Ginns, 1995). Wertheim and Leyser (2002) included early childhood educators in Israel for their study of teacher beliefs, behavior, and motivation in inclusive classrooms. However, Tschannen-Moran and Hoy (2001) expressed concern regarding the conceptual and statistical inconsistencies of the teacher efficacy measure used in the Wertheim and Leyser study.

A few studies have focused specifically on the efficacy of early childhood educators. For example, Rheams and Bain (2005) included early childhood teacher self-efficacy beliefs in their investigation of various teacher attitudes in both self-contained and inclusive classrooms. Desimone, Finn-Stevenson, and Henrich (2000) included measures of teacher efficacy in their evaluation of a whole-school reform model. However, the primary interest in the Rheams and Bain study focused on teachers' perceptions of the interventions in each setting, rather than the overall role of efficacy beliefs in teachers' classroom practices. Desimone et al. (2000) investigated differences

in efficacy beliefs between teachers in the control and reform model schools. Therefore, relationships between teacher efficacy and classroom practice were not explored.

While these studies in early childhood settings included considerations of teacher efficacy, studies examining links between *practicing* early childhood teachers' sense of efficacy and classroom practices are yet to be clearly established in the professional literature. Due to the numerous developmental milestones of early childhood, as well as the influence that adequate mastery of such milestones has on mastery of developmental tasks at later stages of development (Seifert & Hoffnung, 2000), it may be important to explore the potential influence of this construct on the classroom practices of early childhood educators; especially given the previously established links between teacher efficacy and student achievement (Armor et al., 1972; Ashton & Webb, 1986; Berman et al., 1977; Henson, 2002; Ross, 1994; Tschannen-Moran et al., 1998), classroom management (Ashton & Webb, 1986; Rimm-Kaufman & Sawyer, 2004; Ross, 1994; Woolfolk et al., 1990), and willingness to try innovation (Berman et al., 1977; Rimm-Kaufman & Sawyer, 2004; Ross, 1994; Smylie, 1988; Stein & Wang, 1988). The current project investigated the influence of early childhood teachers' efficacy beliefs in classroom decision-making, specifically in relationship to the teachers' willingness to implement the Project Construct Curriculum and Assessment system in their classroom. The Teacher Sense of Efficacy Scale (TSES) (Tschannen-Moran & Woolfolk-Hoy, 2001) was used to assess participants' perceptions of teacher efficacy. The TSES has three factors (a) Efficacy for Classroom Management, (b) Efficacy for Student Engagement, and (c) Efficacy for Instructional Strategies, or the ability to select and use alternative teaching strategies. Participant teachers' efficacy beliefs were compared with the level of

Project Construct implementation in the classroom. Similar comparisons were conducted using constructs from a motivational model – expectancy x value theory, described in the following section.

### *Expectancy x Value Theory*

The conceptualization of expectancy x value theory adopted for use in this study has evolved over the course of more than 70 years and includes the combined works of various theorist including Tolman (1932), Atkinson (1958) and Vroom (1964). The application of the theory for the proposed project is congruent with that of Abrami, Poulsen and Chambers (2004), who used expectancy x value theory to differentiate teachers who used cooperative learning (CL) from teachers who did not use CL.

Abrami et al. (2004) hypothesized that a teacher's decision to implement innovative programs is related to "(1) how highly s/he values the strategy; (2) how successful s/he expects to be; and (3) how high s/he perceives the cost of implementation to be" (p. 203). According to Abrami et al., the teacher's expectancy for success (item #2 above) was the most predictive factor in determining the implementation of the innovative practice (CL) in their study.

### *Applications of expectancy/value theory in educational settings.*

Hancock (1996) references numerous studies which document the usefulness of applying expectancy/value theory in educational contexts. However, since these studies focus on the application of expectancy/value theory in reference to student motivation and learning, their usefulness to the current project is limited.

A few studies have utilized expectancy x value models to investigate teacher motivation. Wright (1985) quantified teachers' perceived value of the incentives offered



to participate in curriculum development and reported “specific incentives do have greater potential for motivating teacher involvement in curriculum tasks than others” (p. 4). Intrinsic incentives, such as increased self-confidence, a sense of achievement, accomplishing the challenge of the task, the development of new skills and leadership potential were endorsed most often while extrinsic incentives, such as the provision of new materials for the school, were endorsed less often.

Wozney, Venkatesh and Abrami (2006) applied the Abrami et al. model to their investigation of teachers’ decisions to integrate computer technologies in their classroom. Similar to Abrami et al. (2004), Wozney et al. reported that, of the three factors, expectancy, value and cost, expectancy for success was most predictive of computer use.

The proposed use of expectancy x value theory for the current study is congruent with the Abrami et al. (2004) model, with Head Start teachers’ beliefs that implementing the Project Construct curriculum will result in improved student learning outcomes relegated to the variable of expectancy, their beliefs about the value of the Project Construct curriculum relegated to the value variable and their beliefs about the physical and psychological costs of implementing the Project Construct curriculum to the cost variable. The inclusion of a motivational model contributes a practical element to the current study. It may be that Head Start teachers choose not to implement the Project Construct curriculum because they do not expect to succeed with their goals if they implement the curriculum, do not see the value of the curriculum, and/or perceive that the cost of implementing the curriculum is greater than the benefits.

## Conclusion

This study investigated the influence of epistemological beliefs, teacher efficacy beliefs and expectancy x value beliefs on Head Start teachers' decisions to implement a Constructivist based curriculum, namely Project Construct, in their classroom. These constructs were selected as they characterize aspects of teacher beliefs potentially salient to teachers' curricular decision-making. For example, teachers may not implement the Project Construct curriculum because the assumptions of the curriculum are not congruent with their beliefs about knowledge and knowledge acquisition (epistemological beliefs). Teachers' failure to implement the Project Construct program may be attributed to their personal perceptions of the curriculum (expectancy x value beliefs) or their beliefs about themselves as teachers (teacher efficacy). Substantively, two of the constructs of interest in the proposed study, epistemological beliefs and teacher efficacy, derive from a rich history of research application within K-12 and/or post-secondary settings. Less information is available, however, regarding the role of epistemology and/or teacher efficacy in early childhood education settings. The application of expectancy x value theory, as an explanatory factor in understanding a teachers' motivation to implement a new curriculum in early childhood education settings, represents a unique contribution to the professional literature.

It was expected that there would be a relationship between each of these constructs and the level of Project Construct implementation in participant teachers' classrooms. The hypotheses for the quantitative portion of the study are:

1. (H1) It was expected that teachers who implemented the locally endorsed, constructivist-based curriculum in their classroom at extensive levels would have more sophisticated epistemological beliefs.
2. (H2) It was expected that teachers who implemented the locally endorsed, constructivist-based curriculum in their classroom at extensive levels would endorse higher levels of teacher efficacy.
3. (H3) It was expected that teachers who implemented the locally endorsed, constructivist-based curriculum in their classroom at extensive levels would endorse beliefs indicating (a) the benefits of implementing the curriculum outweigh the costs, (b) they value the curriculum, and (c) they expect to succeed by implementing the curriculum.

## CHAPTER III: RESEARCH PROCEDURES

### Introduction

The current study was designed to examine influential factors in early childhood education teachers' classroom decision-making processes, specifically in relationship to the level at which they implement an innovative curriculum. The intent of the study was to identify relationships between teachers' mental models about learning and teaching, including teachers' specific beliefs, and their classroom decision-making practices. Since the focus of the study represents a complex process (teacher decision-making) and the interests of the study are both confirmatory (influence of specific beliefs) and exploratory (identification of teachers' mental models and of perception changes after exposure to a constructivist-based curriculum) in nature, a mixed methods research design was selected as the most viable approach for capturing the complexity of both the target phenomena, as well as the varied interest of the overall study.

### Research Paradigm: Mixed Methods Design

Greene, Caracelli and Graham (1989) describe mixed methods research designs as those that include at least one quantitative method and one qualitative method, "where neither type of method is inherently linked to any particular inquiry paradigm" (p. 256). Mixed methods designs are useful when the research intent is to identify alternative (versus a single) perspectives for understanding phenomena (Mertens, 2005) and when the research focus includes problems that are embedded in a complex educational or social context. As noted by Tashakkori and Teddlie (2003) "the major advantage of mixed methods research is that it enables the researcher to simultaneously answer

confirmatory and exploratory questions, and therefore verify and generate theory in the same study” (p. 15).

Tashakorri and Teddlie (2003) describe several advantages for utilizing mixed methods research designs. For example, mixed methods designs expedite investigative inquiry and address research questions that other methodologies cannot; since the researcher is able to examine multiple research questions from multiple perspectives concurrently. This ability to adopt multiple methods for examining phenomena broadens the scope of the investigative inquiry and allows the researcher “to capture a more complete picture of human behavior and experience” (Tashakkori & Teddlie, 2003). Additionally, the utilization of mixed method designs strengthens investigative inference, allowing research findings to be supported, challenged and/or more comprehensively understood through the full compliment of adopted research strategies (Creswell et al., 2003). With the adoption of mixed methods designs, the researcher is able to “generate better understandings of the inquiry problem” (Greene & Caracelli, 2003). Mixed methods allows us “to *do our work better* to develop understandings that are broader, deeper, more inclusive and that more centrally honor the complexity and contingency of human development” (Greene, 2005).

#### Strategy of Inquiry

As introduced above, Greene et al’s (1989) definition of mixed methods research requires the use of both quantitative and qualitative data. In their framework for analyzing mixed methods data, Onwuegbuzie and Teddlie (2003) recommend that two decisions be addressed regarding the treatment of quantitative and qualitative data in mixed methods research. The first decision requires that the overall weight assigned to

each data type be established. Considerations for this decision include, “Will both quantitative and qualitative data be considered equally (equivalent status design) or will one be considered dominant for purposes of analysis and inference (dominant-less dominant)” (Onwuegbuzie & Teddlie, 2003). The second decision refers to how the different types of data will inform each other throughout the process of the study. In consideration of the first decision, the equivalent status design was adopted for this study in that both data types are considered equally. However, in response to the second decision, one type of data (quantitative) was used to structure the analysis for the other type of data (qualitative) based on the idea of supervenience, as proposed by Miller (2003). Miller characterizes supervenience as “a type of “dependency” relation” (p. 437) that does not require reduction from one level to another. For example, in the current project, the quantitative data were used, not only to provide information about early childhood education teachers’ specific beliefs in relationship to classroom practice, but also as the basis for forming groups which were compared in subsequent qualitative analysis. In this case, there is a dependency and weak, though plausible (Miller, 2003) supervenience relationship by which the qualitative data supervenes on the quantitative data, though both forms of data are given equal weight in final inferences produced.

While an equivalent status design was adopted as the preferred mechanism for treating the data in the current project, the strategy of inquiry for the project was drafted from the qualitative tradition, specifically the case study. Hatch (2002) summarizes a description of a case study previously endorsed by two writers, Yin (1994) and Merriam (1988), noting how both writers “argue that case studies are a special kind of qualitative work that investigates a contextualized contemporary (as opposed to historical)

phenomenon within specified boundaries" (Hatch, 2002, p. 30, parenthesis in the original). Bounded phenomena within educational settings may include "a program, an event, a person, a process, an institution, or a social group" (Merriam, 1988). The current study examined processes within a bounded phenomenon at two levels. At a macro level, the process of interest included comparisons of early childhood education teachers' specific beliefs and the level at which they implemented a locally endorsed, constructivist based curriculum in their Head Start classroom. At a micro-level, two additional processes were considered: 1) the participant teachers' classroom decision-making; and 2) noted changes in the teachers' original perceptions of the endorsed curriculum. To examine the process of interest at the macro level, quantitative research techniques were selected in order to explore previously established links between specific beliefs and the classroom practices of teachers working with older students. Research techniques from the qualitative tradition were adopted to explore the two processes of interest at the micro level.

### *Quantitative Inquiry*

The specific beliefs of interest for the quantitative portion of the study included teachers' beliefs about the value of the constructivist based curriculum (expectancy x value beliefs), teachers' beliefs about knowledge and learning (epistemological beliefs), and teachers' beliefs about their own sense of efficacy as teachers (efficacy beliefs). These beliefs were selected due to their previously established relationship to teachers' classroom practice, identified in professional literature (see chapter 2, pp. 18-33) and because they represent different aspects of an explanatory conceptualization for describing influential factors in teachers' classroom decision-making. For example, is

success at implementing an innovation for early childhood education teachers related to congruence between (a) their beliefs about knowledge and learning (epistemological beliefs), (b) their beliefs about their own ability to implement the program (efficacy beliefs) and/or (c) their beliefs about the efficacy of the innovation overall (expectancy x value). These beliefs were also selected due to the recognition that, while the relationship between teachers' beliefs and classroom practice have previously been investigated using teachers from elementary, secondary and post-secondary settings (Benson, 1989; Brownlee & Berthelsen, 2006; Johnston et al., 2001; Kember & Gow, 1994; Morge, 2005; Schraw & Olafson, 2002), published research exploring similar constructs was not represented within the population of practicing early childhood education teachers.

#### *Quantitative Hypotheses*

The primary objective of confirmatory research is to test hypotheses (Stebbins, 2001). The term “confirmatory” is used here as a label for investigations that state alternative hypotheses (from the null hypotheses) and then conduct a study with interest in rejecting or accepting the null hypotheses rather than a term representing an “act” or “intention” to confirm hypotheses. The hypotheses for this portion of the study include:

- 1) (H1) It was expected that teachers who implemented the locally endorsed, constructivist-based curriculum in their classroom at extensive levels would have sophisticated epistemological beliefs.
- 2) (H2) It was expected that teachers who implemented the locally endorsed, constructivist-based curriculum in their classroom at extensive levels would endorse high levels of teacher efficacy.



- 3) (H3) It was expected that teachers who implemented the locally endorsed, constructivist-based curriculum in their classroom at extensive levels would endorse beliefs indicating that (a) the benefits of implementing the curriculum outweigh the costs, (b) they value the curriculum, and (c) they expect to succeed by implementing the curriculum.

### *Qualitative inquiry*

The initial focus of this portion of the project was to elucidate the findings from the quantitative portion of the study by exploring two additional interests: (a) other operative factors in teachers' classroom decision-making processes; and (b) changes in participant teachers' original perceptions of the Project Construct curriculum, given the long term opportunity to both implement the program and to receive additional training and/or exposure to the program.

### *Quantitative and Qualitative Aspects of the Study*

Specific details regarding the aspects of the study that are shared by each tradition, as well as details regarding how the unique processes and procedures of each tradition were applied to the project are presented in this chapter. Specifically, the collection, treatment and analysis of both the quantitative and qualitative data and how the quantitative data was used to structure the analysis of the qualitative data will be discussed. The chapter is organized in four sections. The first section presents the aspects of the current study which are shared by both the quantitative and qualitative traditions, including a description of the research setting, the participants, and the details regarding the recruitment and informed consent procedures. Sections two and three include the processes and procedures unique to the quantitative tradition and qualitative traditions

respectively. The fourth and final section addresses the justification of inferences that are provided in chapters 4 and 5.

#### Method: Phase I

##### *Participants*

While the trustworthiness of quantitative data depends on its ability to provide the degree (statistical significance) to which research findings can be generalized to the population parameters at large, this requirement is not the task of the qualitative researcher. The level at which results from a qualitative study can be transferred to other settings is dependent on what Lincoln and Guba (1985) refer to as the match between the sending and the receiving context. The task of the qualitative researcher is to provide rich descriptions of the research setting and context so that someone, contemplating the possibility of transfer, has enough information to determine a level of fit between the investigative context and other contexts or settings.

As previously mentioned, this research is framed as a case study. The case in this study was defined as a Head Start program within one school district in a large mid-western city. The program had 16 part-day and 10 full-day classrooms. Part-day classrooms conducted both morning and afternoon sessions and met for the duration of the school year. Full-day classrooms were in session all day and year round. The classrooms were distributed across nine sites, with most of the classrooms housed within neighborhood elementary schools, though a few were housed in non-educational settings such as community resource centers. Each classroom had one lead teacher and one assistant. Teaching assignments were permanent for the school year.

### *Sampling procedure*

A primary interest of this study was to better understand the influence of early childhood education teachers' beliefs in relationship to the level at which they implemented an innovative curriculum in their classroom. Therefore, the sample was purposefully selected, with initial interest in capturing typical-case participants (Mertens, 2005), so that a general perspective of teachers' overall level of implementation, (epistemological, efficacy and expectancy x value) could be defined in relationship to specific beliefs of interest to this study.

Teachers eligible for participation in the project included the early childhood education teachers employed by the school district, who served in the role of "lead teacher" in the Head Start program, who completed the constructivist based Project Construct training, and who were assigned a classroom for which they had primary responsibility. Teaching assistants and/or lead teachers who had not completed the Project Construct training, despite fulfilling the other requirements, were not considered eligible for participation. As the target population was small (28 eligible teachers), all eligible teachers were invited to participate in the study and all eligible teachers, who complied with informed consent procedures, were included in Phase 1 of the study.

Kemper, Springfield and Teddlie's (2003) description of stratified purposive sampling corresponds with the sampling procedure adopted in Phase 2 of the study. In stratified purposive sampling, the sample population is purposefully divided into strata so that similarities and differences across subgroups can be identified and explored. Details regarding the subgroups are provided in a later section of this chapter.

### *Sample population*

By and large, Head Start teachers are not required to have a college degree. However, many of the teachers in this mid-western district had at least an associate's degree (64%), with some teachers holding a bachelor's degree (25%). The school district typically provides numerous professional development opportunities throughout the school year. In addition, several teachers have taken advantage of tuition reimbursement opportunities in order to either obtain a degree (associate's or bachelor's degree) and/or to apply for an eventual degree. Though a few of the teachers were Hispanic (18%) and a few were Asian (5%), the majority of teachers were African American (75%). A few teachers were relatively new to the Head Start program but many of the teachers were seasoned early childhood professionals, with years of experience ranging from 1 to 35.

Students, aged 3 and 4, from families both residing in the school district and with a reported income which falls within the current year's poverty guidelines (as determined by the United States Department of Health and Human Services) are eligible for enrollment in Head Start. Each Head Start classroom that participated in this study served 17 (with a maximum capacity of 20) registered students. The sample represented a diverse racial/ethnic mix of students, including African American (43%), Asian (3%), Hispanic (38%), Caucasian (7%), Somali (6%) and other (.5%). Some (29%) of the students were re-enrollees. The majority of students were four-year-olds (60%). The remaining students were three-year-olds (40%).

### *Participant recruitment*

Participant teachers were recruited in two steps. In an attempt to present a description of the study to as many teachers as possible, the first step was conducted

during a regularly scheduled staff gathering. At this gathering, I described the study, presented why the study was important, who would benefit from the study, how the results of the study might benefit Head Start teachers, what participation in the study would include, who was eligible to participate, how differences in the number of participants potentially influences the results of a study and the nature of informed consent. Teachers were allowed to ask questions and to solicit additional information regarding the nature of the study during this presentation. Prior to ending the presentation, I announced that teachers would be invited to participate in the study at a later date.

The second step of the recruiting process included subsequent visits to each teacher's room and/or to regularly scheduled staff meetings in order to either present the above information to teachers who missed the initial meeting and/or to address additional questions or concerns teachers presented regarding either the study itself or participation in the study. Upon agreeing that they would participate in the study, teachers were asked to complete an informed consent document (See Appendix A). Since this case study was designed to explore teacher decision-making, all eligible teachers who personally signed and submitted the informed consent document were identified as participants for the study.

A total of 17 teachers (60% of those eligible to participate), who represented 16 classrooms (one classroom had 2 eligible teachers) across seven sites participated in the study. Of these participants, 67% endorsed their race/ethnicity as African-American, 14% as Hispanic or other, and 4% as Asian. Many (41%) of the participant teachers reported having an associate's degree with some additional coursework and a few reported having

a bachelor's degree (14%). A few (14%) indicated they had completed course work towards an advanced degree. Years of experience as lead teachers in an early childhood education setting ranged from 1 to 35 years with an average of 9.5 years.

*My history with this Head Start program*

Prior to starting my doctoral program, I had worked as the Mental Health Consultant for this Head Start program for six years. In this capacity, I would often visit the classrooms to observe students who were referred for behavioral/emotional/mental health concerns. While the primary function of these observations was to identify environmental antecedents that produced inappropriate behavior and/or to gather information regarding the noted concerns for the student, since I am a systemic therapist, the teachers' interactions with the referred student were also observed. It was not uncommon for me to prescribe shifts in the teacher's interaction with the student as one mode of intervention regarding the presenting concern.

In my role as Mental Health Consultant, I also provided various professional development programs related to positive personal mental health practices, as well as positive mental health practices in the classroom and among the staff. I would also visit classrooms to make presentations to students about various mental health topics over the course of the school year and to encourage teachers to utilize the Second Step curriculum, a violence prevention curriculum designed for early childhood settings. While it had been almost three years since I served as the Mental Health Consultant for this program, many of the teachers whom I worked with in my previous professional role were still employed at Head Start at the time of this study. My prior relationship with the teachers both encouraged and impeded their participation in this study.

In my previous tenure with Head Start, I recognized that differences, such as race, socio-economic status, education, and professional experience, between me and the teachers in this Head Start program impeded my ability to work with teachers in the capacity of Mental Health Consultant. I suspect these differences also limited teachers' willingness to participate in this study. While many of the teachers regularly referred student concerns to me during my tenure as the Mental Health Consultant, there were a few teachers who never referred students to me, despite the student's tendency to be highly disruptive in the classroom. Though these students may have eventually been referred, the referral usually came from management staff rather than through a direct referral from the teacher. In such cases, however, the teacher did cooperate with me in my efforts to understand the presenting issues for the student. Compliance to my recommended interventions varied, but this was true of teachers who self-referred students as well. I was aware of these previous observations and experiences with the Head Start teachers and assumed they would influence teachers' willingness to participate in the study.

While the relationships I had previously established with the Head Start teachers potentially impeded their willingness to participate in the study, I believe my history with the teachers motivated some teachers to participate in the study who might have been less willing to participate if I were a stranger to them. For those teachers who regularly referred students to me in the past, or for whom I had established a positive working relationship, they were highly motivated to participate and celebrated the fact that I had reached this stage of my doctoral program. In a few cases, the energy generated by these teachers motivated less resistant teachers to participate as well. A few teachers

apologized for refusing to participate, as they were under personal stressors and were uncomfortable with committing to additional responsibilities or tasks. While it was not directly stated, due to my previous relationships with the teachers in this program, I suspect that a few teachers refused to participate in this study, as they would probably refuse to participate in any study. Finally, I suspect a few teachers refused to participate either as a reflection of their distrust of the system overall, a distrust of the confidentiality of the data gathered in the study and/or their distrust of me.

These perceptions and assumptions represent the biases I brought to this study as I had previously established relationships, with varying degrees of trust and respect, with most all the teachers in this program. Some of the teachers who I expected would participate declined to participate in the study and some of the teachers who I expected would refuse to participate, willingly consented to participate, despite the high level of time and task demands for the study participants.

Memories of previous classroom visits and of teachers' interactions with students had to be screened while rating the items during the classroom observations. While teachers were generally forthcoming during the interviews, in some cases, the interview skills I had developed as a counselor enhanced my ability to change the interview questions and/or shift the focus of the interview in order to capture as much of the teachers' perceptions about what influences their classroom practices as possible. All of these represent factors that potentially influenced the teachers' willingness to participate in the study, their willingness to respond honestly to the interview questions, and my own ability to observe the teachers and interpret their responses with total objectivity.



### *Data Collection Procedures*

A quantitative approach was adopted as the mechanism for exploring how specific teachers' beliefs influence the level at which they implement a locally endorsed, constructivist based curriculum in their Head Start classroom. This section describes the data collection, treatment and analysis processes for this portion of the study.

Two types of data were utilized in order to identify potential relationships between teachers' beliefs and classroom practice including: (a) teacher belief inventories (Epistemic Belief Inventory, Teacher Sense of Efficacy Scale and the Project Construct Curriculum Questionnaire), and (b) observation data (Project Construct: Early Childhood Classroom Observation Survey). The mechanics of the data collection process for each type of data is described below.

#### *Survey Data Collection.*

Teacher belief inventories (Appendix B) were used to explore the nature of teachers' beliefs about knowledge and knowledge acquisition (Epistemic Belief Inventory), their efficacy beliefs about their competence as teachers (Teacher Sense of Efficacy Scale) and their beliefs about the value of the Project Construct curriculum (Project Construct Curriculum Questionnaire). For the most part, the part-day teachers were confined to their rooms Monday through Thursday and the full-day teachers were similarly confined Monday through Friday. Therefore, administration of the belief inventories was scheduled on days when the majority of the staff members were required to report for regularly scheduled staff meetings and/or staff development. In order to optimize the convenience of having a large group of teachers available at one time, as well as to protect the identity of participant teachers, the administration of the instruments

was scheduled on the same day as these gatherings but at a time when and a place where it was least likely that other teachers and/or Head Start administrative staff would be present. Two such administration times were scheduled.

The administration meetings were scheduled for approximately 45 minutes in length and participant teachers were provided with all three instruments to complete during this time. Completed belief inventories were returned to me and were stored in keeping with the mandates of the University of Missouri – Columbia’s Institutional Review Board.

If participant teachers were unable to attend the two scheduled administration times, they were provided with an opportunity to complete the instruments before or after they participated in the scheduled interview. The interview was conducted to address additional research interests and will be discussed in greater depth later in this chapter.

