Spring 1998

Reconceptualizing early childhood preservice teacher education: A pedagogy of collaborative inquiry

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RECONCEPTUALIZING EARLY CHILDHOOD PRESERVICE

TEACHER EDUCATION:

A PEDAGOGY OF COLLABORATIVE INQUIRY

BY

MARY JANE MORAN

B.S., University of Tennessee, 1975
M.S., University of Tennessee, 1976

DISSERTATION

Submitted to the University of New Hampshire
in Partial Fulfillment of
the Requirements for the Degree of

Doctor of Philosophy

in

Education

May, 1998
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Date April 7, 1998
DEDICATION

To my daughter, Caitlin, my husband, John,
and the teachers and students with
whom I teach and learn.
ACKNOWLEDGEMENTS

The writing and conceptualization of this dissertation bears the traces of many people. True to the theme of this work is my collaboration with students, teachers, staff, and mentors as I have become a novice researcher and better teacher. It is with sincere appreciation and gratitude that I acknowledge many of these people.

I want to begin by thanking the students I teach, in particular, the participants in this study. Through their experiences and their willingness to share those experiences with me, their voices are, in my opinion, the most compelling component of this work. I have gained new insights into my practice, my beliefs, and my values about good teaching as a result of teaching and learning with Hannah, Kaitlin, Mary, Nancy, Leah, and Alice.

My practice as a teacher and researcher has been continually supported (and tolerated, at times) by the teachers with whom I work at the Child Study and Development Center. There were numerous occasions when their words of encouragement, their interests in my ideas, and their beliefs that my work is worthy, were instrumental in moving me forward. I have been bolstered especially by Professor Kathleen McCartney, my administrative partner at the Center, who for the past two years has offered guidance and helped create the necessary space and time for me to complete this work. Finally, I want to thank Marion Ransom, our secretary, for many hours of editing and her unfailing support.
I greatly appreciate the technical assistance I have received from talented professionals within the university community. The photographs and children's drawings were important images to include and were carefully reproduced by photographer, Douglas Prince. Videographer, Michael Gillett, created a cameo of the water project on video tape which captured the developing relationships and emerging collaborative inquiry among teachers and children. I want to especially thank Micki Canfield, administrative secretary for the Department of Education, for her patience, talent, and willingness to work late and long hours to format this document. I am indebted to the expertise of Rick Barton, Professor of Education, who met with me numerous times, guided and informed the development of my quantitative analysis, and was always willing to explain, one more time, the many nuances of cluster analysis.

I want to especially thank the members of my dissertation committee for their guidance, knowledge, and genuine interest in me and my work. This work is deeply personal to me because it is as much about my becoming as it is about young teachers-in-the-process-of-becoming. From my earliest days as a doctoral student, Professor Charlie Ashley has "been in my corner." I thank him for believing in me, his wise counsel, and his commitment to those of us who have participated in this Ph.D. program. Professor Nodie Oja gave me my first opportunity to engage in collaborative research which in turn contributed to the conceptualization of this study. I thank her for her enthusiasm for my work, her sharp editing eye, and the many times she has opened her library to me. Professor

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Paula Salvio gently prodded me to take risks, embraced my ideas, and found ways to extend them. I am deeply grateful for our many conversations from which these ideas were nurtured and framed so that I might pursue them. I appreciate the contributions of Professor John Nimmo, in particular, his encouragement to reveal the experiences of preservice teachers through my depiction of classroom scenes. Equally important to me was his support for the integration of my role as the teacher educator within these scenes so that I might reveal the learning and teaching of both my students and myself.

My process of becoming a novice researcher and better teacher is deeply and directly linked to my advisor and mentor, Professor Rebecca S. New. Without question, the quality of the conceptualization and writing of this research could not have been accomplished without Becky's continued encouragement, commitment to high standards, and unfailing belief in it's value. I thank her for her hours of reading, editing, and guiding every aspect of this work. I also thank her for opening many doors for me in the field, for encouraging me to always do a little better, and finding ways to ensure that it happens. I will always be grateful to her for inspiring me, for willingly sharing her wealth of knowledge with me, and for mirroring my words and thoughts in an effort to provoke the best work that I can produce.