#### *Observation Data Collection*

The Project Construct: Early Childhood Classroom Observation Survey (PC-ECCOS: Appendix C) (2003) was used to assess the level of Project Construct implementation for each classroom. The PC-ECCOS includes two item types. The majority of items are meant to be completed via simple observation but a few items (query items) require dialogue with the teacher. I conducted one observation and completed all the items that could be addressed via classroom observation and as many query items as time and/or teacher availability would allow. Prior to scheduling the initial classroom observation, participant teachers were provided with parental consent forms (See Appendix D) to distribute to and recollect from their students’ parents. Parental consent forms were provided in English and Spanish.

Prior to beginning the classroom observation process, I had been in communication with Head Start administrative staff to address the possibility that some parents might decline to give permission for their child to be present during the observation and/or would simply not return the consent forms. A standard Head Start procedure for managing staff shortages and addressing mandated student-teacher ratios is to move children to different rooms on days when their regular room is understaffed. The Head Start administrative staff suggested that this procedure be similarly adopted in order to address the likelihood that children, for whom the parents had either declined permission and/or failed to return the parent consent form, might be present on the day of scheduled observations. However, I was unwilling to move more than two students from any room so every effort was made to retrieve as many parent consent forms as possible. Once all but two of the parent consent forms were returned for any participant teacher's classroom, the initial observation was scheduled for that classroom with requests made to the participant teacher that she continue in her attempts to retrieve the remaining consent forms. Only two students' parents declined consent for their children to be present during the classroom observations.

Once the initial observation was completed, a second observation was scheduled for completion by personnel who I had trained or who were trained by the Project Construct curriculum expert,<sup>1</sup> to collect these data. I conducted all but one of the initial observations; another investigator from the University of Missouri – Columbia conducted

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<sup>1</sup> Wayne Mayfield, a former Project Construct staff member who contributed to the design and validation of the PC-ECCOS, provided training for the classroom observation raters. Investigators from the University of Missouri-Columbia received direct face to face training from Mr. Mayfield. This training was video-taped and edited for use in the training for the Education Specialist at Head Start who would serve as second raters for the study.

one of the initial observations and I conducted the second observation for that room. The rest of the scheduled follow-up observations were conducted by either another investigator from the University of Missouri – Columbia or one of the Education Specialist from Head Start. Second raters were encouraged to address any of the blank query items in their dialogue with teachers. All observation items were completed by the second rater and, in some cases, both raters were able to complete all the query items.

### *Instruments*

The instruments selected for use in the project included (a) Sense of Teacher Efficacy scale, (b) the Project Construct Curriculum Questionnaire, (c) the Project Construct: Early Childhood Classroom Observation Survey, and (d) the Epistemic Belief Inventory. A description of each instrument, as well as information regarding the reliability and validity of each instrument and how data were treated for subsequent analysis, is provided below.<sup>2</sup>

*Teacher Sense of Efficacy Scale* (TSES: Appendix B). The TSES scale was designed to explore teacher efficacy by including both considerations for personal competence and for task analysis in relationship to the “resources and constraints in particular teaching contexts” (Tschannen-Moran & Woolfolk-Hoy, 2001). This combination of various considerations regarding teacher efficacy are not included in other efficacy measures currently available.

The TSES (short form) is a 12 item scale, with each item assessed on a 9-point continuum with anchors along the continuum including 1- Nothing, 3-Very Little, 5-

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<sup>2</sup> It should be noted that, due to the small sample size for this study, reliability and validity estimates for the current sample could not be established. Inferences regarding the reliability and validity of these instruments are based on reliability and validity estimates established in previous works.

Some Influence, 7-Quite a Bit, and 9-A Great Deal. The measure has three subscales: 1) Efficacy for Instructional Strategies, 2) Efficacy for Classroom Management, and 3) Efficacy for Student Engagement (Tschannen-Moran & Hoy, 2001). Tschannen-Moran and Hoy (2001) describe the TSES as “reasonably valid and reliable” (p. 801), reporting reliability coefficients ranging from .81 to .86 for each subscale of the short form. Tschannen-Moran and Woolfolk – Hoy (2001) provide evidence for the construct validity of the TSES as well, noting correlations between the TSES and other measures of teacher efficacy

Previous studies utilizing the TSES include a study using self-efficacy and prior experience to predict prospective teacher anxiety (Yetkin, 2003) and a study designed to explore the influence of resources and support on teachers’ efficacy beliefs (Tschannen-Moran & Woolfolk-Hoy, 2002). In the later study, reliability coefficients for each subscale were reported as Efficacy for Instructional Strategies (.87), Efficacy for Classroom Management (.88), and Efficacy for Student Engagement (.84).

Changes were made to the language of two items of the TSES in order to accommodate the population for the proposed study. These changes are presented in Table 1 below:

TABLE 1

Item #	Original Item	New Item
2	How much can you do to motivate students who show low interest in school work?	How much can you do to motivate students who show low interest in classroom tasks?
3	How much can you do to get students to believe they can do well in school work?	How much can you do to get students to believe they can do well in classroom tasks?

*Project Construct Curriculum Questionnaire* (PCCQ: Appendix B). The PCCQ represents an adapted version of the Cooperative Learning Implementation Questionnaire (CLIQ) originally designed and validated by Abrami, Poulsen, and Chambers (2004) for use in differentiating users and non-users of cooperative learning (CL). The CLIQ consists of 48, five-point Likert scale items (1=strongly agree to 5=strongly disagree) designed to assess participants' expectancy (PC expectancy), value (PC value) and cost (PC cost) perceptions related to using CL in their classroom. According to Abrami et al., the reliability for each scale in the CLIQ is high with Cronbach's alpha for the expectancy subscale at .86, the value subscale at .74 and the cost subscale at .87.

In order to capture participant teachers' expectancy, value and cost perceptions regarding the Project Construct curriculum, the format of the CLIQ, as well as the language of some of the items, was adapted for use in this study. The CLIQ was reorganized into three sections with the following initial stems:

- 1) I believe...
- 2) I believe that Project Construct..
- 3) I believe I...

Each item from the CLIQ was reassigned, as appropriate, within one of these sections.

While most of the items could be applied without changes to the original terminology of the items, the wording of some of the items was slightly adjusted so that the language of the item would align with beliefs about Project Construct, rather than cooperative learning, and be congruent with terminology typical to the Head Start setting.

While changes in both the overall format and the language of some of the CLIQ items challenges existing reliability and validity estimates, redesigning the CLIQ to accommodate the interest of the proposed study seemed a more viable alternative than constructing a new instrument to measure similar constructs. Though reliability estimates for the current sample are suspect due to the small sample size for the project, the content validity of the PCCQ was addressed by accessing the expertise of both the Head Start Director and Project Construct staff to ensure that the items were congruent with Head Start and Project Construct terminology and phrased in ways that supported the specific intent of the item.

*Epistemic Belief Inventory* (EBI: Appendix B). The EBI is a five-point, 32-item Likert type questionnaire (Schraw & Olafson, 2002), constructed by Schraw, Bendixon and Dunkle (2002) to measure the five dimensions of adult epistemological beliefs, originally described by Schommer (1990). The dimensions include: (a) Certain Knowledge - the continuum of personal views that conceptualize knowledge as absolute and unchanging, to views that conceptualize knowledge as evolving; (b) Simple Knowledge – the continuum of personal views that knowledge is unambiguous, possessing isolated bits of knowledge, to views that conceptualize knowledge as highly interrelated; (c) Quick Learning – continuum of beliefs that knowledge is either learned

quickly or not at all, to beliefs that knowledge is attained gradually; (d) Innate Ability or Fixed Ability - the continuum of beliefs regarding one's ability to learn, rather it is fixed at birth or changeable (Schommer, 1998); and (e) Omniscient Authority – the continuum of beliefs regarding the extent to which knowledge descends from authority figures. Schommer provided statistical validation for all of the constructs except Omniscient Authority (Schraw & Olafson, 2002).

The primary goal of the EBI was to make available a shorter, more efficient and reliable instrument for measuring epistemological beliefs than the instrument originally developed by Schommer (1990). An additional objective for constructing the EBI was to validate the omniscient authority factor, which Schommer's (1998) previous analysis was unable to support (Schraw et al., 2002).

Schraw et al. (2002) reported that, in pilot comparisons between the EBI and Schommer's Epistemological Questionnaire (EQ), a variety of factors were identified in the EQ which challenged the validity of Schommer's previously identified factors. Schraw et al. suggested that the differences identified in their pilot studies comparing the EBI and EQ, could be related to the factor analytic approach adopted by Schommer, who parceled the items of the questionnaire prior to conducting factor analysis on the EQ.

Schraw et al. (2002) conducted exploratory factor analysis (oblique and varimax rotations) on the items of both the EQ and the EBI and noted the following: (a) the EBI yielded all five of Schommer's original factors but explained more sample variance (60%) than the EQ (35%); (b) the EBI had better predictive validity than the EQ, though Schraw et al. caution that the criterion validity for the EBI is still relatively poor; and (c) the EBI had more pronounced test-retest reliability than the EQ. Since the EBI had been



utilized in previous studies identifying links between the epistemological beliefs and classroom practices of teachers working with older student populations, and since the current study was intended to extend inquiry regarding the role of epistemological beliefs to early childhood settings, I decided to use the EBI in order to maintain consistency between the results of this study and the conceptualizations of epistemological beliefs that had been used in prior investigations.

Table 2 below displays the reliability coefficients and test-retest correlations for each factor as reported by Schraw et al. (2002).

TABLE 2

<b>Reliability Data Epistemic Belief Inventory</b>		
<b>Factor</b>	<b>Coefficient Alpha</b>	<b>Test/Retest</b>
Omniscient Authority	.65	.66
Certain Knowledge	.63	.81
Quick Learning	.60	.66
Simple Knowledge	.66	.64
Innate Ability	.63	.62

Additional studies utilizing the EBI report somewhat higher alpha coefficients with Schraw and Olafson (2002) reporting alpha coefficients for the subscales of interest to their study as Simple Knowledge (.76), Certain Knowledge (.79), and Omniscient Authority (.70).

Concerned with reports as to the validity of factors for both the EQ and the EBI, Michelle Gill (personal communication, September 1, 2006) conducted exploratory factor analysis on her sample of 402 preservice and inservice teachers. Her analyses revealed only four factors versus the identified five in the EQ and the EBI. Similar to Schommer's original analysis, Gill's analysis was unable to substantiate the Omniscient Authority factor. In addition, Gill reported that, in her analysis, two items loaded on different factors from the EBI, the differences were:

- Item #9: *If a person tries too hard to understand a problem, they will most likely end up being confused.* Schraw et al. (2002) reported this item loaded on the factor – Quick Learning; Gill (personal communication, September 1, 2006) reported this factor loaded on the factor - Simple Knowledge.
- Item #24: *The more you know about a topic, the more there is to know.* Schraw et al. (2002) reported this item loaded on the factor – Simple Knowledge; Gill (personal communication, September 1, 2006) reported this factor loaded on the factor – Quick Learning.

A review of all three attempts to identify and measure dimensions of epistemological beliefs (Schommer, 2002, Schraw, Bendixen & Dunkle, (2002) and Gill (personal communication, September 1, 2006) suggests that there is some consistency of findings with regard to four of the five factors: Simple Knowledge, Certain Knowledge, Quick Learning, and Fixed Ability. The consistency of the Omniscient Authority factor continues to be suspect and therefore, was not included in the analysis for this project. As discussed above, there were also inconsistencies on item loadings for two factors. To account for this possibility, relationships between Schraw et al.'s original factor loadings

and Gill's identified factor loadings for the Simple Knowledge and Quick Learning scales were computed for the current population. Bivariate correlational analysis revealed that the two versions of both scales were highly correlated ( $r = .92$ ,  $p < .01$ ), despite the changes of one item on each factor. Therefore, Schraw et al.'s original item loadings were used to calculate the EBI scales used in the final analysis. Additionally, changes were made prior to administration regarding the language of a three items (Table 3) in order to accommodate the population for this study.

TABLE 3

Item #	Original Item	New Item
1	It bothers me when instructors don't tell students the answers to complicated problems.	It bothers me when teachers don't tell students the answers to complicated questions.
13	Instructors should focus on facts instead of theories.	Teachers should focus on facts instead of theories.
18	Things are simpler than most professors would have you believe.	Things are simpler than most teachers would have you believe.

*Project Construct: Early Childhood Classroom Observation Survey* (PC-ECCOS: Appendix C). The PC-ECCOS ("Project construct early childhood classroom observation survey (pc-eccos)", 2003) was designed as a reliable and valid tool to assess teachers' implementation of the Project Construct curriculum. The PC-ECCOS contains six

subscales. Reliability estimates for each subscale were computed on two different occasions. The resulting coefficient alpha ranges for both occasions are presented as follows: (occasion 1 and occasion 2 respectively): a) Physical Environment & Schedule, .61 and .62; b) Language Development & Symbolic Expression, .86 and .75; c) Mathematical & Scientific Thinking, .74 and .67; d) Social & Personal Development, .84 and .77; e) Constructivist Teacher Practices, .92 and .91; and f) PC-ECCOS total, .95 and .94. The PC-ECCOS is significantly correlated ( $r = .69, p < .01$ ) with the Early Childhood Environment Rating Scale (ECERS), another commonly utilized fidelity instrument (W. Mayfield, personal communication, June 14, 2005).

#### *Preparing Data for Analysis*

Participant teachers' responses to each of the survey items, as well as the PC-ECCOS observation ratings for each of the two raters, were entered into SPSS 14.0 for eventual analysis. However, prior to analysis, three types of data issues were addressed including: (a) missing data from the teacher surveys and from the PC-ECCOS, (b) elimination of items from the PC-ECCOS and (c) interrater reliability on the PC-ECCOS. The following description chronicles how these issues were addressed.

*Missing data.* There were a few instances of inaccurate or missing data for the survey. In one case a teacher marked two answers for one item. This was addressed by computing the average of the scale in which this item loaded so that the general trend of the other items in the scale could be established. For teachers who had three or fewer missing data points, this issue was addressed by using the neutral response (3) for these

items.<sup>3</sup> In another case, a teacher left four items blank and these four items loaded on two of the three scales of the instrument. Since there were only three scales in the instrument and since the missing items for this teacher influenced more than one scale, the teacher's scores for the two scales with the missing items were not included in the analysis. There were also instances where observation items from the PC-ECCOS did not seem appropriate to include in the analysis. For example, one item of the PC-ECCOS (#55 – “Posts the Project Construct Goals for Early Childhood Students in the classroom”) seemed irrelevant to the interest of the project because (a) these goals were not posted in any of the participant teachers' rooms and (b) this item was included more to represent a measure of fidelity for the Project Construct organization (personal communication, December 2005). Given these considerations, this item was not included in the analysis for the PC-ECCOS.

Three other items of the PC-ECCOS (#11 – “Reads aloud with appropriate expression,” #29 “Supports children in resolving their own conflicts” and #57 “Maintains an adequate classroom library of books available to children”) were also excluded from the analysis. While there was a “no evidence” option for each of the items, using this response for these items potentially misrepresented the purpose of the items. For example, it could be that in determining a response for item #29, a teacher was observed managing a conflict between students but did not assist the students in resolving their own conflict. In this case, using the “no evidence” rating would be appropriate.

However, it is also possible that no conflicts were observed at all during the observation.

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<sup>3</sup>While it is possible that the intent of the missing data for these participants was purposive, no apparent pattern for the missing items could be identified. Since entering the neutral response (3 on a five point scale) failed to unduly influence the mean for the scale and/or misrepresent the trend of the items, the neutral response (3) was applied to the missing items for these teachers.

In this instance, selecting the “no evidence” option suggests that the teacher did not assist the students in resolving their own conflict when in fact, there was no need for such intervention from the teacher. In addition, during the PC-ECCOS rater training, the instructions were to leave these items blanks if either no read alouds and/or no conflicts were observed. These directions created the possibility for missing data and/or the possibility that, since raters observed on different days, the teacher might engage in read alouds or intervene in student conflicts during one observation and not the other, leaving this item for at least one of the raters blank. Due to these issues, these items were not included in the analysis.

*Interrater reliability.* Query items on the PC-ECCOS were one of two types. Either the item could only be completed after querying the teacher (Example: “Collaborates and learns from colleagues”) or, the item could be completed without querying the teacher if observed (Example: “Maintains an adequate classroom library of books available to children”). Instructions for the latter items were to query the teacher if the condition of the item was not observed.

These items presented two problems for measurement. One, since the observations took place during class time and the intent of the observation was to be as non-intrusive as possible, finding an opportunity to speak with the participant teacher at any great length was sometimes difficult as she was usually engaged in activities with the children. At times, not all the query items were completed in the initial observation. In these instances, I would communicate which items had not been completed to the second rater to ensure that at least one response was submitted for each of the query items.

The other problem was that with limited access to teachers, it seemed redundant to present them with the same queries twice. In addition, though a recommended script was provided for each of the query items, a visual inspection of the data revealed that, in some instances, there was disagreement in the ratings when a query item was completed by both raters. Possible explanations for the differences were investigated by identifying the rater pairs for each item and revisiting the scoring sheets for the PC-ECCOS to see if rater notes could explain the differences in scoring. In some cases, rater notes either explained and/or justified the difference in scoring. Decisions regarding the final score for these items were based on this information. It was noted that, in some cases, the Education Specialist from Head Start were able to solicit more information from participant teachers. It is possible that teachers were less forthcoming in their responses to the other second rater, my advisor, since she was unfamiliar to participant teachers and had only a brief window of opportunity to query the teachers. On items where both of the raters were from the University of Missouri – Columbia, the raters discussed these items, recalling the observation and/or accessing rater notes where available to determine the final rating for these items. In cases where rater notes were absent or inadequate, my score was retained as the final rating for the items.

The goal of the classroom observations was to determine level of Project Construct implementation. Conducting ratings on two separate occasions broadened rater exposure to the participant teachers' classroom activities and the use of two raters controlled for the influence of rater bias. With the exception of the query items mentioned above, this resulted in two ratings for each PC-ECCOS item. Since the raters observed different classroom sessions for each participant teacher, rater differences in

scoring for some items was anticipated. The use of two observations to assess level of Project Construct implementation was built into the project design to allow for cumulative exposure to the participant teachers' classroom. Therefore, the average of the two rater scores on the PC-ECCOS was used to represent level of Project Construct implementation in the data analysis.

### *Quantitative Analysis*

Greene et al. (1989) present a typology of applicable confirmatory data analysis techniques for use with quantitative data in mixed methods designs. Two of these techniques were adopted for use in analyzing the quantitative data for this project, correlational analysis and independent samples *t* test. Bivariate correlational analysis was utilized in order to investigate the hypothesis for the project which predicted that teachers, who implemented the Project Construct curriculum at extensive levels in their classroom, as measured by researcher observations, would have sophisticated epistemological beliefs, a high sense of teacher efficacy, would see value in the Project Construct curriculum, would expect to succeed by implementing the curriculum, and would perceive that the benefits of implementing the curriculum outweighed the cost. Participant teachers' epistemological beliefs (as represented by their scores on the EBI), efficacy beliefs (as represented by their scores on the TSES) and beliefs about the PC curriculum (as represented by their scores on the PCCQ) were compared with the level of PC implementation (as measured by the PC-ECCOS).

### Method: Phase II

While the initial interest of the described study focused on increasing our understanding of how specific teachers' beliefs influence the level at which they



implemented a constructivist based curriculum in their classroom, two additional interests of the study included (a) capturing early childhood education teachers' mental models and examining if and how their mental models influenced classroom decision-making and (b) investigating whether or not exposure to innovative practices, such as the Project Construct curriculum and assessment system, impacts early childhood education teachers' beliefs and/or practices in any way. Quantitative design and analysis was adopted to address the initial identified interest of the project in Phase I of the study. A description of the Qualitative procedures utilized in Phase II of the project is provided below.

#### *Data Collection Procedures*

As stated in the Greene et al.'s (1989) definition of mixed methods research, mixed methods research includes the collection of quantitative and qualitative data. The qualitative data for this project were attained using semi-structured, formal interviews (Hatch, 2002). According to Hatch (2002), "...qualitative researchers use interviews to uncover the meaning structures that participants use to organize experiences and make sense of their worlds" (p. 91). Since a basic assumption of conducting in-depth interviews is that "...the meaning people make of their experience affects the way they carry out that experience" (Seidman, 1998), the intent of scheduling interviews for this project was to capture the participant teachers' explanations, feelings, motivations and concerns (Hatch, 2002) regarding their classroom decision-making processes, as well as their self-reported perceptions of the Project Construct curriculum.

Face-to-face interviews were scheduled and conducted with all participant teachers, except for one. This teacher was experiencing several stressors on the day of the

scheduled interview and, preferring to conduct the interview when she was less preoccupied, arrangements were made to reschedule. However, on the day the interview was rescheduled, this teacher was absent and I was unable to reschedule with this participant prior to the end of her employed school year.

Interviews were approximately 45 minutes in length. With two exceptions, each interview was audio-taped. Though written permission was provided through the informed consent process, at the beginning of each interview, the participant teacher was reminded that the interview was being audio-taped and was asked to provide verbal permission to tape the interview. Two teachers declined to allow the interview to be taped so I took detailed notes of these participant's responses to the interview questions. These notes were typed and entered as interview documents in QSR N6.

Hatch (2002) refers to questions used in formal interviews as "guiding questions," given that they are meant to guide the conversation throughout the interview. Hatch additionally highlights the need to carefully draft interview questions, especially when the research design includes multiple informants who are interviewed only once. The research questions for this project were specifically designed to survey four general topics, selected for their potential to illuminate participant teachers' classroom decision-making processes: a) How teachers decide what activities to use in their classroom; b) Do teachers experience a gap between what they expect to happen and what actually happens in the classroom and to what do they attribute the gap; c) Teachers' initial perceptions of the Project Construct curriculum, their perceived level of implementation (with examples), and noted changes in their perceptions over time; d) The factor that is most influential in their decisions about what to do in the classroom. A description of the

purpose and intent for each of these topics is presented below. A sample of guiding questions for the interview is provided in Appendix E.

*How Teachers Decide What Activities To Use In Their Classroom*

This topic area was placed first in the guiding questions format since it represents an *essential question* (Hatch, 2002) or the primary interest of the study; a desire to capture teachers' reports of their classroom decision-making processes. Presenting this question first ensured that there would be adequate time to explore this topic and also focused the participant teacher's attention on the overall purpose for the interview.

*Do Teachers Experience A Gap Between What They Expected To Happen And What Actually Happens In The Classroom And To What Do They Attribute The Gap*

Hatch (2002) would describe this question as an *extra question* or one that is related to an essential question but comes at the topic "from a slightly different angle" (p. 102). The intent of this question was to capture some sense of the connection participant teachers make between what they plan and how students respond. If this connection exists, it would help to gain some insight into the teachers' implicit beliefs about knowledge and learning by exploring their attributions for the gap. For example, if students don't respond the way the teacher expected, does the teacher attribute it to student characteristics (lack of interest, motivation, regulation, ability) or to her own planning efforts? And how does she respond to the gap?

*Teachers Initial Perceptions Of The Project Construct Curriculum, Their Perceived Level Of Implementation (With Examples), And Noted Changes In Their Perceptions Over Time*

This series of essential questions allowed me to explore, in more depth, the teachers' initial perceptions of the Project Construct curriculum and their perceived level of implementation, to secure examples of classroom activities that were implemented since the teacher's exposure to Project Construct and noted changes in the teachers' initial impressions of the curriculum since their initial exposure.

*The Factor That Is Most Influential In Their Decisions About What To Do In The Classroom*

The intent for this question was to present a forced choice in order to capture the one essential factor, the bottom line criteria, for what drives participant teachers' classroom decision-making.

These questions are targeted to highlight teachers' classroom decision-making with specific interest in identifying 1) how they decide what activities to include in their daily lesson plans and 2) their past and current perceptions of the Project Construct curriculum.

*Interview Format*

Generally, the same interview questions were used in each interview. The basic questions were always asked and were typically asked in the order provided, though the interviewer would shift focus to one of the additional interview questions if the participant spontaneously introduced information relevant to that question. When applicable, prompts and probes (see Hatch, 2002) were inserted to encourage teachers to provide more information and/or examples about topical areas introduced during the various sections of the interview. Teachers generally had difficulty responding to the gap question, either because it was not well written and/or the target of the question was more

abstract in nature. I experimented with different ways to ask the question, sometimes providing an example, to assist the participant teacher in understanding what I was trying to ask. Most of the teachers, for whom English was their native language, were eventually able to connect with the intent of the question. This was more difficult for the teachers whose native language was not English. In some cases, I chose to move to the Project Construct questions in order to avoid frustrating the teachers and/or to avoid unproductive use of interview time.

For most of the interviews, the flow of the interaction was linear and predictable. I would ask the questions, the participant teacher would respond, I would prompt and probe for additional information and/or examples and we would move to the next question until the interview was complete. However, on a few occasions, the flow of the interview was less predictable, as teachers responded in unexpected ways that, upon further inquiry, ended up moving the interview in a different direction. This happened most frequently with the initial question (how do you decide what activities to use in your classroom?) and the Project Construct questions. The content of the responses for most of the teachers were similar to the initial question. However, a few teachers gave atypical responses to that question and, due to the nature of those responses, the structure of the whole interview was softened, allowing me the flexibility to fully explore these teachers' perceptions of their classroom experience.

Some teachers required similar flexibility with the Project Construct questions, as the responses to these questions appeared to relate to the level at which the teacher implemented the curriculum and/or their perceptions of the curriculum. In cases where it was apparent that teachers valued the curriculum less than other teachers, I was interested

in identifying if and how these teachers found the curriculum useful in their classroom and I generated questions to reflect that interest.

### *Treatment Of Data*

I transcribed each of the interviews verbatim except in the following instances:

1. My own verbiage when asking the same questions. Since the same questions were asked for each interview and the focus of the investigation was on the participant's responses and not the interaction between the interviewer and interviewee, transcription of the typical interview questions was not included in every interview but a cue as to what question was asked was provided in the transcript. Questions that were atypical or reflective of content offered by the participant were always included in the transcription.
2. Non-essential utterances by the interviewer. The interviewer would often use utterances (i.e. "okay," "mm-hmmmm,") throughout the interview. Attempting to capture these utterances causes the transcription script to be disjointed with non-essential dialogue going back and forth between the interviewer and the interviewee. For this reason, an asterisk (\*) was inserted into the dialogue to reflect that the interviewer had made a non-essential response (i.e., "okay," "oh") at that point of the participant's response. However, the type of utterance was not noted as it is not essential to this project.
3. Non-essential utterances by the participant. The non-essential utterances of the participant were captured verbatim. However, placing these utterances in their proper alignment with interviewer comments results in a disjointed script. Therefore, non-essential utterances by the participant were embedded within the

interviewer dialogue encased in parentheses and not italicized (i.e. “uh-huh,” “mmhmmm,” “yes,” etc.)

My verbiage was identified by use of italicized font. Verbiage from the participant was identified by use of regular font. Completed transcripts were imported to QSR N6 for subsequent analysis.

*Preparing data for analysis* - As previously mentioned, Onwuegbuzie and Teddlie (2003) recommend that two decisions be addressed regarding the treatment of quantitative and qualitative data in mixed methods research. The first decision requires that the overall weight assigned to each data type be established. Considerations for this decision include, “Will both quantitative and qualitative data be considered equally (equivalent status design) or will one be considered dominant for purposes of analysis and inference (dominant-less dominant)” (Onwuegbuzie & Teddlie, 2003). In response to the second decision, one type of data (quantitative) was used to structure the analysis for the other type (qualitative) data. Tashakkori and Teddlie (1998) label this method of data treatment in mixed methods research as sequential quantitative-qualitative analysis, defined as “forming groups of people/settings on the initial basis of [quantitative] data and then comparing the groups on [qualitative] data (subsequently collected or available)” (p. 135, brackets and parenthesis in the original). For this project, quantitative data analysis was conducted first. Participants were then assigned to groups based on the numerical measures established in the quantitative analysis. Subsequent qualitative comparative case analysis was conducted to explain the discrepancies/similarities between the groups (Onwuegbuzie & Teddlie, 2003).

Since the hypothetical assumptions for the quantitative portion of this project suggested that beliefs of teachers would be different, depending on their levels of Project Construct implementation, the group assignments for the qualitative portion of the project were based on the participant teachers' level of Project Construct implementation, as measured by the PC-ECCOS. Participant teachers were assigned to one of three groups, depending on the computed average of their scores on each of the PC-ECCOS scales (Construct Total). Descriptions of each group, as well as how the cut-off scores for each group were determined are provided below:

1. High Implement Group (HIG) – While the range of all participant teachers' scores on the Construct Total scale was relatively small (1.78-2.41), the teachers assigned to this group represented the highest scores on the Construct Total scale. When the Construct Total scores were ranked, there was a natural, though small, break between the last teacher assigned in this group and the first teacher assigned in the Mid-Implementation group. While the range for the HIG teachers' scores fell between 2 and 3, compared to the rest of the participant teachers, their scores approached the 3-extensive evidence range.
2. Mid-Implement Group (MIG) – Teachers whose scores fell between a 2 - some evidence of implementation and the cutoff score for the HIG were assigned to this group. Since the available score range was 1- no evidence to 3 – extensive evidence, the scores on the Construct Total scale for these teachers demonstrated a higher level of implementation than the teachers assigned to the Low Implementation group.



3. Low Implementation Group (LIG) – All the teachers with scores below a 2 – some evidence, on the Construct Total scale were assigned to this group, as their scores approached the 1-no evidence of implementation rating, as compared to the rest of participant teachers.

There were fifteen interviews all together, representing a relatively large amount of data. Since the interest of the project was to capture descriptions of the mental models of participant teachers by group, raw interview data was exposed to several data reduction steps before more detailed analysis could be initiated.

### *Qualitative Data Analysis*

*Data reduction and coding.* Hatch's (2002) steps for conducting inductive analysis served to structure the early stages of the analysis. According to Hatch (2002), the initial step in qualitative analysis is to "identify frames of analysis" (p. 162) or "levels of specificity within which data will be examined" (p. 163). In reviewing teachers' descriptions of practice, I often noticed natural breaks or shifts in the conversation, where the teacher would bring closure to one topic and begin to discuss another topic. The next topic may have been related to the previous topic and/or to a new topic. These chunks of text (Ryan & Bernard, 2000) were identified as the initial frames of analysis. I found that in some cases, such as when the teachers' descriptions were highly complex (where more than one theme was presented and discussed at the same time), the unit of analysis needed to be more specific in order to capture all the themes and relationships presented. In these cases, the frame of analysis shifted to a text line or sentence.

Strauss and Corbin's (1998) detailed descriptions of the basic coding procedures in qualitative analysis informed subsequent analysis steps. Data reduction continued by

use of open coding with each unit of analysis reviewed so that concepts, categories, and sub-categories could be identified and explored. Overall themes, questions and ideas that formed as a part of the data analysis process, as well as recognized attributes of themes, were captured in annotations and memos.

At this stage of the qualitative analysis process, subtle differences between the groups began to present. While I was aware of some of the theme differences between the LIG and HIG group interviews, I was finding it difficult to identify exactly what defined the differences, whether the differences really existed and also, how to report the results of the qualitative analysis in ways that would highlight those differences. Additionally, I was ruminating on how to structure the results so that they were congruent with the targeted phenomenon of this investigation - teachers' beliefs.

While updating my literature review, I was exposed to the work of Strauss (2001) and colleagues (Haim et al., 2004; Mevorach & Strauss, 1995; Strauss, Ravid, Magen, & Berliner, 1998) who combined Schon's (1983) description of theories held by professionals, Shulman's (1986, 1993) classification of types of knowledge, and Johnson-Laird's (Johnson-Laird, 1983) conceptualization of mental models, to investigate the implicit, espoused and in-action theories underlying teachers' professional behavior.

According to Johnson-Laird (1983), mental models are internal representations or 'working models' of a phenomenon in the mind. They are created, and therefore constrained, by the boundaries of the individual as he or she spontaneously or deliberately designs them through interactions with a phenomenon or system. Mental models are works in progress, under continuous modification until they produce workable representation of experienced reality and are functionally (though not necessarily

technically) accurate (Norman, 1983). Norman (1983) presents additional characteristics of mental models, describing them as parsimonious but incomplete, unstable, and unscientific. He further notes that mental models lack firm boundaries and that “people’s abilities to “run” their models are severely limited” (Norman, 1983).

Strauss and colleagues (2001) developed a two-tiered categorization system for classifying units of analysis that allowed them “to determine the nature of teachers’ implicit in-action mental models about children’s minds and learning” (p. 2) based on participant teachers’ instructional practices. The first tier classified explicit teaching behaviors. The second tier classified *inferred* assumptions based on observed teacher behaviors. With the assumption that mental models can be inferred by observing the way teachers teach, Mevorach and Strauss (1995) used this categorization system to analyze videotaped teaching sessions of preservice, novice and experienced math teachers, all teaching the same math lesson from the same curriculum unit. Based on this analysis, Mevorach and Strauss concluded that (a) teachers have in-action mental models of children’ minds which profoundly influence how they teach, (b) the categories in the second tier and the relationships between them represented the teachers’ mental models, and (c) the teachers’ mental models directed their teaching behavior.

Strauss, Ravid, Magen, and Berliner (1998) used the same categorization system to explore differences in junior high school teachers’ mental models, with varying levels of subject matter knowledge and/or years of experiences. According to Strauss et al., their findings challenge the traditional view, that teachers’ subject matter knowledge has “...priority over much of classroom teaching” (p. 593) since the identified mental models for teachers, both novice and experienced, with high and low levels of subject matter

knowledge, were indistinguishable. Based on their findings, Strauss et al. noted that (a) teachers' espoused (how they talk about what they teach) mental models have priority over their subject matter knowledge, and (b) teachers subject matter knowledge is constrained and subordinated by their mental models.

Haim, Strauss, and Ravid (2004) conducted a similar study, exploring relations between subject matter knowledge and the in action (what teachers know while in the act of teaching) mental models of 7<sup>th</sup> grade English as foreign language teachers. Haim et al.'s findings were congruent with those reported by Strauss et al., namely that: (a) teachers' mental models and subject matter knowledge represent two "separate and independent entities" (p. 870), (b) teachers' mental models take precedence over their subject matter knowledge, and (c) there are differences and similarities in how teachers, with varying levels of subject matter knowledge, express their mental models in teaching practice.

Mental models have been applied to other educational and teaching contexts as well. For example, Weber (1999) attributes the failure to identify and recommend or access services for gifted students to teachers' inaccurate mental models regarding gifted students. Henderson and Tallman (1998) explored changes in teachers' mental models as they engaged in one-on-one teaching episodes which involved assisting students attempting to secure information to complete authentic school assignments.

After a review of these studies which adopted teachers' mental models as a conceptual framework for investigating links between teachers' cognition and teaching behaviors, I questioned if recoding the interviews according to the categories described by Strauss (2001) would both highlight the differences I was sensing during the original

analysis and also provide a way to structure the results within the overall framework of teachers' beliefs. I also wondered if synchronously coding the interviews for both groups would demonstrate both the similarities and differences between the groups in a more powerful way. Given these considerations, I decided to recode the data for both groups, using Hatch's (2002) description of typological analysis and applying Strauss's (1995) categories as the initial typologies.

In typological analysis, an initial set of typologies are identified and units of analysis are subsequently assigned to the identified typologies. Since, for this project, I was most interested in capturing the nature of teachers' beliefs, in relationship to their own descriptions of practice, the second tier categories, as described by Strauss (2001), were used to re-assign all the interview data so that similarities and differences, between the LIG and HIG, and within each category could be investigated in more depth. Strauss's four originally established units of analysis for the second tier were as follows; 1) cognitive goals, 2) cognitive processes, 3) basic assumptions, and 3) meta assumptions (Strauss, 2001, p. 228). These categories, with some modifications, now served to structure the qualitative analysis, with the categories modified to be more congruent with learning objectives in early childhood education. For example, the category 'cognitive goals' was changed to 'learning goals,' since it is difficult to separate cognitive from physical processes with children in early childhood, as children in this age range spontaneously construct their own mental representations as they interact with the world (Piaget, 1970). Additionally, early childhood education curricular goals typically include some focus on skill building, such as the gross and fine motor skill development. To

focus only on cognitive goals would prevent focus on skill development, which represents important learning goals in an early childhood setting.

Since I already had impressions about the potential differences between the groups from the initial analysis described above, I wanted to insulate, where possible, the potential influence of that bias in the subsequent coding. In this resolve, rather than coding interviews by group, the interviews were re-analyzed in the order they were completed, using the date of the interview to rank which interviews to code first, second, etc. Each interview was rigorously reviewed so that texts from previously established units of analysis could be assigned to the categories described Strauss and colleagues (2001). This step basically defined new units of analysis – texts that referred (implicitly or explicitly) to teachers' perceptions of (a) learning goals for students, (b) the cognitive tasks students would need to engage in so that learning goals could be achieved, (c) basic assumptions about learning and teaching and (d) meta-assumptions about learning and teaching. All interview texts, where relevant, were now assigned to one or more of these categories.

Strauss and Corbin's (1998) coding procedures were re-visited, with open coding repeated so that concepts, categories and sub-categories could be identified within each unit of analysis, now newly assigned to Strauss's (2001) mental model categories. Then, the newly established categories and sub-categories were reviewed in order to explore and identify the relationships between the sub-categories and to note how sub-categories enhanced the depiction of the category to which it was assigned. This process is defined by Strauss and Corbin as axial coding. At this stage, the intent of the qualitative analysis was twofold: 1) To identify and/or infer, based on each teacher's description of her

classroom decision-making processes and/or classroom activities, the teacher's learning goals for her students, the cognitive processes the teacher assumes her students need to activate in order to achieve the learning goals, the teachers' basic assumptions about teaching and learning and the teachers' meta-assumptions about teaching and learning; and 2) to gather descriptive data, regarding each category, so that subsequent comparative analysis for teachers in the LIG and HIG groups could be conducted. When this stage of analysis was completed, the learning goals, inferred cognitive processes, basic assumptions and meta-assumptions for the LIG and HIG group were examined in order to identify similarities and differences between the groups. However, the treatment of the data assigned to each category required unique considerations that are described below.

*Learning goals* – Based on the review of the interview data, Strauss's original category of 'cognitive goals' was changed to 'learning goals' during the early stages of data reduction. This change was made to more adequately represent one type of learning goal that was presenting with some regularity in the interview data. These goals related more to skill, rather than cognitive, development and were generally reflective of physical skills, such as fine and/or gross motor, that teachers' indicated were important for children to develop as Head Start students.

*Cognitive Processes* – The procedure for identifying the students' cognitive processes, or the cognitive mechanisms for achieving the learning goals, was similar to that as described directly above, with one major exception. Few teachers directly referenced specific cognitive processes and when they did, their references were related to getting students to think, to use their imaginations and/or to their own efforts to understand students' thinking and logic. Therefore, I inferred all of the cognitive

processes listed in this category based on the learning goals and activities the teachers described in their interview.

*Basic Assumptions* – Text units within this node included two types of interview passages: 1) passages where the teacher was presenting information and her assumptions, if not explicitly stated, could be easily inferred; or 2) passages where the underlying assumptions of the teacher's described instructional activities or student/teacher interactions could be easily inferred. Following Hatch's (2002) typological analysis guidelines, I wrote "one-sentence generalizations" (p. 153) that could represent each teacher's basic assumption, based on either the instructional activities and/or the teacher student interactions described by the teacher in each passage. These served as the units of analysis for the following procedure.

*Meta-Assumptions* – The list of basic assumptions was used to generate the meta-assumptions for each group. When at least 75% of the group members endorsed a basic assumption, that assumption was adopted as a meta-assumption of the group. Additionally, in cases where half of the group members in each group endorsed an assumption, it was included as a meta-assumption for both groups, due to the assumption's equal presence in both groups.

#### *Changes in teachers' perceptions after exposure to Project Construct*

Due to my familiarity with the data at this stage of the analysis, I was already aware of the impact that exposure to the Project Construct initial and follow-up trainings had on the participant teachers' beliefs and classroom practices, as well as the supervision and support of the Head Start administrative staff. For this stage of the analysis process, my focus was on describing the nature of the impact. Additionally, since the interest of this



portion of the inquiry related to whether or not the teachers experienced belief shifts, as a result of their exposure to the Project Construct training and their attempts to implement it in their classroom, I broadened the considerations for this portion of the analysis to include all participant teachers.

The teachers' responses to the specific questions regarding the teachers' initial and current impressions of the Project Construct framework were the primary focus of this portion of analysis. Also included were additional references to Project Construct that teachers may have spontaneously presented during the interview. These portions of the interview were reviewed for each individual teacher. The outcome of the review was a profile of each teacher's past and current perceptions of Project Construct, as well as their own descriptions of how Project Construct assumptions and/or strategies are used in their classroom. As the profiles for each teacher were completed, themes for the various types of responses to the Project Construct framework became salient. These themes were used to organize the descriptions of teachers' responses, which are presented in the following chapter.

### Inference Confidence

The most important aspect of any research project is the interpretation of results, the drawing of inferences (Tashakkori & Teddlie, 2003). Inference is defined by Tashakkori and Teddlie (2003) as an umbrella term that "...refers to a final outcome of a study" (p. 35). Inferences take many forms, "...including conclusions about, understandings of, or an explanation for an event, [a] behavior, [a] relationship, or a case" (Tashakkori & Teddlie, 2003). In mixed methods research, inference refers to the investigators claims that conclusions, which are based on findings are "...credible,

warranted, or valid and even possibly true” (Miller, 2003). Tashakkori and Teddlie (2003) prescribe that, in mixed methods research, the term *inference quality* be adopted for use in reference to both the traditionally quantitative notion of internal validity and the qualitative concern with credibility. They define inference quality as “...the mixed methods term for the accuracy with which we have drawn both our inductively and our deductively derived conclusions from a study” (p. 36). According to Tashakkori and Teddlie, inference quality includes two important aspects, design quality, or the evaluation standards for methodological rigor in mixed methods research, and interpretive rigor, or the evaluation standards for the accuracy or authenticity of conclusions.

Tashakkori and Teddlie (2003) suggest that concerns regarding design quality and interpretive rigor can be summarized within four dimensions; (a) conceptual consistency, (b) within-study design consistency, (c) interpretive consistency and (d) interpretive distinctiveness. Applications of these considerations to the current project are discussed below.

### *Conceptual Consistency*

Conceptual consistency refers to consistency between inferences and the known state of knowledge. The professional literature chronicling previous inquiry regarding the influence of teachers’ specific beliefs, as well as the influence of teachers’ mental models about learning and teaching, in relationship to classroom practice has already been presented. Relationships between the final inferences of the current project and the current state of knowledge will be discussed in chapter 5.

### *Within-Study Design Consistency*

Within-study design consistency refers to consistency of the design and procedures that produced the data from which final inferences emerged. Considerations within this dimension include congruence between the inferences, the original research questions and study data, use of valid and reliable measures, and use of appropriate research methods and procedures. While the inferences from the study are yet to be presented, care was given to insure that all inferences derived directly from the data. This is somewhat simpler in considerations regarding the quantitative data. Though, due to the small sample size, particular attention was directed toward the treatment of data.

The small sample size also prevented the opportunity to compute reliability estimates for the belief inventories used in the study. The decision to utilize the selected measures for the current study was based on reliability and validity estimates established in previous research. Previously established reliability and validity estimates were provided in an earlier section of this chapter. Controversial issues regarding use of the EBI were addressed by omitting the one scale (Omniscient Authority) that failed statistical verification by both Schommer (Schraw et al., 2002; Schraw & Olafson, 2002) and Gill (personal communication, September 1, 2006).

The qualitative data used to produce the inferences drawn from the qualitative phase of the study were collected in a systematic way. The semi-structured interview that each teacher participated in was organized around the same set of questions. Additional questions were spontaneously added to clarify the nature of teachers' responses, to get examples of teachers' described activity or decisions and/or to insure the data from the interview would illuminate teachers' espoused theories about their classroom decision-

making and practice. While there were no *direct* questions presented to participant teachers for which the specific intent was to target Strauss's (2001) mental model categories, their responses were coded typologically (Hatch, 2002), based on the assumption that teachers' retrospective descriptions of their own classroom decisions and practices represented personal mental models about teaching and learning. Once their responses were organized into Strauss's mental model categories, analytical coding was initiated to identify common themes, topics and relationships within each category.

### *Interpretive Consistency and Distinctiveness*

Interpretive consistency and distinctiveness refers to the "consistency of interpretations across people" (consistency) and "the degree to which the inferences are distinctively different from other possible interpretations of the results" (distinctiveness) (Tashakkori & Teddlie, 2003). Comparative analysis was utilized to address concerns regarding inference consistency and distinctiveness. Once the mental models were established for each of the groups, comparative analysis was initiated so that all the data in each group were revisited, looking for the possibility that themes and categories, identified in the opposing group may have been missed in the initial stages of analysis. The goal was to ensure that any differences in the learning goals, cognitive processes, basic assumptions and meta-assumptions established for each group were truly unique to that group. Again, only themes and categories common to either 50% of members from both groups and/or 75% of the participants assigned to one group were considered as representative of that group. While similar themes and categories may have been present in the initial stages of analysis for an opposing group, those themes and categories would not have been included in the stages of analysis that resulted in the final inferences for the

study if they were not representative of the group overall. Comparative analysis allowed for both a review of the initial category and theme assignments, as well as initial inferences, and confirmation/disconfirmation that the final themes, categories and inferences were truly representative of each group and where indicated, distinctive for that group.

Finally, Tashakkori and Teddlie (2003) recommend that, in mixed methods research, the term *inference transferability* be adopted for use in reference to both the traditionally quantitative notion of external validity and the qualitative concern with transferability. They define inference transferability as the generalizability and applicability of research results to other individuals or entities (population transferability), other settings or situations (ecological transferability), other time periods (temporal transferability), or other methods of observation/measurement (operational transferability). The type of transferability of most interest to this project is population transferability since the encompassing purpose is to increase our understanding of how early childhood education teachers' beliefs and mental models influence their classroom decision-making and curricular decisions, especially in relationship to their response to innovative programs. Kemper et al. (2003) and Johnson and Turner (1983) suggest that, due to the Gestalt principle ("the whole is bigger than the sum of its parts" (Tashakkori & Teddlie, 2003), inferences derived from mixed methods designs are more transferable than inferences drawn from either quantitative or qualitative studies alone. Still, qualitative researchers postulate that the role of verifying external validity falls not with the researcher (sending context) but with the reader (receiving context) (Lincoln & Guba, 1985) According to Lincoln and Guba (1985), the qualitative researcher "can only

provide the thick description necessary to enable someone interested in making a transfer to reach a conclusion about whether transfer can be contemplated as a possibility” (p. 316). Thus, a full description of the study setting and participants was provided.

### Conclusion

This chapter provides a detailed description of the overall conceptualization of the current project, including the relationships between the use of the quantitative and qualitative research methods and techniques, the description of research procedures including participant recruitment, informed consent, and data collection processes, the selection and use of measurement instruments, relevant reliability and validity criteria, and a description of the statistical and qualitative analytical techniques utilized for the project. Tashakkori and Teddlie’s (2003) four dimensions for insuring inference quality was used to organize the discussion of the study’s trustworthiness or, as Weisner (2005) frames it, in what ways are the results of the study believable? This was reviewed in order to qualify the discussion of the results presented in Chapter 4, allowing the reader to judge the adequacy and implication of the results based on the methods, techniques and processes from which they were derived.

## CHAPTER IV: RESEARCH RESULTS

### Introduction

The current study was designed to examine the factors most influential in Early Childhood Education teachers' classroom decision-making processes, specifically in relationship to the level at which they implement an innovation. There were three purposes for conducting the reported study: (a) identifying the influence of teachers' specific beliefs in relationship to their classroom decision-making practices, (b) identifying additional factors influential to teachers' classroom decision-making, and (c) exploring changes in teachers' beliefs after long term training and exposure to a constructivist-based curriculum. Since classroom decision-making represents a complex process and the focus of the study shares both confirmatory and exploratory interests, a mixed methods research design was selected as the most viable approach for capturing the complexity of both the target phenomena as well as the varied interest of the overall project. Though research techniques from both the qualitative and quantitative traditions were utilized in the study and while the data from each tradition was considered as equivalent, the overall conceptualization of the study is most congruent with qualitative strategies of inquiry, specifically the case study.

Hatch (2002) summarizes a description of a case study previously endorsed by two writers, Yin (1994) and Merriam (1988), noting how both writers "argue that case studies are a special kind of qualitative work that investigates a contextualized contemporary (as opposed to historical) phenomenon within specified boundaries" (Hatch, 2002, p. 30, parenthesis in the original). Bounded phenomena within educational

settings may include "a program, an event, a person, a process, an institution, or a social group" (Merriam, 1988).

In this project, processes were examined within a bounded phenomenon at two levels. At a macro level, the process of interest was investigated within one school district's Head Start program and included comparisons of Early Childhood Education teachers' specific beliefs and the level at which they implemented a locally endorsed, constructivist based curriculum in their classroom. At a micro-level, two additional processes were considered (a) the participant teachers' classroom decision-making, and (b) noted changes in the teachers' original perceptions of the endorsed curriculum. Quantitative research techniques were selected for use in order to examine the process of interest at the macro level. In contrast, research techniques from the qualitative tradition were adopted to examine the processes of interest at the micro-level.

A concurrent triangulation research design (Creswell et al., 2003) served to structure the data collection and analysis phases of the study. The identifying features for concurrent triangulation designs include concurrent data collection and equivalent data status with the primary stages of integration initiated at the analysis or interpretation phases. While the quantitative and qualitative data in this study were considered as equivalent during the project, the sequential quantitative-qualitative analysis (1998), specifically contrasting case analysis (Onwuegbuzie & Teddlie, 2003), was adopted as the method for structuring both the data analysis and the results reported here.

According to Tashakkori and Teddlie (1998), sequential quantitative-qualitative analysis involves "forming groups of people/settings on the initial basis of [quantitative] data and then comparing the groups on [qualitative] data (subsequently collected or



available) (p. 135, brackets and parenthesis in the original). In qualitative contrasting case analysis, quantitative data analysis on relevant construct(s) is conducted first. A proportion or a specific number of participants are then assigned to groups based on the numerical measures established in the quantitative analysis. Subsequent qualitative analysis is conducted to explain the discrepancies/similarities between the groups (Onwuegbuzie & Teddlie, 2003). In keeping with the sequential quantitative-qualitative analysis approach, the quantitative results for the study will be presented first, followed by a description of the qualitative findings.

### Quantitative Results

As previously mentioned, quantitative research techniques were utilized in order to identify relationships between teachers' specific beliefs and the level at which they implemented Project Construct, a locally endorsed, constructivist based curriculum in their classroom. The beliefs of interest to this investigation include teachers' beliefs about the value of the constructivist based curriculum (expectancy x value beliefs), teachers' beliefs about knowledge and knowledge acquisition (epistemological beliefs), and teachers' beliefs about their own sense of efficacy as teachers (efficacy beliefs).