And finally, I will be eternally indebted to the support and love I have received from so many friends and family members. The women of the mountains, comprised of women who have made this
journey with me since 1992, have been stalwart in their support and have shared much good humor as we have learned to laugh at ourselves and seek a balance in our lives. I am fortunate to belong to two women's groups. Friends from both of these communities have tolerated my absences and have sent cards and made phone calls to convey their support, as well as my mother, sister, and lifelong friend, Ella Kay. For all of their kind words, their assurances, and their loyalty to sustaining our relationships, I am grateful.

When I began my studies in 1991, my daughter, Caitlin, was only 10 years old and now she is a young woman. Throughout these years, she has been my champion, my constant and undying supporter—and I might add—the creator of all the tables and graphs in this thesis. We have shared many nights together studying and commiserating over papers we need to write and books we must read. These shared experiences have been one of the many bright lights along the way and I will always look back on these years with her along side me. I want to thank my partner and husband, John, for never doubting for a minute that I would finish this task, for cooking for me and caring for the many needs of our family while I worked in my study. I especially want to thank John for participating in hours of conversation with me about my challenges, my ideas, and my hopes for creating work that makes a contribution to the field of early childhood teacher education. For all of you and for your many contributions, I thank you.
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ABSTRACT

RECONCEPTUALIZING EARLY CHILDHOOD PRESERVICE TEACHER EDUCATION: A PEDAGOGY OF COLLABORATIVE INQUIRY

by

Mary Jane Moran
University of New Hampshire, May, 1998

This study describes changes in thinking and practice among 24 early childhood preservice teachers as they move away from a reliance on traditional interpretations of child-centered curricula and developmentally appropriate practices toward one of collaborative inquiry. Participants enrolled in a 15 week undergraduate teaching methods course were assigned to teaching teams to implement collaborative projects with the same group of three to five year-old children.

Traditionally, early childhood teacher education has been influenced by developmental theory which emphasizes processes of children’s learning. And yet, teachers typically learn to teach from a transmission orientation with perspectives provided by experts rather than from a position of inquiry. This study describes a reconceptualization of teacher education informed by key tenets of social constructivist theory, reflective practice and teacher research, and the implementation of collaborative projects as popularized by the preprimary schools of Reggio Emilia, Italy. This study is the first
to integrate these three components to create an environment in which there is congruency between the processes through which teachers construct knowledge and those which characterize children's construction of knowledge.

The study utilized both quantitative and qualitative measures to assess conceptual level, changes in reflectivity, and the use of advanced interpretations of developmentally appropriate practices associated with inquiry-oriented teaching. Results suggest that the emergence of collaborative inquiry among preservice teachers is a dynamic and diverse process not readily assessed by static measures or discreet skills. Findings from the qualitative analyses both challenged and explained some of the findings from the quantitative portions of the study. The metaphor of "portraiture" was utilized to describe team meetings and classroom practices as they constituted an environment for adult learners.

In this study, experiences were shared and meanings socially constructed through the use of discourse and tools within recursive cycles of reflection and teaching, each of which drew upon and contributed to a complex web of relationships. This reconceptualization of preservice teacher education requires an expanded concept of professional competence and what is meant by good teaching to include an emphasis on proximal development within a community that promotes learning among adults as well as children.
INTRODUCTION

Teacher education is under scrutiny and revision within the field of early childhood education, due, in part, to the widespread discontent with the outcomes of schooling in the United States. How is it that many young children demonstrate so many capacities in the early years, yet our institutions of higher learning are routinely creating remedial courses to support basic learning skills? There are many factors that contribute to the perceived "failure" of United States schools including socioeconomic and cultural diversity, racial and gender inequities, and--some would say--a need to return to the basics. Many believe, however, that teachers are simply unprepared to meet these challenges. All of these issues characterized debates within the larger field of education as well as the field of early childhood education.

Traditionally, early childhood preservice teacher education has been influenced predominately by developmental theory which emphasized processes of children's learning. And yet teachers typically learn to teach from a transimission orientation with perspectives provided by experts rather than from a position of inquiry.