When the Project Construct curriculum was initiated at Head Start, all participant teachers completed the initial training provided by the district and most received subsequent advanced training modules prior to the study. The first aim of the quantitative analysis was to identify the overall level of Project Construct implementation by participant teachers. When this was established, bivariate correlations were computed to determine significant relationships between both the specific teachers' beliefs and the level of Project Construct implementation. The following section will describe each of

the analysis processes in more detail, as well as present relevant results. Table 4 provides the means, standard deviations and correlations for the variables discussed in this section.

TABLE 4

Scales	PC-ECCOS SCALES							Means	Standard Deviations
	Physical Environment	Language Development & Symbolic Expression	Mathematical & Scientific Thinking	Social Development	Constructivist Practice	Queries	Project Construct Total Implementation		
EBI SCALES (Scores range from 1 - 5)									
CertainKnowledge	- 0.05	-0.30	-0.31	-0.31	-0.48	0.14	-0.31	2.67	0.46
Fixed Ability	- 0.05	-0.30	-0.16	-0.40	-0.40	-0.08	-0.32	2.98	0.79
Simple Knowledge	0.35	-0.27	0.02	0.25	-0.20	-0.37	-0.09	1.98	0.73
Quick Learning	0.24	-0.27	0.06	-0.20	-0.26	-0.08	-0.13	2.90	0.40
TSES SCALES (Scores range from 1 - 10)									
Student Engagement	- 0.04	0.01	0.23	-0.02	0.08	0.08	0.01	8.13	0.63
Instructional Strategies	- 0.02	-0.03	0.34	-0.40	-0.19	-0.12	-0.11	7.52	0.59
Classroom Management	- 0.14	-0.01	0.13	-0.04	-0.01	-0.42	-0.42	7.47	0.63
PCCQ SCALES (Scores range from 1 to 5)									
Expectancy	0.06	- 0.53*	-0.07	-0.35	-0.41	-0.01	-0.31	2.64	0.43
Value	0.01	-0.23	0.004	-0.06	-0.11	0.21	-0.01	2.75	0.62
Cost	- 0.19	- 0.63*	-0.25	- 0.57*	- 0.52*	- 0.001	- 0.53*	3.31	0.48
PC-ECCOS SCALES (Scores range from 1 - 3)									
Means	2.38	1.77	1.71	2.17	1.98	2.65	2.11		
Standard Deviations	0.28	0.25	0.31	0.28	0.28	0.4	0.19		

\*p < .05

### *Level of Project Construct Implementation*

The level of Project Construct implementation was determined by structured observations using the Project Construct – Early Childhood Curriculum Observation Survey (PC-ECCOS). Raters could select one of 3 ratings for each item: 1) no evidence of the item was observed, 2) some evidence of the item was observed, and 3) extensive evidence of the item was observed. The total level of implementation was computed by averaging the combined totals of all the PC-ECCOS scales. Average scores could range from one to three.

For the 16 who participated in the study, the mean ( $\bar{X}$ ) for level of Project Construct implementation was  $\bar{X} = 2.11$ , with the range of implementation scores varying from 1.78 to 2.41 and a standard deviation of  $SD = .19$ . Based on these scores, there was some evidence that the Project Construct curriculum was being implemented in each participant teacher's classroom. There were no noticeable outliers and, though no teachers approached the top rating of extensive evidence, visual data analysis (histogram) indicated that three participant teachers demonstrated the highest level of implementation.

### *Teacher Beliefs*

*Epistemological beliefs* – To secure an overall perspective of participant teachers' epistemological beliefs, as measured by the EBI, descriptive statistics were computed for all scales (see Table 4). Generally, participant teachers' epistemological beliefs fell within the mid-range, with the most sophisticated beliefs presenting on the Quick Learning scale. The scores on this scale suggest a tendency for participant teachers to believe that learning can be difficult but can take place with appropriate application.

*Relationships between teachers' epistemological beliefs and implementation of the Project Construct curriculum* – According to the first hypothesis (H1), it was expected that teachers who implemented the locally endorsed, constructivist-based curriculum at extensive levels in their classroom would have sophisticated epistemological beliefs. To confirm this hypothesis, bivariate correlations were computed to examine the relationship between teachers' epistemological belief scores on the EBI and the overall level of implementation of the Project Construct curriculum. To protect against type I error, levels of significance were determined at the .05 alpha level, suggesting a 95% level of confidence when generalizing findings from the sample to the target population (Ary et al., 2002). There were no significant relationships identified between any scale of the Epistemological Beliefs Inventory and classroom practice. Based on these results, H1 was rejected.

*Teachers' sense of efficacy* - An overall perspective of participant teacher's sense of teaching efficacy, as measured by the TSES was obtained by computing descriptive statistics for each subscale SEE TABLE???. Participant teachers reported generally high levels of perceived sense of teacher efficacy. The teachers' scores for each of the subscales were quite similar, though teachers' endorsed slightly higher feelings of efficacy on the scale of student engagement.

*Relationships between teachers' efficacy and implementation of the Project Construct curriculum* – According to the second hypothesis (H2), it was expected that teachers who implemented the locally endorsed, constructivist-based curriculum in their classroom at extensive levels would endorse high levels of teacher efficacy. To confirm this hypothesis, bivariate correlations were conducted, examining the relationship

between the teachers' scores on each scale of the TSES and the overall level of implementation of the PC curriculum. There were no significant relationships (at the level of significance .05) identified between any scale of the TSES and classroom practice, as measured with the PC-ECCOS. Therefore, H2 was rejected.

*Teachers expectancy x value beliefs* – Similar to their epistemological beliefs, participant teachers' beliefs regarding the value, versus the cost, of implementing the Project Construct curriculum, as well as their expectations to succeed if they implement the curriculum, fell within the mid-range (see Table 4). The highest mean (in the direction of "strongly agree") was teachers' perceptions that the cost (in personal time and effort, classroom time and materials) needed to implement Project Construct is greater than the benefits.

*Relationship between expectancy x value constructs and Project Construct implementation* – To investigate the third hypothesis for this inquiry (H3), it was expected that teachers who implement the locally endorsed, constructivist-based curriculum in their classroom at extensive levels would endorse beliefs indicating that (a) the benefits of implementing the curriculum outweigh the costs, (b) they value the curriculum, and (c) they expect to succeed by implementing the curriculum, bivariate correlations for each subscale (PC Cost, PC Expectancy, PC Value) of the PCCQ and overall level of implementation of the Project Construct curriculum were computed in order to identify relationships between expectancy x value constructs and level of Project Construct implementation. There were no significant relationships between Project Construct implementation and either the PC Expectancy or the PC Value scales. However, there was a significant negative relationship,  $r(15) = -.526, p < .05$ , between the

PC Cost scale and level of Project Construct implementation. Therefore, teacher's who scored high (direction of strongly agree) on the PC Cost scale scored low on level of Project Construct implementation. In other words, teachers who implemented the Project Construct curriculum at lower levels perceived that the cost of implementing the Project Construct curriculum outweighed the benefits.

As previously mentioned, sequential quantitative-qualitative analysis (Onwuegbuzie & Teddlie, 2003), specifically contrasting case analysis, was adopted as the method for structuring the overall data analysis for this inquiry. Using this method, quantitative data analysis was conducted first. Based on the results of the quantitative analysis, groups were established and the grouped data were used for subsequent quantitative and qualitative analysis (Onwuegbuzie & Teddlie, 2003).

Since the hypothetical assumptions for the quantitative portion of this project suggested that teachers would have different beliefs depending on their levels of implementation, the group assignments for the qualitative portion of the project were based on the participant teachers' level of Project Construct implementation, as measured by the PC-ECCOS. Participant teachers were assigned to one of three groups, depending on the rank-order of their computed average of the scores on the calculated total of the PC-ECCOS scales (Construct Total). Descriptions of each group, as well as how the cut-off criteria for each group was determined, are provided below. Teachers were assigned to three groups, and subsequent comparative analyses were conducted comparing teachers in the High Implement and Low Implement groups:

1. High Implement Group (HIG) – While the range of teachers' scores on the Construct Total scale was relatively small (1.74 – 2.41), the teachers assigned to

this group represented the highest scores on the Construct Total scale. When the Construct Total scores were assigned to a rank-order, there was a small break between the last teacher assigned in this group and the first teacher assigned in the Mid-Implementation group; while the range for the HIG teachers' scores fell between 2 and 3, compared to the rest of the participant teachers, their scores approached 3 (extensive evidence range). This group includes four teachers, with the majority reporting that they have an associate's degree and some additional coursework. The teachers in this group represent a wide range of tenure in early childhood education settings, which corresponded with the mean ( $\bar{X} = 16.33$ ) for years of experience teaching early childhood. None of the teachers in this group were from the same site and the average number of years the teachers had been with Head Start was  $\bar{X} = 5.87$ .

2. Mid-Implement Group (MIG) – Seven teachers were assigned to this group, which included the teachers whose scores fell between a 2 (some evidence of implementation) and the cutoff score for the HIG (2.30). Since the available score range was 1 (no evidence) to 3 (extensive evidence), the scores on the Construct Total scale for these teachers demonstrated a higher level of implementation than the teachers assigned to the Low Implementation group.
3. Low Implementation Group (LIG) – All the teachers with scores below a 2 (some evidence) on the Construct Total scale were assigned to this group, as their scores approached the 1 (no evidence of implementation rating), as compared to the rest of participant teachers. This group included five teachers who represented three different Head Start sites within the school district. Some of the participants in

this group reported they had an associate's degree and some indicated they had an associate's degree with additional coursework. The mean number of years working as lead teachers in early childhood education settings for this group was  $\bar{X} = 9.80$ , with the mean for tenure with this Head Start setting at  $\bar{X} = 5.50$ .

Prior to conducting the qualitative analysis, independent sample *t*-tests were computed to determine if there were significant differences between teachers' beliefs and/or practices in the LIG and the HIG groups. Table 5 displays the means and standard deviations for each of the scales for both groups.

TABLE 5

Variable	Mean	Standard Deviation	Mean	Standard Deviation
	<b>LIG (n=5)</b>		<b>HIG (n=4)</b>	
<b>Epistemological Belief Inventory (Range 1-5)</b>				
Certain Knowledge	2.78	.389	2.38	.685
Fixed Ability	2.97	.592	2.39	.610
Quick Learning	1.88	.522	1.7	.416
Simple Knowledge	2.83	.341	2.89	.486
<b>Teacher Sense of Efficacy Scale (Range 1-10)</b>				
Instructional Strategy	7.45	.371	7.38	.924
Classroom Management	7.8	.447	7.69	.747
Student Engagement	7.95	.411	8.0	.791
<b>Project Construct Curriculum Questionnaire (Range 1-5)</b>				
PC Expectancy	2.71	.287	2.44	.342
PC Value	3.16	.156	3.23	.652
PC Cost*	3.03	.310	2.10	.330
<b>Project Construct – Early Childhood Classroom Observation Survey (Range 1-3)</b>				
Physical Environment	2.17	.345	2.5	.060
Language & Symbolic Expression	1.55	.210	2.04	.083
Math	1.54	.270	1.93	.377
Social	1.96	.241	2.48	.275
Constructivist Practice	1.73	.178	2.32	.223
Project Construct Total	1.89	.065	2.35	.049



Results indicated that there was a significant difference,  $t(df = 6) = 4.04, p < .01$ , between the LIG and the HIG in their perceptions of the cost versus the benefits of implementing the Project Construct curriculum. There was also a significant difference,  $t(df = 7) = -11.71, p < .001$ , in the level of Project Construct implementation (Project Construct Total) between the LIG and the HIG groups, possibly accounted for by an additionally noted significant difference,  $t(df = 7) = -4.20, p < .01$ , between the groups on the Language and Symbolic Expression scale. Additional qualitative analysis was conducted to address the remaining interests of the study. The qualitative conceptualizations as well as the results of the qualitative analysis are presented in the next section.

### Qualitative Results

The investigation was framed as a case study with the boundaries of the case defined as a Head Start program within one school district in a large mid-western city. The conceptual framework, adopted during this phase of the study, was drawn from Strauss and colleagues (Mevorach & Strauss, 1995) utilization of Johnson-Laird's (1983) depiction of mental models. According to Johnson-Laird (1983), mental models are internal representations or 'working models' of a phenomenon in the mind. Mental models are under continuous modification until they produce workable representations of experienced reality and are functionally accurate (though not necessarily technically accurate) (Norman, 1983). Norman (1983) presents additional characteristics of mental models, describing them as parsimonious but incomplete, unstable, and unscientific. He further notes that mental models lack firm boundaries and that "people's abilities to "run" their models are severely limited" (Norman, 1983).

Combining Schon's (1983) description of theories held by professionals, Shulman's (1986; Shulman, 1993) classification of types of knowledge, and Johnson-Laird's (Johnson-Laird, 1983) conceptualization of mental models, Mevorach and Strauss (1995) investigated participant teachers' implicit, in-action theories underlying their professional behavior. They developed a two-tiered categorization system for classifying units of analysis that allowed them to infer in-action mental models based on teachers' instructional practices. The first tier classified explicit teaching behaviors and the second tier classified *inferred* assumptions based on observed teachers' behaviors. This second tier, with slight modifications, was adopted for use in organizing both the data analysis and report of findings for this phase of the study.

The originally established units of analysis for the second tier were:

- 1) Cognitive goals which teachers want their pupils to achieve.
- 2) Cognitive processes which teachers think lead to these cognitive goals.
- 3) Basic assumptions about how teaching in a particular way leads to these processes, that in turn, lead to cognitive goals.
- 4) The "mother" of all assumptions (meta-assumptions) about learning and teaching (Mevorach & Strauss, 1995). Meta-assumptions represent underlying beliefs or attitudes regarding instructional practices that encourage students to engage in the cognitive processes needed to achieve the cognitive goals.

The spirit of Strauss's (2001) categories provided the organizational structure for the qualitative analysis in this phase of the project. The categories have been modified in order to be more congruent with learning objectives in early childhood education. For example, it is difficult to separate cognitive from physical processes with children in

early childhood, as children in this age range spontaneously construct their own mental models as they interact with the world (Piaget, 1970). Additionally, ECE curricular goals typically include some focus on skill building, such as the gross and fine motor skill development. To focus only on cognitive goals would prevent focus on skill development, which represents important learning goals in an early childhood setting. Therefore, the cognitive goal category was changed to learning goals and included both cognitive and skill goals. The rest of the categories were utilized as described above.

Mevorach and Strauss (1995) inferred teachers' mental models based on observations of teachers' in action and argued that in-action mental models "direct teachers' teaching" (p. 6). While the current project utilized observational (in action) measures in phase one, Argyris and Schon's (1974) description of professional's espoused theories was utilized in order to capture descriptions of participant teachers' mental models in phase two of the study. According to Argyris and Schon, "when someone is asked how he would behave under certain circumstances, the answer he usually gives is his espoused theory of action for that situation" (1974, p. 7). According to Strauss (1993), teachers' pedagogical content knowledge or their "knowledge about the nature of children's minds, how those minds work when learning takes place, and the roles instruction plays in fostering learning" (p. 280), can be inferred from teachers' descriptions of their teaching. For this phase of the study, mental models were generated based on teachers' descriptions of their practice. Comparative case analysis was conducted in order to highlight the similarities and differences between the teachers who implemented the Project Construct curriculum at varying levels in their classroom.

### *Participant Teachers' Learning Goals for Students*

Two themes defined nearly all the participant teachers' goals for their students (a) Kindergarten readiness and (b) mastery of "the basics." Mastery presents as a theme, which is subsumed by Kindergarten readiness, because almost all of the participant teachers want their students to master "the basics" before they go to Kindergarten. The following quote from one teacher exemplifies the focus underlying most teachers' instructional activities. The other quote summarizes what teachers tended to refer to in their references to Kindergarten readiness. Pseudonyms have been assigned to participant teachers whose quotes are presented throughout this chapter.

#### *Quote 1 (Monique): Kindergarten Readiness*

*We know those are the requirements for Kindergarten. I believe in certain Kindergartens, they give them a pre-test to see how much they know so we want to make sure they're prepared for that.*

#### *Quote 2 (Monique): Focus on the Basics*

*Knowledge of the basics, knowledge of their names, address, shapes, mathematic, their mathematical thinking will be observed, their scientific thinking...writing alphabet, basics.*

Categorizing teachers' references to the "basics" resulted in two sub-themes or categories: (a) knowledge and (b) skills. All learning goals could be assigned to these two categories. Table 6 presents a summary of all the learning goals identified throughout the teacher interviews. So that similarities and differences between groups can be noted, the first two letters of the teachers' names (pseudonym) are provided for each goal. Teachers were included if they referred, either explicitly or implicitly, to each goal during the

interview. Cells were left blank in cases where no teachers were represented from that group.

Teachers in both groups referred to knowledge goals of letter and number recognition, reading comprehension, counting, shapes, and colors. Additionally, teachers in both groups referred to the skill goals of writing, drawing and self-esteem/confidence.

TABLE 6

Learning Goals								
Kindergarten Readiness								
Mastery of Basics								
KNOWLEDGE								
Literacy			Math			Other		
	LIG	HIG		LIG	HIG		LIG	HIG
Letter Recognition	Ja, Sh Si	Da	Numbers	Ja, Sh Ay, Si	Ma Mo, Da	Shapes	Ja, Sh	Mo
Reading Comprehension	Ja	Ma Da	Counting	Ja, Si	Da	Colors	Ja, Sh	Na
Reading Appreciation	Ja		Math Thinking		Mo			
SKILLS								
Personal Development						Fine Motor		
Self-Esteem	Sh	Da	Responsible	Ay		Writing	Ja, Sh Si	Mo, Da
Self-Regulation		Da	Self- Directed		Da	Drawing	Sh	Da
Autonomy		Da						

### *Cognitive Processes*

Few teachers explicitly mentioned awareness or attention to the cognitive processes of their students. In cases where cognitive processes were explicitly mentioned, nodes were spontaneously generated to store these references. For all other nodes (themes) within this category, I inferred, based on the teachers' descriptions of their classroom activities and my own observations of Head Start classrooms, the cognitive processes students would need to engage to master the learning goals.

Since mastery of "the basics" is the most common learning goal referred to by participant teachers, typical cognitive processes related to engagement, information storage and recall. Since some of the teachers' learning goals included skill mastery, I also included themes within this category that referred to any processes (cognitive and physical) required in order to master skill related learning goals, such as writing. Other learning goals inferred from teachers' descriptions included aspects of personal development. The cognitive processes for mastering personal development skills, such as self-regulation, self-direction, and autonomy are difficult to concretely define. For purposes of analysis, I considered these as skills, holding the assumption that mastery of personal skills, such as self-regulation, typically manifest in some form of choice or behavior. For example, a child may be more or less skilled at making good choices or behaving appropriately (i.e., choosing to respond to upsetting situations in the block area with words instead of hitting). Table 7 summarizes the cognitive/skill processes inferred from teachers' descriptions of their instructional activities. As in Table 8, the first two initials of the names of teachers who either described activities that engaged the process or explicitly referred to the process are provided for both the LIG and the HIG groups.

Cells were left blank in cases where no teachers were represented from that group.

Teachers from both groups were well represented in both lower and higher order processes, as well in areas of personal development.

TABLE 7

<b>Cognitive Processes</b>		
<b>Lower Order Cognitive/Skill</b>	<b>LIG</b>	<b>HIG</b>
Engagement	Ja, Ay	Mo, Da
Information Storage	Ja, Sh, Ay, Si	Mo, Da
Information Recall	Ja, Ay	Mo, Da
Writing	Sh, Si	Ch, Mo, Da
<b>Higher Order Cognitive Skill</b>		
Matching	Ja, Sh	
Associations	Ja, Sh	Mo, Da
Symbolic Expression	Sh	Ch, Da
Attach Meaning	Ja	Ch, Da
Logical Thinking	Ja, Sh	Mo, Da
Questioning/Cause & Effect/Problem Solving		Mo, Da
<b>Personal Development</b>		
Self-Regulation		Da
Self-Esteem	Sh	Da
Work as a team		Da

Passages taken from teacher interviews below highlight descriptions of activities that represent emphasis on cognitive processes, such as using matching exercises to encourage storage and recall (quote 1) and cause and effect considerations (quote 2).

Quote 1 – Janee: *Beginning of the year, each child, after I learn their names. I took and wrote their name on some little books that I had cut out and I had em sitting at the table so they you know, so they would know their name. The children would then go around the table and find out what their, you know, I, they have their bus tag or I had uh, like sensor strips with their names on it and they could take the sensor strip or their bus tag if they were kind of like fairly new and didn't have one that, ... and you go around and find their names that teaches the children how to identify their names.*

*Quote 2 – Danella: In block area, I may come in and encourage you to build your tower higher by asking you how tall do you think that can get? How many more blocks can we put up there?” Well, what do you think will happen if we put em up there and they usually can tell that kind of thing.*

### *Basic Assumptions*

The nodes represented with the category of basic assumptions were generated from assumptions referred to, either directly or indirectly (inferred by me), as teachers’ described their classroom decision-making processes. Participant teachers’ assumptions could be consolidated into eight themes: 1) Lesson planning and implementation; 2) Student characteristics; 3) Students’ behavior; 4) Students’ personal development; 5) Learning; 6) Instructional activities; 7) Teacher/Student interactions; and 8) Peer learning. All of these assumptions were considered in order to generate the meta-assumption which will be discussed in the next section. However, the full list of assumptions can be reviewed in Appendix F. The number of teachers, for whom the assumption was either inferred or explicitly generated, is provided by group for each assumption.

### *Meta-Assumptions*

The list of basic assumptions was used to generate the meta-assumptions for each group. When at least 75% of the group members endorsed a basic assumption, that assumption was adopted as a meta-assumption of the group. In addition, in cases where half of the group members in each group endorsed an assumption, it was included as a meta-assumption for both groups, due to the assumption’s equal presence in both groups. Since some of the assumptions under the learning category were similar to assumptions



in the instructional activity category, considerations of these two categories were combined when generating the meta-assumptions.

The number of themes which presented, when generating the meta-assumptions, reduced to four after dropping basic assumptions that were either not represented by 75% of the teachers in each group or not shared equally by half the teachers in both groups. The remaining themes were (a) student characteristics and abilities, (b) lesson planning and implementation, (c) learning and instructional activities, and (d) teacher/student interactions. The meta-assumptions for each of these themes, for both groups, are provided below. In some cases, teachers' quotes are provided to more fully communicate the essence of the assumption. A complete list of meta-assumptions for each group is provided in Table 8.

*Student characteristics and abilities* – Based on content analysis of the interviews, most of the teachers from both groups would likely agree with the following two statements.

- Students in Head Start classrooms are at different levels developmentally. They have different interests, skills, abilities and levels of knowledge.
- Children can symbolically represent and should be given opportunities to do so.

It was typical for teachers, from both groups, to refer to the differences of their students, especially developmental differences, at least once if not more frequently during their interview. Developmental differences frequently influenced the teachers' lesson planning, as in the following quote from Monique:

*The way I decide to do activities in the classroom, it's very important to look at the children individually and every year, I will have a different group of children, depending on each child's individual needs, I will plan*

*my lesson. Then we will separate them in groups ...by development, by age... and be able to work with those children. So, I definitely design my lesson plans with accordance to those individual children, those particular family situations and needs of the child.*

Developmental differences also influenced teacher's interpretations of their students' work and performance, described in Sidney's quote:

*Well, just because he didn't do it right doesn't mean he didn't get it. He just might not be exactly where he, the five year old is. But I have to take into account well, he might just be turning 3. He might of just turned 3 and just got into our program so actually his mind still might be at a 2 ½ year old you know. So he might not be where my 5 year old, who's probably thinking like a 6-year-old is supposed to be.*

The meta-assumption, that students can symbolically represent, was generated based on teachers' references to the use of activities, such as drawing or painting, in their classroom. While this is discussed at greater length in a later section of this chapter, the inclusion of the two quotes below, of how Aiyinde perceives student work and how her use of drawing changed after her exposure to the Project Construct training, demonstrates this teacher's belief and reverence for children's symbolical representations.

Quote 1- Aiyinde: *What they (children) put on paper is for real. It's their mind on paper.*

Quote 2 – Aiyinde: *I never give students a book or picture to look at and copy. Instead I put a blank sheet in front of a child and ask them to draw a picture of a house, tree or pig from their own mind without showing them what it looks like.*

Interviewer: Is this the same as before Project Construct, were you already doing these things or did you implement them after Project Construct exposure?

*Aiyinde: ...Before Project Construct, I would have shown them a picture. Here it is, draw it, color it. But now they make their own picture. Otherwise, I would have made copies of the picture and I would say "here's the tree, now color the tree."*

While most of the teachers from both groups would assert that young children can symbolically represent, teachers in the LIG were less likely to describe activities that activated students' abilities to recall and understand stories. This does not mean that teachers in the LIG did not include literacy activities, such as read-alouds, in their classroom activity descriptions. They were just not mentioned or described frequently enough to be considered as a primary assumption for this group.

Not wishing to misrepresent the LIG, I returned to the quantitative data and selected the items from the PC-ECCOS that were used to measure similar constructs in the rater observations. I created a variable using these three items (item 10 – “Reads aloud to children”, item 16 – “Provides functional contexts for reading and writing” and, item 21 – “Includes literacy activities at various times throughout the day”) and calculated the mean (LIG  $\bar{X}$  = 1.6; SD = .32; HIG  $\bar{X}$  = 2.0, SD = .19) for both groups. I then computed a *t-test* to determine if there were significant differences between the LIG and the HIG teachers' use of literacy activities, as observed in their classrooms. At the .05 level of significance, no significant differences were noted, between LIG and HIG classrooms, in the observers' ratings of the use of literacy activities. However, when the results were considered at the .10 level of significance, a significant difference,  $t(df = 7) = -2.16, p < .10$ , was noted between the LIG and HIG teachers use of these activities, as rated by both observers. This finding, combined with a review of the basic assumptions from which this meta-assumption was derived, give credence to the possibility that teachers in the HIG group recognize the importance of giving students opportunities to comprehend and recall story lines and they provide these opportunities more frequently than teachers in the LIG group.

*Lesson planning and implementation* – There were differences between the LIG and the HIG groups in their meta-assumptions about lesson planning and instructional activity selection. The LIG group designed lesson plans based on learning goals or “what we know children need to know,” with additional consideration given to the role of student interest and engagement. 75% of the teachers in the LIG group based their lesson plans on pre-established classroom themes, which incorporated learning goals, either considered part of the basics and/or reflective of the teacher’s personal goals for students. Consider the dialogue below, as this LIG teacher describes how she incorporates “the basics” into her classroom, along with student interest and her own defined learning goals for students. Note her reference to “watching what they’re doing” (assessing interest) and then incorporating that into her lesson plans and instructional activities, along with goals she has for the students:

*Janee: Then in order to get them to write their names, I had to incorporate that also so there are some children that like to go, that like to go into the writing area, like their names and stuff will be sitting over there. I have a word wall, words that are on the table. You know, just pencils, markers, whatever in that area so when they go down, sit down and they could write their names or write some of those words on the table. That’s, their incorporating how to write, how to design alphabets, how to design uh, numbers so that, that comes into where I have kind of like put it out there for them to do, for them to learn. But, a majority of the time, like I said, it’s either, I’m watching what their doing and I put, incorporate that into the lesson plans, along with some of the things that I do have.*

Interviewer: That you name, yeah.

*Janee: That, some goals that I do set for them. Uh, I do have.*

While some of the teachers in the HIG also reported using pre-established classroom themes, they were more likely to design lesson plans based on their assessment of students’ needs, assessments which included input from parents or considerations of

family situations. In addition, teachers in the HIG were more likely than teachers in the LIG group to describe instances in which students mediated the process and outcome of pre-determined classroom activities. The following quotes from Monique and Danella highlight the flexible approach they each take regarding the implementation of their lesson plans.

Quote 1 – *Monique: I do have an idea of how it, I would like for it to work out but if it happens to change, I'll just take on that and I'll immediately change my idea of it and explore with the children the other direction and if the outcome is not exactly what I expected I definitely believe that the process is more important than the product.*

Quote 2 – Interviewer: So in this case, you were expecting to be able to read the whole story. You had this one student who wasn't able to pay attention today, maybe ever and because of that he got the momentum of the whole class.

*Danella: The whole classroom.*

Interviewer: And uhm, so you just had to shift, shift gears.

*Danella: Mmhmm just kind uh, we just change you know. And then, uhm, sometimes. I'll tell em well, your not interested in this story so what can we do? What would you like to do? Well we heard that story so I say "okay, do you wanna to pick out another story?" So, you know it just depends on which way they want to go.*

*Assumptions about learning* – Based on content analysis of the interviews, most of the teachers from both the HIG and LIG groups would likely agree with the following three statements:

- Information storage is enhanced if new concepts are connected and associated with other concepts. Therefore, learning a new task or construct should be reinforced by introducing students to a variety of stimuli so they experience the task and/or construct in different ways.

- Storage and recall can be enhanced by review.
- Storage, recall and review of simple constructs can be embedded in more complicated cognitive processes such as matching.

Participant teachers' descriptions of their classroom decision-making and instructional activities reveal their understanding of how exposure to stimuli enhances student learning. Many teachers described instances where they integrated a concept or topic throughout their room and or supported learning a new concept or task with a variety of activities. Consider the following example, where Janee integrated an "animal" theme into the reading area, the block area and the house area, as well as in her conversations with students.

*Janee: If I'm gonna have a lesson plan based on animals and if I've got like, I've got, might have animal books in the reading area. I've got little animals in the block area; I've got little pets in the house area, those kinds of things. If they like to do things with animals then I'll come up with a lesson plan that involves animals. Uh, we'll talk about different animals, what animals like to do. Uh, what animals are, you could see on the streets. What animals that you could go to the zoo and see. Some animals that you like to keep as pets and we'll do you know activities around that during a week or two. It all depends on how well it's going, if the children are really interested in animals, then we'll do animals for more than just one week, we'll do them twice.*

Some of the teachers from both groups referred to using review as a strategy to enhance storage and recall. Review activities took several forms. Some teachers built review of natural concepts, such as days of the week, months of the year and weather into their daily routines. Some teachers' descriptions of classroom practice included regularly reviewing concepts they wanted students to learn as a way to enhance storage and recall. Some teachers would review material more than they originally planned because they

perceived students did not understand certain concepts. Some teachers used review before dismissing for the weekend, discussing with students what they had talked about and what they had learned in class that week.

For some teachers, review or storage/recall activities were embedded within activities that required more complex cognitive processing, as in the following example from Danella:

*Danella: I might walk in and the class is loud, and just take the ABC cards and just throw em up in the air and it gets their attention. And then you can say, okay, John, can you go get the letter that your name starts with. I never give you the letter. I wanna see if you know it, if you notice. I don't give away the letters... It's better when they do it on their own.*

In this example, the teacher initiates an activity that serves as both a classroom management and recall/review exercise. The learning goal is letter recognition, but rather than asking Johnny to find a “J” or some other specific letter, she asks him to find the letter that his name begins with, thus requiring him to think about his name, to identify what letter his name begins with and then to find (differentiate or recognize) that letter among the ABC cards scattered on the floor.

While teachers from both groups share many assumptions about learning, some differences, as inferred from their descriptions of classroom decision-making and practice, were identified. For example, teachers in the LIG were more likely to refer to the influence of environmental factors on student learning. According to Ayinda, the “environment of the classroom and the way the classroom is set up plays a part. It determines what they learn and how they behave. For instance, the word wall – putting words all over the classroom, they are seeing the word, learning the word...the way you

carry yourself, what you say and what you do.” Aiyinda proudly went on to share an example of one student learning a new word. She shared how they had been learning the word “boy” in class and that the word had been displayed on the word wall in the classroom. One day when the students were going to the restroom out in the hall, the student pointed to the word “boy” posted outside the men’s room and said, “Teacher, that word is boy. I know that word.”

The influence of the environment on student learning was less a theme for teachers in the HIG group. For these teachers, the theme of flexibility, as previously discussed, reappears in their inferred assumptions about learning.

*Teacher-student interactions* - Several basic assumptions regarding the role of teacher-student interactions in the Head Start classroom could be inferred from the teachers’ descriptions of classroom decision-making and practice. However, only the assumptions of the HIG teachers demonstrated enough similarity (present in 75% of cases) to be considered a meta-assumption for this group. According to most the teachers in the HIG, interacting with students, specifically asking the students questions, allows the teacher an opportunity to assess students’ understanding and comprehension and can serve to shape students’ learning. The example below depicts how Monique uses questions, in two different classroom scenarios, to assess students’ “train of thought and their logic” or as an opportunity to listen and model problem solving skills:

*Monique: We have, we do an experiment called “color splash experiment” and we have, we put, it’s a scientific experiment. We put milk in a bowl with a drop of dish detergent and a drop of food coloring and when they put the drop in the milk and simply just touch it with a little toothpick, the color splashes all through the milk and it’s wow, you know but, while doing that, they get to learn their colors and then they get to ask a lot of questions, they get to, you get to listen to their train of thought and*



*their logic. Why did that happen? How did it happen? What did we do first? And that develops their thinking, that's one example. Or just everyday working in the house area with the baby dolls or the telephones you, you provide these real life experiences for them and you just listen, you ask open-ended questions and you help them problem solve at that time. A lot of things happen at the same time.*

The following quote from Danella demonstrates how she uses questions to prompt students with new challenges and guides their thinking during work time.

*Danella: In block area, I may come in and encourage you to build your tower higher by asking you how tall do you think that can get? "How many more blocks can we put up there?" Well, what do you think will happen if we put em up there? and they usually can tell, that kind of thing.*

As previously mentioned, teachers assumptions about teacher/student interactions were generated but there were no assumptions among teachers in the LIG group that presented with enough frequency, such that meta-assumptions regarding teacher/student interactions could be generated. However, given the meta-assumption about teacher-student interactions for the HIG group, as presented above, and a desire to report only tangible differences between the groups, I returned to the quantitative data and conducted a quantitative analysis similar to the procedure described above in the meta-assumptions about student characteristics and abilities. I selected items on the PC-ECCOS that specifically related to the teacher asking students' open-ended questions (item 39 – "Asks open-ended questions to facilitate children's involvement and understanding") and exploring students' thought processes (item 50 – "Analyzes children's answers for evidence of thinking patterns"). A variable was created using these two items and a *t*-test was calculated to determine if there were observed differences between LIG ( $\bar{X} = 1.30$ ;  $SD = .21$ ) and HIG ( $\bar{X} = 2.06$ ;  $SD = .47$ ) teachers' use of questions and the observed

function of their interactions with students. There was a significant difference  $t(df = 7) = -3.27, p < .05$ , between the HIG and the LIG teachers use of open-ended questions and the function of their interactions with students, as observed by both raters, with HIG teachers demonstrating more use of asking questions to facilitate childrens' understanding and analyzing students' answers for evidence of thinking patterns. This finding suggests that teachers in the HIG group likely have different assumptions about the role of teacher/student interactions in the classroom than teachers in the LIG group.

#### *Influence of Project Construct on teachers' beliefs and practice*

The final focus of this inquiry was to explore changes in teachers' beliefs after long term training and exposure to the Project Construct curriculum and assessment system. Comparisons of participant teachers' retrospective perspectives, upon initial exposure to the Project Construct curriculum, as well as their current perspectives of the curriculum, were drawn from the participant teacher interviews so differences in teachers' beliefs, as a result of exposure to Project Construct, could be identified. For this case, the immediate answer to the question - "does training and exposure to different instructional assumptions and practices influence the beliefs and/or practices of teachers who receive the training?" - is yes. All but two of the participant teachers, Dominique and Shania, reported changes in their original perceptions of the Project Construct curriculum, which influenced their classroom practice in varying ways.

TABLE 8

<b>Meta-Assumptions</b>	
<b>LIG</b>	<b>HIG</b>
<b>Student Characteristics &amp; Abilities</b>	
Students in Head Start classrooms are at different levels developmentally. They have different interests, skills, abilities and levels of knowledge.	Students in Head Start classrooms are at different levels developmentally. They have different interests, skills, abilities and levels of knowledge.
Children can symbolically represent and should be given opportunities to do so.	Children can symbolically represent and should be given opportunities to do so.
	Young children can comprehend and recall stories and should be exposed to reading activities frequently.
<b>Lesson Planning and Implementation</b>	
Lesson plans should be based on learning goals or “what we know children need to know,” with consideration given to students’ interests.	Parent input (parent teacher conferences, home visits) should be considered in goal setting and lesson planning. Lesson plans should be based on students’ needs. The process and outcome of the lesson implementation should be student mediated.
<b>Learning &amp; Instructional Activities</b>	
Physical environment of the classroom influences student learning.	Teachers have to flexible and adjust their lessons and outcome goals based on student interest, ability or the direction students take the activity.
Role of associations and connections. Learning a new task or construct should be reinforced by introducing students to a variety of stimuli so they experience the task and/or construct in different ways.	Role of associations and connections. Learning a new task or construct should be reinforced by introducing students to a variety of stimuli so they experience the task and/or construct in different ways.
Storage and recall can be enhanced by review.	Storage and recall can be enhanced by review.
Storage, recall and review of simple constructs can be embedded in more complicated cognitive processes such as matching.	Storage, recall and review of simple constructs can be embedded in more complicated cognitive processes such as matching.
<b>Teacher/Student Interactions</b>	
	Asking the students questions can help the teacher assess students’ understanding and comprehension and can serve to shape students’ learning.

These two teachers, who did not report changes, indicated that they were already using similar teaching perspectives and strategies in their classroom. Yet, changes were still noted among these teachers during the interviews. For example, Dominique talked about how the Project Construct guidelines structure her student needs assessments and how she uses information derived from her assessments to guide her lesson plan decisions. She also indicated that, while she was already using instructional frameworks and strategies similar to Project Construct, the Project Construct training had “titles” for everything, allowing her to describe her own practice using the professional language of the field.

There were a variety of responses from the remaining participant teachers as they described their initial and current perspectives of the Project Construct curriculum. Some teachers’ initial responses were more related to just the experience of the training and how language and/or other factors initially served as barriers to understanding the assumptions and practices of Project Construct. For many teachers, who were new to early childhood education and/or to Head Start, participation in the Project Construct training served almost as an orientation for them, providing them with a framework for conceptualizing their classroom, their students, their role as teachers, as well as a structure to guide their lesson planning and assessment. There are a few teachers who held misconceptions about Project Construct, which likely inhibited more complete implementation of the framework in their classrooms. Finally, there were teachers who humorously shared both their initial disbelief and then subsequent realization and acceptance of the assumptions of the Project Construct framework. Examples from each of these will be discussed in more depth in the remainder of this section.

A few of the participant teachers, for whom English was a second language, reported that their initial exposure to the Project Construct framework was difficult simply due to their lack of familiarity with the English language. In addition, some of these teachers were new to either early childhood education and/or to Head Start, so they were juggling several new professional experiences at one time. Despite their report that the training was initially difficult to understand, both from the language and conceptual perspective, the teachers still spoke highly of their training experience, noting special appreciation for their opportunity to “get ideas from other teachers” and for the professionalism of the training staff.

As mentioned above, for these teachers, as well as for other teachers who were new to early childhood education and/or to Head Start, the exposure to the Project Construct framework early in their tenure provided them with a method for structuring the physical layout of their classroom, for assessing and interacting with students, and for planning lessons. Based on the observation results of this investigation, the level at which the teachers implemented this framework varied, though there is evidence from both observation and teacher self-report data that all participant teachers implemented the Project Construct curriculum at some level in their classroom.

For a few teachers, their initial reactions to the Project Construct training could be described as cognitive and affective. Consider Sidney’s description of her initial reaction:

*Sidney: So for me, it just seemed as if, okay, how am I about to go in here and allow them to do these types of things and still have control of the classroom and that was a problem that I had, felt everything was so hands on, kind of let them do the play thing were I was so used to saying this is what we’re going to do, this is how we’re going to do it and this is what it’s going to be. So for me to come in here and have, have to learn this Project Construct curriculum, it totally went against everything that I*

*thought that should be done in the classroom. So for me, it was a little hard and so my first impression of it was, this is going to be hard.*

I described this response as both cognitive and affective since, as the Project Construct training exposed her to beliefs about teaching that were different from her own, she experienced cognitive conflict. As a part of reconciling this conflict, her own efficacy as a teacher is introduced and she asks herself, “how am I about to go in here and allow them to do these types of things and still have control of the classroom?” Such conflicts typically muster some mild form of affective response at the very least.

Another teacher, Sasha, openly shared her initially negative affective response to the PC training:

*Sasha: I didn't like Project Construct at first. I hated going to them classes... I hated it truly I did but then, as I started learning, as I figured out, “Okay, this has a purpose for teaching, with teaching, your gonna stay in teaching until you retire, so this has a purpose, so you must learn this purpose in order to help your children.” So that's the kind of the way I look at it now.*

This quote demonstrates Sasha's affective response to the training and highlights the impetus for change in her perception of Project Construct. Expectancy x value theory may explain why the teacher needed to recognize the value of the curriculum to her students and to her career before her affective response shifted and she was more cognitively open to the Project Construct assumptions and practices.

In two of the teachers' descriptions of Project Construct, I recognized that there were misconceptions regarding the usefulness of Project Construct in teaching and reinforcing “the basics” in the classroom. Consider the following two passages:

Quote 1: Interviewer: But the impression I'm getting from just what you're saying is that Project Construct kind of comes into play once they have some basics, that until they have the basic skills that, you know, you can't move them anything, to any more sophisticated because they don't...

Shamar: *They don't know the basics..... I'm like okay but you know everybody's not gonna be able to jump into their area [she is referring to the work areas in the classroom] because they, they don't, they don't have the basics.*

Shamar's comment above suggests an assumption that students can not productively learn in their work areas until after they have some knowledge of "the basics." This assumption is incongruent with Project Construct assumptions, which endorse the development of students' basic knowledge and skills through the integration of instructional activities and opportunities into their play (interact with objects and others in the work areas). The following dialogue highlights a similar misconception by another teacher, Latisha, who reported that she initially liked Project Construct but, upon implementing it in her classroom, felt it emphasized children's social development more than Kindergarten readiness:

Quote 2: Interviewer: Do you remember what your first impression of PC was, when you were exposed to it?

Latisha: *.....mmmm....when I first was exposed to it, (she is laughing a little here – at least smiling as she says it) I kind of enjoyed it.*

Interviewer: You did.

Latisha: *Yeah, I really did, I did, we were doing activities, writing... taking notes of every, we were working into groups and we, you know, compiling all our notes together as a group. It gave me a lot of ideas too, you know to help but after I got started with the Project Construct curriculum, I kind of geared towards, more towards what the children's needs was in the*

*classroom because I believe kind of getting that basic curriculum that they need to go to Kindergarten.*

Interviewer: Mmhmm, okay and then you said when you started to work with it in the classroom, did you kind.....

*Latisha: I kind of get off of it a little bit.*

Interviewer: Should, it didn't work to children's.....

*Latisha: Needs, mmhmmm. Because I think basically their needs..especially the 4 year olds as being prepared for Kindergarten, you know what I'm saying.*

Interviewer: Your talking about preparing the kids for Kindergarten and making sure that their, what ever they need for that, that sounds like one of your main goals and when you were trying to implement Project Construct, how did that not help you address the needs, how, because it sounds like you see them as two separate things, that....

*Latisha: Oh, I do...But I think Project Construct is really for like, social, more social than the basic academic you know for the children .*

In each of these instances, the teacher highlights their misconception about the usefulness of Project Construct for teaching “the basics,” for getting children ready to go to Kindergarten. Both teachers had frameworks and systems different from Project Construct that guided their classroom and instructional decision-making. While they were implementing Project Construct to some degree, either purposively or by default, these teachers have yet to grasp the underlying paradigmatic assumptions of Project Construct; environments that encourage children to construct their own knowledge are useful for teaching even basic concepts, such as numbers, letters, colors, and shapes.

Despite the presence of these misconceptions, Latisha still shared how Project Construct is useful in her work with students as she noted, “I like the domains, because



you know where the children are, you can recognize where the children are, you can place them where they're needed."

The teachers who described the greatest change, both in their beliefs and practice were those whose initial response to Project Construct was disbelief. The following quote personifies Danella's response to her initial exposure to Project Construct.

*Danella: Was, "Oh Lord, we're losing control" because from that structure, where everything was teacher directed and now you're telling me the children get to choose. Oh, boy, we're not gonna learn anything. That's the way I felt. I felt like hey, this don't even make sense, they won't learn.*

However, soon after this comment, in the passage below, Danella eloquently describes her own reflective process, how she began to make connections with her previous coursework in early childhood education and how her thinking eventually changed.

*Danella: When I started to reflect back on my earlier classes that I'd started taking at (teacher indicated a local community college) and Piaget, I love him. Okay so actually I started to go back, read books okay, and think about actually what he meant by children construct their own knowledge and then I looked at the training that I had in Project Construct and the understanding that I had of it was basically the same thing. Okay, so that helped me a lot and then uh, I could see that even though the curriculum is more student directed, that there are a lot of teachable moments. Okay, you just have to get in there and find those moments. And I like, uh, I also looked at Vygotsky part of it, the scaffolding and so I like that part too and its all, it's a blend, Project Construct, I even see some Montessori in it you know and, and so it's a curriculum to me that's just not one theory, it's a combination and in order to actually have a good teacher, environment for children you need that because the children are so different so, I find it, I love it.*

Janee also described her skepticism when first exposed to Project Construct but then, later in the interview, shared her realization that children can learn by playing.

*Janee: When I was first exposed to it I was like “you gotta be kidding.” (we both laugh) I mean how are children going to learn alphabets playin? How are children going to learn colors, playing?.....They can’t learn their letters while they play.*

Later in the interview

*Janee: They can learn these things in those areas. And, when I first saw this, when I was first was in one of those trainings, I was like “no”, you’ve got to be able to write em, you’ve got to be able to see em and it never dawned on me that they are seein em. And they will eventually be writin em. Their seeing the colors, their seein the shapes, they seein the numbers, their seein all that in play. I mean and I just thought it was jus, I, it was just total disbelief. There’s no way. But it is a way.*

Danella and Janee’s responses share the shift in their own thinking about teaching and learning, thus serving as examples of the kind of impact that this professional development opportunity had on teachers in this Head Start program. As demonstrated in the quantitative results section, all the teachers implemented the Project Construct curriculum in their classroom, though at varying levels. As presented in this section, nearly all the participant teachers communicated some shift in either their thinking about learning and teaching and/or their practice as a result of their experiences with the Project Construct curriculum and Assessment program. An overview of all the project’s results suggest that, while there may be a relationship between teachers’ willingness to implement an innovation and teachers’ epistemological, efficacy and expectancy x value beliefs, the motivational dimension of perceived cost of implementation is the most salient variable, when comparing teachers who implemented the curriculum at higher levels versus teachers who implemented the curriculum at lower levels. But even the teachers with High Cost, Low Implementation ratings described aspects of the Project Construct curriculum that were useful to their classroom practice.

### *Additional results from qualitative analysis*

Early in the qualitative analysis process, I was struck by the level of commitment participant teachers had to their students, especially in relationship to their desire for their students to leave Head Start more than prepared for Kindergarten. Even at this early stage, I began to wonder if the study, as well as professional development and administrative staff, was focusing on the wrong point of intervention. I wondered if, instead of focusing on the influence of teachers' beliefs in relationship to their willingness to implement an innovative curriculum, I shouldn't be focusing on how teachers' goals for students influence their classroom and curricular decision-making.

While quantitatively and/or qualitatively assessing teachers' goals was not the focus of this project, some insight into the role of participant teachers' learning goals for their students was provided through the qualitative analysis, as attempts were made to infer teachers' learning goals based on their descriptions of classroom decision-making and practice. Teachers from the LIG and HIG group shared similar goals in relationship to Kindergarten readiness, namely mastery of "the basics." However, descriptions of decision-making and classroom practices from HIG teachers also included (a) goals that required students to engage in more sophisticated levels of cognitive processing, such as reading comprehension and mathematical thinking and (b) activities requiring students to cognitively engage in tasks involving the ability to think logically, to problem solve and/or to predict or notice cause and effect relationships. While teachers in both groups shared assumptions about lesson planning and implementation, students characteristic and abilities, learning and instructional activities and student/teacher interactions, teachers in the LIG group were more likely to refer to the role of environmental factors in

students learning; while teachers in the HIG referred more often to their flexibility in allowing students to mediate the process and outcome of their lesson plans and implementation. While I suspect a majority of teachers from both groups would agree that encouraging students to engage in higher levels of cognitive processing and/or encouraging students to be self-regulative, self-directed and responsible are important considerations in the Head Start classroom, it was the teachers in the HIG group who referred to these most often and with the most consistency in their classroom decision-making and practice descriptions. This was especially true for Danella, who was identified during the qualitative analysis as an outlier. Because Danella's description of her classroom decision-making and practices were so compelling, and also because she had the highest level of Project Construct implementation, it was particularly important to describe her beliefs and practices in more detail based on my experiences with the data. Specifically, professional development interventions targeting the implementation of innovative practices need to consider the role of teachers' goals as a motivational force for defining their classroom decision-making and practice, especially those based on constructivist assumptions.

As previously mentioned, the participant teachers were very committed to their students, especially in relationship to preparing them for Kindergarten. This is no less true for Danella, who gave me permission to present and discuss portions of her interview specifically, since her overall approach to her students, to her role as their teacher, as well as her stated beliefs about learning and teaching is different than the rest of the participant teachers. While all teachers may have presented with activities, perceptions, beliefs and/or opinions that were similar to hers at some level, Danella was the only

teacher to mention learning goals, students' cognitive processing, her belief about her role as their teacher and/or her overall perception of the Head Start classroom in the interview.

Danella represents the closest exemplar to a Project Construct teacher among the participant teachers. As such, a more detailed description of her beliefs and practices can illuminate why focus on teachers' goals, at least at this Head Start, could result in higher levels of Project Construct implementation and/or practices consistent with constructivist assumptions.

In order to summarize a large amount of information, as well as to present the inferred themes of Danella's interviews in a way that communicates them as she did, eight passages from her interview are presented in Table 11. These passages represent the essence of her beliefs about learning, about her role as an early childhood teacher and about classroom practices. In the column next to the passage, I noted the themes, as I recognized them during multiple reviews of her interview. Notice in passages 1 through 3, Danella communicates her beliefs about learning; that children construct their own knowledge, that students should have ownership and be self-directed in their learning and that the role of the teacher is "just confirming it." In passage 4, she describes how she makes student/teacher interactions cognitively and emotionally safe, so students can risk answering questions. She refers to her role as a guide and describes how she encourages students to "think," telling them how to go about the process of thinking. In passage 5, her focus on students' self-directed learning and on higher order cognitive processing is demonstrated as she encourages children to make choices, to think, to use their imaginations, to be creative. She then describes how she follows-up with students and

asks them to tell her about - to attach meaning - to their drawings. While all of these passages share aspects of Danella's beliefs and classroom practices that set her apart from the other participant teachers, it is her references to learning to think, to personal development, to self-regulation, and to autonomy, as demonstrated in passages 6-8 that I believe represent the essence of how Danella conceptualizes her classroom, her goals for the students, and her role as their teacher.