National guidelines for teacher practice in early childhood settings have, until recently, reflected this transmission orientation to teacher practice, even as they recommend more constructivist approaches for young children. The 1987 edition of Developmentally
 Appropriately Practice in Early Childhood Programs (Bredekamp) published by NAEYC, the nation's largest early childhood educational professional organization, included a list of do's and don'ts couched under the labels of "developmentally appropriate" and "developmentally inappropriate." Referred to by many in the field as "the Bible," this conceptualization of the teacher's role left little room for teacher investigation or even variation of approved practices to meet the diverse needs of young children (New & Mallory, 1994).

Ten years later, the revised edition of Developmentally Appropriate Practice (Bredekamp & Copple, 1997), not only acknowledges the need for teachers to consider the developmental capacities of young children, but also emphasizes the influence of diverse sociocultural contexts on learning and thus the need for teacher decision-making to inform practice. This exemplifies a major shift in focus for the field of early childhood education, broadening the lens to consider the influence of sociohistorical, sociocultural, and developmental entities of young children on their learning. Such a change in orientation to young children comes with numerous implications for changing the role of teachers. Nevertheless, there remains a significant incongruency between what we know about children's capacities within various sociocultural contexts and the professional development of early childhood teachers.

This study is based on the belief that the concept of developmentally appropriateness will remain difficult to translate into classroom practice until such time that the concept is also applied to early childhood preservice teacher education. Such a reconceptualization includes both the linking of developmental and
sociocultural aspects of children’s learning and ensuring that this knowledge is congruent with the practice of preservice teachers. The practical challenge of this reconceptualization requires the reconstruction of the very contexts within which preservice teachers teach. The framework of this study therefore not only reflects this reconceptualizing agenda, it also operationalizes early childhood preservice teacher education as (a) informed by the convergence of key tenets of social constructivist theory, (b) characterized by the inclusion of particular teaching strategies and reflective practices representative of an inquiry orientation to teaching, and (c) focused by the collaborative endeavors of adults and children involved in the implementation and documentation of projects such as those inspired by those in the preprimary schools of Reggio Emilia, Italy.

There is much evidence which supports the contributions of these three components to the design of contemporary programs for children and adults. Social constructivist perspectives have informed us about how children construct knowledge; the implications of this theory are not limited to age and therefore can illuminate the ways in which adults learn. Teachers who teach from an inquiry orientation engage in reflective practice and participate in research about their teaching. As a result, they develop adaptive abilities in the classroom which enable them to meaningfully respond to children’s needs and interests, moving beyond a narrow focus on development and the transmission of knowledge that is insensitive to the dynamics and diversity found in any classroom of young children. Finally, the Reggio Emilia approach to early education has influenced thousands of early childhood educators to pay more
attention to classroom environments and to include long-term project work and documentation within curricula, among others. Reggio Emilia’s interpretation of teacher development, while less often studied, has significant implications for the reconceptualization of preservice teacher education in the United States.

The intended contribution of this study to the field of early childhood preservice teacher education is not only in the defense of social constructivist theory, nor solely to promote the merits of educating inquiring teachers. The goal is also not to advocate for the replication of "the Reggio Emilia approach." Rather, the aim of this study is to operationalize the reconceptualization of early childhood teacher education by demonstrating the convergence of these three sources of influence in the design of a context and process for an undergraduate, introductory teaching methods course. The overriding hypothesis of this study is that within such a context which includes the use of collaborative teaching of projects with young children, preservice teachers can begin to take steps away from a transmission orientation toward one of inquiry.
CHAPTER ONE

REVIEW OF THE LITERATURE

An Historical Perspective on Child Development and Early Childhood Education

While the field of early childhood has been linked to the field of developmental psychology for most of this century (Bloch, 1991), it did not begin that way. The field of early care and education emerged during the mid to late 1800's in response to two major strands of activity: the provision of care for young children, particularly from poor and troubled families, rooted in the social welfare tradition; and early education for young children, often from upper- and middle-class families, rooted in Friedrich Froebel's kindergarten movement (Beatty, 1995; Olmsted, 1992, p. 23). As the field of early childhood education grew, so, too, did the field of developmental psychology—a social science which ultimately served as a model for "truth, definitions of valuable knowledge, [and] as a way to get factual information about 'normal' child development and guidance for pedagogy" (Bloch, 1991, p.100). By the turn of the century a shift had occurred in the linkage between early care and education and social reform toward an alliance with developmental psychology. This alliance has had significant implications for early childhood teachers throughout the century.