TABLE 9

<b>Passages from Donnella's interview</b>		
	<b>Quote</b>	<b>Themes</b>
Passage 1	<i>I truly believe now that children do construct their own knowledge. It took me to looking back at myself even as a child even as a child and wondering, okay, now how did I learn? I don't remember.. anybody teaching me....</i>	Beliefs about learning Teachers' personal reflection
Passage 2	<i>Back when I was rigid. I didn't make it personal. I didn't say "mm, Denise now what letter does Denise start with? You know what I'm saying? I didn't let you have ownership in what you were doing or what you were learning but now they have ownership, its theirs, it belongs to them. So that's the difference and I think that is a formula for success I really do.</i>	Beliefs about learning Student ownership

TABLE 9 (cont.)

Passage 3	<i>Life long learning, life long learning. They'll be successful because they are being taught how to take ownership. You're not teaching "okay, that's green!" They're teach, in a sense their teaching themselves. When you kind of think about it, you're just confirming it so, I think this is a better way.</i>	<p>Beliefs about learning</p> <p>Student ownership Self-directed learning</p> <p>Role of teacher</p>
Passage 4	<i>I might have 3 people not asking questions or giving an answer or and I'll say, "its okay." You know we're all learning here. I might not know the right answer; you might have to tell me so it's okay. Just think, all I want you to do first is think and then tell me. Don't just holler but think about it okay? Close your eyes, picture it, think about it and that works pretty well because you get wrong answers, you know that.... But its' okay. They need to know it's okay. You need, they need to build self-esteem. That's another reason why you guide them, but not just give it to them.</i>	<p>Cognitive/Emotional safety</p> <p>Teacher goal and cognitive process - Encouraging children to think and telling them how to represent something in their mind</p> <p>Cognitive/Emotional safety Personal Development Teacher as Guide</p>

TABLE 9 (cont.)

Passage 5	<i>Actually when you ask the children what it is they want to learn. There your doing that, you know, your giving them choices, your letting them kind of direct their own learning. When we go to small groups,...it's, we'll use writing for instance or drawing. I don't say, here we're going to draw this, do this, do that. I try to encourage them to be creative and use their imagination, my thing is, if you want to draw a butterfly because we talked about it that's fine. If you don't, then you draw or write whatever it is you want to write but when I come to you,.... I always tell them "I'm gonna ask you about that." I need you to tell me about that.</i>	Self-directed learning  Symbolic Representation  Be creative – use imagination  Attach meaning
Passage 6	<i>Because they need it to develop, they need it to think. They need to be able to problem solve. They need to know how to decide right from wrong. Those are, those are basic things. They need to learn how to get along.</i>	Teachers' goals and cognitive process  Personal and social development
Passage 7	<i>They need to learn to manage themselves</i>	Learning Goals Personal Development Self-regulation
Passage 8	<i>So, as the group of children change, your practice has to change some. There are some children you cannot let go on their own. You kinda have to guide them into that autonomy.</i>	Flexibility Personal development - autonomy



It is plausible that all of Danella's learning goals, including personal development and social development, as well as mastery of "the basics," are subsumed by her overall goal of fostering student autonomy. Everything from how she introduces the alphabet, to how she moves into students' play, to how she introduces writing, is bounded by how much students' are able to manage on their own and how she can use their current level of performance and/or thinking to broaden their knowledge and experience. Consider the dialogue below, a representation of her response and our subsequent discussion to the question, "how do you decide what to do in your classroom?"

*Danella: Actually I read stories to the children and talk to them about the stories and I pick up on what they want, what their interest is. A lot of times, for instance last week we were talking about the 4<sup>th</sup> of July. Well, one little girl said "I've never been on a picnic" and so this was curriculum, I mean lesson plan, it's about picnics. Okay and uh, that's kind of individualized too and that's how I do it.*

Interviewer: So your theme this week will be, it's on picnic.

*Danella: It's on picnics.*

Interviewer: So can you give me an example or 2 of kind of what you're, what you'll be planning to.

*Danella: How we'll do it?*

Interviewer: Yeah, what's your, how you're going to use the theme of picnics ...

*Danella: Okay, uhm, we started out with a web.*

Interviewer: With a...?

*Danella: A web and I asked the children what do they know about picnics, tell me some things about picnics. So they talked about uh, the food they would take on a picnic, we talked about insects, picnics are you can have them in parks, in your backyard, different places you can have picnics and*

*those are the things that we know about a picnic. Okay, then we talk about what we wanna know, say I ask them, what is it that you want to know about picnics? Okay, uhm, we haven't gotten that far this week but they may name, for instance "How do you cook a hot dog? How do you make a sandwich to take on a picnic?" You know things like that, okay? Then uhm, we generate questions from that. We look at the letter "p," learn the letter "p," learn the sounds and we come up with words that start with "p." At first it's any words. Then we go to food.*

Interviewer: Foods that start with "p."

*Danella: That start with the letter "p." Okay and some of those things we may use on our picnic. It's their choice. Okay and then, let's say Friday we'll do a review, we'll talk about what we've learned about a picnic and then we'll plan to go on a picnic. We plan the actual picnic. We read stories. Uh, they get ideas from stories. I tell them to think, use their imagination, talk to their parents, ask your parents what do you take on a picnic? Well, one little girls Samolian, she's we don't have picnics, Samolians don't have picnics.....*

Interviewer: But, and so, the, the, you are sh, their learning about picnics  
Uhm,.....

*Danella: We started, okay, we worked with the letter "p" the recognition, we did the letter sound. Uh, we came up with words that started with the letter "p." And made the "p" sound. Uh, we sorted insects today in Science Area..*

Interviewer: You sorted them?

*Danella: Sorted, mmhmm. We, you know put em in different categories. What else did we do today? In house keeping they play like their on a picnic. Uhm, we did some uh, sand play. We talked about the beach where you'll find the sand and some people drew pictures uh, they painted in art area so it's all through the, uhm all the domains [referring to Project Construct domains] that we use.*

Danella uses read alouds to introduce topics students could potentially find interesting and then, she uses topics, for which children expressed interest, as the theme for her lesson plans. Notice how: (a) She incorporates her own learning goals of letter recognition by using the theme to determine what letters they will focus on throughout

the theme, (b) she has the students connect the letter sound to words in general and then words that specifically relate to the theme – picnics, (c) she uses a visual, the web, to both assess and activate students’ prior knowledge about the theme, and then models self-directed learning by asking “what do we want to know about picnics?” (d) she provides them with resources to learn more about picnics (books and talking to parents), which introduces cultural differences in the classroom, as not all families go on picnics; (e) she integrates the picnic theme throughout all the work areas in the classroom; going on picnics in the house area, sorting insects in the Science area, drawing and painting pictures in the Art area and the introduction of the beach and sand through sand play; and (f) she reviews it all at the end of the week and then takes the children on the picnic that they planned.

While the descriptions of other participant teachers shared aspects of Danella’s description above, none of the participant teachers’ descriptions captured so many of the types of instructional strategies and assumptions considered as congruent with assumptions from Project Construct. While other teachers might focus on students’ interest and what students enjoy doing, and might even choose, as lesson plan themes, the topics students introduce, or even integrate themes throughout the work areas in the classroom, Danella was the only teacher who described classroom practices that incorporated the teachers’ learning goals, the students’ interest, prior knowledge, integration of the theme throughout the domain and work areas in the classroom, and also modeled self-directed learning. Even Danella’s strategies for behavior management present and encourage opportunities for students to self-regulate, as demonstrated in the quote below:

*Danella: In my classroom you probably will never just see a child in what you call "time out." I try to let them, give them opportunity to redirect their own behavior to kind of change what they're doing. .... and I let the children, in a sense, redirect each other.....Uhm, okay, say you're Sarah and you are throwing crayons. Well, I might say, "mmm, Sharon can you help your friend, she's having a problem with those crayons!" And normally the child will say, we don't throw our crayons. They correct each other if there's bad language used. They would say "Oup, we don't say that in here." So, I do it even in self management skills.*

In summary, Danella's focus on student autonomy structures her mental model such that learning goals, cognitive processes, her assumptions about students, about learning, and about her interactions with the students are all in service to the development of her students' ability to self-regulate, to self-direct, and to function autonomously, in developmentally appropriate ways, when they leave for Kindergarten. The rest of the Head Start teachers would naturally begin to implement instructional strategies congruent with Project Construct assumptions by focusing on student autonomy, since providing students with opportunities to function autonomously would eventually demand them to do so. Some Head Start teachers recognize the need to provide more opportunities for autonomy and note how difficult that can be. Consider Dominique's description of how she tried to let go of her typical approach to a classroom activity, based on a suggestion from her Education Specialist.

*Dominique: Yeah, because I mean, its, I think what it really is, is teachers giving the children the lead and that's hard for some of us to do because I was doing an activity and my supervisor, she told me, cause I was so used to just cutting everything out and putting it in the piles, to let them do it but she, she was mo, because we did the 3 little pigs things and she was more like, well why don't you let the kids cut the pigs out and I was like, well it won't be as pretty. But then, I went on after she left, I let them do it. I said, cut out your own pigs and do this and I mean, they did it all. I, the only thing I think I cut out was the straw, the bricks and the sticks so they could put em together and uh, each child went to wo, the area, the table*

*where they wanted to make their house and they cut out their own pigs and it was better and I told her you know, I said, well and it just, you have to let it go and we don't because we want everything to be pretty. And that's just how we've been, that's just how we've been taught but then, the people that will work with me I'm like, don't do it. Let them do it because you know what, they don't want our work. Their parents want their work. So it was hard to let that go and that's one thing I think about Project Construct is that they want the kids, the kids' work, not my perfect circle. They want their circle. I mean however you make your pig, if you want him to be round, if you want him square, oval, rectangle, it's yours so... I, I've done a lot of that this year, of just letting go and letting them do, as opposed to me cutting out every perfect circle, every perfect shoe and that's, it, it was a good year because they did real good.*

Dominique's passage was not uncommon among teachers who shared their experiences with "letting go" and allowing children to be more active, more responsible and to have more ownership of their own work. Later in the interview, Dominique said, "I guess we still treat them like babies. And we have to let that go." Dominique's comments highlight her own growing awareness, that children can take ownership of and complete more complicated tasks than early childhood teachers might give them credit for, that they can function more autonomously, if given the opportunity.

### *Qualitative Summary*

While the mental models for both groups of teachers share similar goals, cognitive processes, assumptions and meta-assumptions, there are differences between the groups in each of these areas. For example, in their descriptions of classroom decision-making and practice, references to goals of reading appreciation and personal responsibility were only noted in the LIG. In contrast, references to goals related to mathematical thinking were only noted in the HIG. Teacher descriptions in the HIG included references to personal development goals, such as self-regulation, self-direction

and personal autonomy, which were not reflected in the LIG teachers' descriptions. LIG teachers' descriptions tended to emphasize basic knowledge and skill goals (letter recognition, writing, shapes, colors, numbers and counting). While these goals were present in the HIG teachers' descriptions, teachers in this group also referred to learning goals that required more sophisticated levels of cognitive processing (reading comprehension, mathematical thinking and personal development goals).

In regards to cognitive processes, while teachers in both the LIG and the HIG described activities requiring the cognitive processes of information storage and recall, teachers in the LIG referred to activities that reinforced information storage and matching. In contrast, teachers in the HIG group referred to activities requiring students to cognitively engage in tasks involving the ability to think logically, to problem solve and/or to predict or notice cause and effect relationships and to activities that emphasized processes of self-regulation and team work.

While teachers in both groups shared assumptions about lesson planning and implementation, students characteristic and abilities, learning and instructional activities and student/teacher interactions, there were also differences in their assumptions, as inferred from their descriptions of the classroom-decision-making and practice. Both qualitative and quantitative differences were noted in teachers' descriptions and/or observer ratings of the use of literacy activities and the use of questions to assess student thinking and understanding and/or to shape student learning. Teachers in the LIG referred more often to the influence of environmental factors on student learning and teachers in the HIG referred more often to their flexibility in allowing students to mediate the process and outcome of their lesson plans and implementation. In their lesson planning,

teachers in the HIG group referred to their considerations of parent input when designing their lesson plans and learning goals. Teachers in the LIG group were more likely to include, in their descriptions of how they decide what to do in their classroom, a combination of learning goals, such as “the basics,” as well as their own personal goals for students, and considerations for students’ interest. While quantitative and qualitative differences between the LIG and HIG teachers’ beliefs have been noted, all participant teachers were impacted by their exposure to the PC curriculum and assessment system.

## Chapter V: RESEARCH SUMMARY AND CONCLUSIONS

### Project Review

This project was initiated in response to concerns, expressed by a Head Start director in a local school district, regarding the low level of implementation of the Project Construct Curriculum and Assessment system that she observed in the Head Start classrooms. Despite the fact that the teachers had been provided with extensive training, the necessary materials, and ongoing support, the director was curious as to why teachers either elected to not implement the program at all or implemented it at what she perceived as low levels.

While this investigation represents applied research or research emerging from a desire to address an immediate problem (Ary et al., 2002), the conceptualization of the overall study was designed with consideration for other Head Start and/or early childhood programs that might benefit from the results. For example, there is little published research that includes considerations of either *practicing* early childhood teachers' epistemological beliefs or teachers' sense of efficacy in relationship to classroom decision-making. The inclusion of the expectancy x value motivational models represents a new perspective applied to investigative efforts designed to enrich our understanding of early childhood education teachers' classroom decision-making processes. The application of mental models, as a way to structure the analysis and reporting of participant teachers' espoused mental models, provides a mechanism for inferring teachers' beliefs about teaching and learning based on descriptions of their own classroom decision-making and practice. In summary, this study was designed to investigate whether teachers' beliefs about knowledge and knowledge acquisition



(epistemological beliefs and mental models), teachers beliefs about themselves as teachers (efficacy) or their beliefs about the innovative curriculum endorsed by the school district (expectancy x value), influenced their classroom practice, specifically in relationship to the level at which they implemented the Project Construct curriculum.

### Curriculum Implementation and Teacher Beliefs

While the Head Start director indicated that some teachers did not implement the program in their classroom, all the participant teachers for this project implemented the Project Construct curriculum at some level, though the extent of the implementation varied from teacher to teacher. This variability was captured using both quantitative analyses, whereby teachers' beliefs were compared to the level of implementation, and qualitative analyses, in which implementation groups were differentiated by the rank-order of their implementation scores, so that interview data could be explored and implementation issues identified.

Overall, participant teachers endorsed relatively high levels of teacher efficacy. It appears that the participant teachers feel competent in their ability to engage students, since their perceptions of efficacy were highest on the Student Engagement scale. Given that both groups identified engagement as one of the inferred cognitive processes required for achievement of the identified learning goals, this finding represents congruence between teachers' perceived sense of efficacy and their beliefs about learning. The recognition that the participant teachers' learning goals for their students appear to have an important impact on their classroom decisions and curricular decision-making may account for the lack of identified significant relationships between levels of efficacy and Project Construct implementation. Since the teachers' scores on all three

scales of the TSES were relatively high, it is possible that the participant teachers' feel efficacious in the instructional variables that are most salient for them - their ability to select and implement instructional strategies that optimize students' ability to achieve the established learning goals.

Visual analysis of the histograms, depicting the level of Project Construct implementation and participant teachers' epistemological and expectancy x value beliefs, highlights a relatively "lukewarm" trend in regards to participant teachers' epistemological beliefs in general, as well as their expectancy and value beliefs. There were no outliers in either the epistemological, expectancy or value beliefs and/or the level of implementation scale(s) (though one teacher was identified as different from the other participant teachers during the qualitative analysis). I questioned whether the "average" level of overall implementation by participant teachers is reflective of their somewhat "lukewarm" epistemological, expectancy and/or value beliefs overall. For example, when looking at the means in isolation I was somewhat concerned to see that the means for both the expectancy ( $\bar{X} = 2.63$ ) and the value ( $\bar{X} = 2.75$ ) scales, fell below the median (3). Though no significant relationships were established between the level of implementation and these two beliefs in the expectancy x value model, the value teachers attribute to the curriculum, as well as their belief that they will succeed if they implement the curriculum, is disappointingly low. Despite the fact that these beliefs failed to be relevant in the quantitative analysis, these indications of low expectancy and/or value for the curriculum may still be a cause for concern. Head Start administrative staff might benefit from safe discussions with Head Start teachers regarding their perceptions of the

curriculum so that misconceptions and/or other factors influencing the teachers' perceptions of the curriculum can be addressed.

The outcomes regarding the expectancy x value model in this study were different from those established in previous studies using the model. Both Abrami, Poulson and Chambers (2004) and Wozney, Venkatesh and Abrami (2006) reported that the expectancy factor was most predictive of teachers' use of cooperative learning and technology, respectively, in their classroom. While a statistically significant relationship between participant teachers' expectancy and value scores and level of Project Construct implementation was not established in this project, a significant relationship was identified between teachers' perceptions of the cost of implementing the curriculum and less extensive levels of implementation. The descriptions of participant teachers' practices, gleaned from the qualitative phase of the project, provide some explanation for this finding. For example, while teachers in the LIG indicated they based their classroom decisions on learning goals, such as "the basics" and personal goals for the students, nearly all the teachers in this group also spoke of a consistent use of classroom themes. Some teachers could provide an outline, from memory, of what themes would be presented throughout the whole school year. Many of the classroom themes were seasonal (fall, spring, etc.) or centered on holidays (Thanksgiving, Christmas, Cinco de Mayo, etc), suggesting the possibility that these themes are presented with some consistency each year, with learning goals and student interest integrated within each theme. It was difficult to determine what essentially drove the LIG teachers' lesson planning, the learning goals or the themes. It may be that, through their years of teaching experience, they've established a system that combines both.

If in fact LIG teachers have a well established system that defines their lesson planning processes, and if they perceive that implementing Project Construct challenges the system they've refined over years of experience, their perceptions about the value of implementing the curriculum outweighing the cost are understandable. I would argue, however, that this perception represents a misconception about the Project Construct curriculum since as Monique described it, Project Construct is "just a way of thinking that you bring into the classroom." I contend that the constructivist assumptions, which represent the foundational elements of Project Construct, could easily be implemented into the thematic systems that define the teachers' lesson planning for the whole year but these teachers have yet to grasp "this way of thinking."

LIG teachers' perceptions of the cost of implementing Project Construct, versus the benefits, is also understandable considering the combination of the teachers' misconceptions regarding the Project Construct curriculum (discussed in chapter 4) and their focus on Kindergarten readiness. Since a few of the teachers view Kindergarten readiness and Project Construct instruction as two different curriculums, and/or they view Project Construct as something to implement after students have at least an introductory level of the basics, it follows that teachers with Kindergarten readiness goals for their students would fail to see the usefulness of the Project Construct curriculum. Investing the time and effort towards implementing a curriculum that is not congruent with their goals for their students represents a high-risk decision for these teachers. It is likely that they perceived that fully implementing Project Construct would compromise their ability to adequately prepare their students for Kindergarten.

Another explanation for why the cost of implementing Project Construct outweighs the benefits for LIG teachers relates to their initial beliefs about teaching and learning prior to their exposure to Project Construct. Nearly all the teachers in the LIG related their skepticism and/or surprise at being introduced to assumptions about learning, as endorsed by Project Construct. Many of the teachers in the LIG shared the cognitive conflict that was introduced when these assumptions were presented and while they may implement activities based on these assumptions during portions of their class, they have not yet fully committed to the paradigm that represents the essence of Project Construct.

#### Early Childhood Teachers' Mental Models

The categories for mental models, as established by Strauss and colleagues (1995), provided a functional method for conceptualizing the qualitative phase of this project. However, the findings regarding the mental models for teachers in this project were different than those originally established by Strauss and his colleagues (Haim, Strauss, & Ravid (2004); Mevorach & Strauss (1995); Strauss (1993). These authors reported that there were no differences in the mental models of the teachers' in their study; though Haim, Strauss, & Ravid (2004) indicated that the mental models for participant teachers in their study, while still the same, manifested differently in the classroom. There are four differences, between this project and the previous investigative use of Strauss's conceptualization of mental models, that might explain the contrasts between the findings reported in this study and those established in prior investigations: (a) In previous studies, the conceptualization was utilized to structure the overall

research design and the research questions. In this study, mental models were adopted *a priori* as a way to structure the qualitative analysis and, while important, were not the major focus of the study; (b) the sample sizes (5 to 8 participants), for the groups in the previous studies were larger than the size of the groups in this study. It is possible that more similarities, in participant teachers' mental models, would have been identified in the current study with a larger number of teachers in each group; (c) the sample of teachers in the previous studies worked in elementary or middle school/junior high settings; and (d) one of the major goals for the previous investigations, beyond establishing the descriptions of participant teachers' mental models, was differentiating the activation of teachers' mental models about teaching and learning and their level of subject matter knowledge in the teachers' espoused and/or in action theories. The emphasis for this study, which included early childhood education teachers (who teach children in a wider age range, 3-5, versus one grade and who teach a variety of knowledge and skills, versus one subject) may also explain the differences in the mental models identified between teachers in the LIG and the HIG group.

#### Inference Limitations

The recommendation, that professional development interventions designed to promote the implementation of constructivist based assumptions and instructional strategies might benefit from targeting teachers' goals, is based on the assumption that results generated from this project are reasonable and valid. While every attempt was made to protect the inference quality and transferability of this project, some limitations

regarding observational ratings, qualitative analysis, instrument selection and sample size should be noted. For instance, I was the only investigator to analyze and interpret the qualitative data. More confident inferences could have been generated with additional raters. In addition, though I made every attempt to clarify my own interpretation of the teachers' comments throughout the course of the interview, participant teachers were not provided with an opportunity to confirm or disconfirm the accuracy of my post-analysis assumptions.

While the Project Construct's fidelity instrument (PC-ECCOS) was used to assess the level of curriculum implementation, I was not present at the initial and/or follow-up Project Construct trainings. Knowledge of what was communicated to the participant teachers, regarding the assumptions and instructional strategies of Project Construct, was communicated second hand through Project Construct materials and teachers' descriptions. There is no way of knowing whether what I assessed from the classroom observations was congruent with what was actually communicated to teachers during the training. Congruence was assumed based on the similarity between the PC-ECCOS and the curricular domains and assessment instruments, which were custom designed by Project Construct for use in the Head Start program.

The PC-ECCOS provided raters with a structured method for observing the participant teachers' classroom practices and the raters were only asked to provide a rating for each item. In some cases, raters made personal notes regarding their observations and/or regarding their ratings. However, no formal field notes were provided or required from the raters, which limited my ability to screen for observer bias in the PC-ECCOS ratings. Including field notes with observer ratings, even for the

structured observations, would have provided additional data sources to consider in regards to the participant teachers' classroom practices and would have strengthened the confidence in inferences drawn from the observational data.

The lack of significant findings in relationship to epistemological beliefs and curriculum implementation may be a result of the instrument selected for measurement. Since the Epistemological Belief Inventory is a multi-dimensional inventory, any variability in teachers' epistemological development may have gone undetected. Selecting a unidimensional measure of epistemological development may have provided more useful information regarding the influence of teachers' epistemological beliefs in relationship to classroom decision-making and practice.

The small sample size presents some doubt as to the validity of the inferences generated from the quantitative portion of this study. While efforts were made to use qualitative data to triangulate the quantitative findings, the small sample size still presents as a challenge in consideration of inference quality and transferability. As such, a rich description of the research setting, as well as the participant sample, was provided so that readers could determine level of "fit" between this case and other early childhood settings.

The small sample size is also a limitation in this study as it challenges the described comparative findings between the LIG and HIG groups. A larger number of participants in each group could potentially dilute the differences described in this study or could have clarified more concrete differentiation between the LIG and HIG groups. In future studies, this can be addressed by selecting the qualitative-quantitative sequential analysis method instead of the quantitative-qualitative sequential analysis method. For



example, all the teacher interviews could have been analyzed initially, with groups established from similarities in teachers' mental models, and then significant differences in levels of implementation or other quantitative difference between these groups could be explored.

There is also no evidence, generated from this study that relationships exist between the different levels of Project Construct implementation and student learning outcomes, which suggests one important consideration for future research. Additional considerations are discussed in the next section.

### Implications for Practice

This study examined the ways in which teachers' beliefs and mental models influenced their classroom decision-making and practice. The results from this study can benefit professional development, curriculum development and early childhood education management staff who seek to optimize student learning through the presentation of new and innovative curricula and/or through professional development initiatives that present diverse conceptualizations of learning and teaching. For example, it is evident that despite exposure to an extensive initial training, consistent follow-up training modules, and the continued provision of resources and support, participant teachers still implemented the Project Construct curriculum at varying levels in their classroom. Motivational constructs, such as expectancy x value perceptions and teachers' learning goals for students, were related to the varying levels of implementation observed in the study. If educational reform initiatives target shifts in early childhood education teachers' classroom practices, this study indicates that teachers will need to believe that the benefits of implementing new curricula and/or utilizing new or different instructional

strategies outweighs the costs involved in making recommended changes in their classroom practices. This is especially true if teachers perceive that implementing a new curriculum or strategy might compromise their efforts to ensure that their students achieve their learning goals.

### Implications for Future Research

While this project provided new insight into why teachers' implement innovative ideas at varying levels in their classroom, it also presents new questions to consider in future inquiries. Questions such as:

1. Would interventions that target shifts in teachers' learning goals influence teachers' beliefs about pre-school children's capabilities, about learning and teaching and/or classroom practices? If so, how? In their qualitative study, Kang and Wallace (2004) identified relationships between teachers' epistemological beliefs, learning goals for their students and use of laboratory activities in Science. Applying a similar approach to future inquiries could provide a more comprehensive understanding of the mental constructs that mediate classroom decision-making and classroom practice for early childhood education teachers.
2. Would capturing early childhood education teachers' *on action* (reflections about teaching after viewing teaching practice) mental models result in the same inferences as those derived from their espoused mental models?
3. Would research exploring teachers' *on action* mental models initiate a reflective act for teachers? Would the reflective process, initiated in research, deepen both our professional knowledge of teachers' mental models, as well as teachers own understanding of their mental models about teaching and learning? Would the act

of reflecting on their own learning goals for students, on students' cognitive processes and on their own assumptions about teaching and learning initiate shifts in teachers' beliefs and practices?

These questions represent just a few of the perspectives that could be explored in the effort to optimize student learning through professional development initiatives that promote innovative ideas for implementation in the classroom.

### Conclusion

In the conclusion stages of this inquiry process, as I consider the intersection between professional development and the shaping of teachers' mental models, including specific beliefs such as epistemology, efficacy and expectancy x value assumptions, I'm repeatedly struck with the similarities between the notion of enculturation and the use of professional development to invite teachers to consider and change sometimes deeply entrenched beliefs. It is my impression that perhaps our expectations for professional development outcomes are too high, especially when considering how entrenched cognitive conceptual entities, such as mental models, can be and how "... people's ability to "run" their models are severely limited" (Norman, 1983).

While resource accountability may force educational administrators to demand more productive outcomes for their investments in staff development, this study has highlighted, at least for me, the magnitude of commitment (in time, energy, attention and resources) required to collectively shift teachers' beliefs and practices. I empathize with the frustrations of teachers who "get it" and of management staff who often wonder if some teachers will ever "get it." I empathize as well, with the cognitive conflict and subsequent cognitive discomfort that teachers, when introduced to assumptions and

practices that are different from their own, must experience; and have an appreciation for those teachers who are willing to risk both their cognitive comfort, as well as a predictable classroom, in order to allow cognitive transformation to take place.

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## Appendix A

### INFORMED CONSENT LETTER

Dear Head Start Teacher:

You are being asked to participate in a research project at KCMSD Head Start this year. The focus of the project is on how early childhood education teachers' beliefs influence classroom practice and student learning outcomes. This project will be conducted to partially fulfill the requirements of a doctoral program of study for Denise Kay.

If you agree to participate in the study, you will be asked to do the following:

1. Sign this informed consent document.
2. Distribute and collect parent information letters.
3. Attend one meeting where you will complete three teacher belief instruments (Epistemological Belief Inventory, Teacher Sense of Efficacy Scale, Project Construct Curriculum Questionnaire). Completion of the instruments should take no more than one hour.
4. Allow an investigator to observe your classroom for a total of 2 ½ - 3 hours. The investigator may ask questions about your classroom and your accurate response will be helpful to the project.
5. Attend a one-on-one follow-up interview with Ms. Kay toward the end of the 2005-2006 school year. This audio-taped interview will take approximately one hour.

There are few risks for participants in this study. All individual responses to the teacher belief inventories, as well as the results from the classroom observations and teacher interviews, will remain confidential. Ms. Kay will secure all records and data generated from this study in her private residence for three years. While every eligible teacher is encouraged to participate in the study, your employability or relationship with KCMSD Head Start will not be affected in any way should you refuse to participate. Even if you agree to be a participant in this study, you may change your mind at any time throughout the study. Just let Ms. Kay know you no longer wish to participate.

Ms. Kay will publish the overall results of the study in her dissertation and in professional presentations and/or publications. However, no individual teacher, student or classroom information will be provided in these presentations. If you have any questions about the research project, contact Denise Kay at (816) 200-3739 or [dkkq8@mizzou.edu](mailto:dkkq8@mizzou.edu) or Dr. Jessica Summers at (573) 885-9733 or [summersje@missouri.edu](mailto:summersje@missouri.edu). If you feel your participation in this project results in harm to yourself or your students, contact the Institutional Review Board at the University of Missouri – Columbia at (573) 882-9585.

### Signature of Consent

\_\_\_\_\_ I agree to be a participant teacher in the proposed study.

\_\_\_\_\_ I do not wish to participate in this study.

Name: \_\_\_\_\_

Signature: \_\_\_\_\_

Date: \_\_\_\_\_

## Appendix B

### TEACHER BELIEF SURVEYS

Epistemological Belief Inventory

Teachers Sense of Efficacy Scale

Project Construct Curriculum Questionnaire

## Epistemological 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 teachers don't tell students the answers to complicated problems.

Strongly Disagree	1	2	3	4	5	Strongly Agree
----------------------	---	---	---	---	---	-------------------

2. Truth means different things to different people.

Strongly Disagree	1	2	3	4	5	Strongly Agree
----------------------	---	---	---	---	---	-------------------

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

Strongly Disagree	1	2	3	4	5	Strongly Agree
----------------------	---	---	---	---	---	-------------------

4. People should always obey the law.

Strongly Disagree	1	2	3	4	5	Strongly Agree
----------------------	---	---	---	---	---	-------------------

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

Strongly Disagree	1	2	3	4	5	Strongly Agree
----------------------	---	---	---	---	---	-------------------

6. Absolute moral truth does not exist.

Strongly Disagree	1	2	3	4	5	Strongly Agree
----------------------	---	---	---	---	---	-------------------

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

Strongly Disagree	1	2	3	4	5	Strongly Agree
----------------------	---	---	---	---	---	-------------------

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

Strongly Disagree	1	2	3	4	5	Strongly Agree
-------------------	---	---	---	---	---	----------------

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

Strongly Disagree	1	2	3	4	5	Strongly Agree
-------------------	---	---	---	---	---	----------------

10. Too many theories just complicate things.

Strongly Disagree	1	2	3	4	5	Strongly Agree
-------------------	---	---	---	---	---	----------------

11. The best ideas are often the most simple.

Strongly Disagree	1	2	3	4	5	Strongly Agree
-------------------	---	---	---	---	---	----------------

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

Strongly Disagree	1	2	3	4	5	Strongly Agree
-------------------	---	---	---	---	---	----------------

13. Teachers should focus on facts instead of theories.

Strongly Disagree	1	2	3	4	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	4	5	Strongly Agree
-------------------	---	---	---	---	---	----------------

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

Strongly Disagree	1	2	3	4	5	Strongly Agree
-------------------	---	---	---	---	---	----------------

18. Things are simpler than most teachers 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	1	2	3	4	5	Strongly Agree
-------------------	---	---	---	---	---	----------------

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

Strongly Disagree	1	2	3	4	5	Strongly Agree
-------------------	---	---	---	---	---	----------------

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

Strongly Disagree	1	2	3	4	5	Strongly Agree
-------------------	---	---	---	---	---	----------------

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

Strongly Disagree	1	2	3	4	5	Strongly Agree
-------------------	---	---	---	---	---	----------------

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

Strongly Disagree	1	2	3	4	5	Strongly Agree
-------------------	---	---	---	---	---	----------------

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

Strongly Disagree	1	2	3	4	5	Strongly Agree
-------------------	---	---	---	---	---	----------------

25. What is true today will be true tomorrow.

Strongly Disagree	1	2	3	4	5	Strongly Agree
-------------------	---	---	---	---	---	----------------

26. Smart people are born that way.

Strongly Disagree	1	2	3	4	5	Strongly Agree
----------------------	---	---	---	---	---	-------------------

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

Strongly Disagree	1	2	3	4	5	Strongly Agree
----------------------	---	---	---	---	---	-------------------

28. People who question authority are trouble makers.

Strongly Disagree	1	2	3	4	5	Strongly Agree
----------------------	---	---	---	---	---	-------------------

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

Strongly Disagree	1	2	3	4	5	Strongly Agree
----------------------	---	---	---	---	---	-------------------

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

Strongly Disagree	1	2	3	4	5	Strongly Agree
----------------------	---	---	---	---	---	-------------------

31. Sometimes there are no right answers to life's big problems.

Strongly Disagree	1	2	3	4	5	Strongly Agree
----------------------	---	---	---	---	---	-------------------

32. Some people are born with special gifts and talents.

Strongly Disagree	1	2	3	4	5	Strongly Agree
----------------------	---	---	---	---	---	-------------------

## Teacher Sense of Efficacy

This questionnaire is designed to help us gain a better understanding of the kinds of things that create difficulties for teachers in their school activities. Please indicate your opinion about each of the statements below. Your answers are confidential.

1. How much can you do to control disruptive behavior in the classroom?

Nothing  
1            2            3            4            5            6            7            8            A Great Deal  
9

2. How much can you do to motivate students who show low interest in classroom tasks?

.Nothing  
1            2            3            4            5            6            7            8            A Great Deal  
9

3. How much can you do to get students to believe they can do well in classroom tasks?

Nothing  
1            2            3            4            5            6            7            8            A Great Deal  
9

4. How much can you do to help your students value learning?

Nothing  
1            2            3            4            5            6            7            8            A Great Deal  
9

5. To what extent can you craft good questions for your students?

Nothing  
1            2            3            4            5            6            7            8            A Great Deal  
9

6. How much can you do to get children to follow classroom rules?

Nothing  
1            2            3            4            5            6            7            8            A Great Deal  
9

7. How much can you do to calm a student who is disruptive or noisy?

Nothing  
1            2            3            4            5            6            7            8            A Great Deal  
9

8. How well can you establish a classroom management system with each group of students?

Nothing								A Great Deal
1	2	3	4	5	6	7	8	9

9. How much can you use a variety of assessment strategies?

Nothing								A Great Deal
1	2	3	4	5	6	7	8	9



### Project Construct Curriculum Questionnaire

<b>SECTION 1: I BELIEVE THAT...</b>	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
A. The costs involved in implementing Project Construct are great.	A. 1	2	3	4	5
B. Students seem less engaged when I use the Project Construct approach.	B. 1	2	3	4	5
C. Competition best prepares students for the real world.	C. 1	2	3	4	5
D. The amount of Project Construct training I have received has prepared me to implement the program successfully.	D. 1	2	3	4	5
E. Classroom activities in the Project Construct approach take too much class time.	E. 1	2	3	4	5
F. My students presently lack the skills necessary for Project Construct to be effective in my classroom.	F. 1	2	3	4	5
G. For me to succeed in using Project Construct in my classroom depends on receiving support from my colleagues.	G. 1	2	3	4	5
H. Using Project Construct is likely to create too many disciplinary problems among my students.	H. 1	2	3	4	5
I. Using Project Construct enhances my career advancement.	I. 1	2	3	4	5
J. Implementing Project Construct takes too much preparation time.	J. 1	2	3	4	5
K. Peer interaction helps students learn better.	K. 1	2	3	4	5
L. My training in Project Construct has not been practical enough for me to implement it successfully.	L. 1	2	3	4	5
M. It is impossible to implement Project Construct without specialized materials.	M. 1	2	3	4	5
N. It is difficult to assess student learning in the Project Construct approach.	N. 1	2	3	4	5
O. There isn't enough time to support student learning when I use the Project Construct approach.	O. 1	2	3	4	5
P. There are too many students in my class to use Project Construct effectively.	P. 1	2	3	4	5
Q. My students are resistant to trying classroom activities which are based on the	Q. 1	2	3	4	5

Project Construct approach.						
R. Using Project Construct interferes with student learning progress.	R.	1	2	3	4	5
S. Implementing Project Construct requires a great deal of effort.	S.	1	2	3	4	5
T. There are too many demands for change in education today.	T.	1	2	3	4	5
U. If I use Project Construct, my classroom is too noisy.	U.	1	2	3	4	5
V. In order to successfully implement Project Construct, I need support from Head Start administration	V.	1	2	3	4	5
W. The physical set-up of my classroom is an obstacle to using Project Construct.	W.	1	2	3	4	5

SECTION 2	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
A. I feel pressured by the administration to use Project Construct.	A. 1	2	3	4	5
B. I understand Project Construct well enough to implement it successfully.	B. 1	2	3	4	5
C. I have too little teaching experience to implement Project Construct successfully	D. 1	2	3	4	5
D. I feel pressured by other teachers to use the Project Construct approach.	E. 1	2	3	4	5
E. I prefer to use familiar teaching methods over trying Project Construct.	F. 1	2	3	4	5
F. I believe I am a very effective teacher.	G. 1	2	3	4	5
G. I feel a personal commitment to use Project Construct.	H. 1	2	3	4	5
H. I believe I can implement Project Construct successfully.	C. 1	2	3	4	5

I BELIEVE THAT PROJECT CONSTRUCT...					
	Strongly Disagree	Strongly Disagree	Disagree	Neutral	Agree
A. Holds bright students back.	A. 1	2	3	4	5
B. Is consistent with my teaching philosophy.	B. 1	2	3	4	5
C. Contradicts parental goals.	C. 1	2	3	4	5
D. Is a valuable instructional approach.	D. 1	2	3	4	5
E. Is appropriate for Head Start students.	E. 1	2	3	4	5
F. Places too much emphasis on developing students' social skills.	F. 1	2	3	4	5
G. Enhances students' social skills.	G. 1	2	3	4	5
H. Promotes friendship among students.	H. 1	2	3	4	5
I. Gives too much responsibility to the students.	I. 1	2	3	4	5
J. Enhances the learning of low-ability students.	J. 1	2	3	4	5
K. Is an efficient classroom strategy.	K. 1	2	3	4	5
L. Helps meet Head Starts' goals.	L. 1	2	3	4	5
M. Fosters positive student attitudes towards learning.	M. 1	2	3	4	5
N. Is too difficult to implement successfully.	N. 1	2	3	4	5
O. Would not work with my students.	O. 1	2	3	4	5
P. Is inappropriate for the students I teach.	P. 1	2	3	4	5

# **Project Construct:**

## **Early Childhood Classroom Observation Survey (PC-ECCOS)**

---

\_\_\_\_\_  
Name of Center/School

\_\_\_\_\_  
Name of Teacher(s)

\_\_\_\_\_  
Date of Observation

\_\_\_\_\_  
Name of Observer

\_\_\_\_\_  
Time Observation Began

\_\_\_\_\_  
Time Observation Ended

### **Directions**

- *It will take approximately 2 ½-3 hours to make all observations necessary to complete the PC-ECCOS.*
- *Mark the appropriate box for each item.*
- *For some items, the “Some Evidence” box is blank. This means that a “Some Evidence” response is appropriate if the evidence observed falls between the “No Evidence” and “Extensive Evidence” indicators.*
- *If you need to ask the teacher some questions to answer an item, put an “X” in the “Mark if query needed” box. Use the questions provided, when possible, to query the teacher for further information. Space is provided on these items to take notes to help document your evidence.*
- *Use the “Notes” section to document any unusual circumstances or other information that might be useful in making sense of the data.*
- *If there are multiple staff in the classroom, focus on lead teacher.*

<b>I. PHYSICAL ENVIRONMENT &amp; SCHEDULE</b>	<b>No Evidence</b>	<b>Some Evidence</b>	<b>Extensive Evidence</b>
<b>1. Labels shelves, containers, and/or supplies with symbols, pictures, and/or words</b>	<input type="checkbox"/> <i>Materials used by children are not labeled.</i>	<input type="checkbox"/> <i>Some materials used by children are labeled appropriately.</i>	<input type="checkbox"/> <i>Most materials used by children are appropriately labeled.</i>
<b>2. Stores materials so that they are freely accessible to children</b>	<input type="checkbox"/> <i>Materials not easily accessible.</i>	<input type="checkbox"/> <i>Some of the materials are easily accessible.</i>	<input type="checkbox"/> <i>All appropriate materials are freely accessible to all children.</i>
<b>3. Arranges furnishings and learning areas to encourage engagement</b>	<input type="checkbox"/> <i>Learning environment is cold, harsh. Not enough variety of furnishings/not appropriate for use by children. Furnishings are broken, worn out.</i>	<input type="checkbox"/>	<input type="checkbox"/> <i>Learning environment is attractive, inviting, with at least one well-defined cozy area. Furnishings are child-sized. Centers are located so that they do not interfere with each other.</i>
<b>4. Children have access to real objects and living things</b>	<input type="checkbox"/> <i>Children have little access to real objects and living things.</i>	<input type="checkbox"/> <i>Learning centers (or classroom in general) have some authentic objects and/or living things. Most objects/things are accessible to children.</i>	<input type="checkbox"/> <i>Learning centers (or classroom) have an extensive number of authentic objects and/or living things, as appropriate to the center—all of which are accessible to children.</i>
<b>5. Learning centers are clearly defined and provide a variety of learning experiences</b>	<input type="checkbox"/> <i>Fewer than three centers are established. Or, if at least three are defined, they are inadequate as places of learning (e.g., not enough space, not enough materials).</i>	<input type="checkbox"/> <i>At least three centers are defined and appropriately equipped. Opportunities for learning experiences at each center are adequate.</i>	<input type="checkbox"/> <i>At least five centers are defined—each of which provides a rich variety of learning experiences.</i>
<b>6. Maintains an adequate classroom library of books accessible to children</b>	<input type="checkbox"/> <i>Accessible library has less than 1 book per child.</i>	<input type="checkbox"/> <i>Accessible library has 1 book per child.</i>	<input type="checkbox"/> <i>Accessible library has more than 1 book per child.</i>
<b>7. Provides space to display children's creations</b> <i>(in classroom, hallways, etc.)</i>	<input type="checkbox"/> <i>None or very little of the display is work done by children.</i>	<input type="checkbox"/> <i>Some of the display is work done by the children.</i>	<input type="checkbox"/> <i>Most of the display is work done by the children and is displayed at their eye level.</i>
<b>Notes:</b>			

<b>II. LANGUAGE DEVELOPMENT &amp; SYMBOLIC EXPRESSION</b>	<b>No Evidence</b>	<b>Some Evidence</b>	<b>Extensive Evidence</b>
<b>8. Encourages conversations, talking things over, and exchanging opinions</b>	<input type="checkbox"/> <i>No activities or strategies used to encourage children to communicate.</i>	<input type="checkbox"/> <i>Some activities or strategies used to encourage children to communicate.</i>	<input type="checkbox"/> <i>Many activities or strategies are used, with a balance of listening and talking.</i>
<b>9. Shares own thinking processes while reading to children</b> <i>(not necessarily during read aloud, may apply to other activities)</i>	<input type="checkbox"/> <i>No sharing was observed.</i>	<input type="checkbox"/> <i>Teacher shares thinking process in a limited way. The sharing process may not be beneficial to all children.</i>	<input type="checkbox"/> <i>Teacher shares thinking in appropriate ways that clearly benefit most children.</i>

## II. LANGUAGE DEVELOPMENT & SYMBOLIC EXPRESSION (CONTINUED)

	No Evidence	Some Evidence	Extensive Evidence
<b>10. Reads aloud to children</b> (to large groups, small groups, and/or individuals)	<input type="checkbox"/> No reading aloud observed. Skip to item 13.	<input type="checkbox"/> Reads aloud at least once during observation.	<input type="checkbox"/> Reads aloud on at least two occasions.
<b>11. Reads aloud with appropriate expression</b> (Skip this item if no read aloud is observed)	<input type="checkbox"/> Expression is bored, deadpan, uninterested.	<input type="checkbox"/> Teacher reads in her natural tone of voice.	<input type="checkbox"/> Reading style is lively, entertaining, with different voices for each character.
<b>12. Encourages children to use picture cues to make meaning of text</b> (e.g., environmental print)	<input type="checkbox"/> Teacher does not help children use picture cues to "read" texts.	<input type="checkbox"/> Teacher shows some evidence of helping children to use picture cues; or, her efforts could be more developmentally appropriate.	<input type="checkbox"/> Teacher points out the value of picture cues and how they can be used (e.g., discusses environmental print). Classroom things are labeled with pictures and words.
<b>13. Supports experimentation with sounds of language</b> (e.g., rhythm, rhyme, alliteration; children's experimentation can occur in the context of songs/music)	<input type="checkbox"/> Teacher does not encourage or elaborate upon children's use of language.	<input type="checkbox"/> A few activities are used to encourage experimentation with language sounds.	<input type="checkbox"/> Several developmentally appropriate activities are used to support experimentation with language.
<b>14. Provides activities in which children listen to differences and similarities in consonants, vowels, and words</b> (e.g., finger plays, rhyming games, "cat-bat")	<input type="checkbox"/> No activities provided or they are not developmentally appropriate.	<input type="checkbox"/> Some activities are provided; or, activities are not as developmentally appropriate or as authentic as they could be.	<input type="checkbox"/> Teacher engages in authentic, appropriate activities that help children distinguish the sounds of consonants, vowels, and words.
<b>15. Provides activities in which children attend to visual differences and similarities in letter combinations</b> (e.g., during daily message, points out letters)	<input type="checkbox"/> No activities provided or they are not developmentally appropriate.	<input type="checkbox"/> Some activities are provided; or, activities are not as developmentally appropriate or as authentic as they could be.	<input type="checkbox"/> Teacher engages in authentic, appropriate activities that help children attend to visual differences and similarities in letter combinations.
<b>16. Provides functional contexts for reading and writing</b> (e.g., labels, daily messages, notes, lists; or taking dictation and reading the text together)	<input type="checkbox"/> No activities provided or they are not developmentally appropriate.	<input type="checkbox"/> Some activities are provided; or, activities are not as developmentally appropriate or as authentic as they could be. Or, if no activity is observed, there is some evidence around the room that this occurs.	<input type="checkbox"/> Teacher engages children in authentic activities that relate to reading and writing. Or, if no specific activity is observed, there is ample evidence around the room of authentic child-produced (or teacher-and-child-produced) texts.
<b>17. Encourages children to write for real purposes</b> (e.g., signs, notes to parents or friends, journals; for preschoolers, this may include drawings, maps)	<input type="checkbox"/> Children engaged in writing activities that are not authentic or functional. Or, children are not provided with any writing opportunities.	<input type="checkbox"/> Teacher makes some effort to create learning experiences in which children must create text for authentic purposes.	<input type="checkbox"/> Teacher creates rich learning experiences that allow children numerous opportunities to write for authentic reasons.

Mark if query needed	<b>18. Writes down and reads back children's ideas</b> <i>(on an individual basis, such as during pretend play; may be posted around the classroom)</i> <ul style="list-style-type: none"> <li>• “Do you help children write by having them dictate to you their ideas and you write them down and read them back?”</li> <li>• “Do you have an example of this?”</li> <li>• “About how often does this occur?”</li> </ul>	<input type="checkbox"/> If not observed, query teacher. <i>Teacher does not do this or does not have an example to share.</i>	<input type="checkbox"/> <i>Occurs at least once during observation. Or, there is some evidence around room that this occurs. Or, after producing an example, teacher says that she does this occasionally.</i>	<input type="checkbox"/> <i>Occurs more than once during observation. Or, there is a lot of evidence around the room that this occurs. Or, after producing an example, teacher says that she does this often.</i>
	<b>19. Supports children's experimentation with writing</b> <i>(e.g., provides plenty of writing materials, validates their scribbles and attempts at writing)</i>	<input type="checkbox"/> <i>Insufficient or inappropriate writing materials. Or, emphasis on correct letter formation.</i>	<input type="checkbox"/> <i>Children have access to appropriate writing materials. Teacher is inconsistent in her encouragement of writing experimentation (e.g., gives children freedom to write but emphasizes correct letter formation).</i>	<input type="checkbox"/> <i>Ample evidence (e.g., via observation and/or displays around room) that children's experimentation with writing is valued.</i>
<b>II. LANGUAGE DEVELOPMENT &amp; SYMBOLIC EXPRESSION (CONTINUED)</b>				
		<b>No Evidence</b>	<b>Some Evidence</b>	<b>Extensive Evidence</b>
	<b>20. Encourages children to express themselves through various forms of music, art, pretend play, and movement</b> <i>(e.g., write or sing an original song, act out a story, paint a picture)</i>	<input type="checkbox"/> <i>No symbolic expression activities are observed. Or, children are engaged in symbolic expression activities that are not authentic or functional (e.g., teacher-directed activities that do not allow for choice).</i>	<input type="checkbox"/> <i>Some symbolic expression activities are observed.</i>	<input type="checkbox"/> <i>Teacher creates rich learning experiences that allow children numerous opportunities to engage in symbolic expression.</i>
	<b>21. Includes literacy activities at various times throughout the day</b> <i>(Focus here is on the frequency of activities; individual, small-group, and large-group activities count here)</i>	<input type="checkbox"/> <i>Teacher provides few literacy activities.</i>	<input type="checkbox"/> <i>Teacher includes literacy to some degree throughout the observation period.</i>	<input type="checkbox"/> <i>Teacher makes an effort to provide literacy activities and to link literacy to all activities throughout the observation period.</i>
<b>NOTES:</b>				

### III. MATHEMATICAL & SCIENTIFIC THINKING

	No Evidence	Some Evidence	Extensive Evidence
<b>22. Encourages children to act on objects to produce effects</b> <i>(e.g., floating/sinking objects, using ramps, aiming activities, mixing paints)</i>	<input type="checkbox"/>  <i>There is no science/physical knowledge center. Or, no science/physical knowledge activities are observed.</i>	<input type="checkbox"/>  <i>Some science/physical knowledge activities are observed. Or, center has requisite materials. Or, some evidence that such activities have occurred (e.g., child-constructed ramp or sink-and-float chart are visible).</i>	<input type="checkbox"/>  <i>Teacher is observed actively encouraging children to act on objects and appropriately facilitates their learning process.</i>
<b>23. Encourages children to make predictions, test hypotheses, and evaluate their predictions</b>	<input type="checkbox"/>  <i>Teacher tells children what will occur (rather than allowing them to test their own predictions). Or, teacher does not encourage the inquiry process.</i>	<input type="checkbox"/>  <i>Teacher directs group of children to make predictions, test hypotheses, and/or evaluate their predictions—without individual follow-up, guidance, or feedback.</i>	<input type="checkbox"/>  <i>Teacher follows up with individuals or small groups and actively facilitates the process.</i>
<b>24. Uses manipulatives to help children develop mathematical understanding</b>	<input type="checkbox"/>  <i>No developmentally appropriate manipulatives are accessible.</i>	<input type="checkbox"/>  <i>Children have access to some developmentally appropriate manipulatives.</i>	<input type="checkbox"/>  <i>Teacher works with children as they use manipulatives to facilitate development of math concepts.</i>
<b>25. Provides opportunities for children to develop number concepts through everyday experiences</b> <i>(e.g., graphing classmates' heights, lunch count)</i>	<input type="checkbox"/>  <i>No activities are provided that facilitate development of number concepts.</i>	<input type="checkbox"/>  <i>Some activities are provided. Or, activities are not as developmentally appropriate or as authentic as they could be.</i>	<input type="checkbox"/>  <i>Teacher engages children in authentic activities that relate to number concepts and actively facilitates children's development by working with individuals/small groups.</i>
<b>26. Uses games to help children develop mathematical concepts</b> <i>(e.g., board games, card games, group games, teacher-made games)</i>	<input type="checkbox"/>  <i>No game playing observed. Or, games are not readily accessible to children.</i>	<input type="checkbox"/>  <i>A variety (three or more) of games are accessible to children. Or, children play games, but teacher does not interact with them to develop math concepts.</i>	<input type="checkbox"/>  <i>Teacher interacts with children while they are playing (or plays with them) in order to facilitate development of math concepts.</i>
<b>NOTES:</b>       			

### IV. SOCIAL & PERSONAL DEVELOPMENT

	No Evidence	Some Evidence	Extensive Evidence
<b>27. Facilitates the development of social skills to build community</b> <i>(e.g., cooperating, helping, negotiating, talking with others)</i> <i>(If no specific teacher behaviors are observed, then rate the quality of children's interactions.)</i>	<input type="checkbox"/>  <i>When social problems arise, teacher solves them, rather than children. Little evidence of classroom community.</i>	<input type="checkbox"/>  	<input type="checkbox"/>  <i>Teacher actively encourages children to use their own social skills to build community (i.e., help each other, cooperate, negotiate).</i>
<b>28. Encourages children to be empathetic and responsive to others' feelings and needs</b> <i>(If no specific teacher behaviors are observed, then rate the quality of children's interactions.)</i>	<input type="checkbox"/>  <i>Teacher provides no modeling; does not facilitate discussion of feelings/needs; does not acknowledge feelings/needs.</i>	<input type="checkbox"/>  	<input type="checkbox"/>  <i>Teacher appropriately models empathy and active listening. Teacher actively encourages children to respond to others appropriately.</i>
<b>29. Supports children in resolving their own conflicts</b>	<input type="checkbox"/>  <i>During conflicts, teacher acts as judge rather than facilitator.</i>	<input type="checkbox"/>  	<input type="checkbox"/>  <i>Teacher actively helps children to use appropriate conflict resolution processes to resolve problems. Or,</i>



Mark if query needed	<b>30. Provides opportunities for children to interact with others</b>	<input type="checkbox"/>	<input type="checkbox"/>	<i>no conflicts are observed.</i>
		<i>Very little interaction among children is observed. Or, teacher exerts a great deal of control over interactions (as a management strategy).</i>	<i>Children actively interact as directed by teacher (not on their own terms). Or, there is some evidence that teacher allows only certain interactions.</i>	<i>Children interact freely as appropriate during the observation period.</i>
	<b>31. Provides opportunities for children to share their learning with others</b> (e.g., sharing during circle time or class meetings, encourages a child to explain something to another child)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		<i>No evidence of sharing learning is observed.</i>	<i>One clear example of sharing is observed.</i>	<i>More than one example of sharing is observed.</i>
	<b>32. Classroom rules were devised by children and reflect their language</b> • “How do you establish classroom rules?”	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		<i>If not observed, query teacher. No classroom rules are established.</i>	<i>Classroom rules do not reflect children's language or input in an obvious way.</i>	<i>Classroom rules use children's language and reflect the context of the specific classroom.</i>
<b>NOTES:</b>				

<b>V. CONSTRUCTIVIST TEACHING PRACTICES</b>	<b>No Evidence</b>	<b>Some Evidence</b>	<b>Extensive Evidence</b>
<b>33. Allocates substantial time daily for children to choose among learning centers</b> (“Substantial time” = 45 minutes daily uninterrupted; exact time not required, indicators are guidelines)	<input type="checkbox"/> <i>Learning center choice time is less than 20 minutes.</i>	<input type="checkbox"/> <i>Learning center choice time is between 20 and 45 minutes.</i>	<input type="checkbox"/> <i>Learning center choice time is at least 45 minutes.</i>
<b>34 Uses children's curiosity and desire to make sense of their worlds to motivate their learning</b> (as opposed to external rewards, e.g., stickers, candy, contests)	<input type="checkbox"/> <i>Little evidence that teacher makes use of intrinsic motivation (children's interests).</i>	<input type="checkbox"/> <i>Teacher relies on both extrinsic and intrinsic sources to motivate children's learning.</i>	<input type="checkbox"/> <i>Teacher provides rich learning experiences that allow children numerous opportunities to explore their own interests. No evidence of using extrinsic motivators.</i>
<b>35. Recognizes and accepts children's attempts and approximations</b>	<input type="checkbox"/> <i>Teacher corrects cognitive errors (those NOT based on conventional knowledge).</i>	<input type="checkbox"/>	<input type="checkbox"/> <i>Teacher accepts children's attempts and errors; asks questions or probes to further children's thinking.</i>
<b>36. Encourages children to identify and solve their own problems</b> (e.g., sink-and-float, how to keep a block structure from falling down, how to fairly distribute snacks; emphasis is on cognitive problems)	<input type="checkbox"/> <i>No evidence that teacher empowers children to address their own questions or problems.</i>	<input type="checkbox"/>	<input type="checkbox"/> <i>Teacher actively encourages children to pose their own questions and problems. Teacher may ask additional clarifying questions or suggest ways to encourage children to discover the answer on their own.</i>

<b>V. CONSTRUCTIVIST TEACHING PRACTICES (CONTINUED)</b>	<b>No Evidence</b>	<b>Some Evidence</b>	<b>Extensive Evidence</b>
<b>37. Shares own enthusiasm for learning</b>	<input type="checkbox"/> <i>Teacher provides no modeling of questioning/wondering. Or, does not exhibit any curiosity about the world/classroom environment.</i>	<input type="checkbox"/>	<input type="checkbox"/> <i>Teacher appropriately shares her own questioning/wondering process. Shows curiosity and love of inquiry.</i>
<b>38. Provides opportunities for children to make connections to their lives outside of class</b> (e.g., during read aloud, class meetings)	<input type="checkbox"/> <i>Teacher does not provide opportunities for children to make</i>	<input type="checkbox"/> <i>Teacher allows time for such connections but may not help children</i>	<input type="checkbox"/> <i>Teacher encourages children to make meaningful connections to</i>

	<i>such connections.</i>	<i>to make meaningful connections.</i>	<i>their outside lives.</i>
<b>39. Asks open-ended questions to facilitate children's involvement and understanding</b> (e.g., What were you thinking when you did ____? How did you do ____? What do you think will happen if ____?)	<input type="checkbox"/> <i>Teacher uses mostly closed (yes/no) questions when interacting with children.</i>	<input type="checkbox"/> <i>Teacher uses a mix of closed and open-ended questions.</i>	<input type="checkbox"/> <i>When appropriate, teacher almost exclusively uses open-ended questions.</i>
<b>40. Recognizes and takes advantage of the teachable moment</b> (e.g., uses every day events to explore nature/science concepts; adds materials to a center to promote further exploration; brings a book to a child to support his/her inquiry)	<input type="checkbox"/> <i>No evidence that teacher takes advantage of teachable moments.</i>	<input type="checkbox"/> <i>Teacher shows some awareness of teachable moments during the day and makes use of them.</i>	<input type="checkbox"/> <i>Teacher is consistently making use of teachable moments throughout the day.</i>
<b>41. Provides opportunities for children to relate what they are learning to their prior knowledge</b>	<input type="checkbox"/> <i>Teacher does not provide appropriate opportunities or does not acknowledge the role of prior knowledge.</i>	<input type="checkbox"/> <i>Teacher provides some opportunities but may not help children in the most appropriate ways to make meaningful connections to prior knowledge.</i>	<input type="checkbox"/> <i>Teacher actively encourages children to make meaningful connections to their prior knowledge and experiences.</i>
<b>42. Shares own thinking while solving a problem</b>	<input type="checkbox"/> <i>Teacher does not share her own thinking process while solving a problem.</i>	<input type="checkbox"/> <i>Teacher shares her own thinking process in ways that may not be as developmentally appropriate as possible.</i>	<input type="checkbox"/> <i>Teacher appropriately shares her own thinking process while solving problems.</i>
<b>43. Provides time for children to respond to questions</b> (i.e., wait time)	<input type="checkbox"/> <i>Teacher allows almost no time for children to respond to questions.</i>	<input type="checkbox"/> <i>Teacher shows some awareness of the importance of wait time but sometimes provides answers too quickly.</i>	<input type="checkbox"/> <i>Teacher allows appropriate and adequate amount of wait time.</i>
<b>44. Allows children to experience natural consequences (keeping safety considerations in mind)</b> (e.g., children clean up after themselves)	<input type="checkbox"/> <i>Teacher controls children's behaviors, not allowing them to make mistakes or messes.</i>	<input type="checkbox"/> <i>Teacher shows some willingness to allow children to experience natural consequences, but there are some instances in which she does not allow this to occur.</i>	<input type="checkbox"/> <i>Teacher shows a clear commitment to allowing children to experience natural consequences as an important path towards autonomy.</i>
<b>45. Confers with individuals and small groups</b> (e.g., talks one on one with child while he is solving a puzzle)	<input type="checkbox"/> <i>No conferring with individual children or small groups.</i>	<input type="checkbox"/> <i>Teacher makes some effort to confer with individuals or small groups.</i>	<input type="checkbox"/> <i>Teacher spends a great deal of instructional time conferring.</i>
<b>46. Encourages children to make choices</b> (e.g., themes, activities, books)	<input type="checkbox"/> <i>Teacher shows propensity to make choices for children (e.g., directs children looking for direction rather than exploring their own choices).</i>	<input type="checkbox"/> <i>Teacher provides some opportunities.</i>	<input type="checkbox"/> <i>Teacher provides numerous opportunities for children to make choices throughout the day.</i>
<b>47. Encourages and supports children in learning through play</b>	<input type="checkbox"/> <i>Play time is limited. Teacher does not facilitate learning during play.</i>	<input type="checkbox"/> <i>Teacher allows some play but does not take full advantage of the learning opportunities inherent in play.</i>	<input type="checkbox"/> <i>Teacher allows adequate play time and is an active facilitator during play time.</i>

## V. CONSTRUCTIVIST TEACHING PRACTICES

(CONTINUED)

		No Evidence	Some Evidence	Extensive Evidence
	<b>48. Teaches basic knowledge and skills within a meaningful context</b> (e.g., teaches colors, shapes, numbers, letters in authentic way, such as discussing colors while reading a book, talking about shapes they observe in the outdoor play area)	<input type="checkbox"/> <i>Teacher focuses on isolated skills without a meaningful context (e.g., uses worksheets to practice correct letter formation).</i>	<input type="checkbox"/>	<input type="checkbox"/> <i>Teacher takes advantage of authentic contexts to teach basic knowledge and skills.</i>
Mark if query needed	<b>49. Allocates time for class meetings and discussions</b> <ul style="list-style-type: none"> <li>• “Do you have regular class meetings?”</li> <li>• “How often do you have them?”</li> <li>• “What do you see as the purpose of class meetings?”</li> </ul>	<input type="checkbox"/> If not observed, query teacher.  <i>No evidence for class meetings and/or discussions.</i>	<input type="checkbox"/> <i>Class meetings and/or discussions occur, but teacher does not take full advantage of them for learning purposes.</i>	<input type="checkbox"/> <i>Class meetings and discussions are an integral part of the day. Teacher effectively uses them as both community building and learning experiences.</i>
	<b>50. Analyzes children's answers for evidence of thinking patterns</b>	<input type="checkbox"/> <i>Teacher focuses only on whether answer is correct or incorrect. Teacher shows no evidence of planning interventions given the pattern of children's responses.</i>	<input type="checkbox"/> <i>Some of the teacher's interventions are linked to the thinking patterns she observes.</i>	<input type="checkbox"/> <i>Teacher consistently uses evidence of children's thinking to drive her interventions.</i>

	<b>51. Maintains balance between child's need to explore independently and own input into learning</b> <i>(e.g., child is allowed to discover her block building is unbalanced when it falls)</i>	<input type="checkbox"/> <i>Teacher allows very little independent exploration (e.g., tells children what they need to know or do, corrects students before they make errors). Or, teacher does not provide enough input when appropriate (e.g., allows child to make repeated conventional knowledge errors).</i>	<input type="checkbox"/>	<input type="checkbox"/> <i>Teacher acts as a facilitator of knowledge, providing input when appropriate. Teacher allows children to explore on their own.</i>
	<b>52. Structures transitions to run smoothly and encourage learning</b>	<input type="checkbox"/> <i>Children have to wait for long periods of time during transitions between events. Teacher has no obvious method of facilitating transitions.</i>	<input type="checkbox"/> <i>Transitions are smooth (e.g., has materials ready for next activity before current one ends, uses transition rhymes) and do not interrupt the flow of daily events.</i>	<input type="checkbox"/> <i>Transitions are smooth and, when appropriate, incorporate learning elements.</i>
Mark if query needed	<b>53. Incorporates students' cultures into classroom materials and practices</b> <i>(e.g., holiday celebrations, family activities, books, dolls, posters, field trips, special guests, family newsletter translated in Spanish)</i> <ul style="list-style-type: none"><li>• "Do you use any activities to help children understand the variety of people in your classroom and the world?"</li><li>• "Please give me some examples."</li></ul>	<input type="checkbox"/> <i>No evidence that teacher acknowledges cultural differences among students.</i>	<input type="checkbox"/>	<input type="checkbox"/> <i>Daily routines, activities, and/or materials reflect the diverse cultures of the children in the classroom (e.g., ethnic foods are a regular part of snack time; music from different cultures played during music time).</i>
Mark if query needed	<b>54. Engages children in outdoor learning experiences</b> <i>(e.g., playing with balls, climbing, bikes, nature experiences)</i> <ul style="list-style-type: none"><li>• "What kinds of outdoor learning experiences do children have?"</li></ul>	<input type="checkbox"/> <i>If not observed, query teacher. No evidence of outdoor learning experiences.</i>	<input type="checkbox"/> <i>Children have some (3-5) outdoor learning activities.</i>	<input type="checkbox"/> <i>Children have a variety (more than 5) outdoor learning activities.</i>
<b>NOTES:</b>				

## VI. ASSESSMENT

		No Evidence	Some Evidence	Extensive Evidence
Mark if query needed	<b>55. Posts the Project Construct Goals for Early Childhood Students in the classroom</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		<i>Goals not posted.</i>	<i>Goals posted but not easily seen or used by staff.</i>	<i>Goals are posted so that they are easily used (e.g., in a central location or in each center).</i>
	<b>56. Uses a performance-based assessment system to plan instruction</b> (e.g., anecdotal records, dated student work samples)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<ul style="list-style-type: none"> <li>“Do you have an assessment system?”</li> <li>“Please describe how your system works.”</li> <li>“What do you do with assessment information?”</li> </ul>	<p>If no assessment activities are observed, query teacher.</p> <p><i>No evidence that a performance-based assessment system is used.</i></p>		<i>Teacher takes frequent anecdotal records and uses that information to plan whole-group activities, as well as to individualize instruction appropriately.</i>
<b>NOTES:</b>				

*Items 57-59 require queries.*

QUERIES		No Evidence	Some Evidence	Extensive Evidence
(Language Development & Symbolic Expression)	<b>57. Maintains an adequate classroom library of books available to children</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<p>(at least 10 books per child, including a variety of genres)</p> <ul style="list-style-type: none"> <li>“Do you have other books that aren’t displayed?”</li> <li>“About how many?”</li> </ul>	<i>Available library has fewer than 5 books per child.</i>	<i>Available library has 5-10 books per child.</i>	<i>Available library has at least 10 books per child.</i>
(Constructivist Teaching Practices)	<b>58. Has an established system for regularly communicating with parents using a variety of methods</b> (e.g., notes, newsletters, phone calls, conferences, home visits)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<ul style="list-style-type: none"> <li>“Do you and the parents share information about the children?”</li> <li>“How is this done?”</li> <li>“About how often do you communicate with parents?”</li> </ul>	<i>Teacher does not provide parents with information about the program or the progress of their children.</i>	<i>Teacher provides administrative information about the program in writing (e.g., schedule changes, fees, etc.). Sharing of child-related information only occurs at the parents’ request.</i>	<i>Much sharing of child-related information between parents and teacher using a variety of methods (e.g., frequent informal communications, conferences, newsletters). Sharing is done on a regular basis.</i>

(Constructivist  
Teaching  
Practices)

59. Collaborates and learns from colleagues			
<ul style="list-style-type: none"><li>• “Do you have opportunities to share information about the children and teaching with colleagues?”</li><li>• “How often does this occur?”</li><li>• “What kinds of things do you talk about?”</li></ul>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<i>Teacher does not collaborate or indicates that she has no opportunities to learn from others.</i>	<i>Teacher indicates that she has some collaborative interactions with colleagues.</i>	<i>Teacher regularly collaborates with others and indicates that she is open to learning from others.</i>
NOTES:			

## Appendix D

### PARENT CONSENT LETTER

Dear Parent:

Your child's teacher has agreed to participate in a research study that will be conducted at his/her school this year. The study is about how teachers' beliefs influence what they do in the classroom. While your child is not the focus of this study, this letter is provided to inform you that researchers will be observing your child's classroom for about 3 hours.

The researcher for this project is Denise Kay. Ms. Kay is conducting this study to fulfill requirements for her doctoral degree. While Ms. Kay may publish the overall results of the study, information that may identify teachers or students in the study will not be included.

Your child's standing with KCMSD Head Start will not be affected should you decide you do not want your child to be present when Ms. Kay observes the classroom or do not want your child's scores to be included in the classroom information provided to Ms. Kay. If you have questions about this study, contact Denise Kay at (816) 200-3739 or [dkkq8@mizzou.edu](mailto:dkkq8@mizzou.edu) or Dr. Jessica Summers at (573) 885-9733 or [summersje@missouri.edu](mailto:summersje@missouri.edu).

If you give permission for your child to participate in classroom sessions that are observed as part of the study, but later decide that you no longer want your child to participate, you may notify Ms. Kay or your child's teacher in writing that you do not want your child to participate in the study. If you feel your child is being harmed in any way as a result of this project, let Ms. Kay know or contact the Institutional Review Board at the University of Missouri – Columbia at (573) 882-9585.

### Signature of Consent

I agree to allow my child to be present when Ms. Kay observes his or her classroom. I understand that observers may collect information that constitutes personally identifiable information about my student, but this personally identifiable information about my child will not be included in published study results.

Student Name: \_\_\_\_\_  
(Please print)

Name: \_\_\_\_\_  
(Please print)

Signature: \_\_\_\_\_

I do not agree to allow my child to be present when Ms. Kay observes his or her classroom.

Student Name: \_\_\_\_\_  
(Please print)

Name: \_\_\_\_\_  
(Please print)

Signature: \_\_\_\_\_



## Appendix E

### Guiding Questions

#### Sample

1. How do you decide what activities to do in your classroom each day?
2. Is there ever a gap between what you expected or planned to happen with a lesson or activity and what actually happened?
  - a. Get an example
  - b. Probe what teachers attribute the difference to
3. When did you complete the Project Construct training?
  - c. What were your first impressions of Project Construct when you were first introduced to the program?
  - d. your impressions about Project Construct changed since you went through the training and had a chance to implement some of the ideas?
4. What do you think has the greatest influence on what you decide to do in your classroom?
5. Is there anything else you think would be important for me to know or that you would like to share?

Appendix F

<b>EARLY CHILDHOOD EDUCATION TEACHERS’ MENTAL MODELS BASIC ASSUMPTIONS</b>		
<b>Lesson planning &amp; implementation</b>	LIG	HIG
Lesson plans and should be based on student’s individual <i>needs</i> . The process and outcome of implementing lessons should be student mediated.		1
Lesson plan are based on themes. Themes and lessons should be selected based on student’s <i>needs</i> and <i>interests</i> .	1	1
Lesson plans and themes should be based on students’ <i>interests</i> and implementation and outcomes should be <i>mediated by students</i> .		1
Lesson plans should combine student <i>interest/preference</i> and <i>learning goals</i>	1	
Themes for lesson plans should be pre-determined but the process and outcome of implementation should be <i>mediated by student</i> engagement	1	
Themes and lesson plans should be based on what “we know children need to know”	2	
Constructs that students don’t know need to be integrated into lesson plans as themes	1	
Parent feedback and concerns should influence lesson plans and classroom activities	1	3
<b>Student Behavior</b>		
Students need to behave appropriately before teacher can proceed with lessons. Behavior management and instruction are managed separately	1	1
Students will remember the rules better if they help create them	1	
Inappropriate behavior can be redirected by engaging students in new or interesting tasks		1
Students should be given opportunities to redirect their own behavior and these opportunities are opportunities to teach and reinforce self-regulation		1

<b>Personal Development</b>		
Teacher should model self-directed learning		1
Giving students' opportunities to make choices fosters responsibility.	1	
<b>Student characteristics and abilities</b>		
Students in Head Start classrooms are at different levels developmentally	3	3
Students have different levels of knowledge, skills, abilities and interests	2	2
Students can symbolically represent & express	2	2
Students' work is real to them, despite how it appears to teachers	1	
Students should experience the classroom as physically, emotionally and cognitively safe.		2
Young children can comprehend and recall stories	1	3
Students can learn to work as a team		1

<b>Teacher/ Student Interactions</b>		
Asking children open-ended questions gives them an opportunity to express their feelings	1	
Asking students questions can shape students learning	1	3
Asking students questions can help the teacher assess student understanding/comprehension		3
It is important for teacher to interact with children during their work time	1	2
Interacting with students gives teacher opportunity to assess students' learning needs		1
Interacting with students gives teacher opportunity to assess students' interest		1
Interacting with students gives opportunity to work on skill and knowledge deficits		1
Teachers need to look for and take advantage of teachable moments		1
Teachers should help children think and problem solve		1
Teachers can introduce challenges, into students' play and work, that encourage the exploration of cause and effect relationships.		1
Teachers should encourage children to attach meaning to their work by asking them to talk about it.		1
Teachers interactions with student can communicate expectations regarding behavior in the classroom		1

<b>Learning</b>		
Students learn through imitation	1	1
Students learn by playing	2	1
Students construct their own knowledge		1
Student engagement is an indication of student understanding. If students do not engage and/or cease to engage, it could be that they are not interested or the task is too difficult	1	2
Teachers have to flexible and adjust their lessons and outcome goals based on student interest, ability or the direction students take the activity	1	3
Physical environment of the classroom influences student learning	3	1
The teacher is a role model and is teaching all the time. Her attitude influences the classroom	1	2
Learning should be progress as the year progresses so that new constructs and skills build on constructs and skills taught earlier in the year	1	
How well the teaching team gets along and works together can impact students' classroom experiences.	1	2
Learning should be fun	1	
Learning is enhanced by giving students opportunities to make associations and connections.	2	1
Attendance influences student learning	1	
Parents can influence student learning	2	
Students can learn vicariously	1	
Storage and recall can be enhanced by review	2	2
Students should have ownership and have opportunities to be self-directed in their learning.		1
<b>Peer Learning</b>		
More advanced peers can assist students who are less advanced or struggling	1	1
Peers can help to maintain the cultural and behavioral expectations of the classroom		1
Peers challenge each others beliefs and assumptions		1

## VITA

Denise Kay was born in Troy, Ohio but spent most of early childhood and pre-adolescent years in Fort Recovery, Ohio. A preacher's kid, Denise's parents moved to Merrillville, Indiana when she was 13 and the family remained there until Denise graduated from Merrillville High School.

A true believer in education, Denise has attended post-secondary and graduate school at Point Loma University in San Diego, CA, Mid-America Nazarene University in Olathe, KS (B.A.) University of Missouri – Kansas City (M.A.) and University of Missouri – Columbia. She is a Licensed Professional Counselor in the state of Missouri, is a clinical member of the American Association of Marriage and Family Therapy and a certified World Instruct Trainer School fitness trainer. Prior to her doctoral work, Denise worked for eight years as a counselor working with individuals, couples and families. She plans to pursue a career in academia upon completion of her doctoral program.