Not only did this alliance influence the knowledge base and associated teaching methodology for early childhood teachers, it also...
changed the image of the early childhood teacher. But who were these first early childhood professionals? What were their desirable qualities and skills? What information and understandings constituted their knowledge base? What were their primary roles in children's learning and how did these change as this alliance with the field of developmental psychology encouraged teachers to become more "scientific and professional" (Bloch, 1987, 1991)? These questions are critical to a contemporary understanding of the evolution of teacher education in general and the current challenge to reconceptualize the field of early childhood teacher education, in particular.

**Becoming Scientific and Professional: From Caretaker to Scientist**

One hundred years ago, teachers of young children, whether working in Pauline Shaw's charity kindergartens or in Froebelian kindergartens, were young, single, and female. They taught without formal education in child development, and indeed may not have finished grade school. In fact, not until 1913, was the first laboratory kindergarten opened at Wellesley College for the dual purposes of instruction for children and training for Wellesley students who hoped to become teachers. Prior to this time, the overriding belief was that the necessary prerequisites for becoming an early childhood teacher required one to be female, espouse a love for children, be able to care for their physical and spiritual needs, and be willing to play with them. There was little emphasis on the role of early childhood teachers in children's pre-scholastic experiences. Elizabeth Peabody, perhaps the best known advocate for American kindergartens, stated that a "genuine" kindergarten
was one in which children did "not learn to read, write, or cipher; nor to study objects unconnected with their own conscious life" (Beatty, 1995, p. 61).

The Froebelian kindergarten movement was part of the German-American kindergarten efforts of the mid 1880s in the United States. Friedrich Froebel's philosophy and methods represented both "naturalistic and developmentalist" beliefs (Beatty, 1995, p. 42). To this end, children's play was to be "protected... guarded... and cultivated" by mothers as well as teachers. At the same time children were provided direct instruction by teachers, using the twenty Froebelian gifts and occupations to teach such things as the law of equilibrium or transmitted motion. Froebel's materials and activities for use by teachers provided detailed directions on how the first gift, a ball, was to be held, moved, suspended and swung, for example (p. 43). Evidence of these activities appeared in U.S. early childhood settings as early as the mid-1800's and had a major impact on the development of curricula and teacher practice in kindergartens for middle and upper-middle class children until the early 1900's. This notion that children should be not only cared for but also educated outside of the home in sharp contrast to the prior and competing model of early care and education provided to socioeconomically disadvantaged children often associated with settlement houses.

Thus, teachers influenced by the Froebelian movement not only provided materials and activities, they also played with children. In many ways, however, their role remains primarily one of caretaker and when they did give direct instruction it was to "guide and direct"
(Morrison, 1991, p. 55) the natural unfolding of children's abilities. Teachers were likened to gardeners, children to seed, and the learning context as the "child garden" or Kindergarten. In fact, Froebel is often referred to as "the father of American kindergarten."

In many of these early kindergartens, teachers typically ran morning classes only and spent their afternoons making social calls on families. These social calls were intended to offer support to parents through informal parent education. The children were taught to address teachers as "Auntie" to emphasize their sisterly relationship with their mothers (Hewes, 1995, p. 215). Even though most teachers were single, Elizabeth Peabody defined kindergartening, or the teaching of preschool-aged children, as "equated to mothering" and as a "spiritual vocation" (Beatty, p. 62).

In contrast to Froebel-influenced kindergartens, teachers who taught in charity kindergartens or centers (often affiliated with settlement houses) focused most of their attention on supporting families through meeting the basic health and safety needs of children in their care. Within this period, teachers most often associated with programs such as charity kindergartens were expected to create contexts for teaching and learning that were "home-like." There were rooms for noisy activities and quiet ones, with outdoor spaces for play and for gardening. A piano for accompanying singing was a standard piece of equipment, while unit blocks and books were coupled with child-sized brooms, dust pans, and sewing boxes-- all used as "part of a curriculum that focused on manual training and preparation for domestic service" (Beatty, 1995).
It was believed that by caring for and educating young children, teachers would help "prevent urban crime, promote 'the public good, on the side of law, order and commercial prosperity,' and combat the 'poisonous atmosphere' of some homes" (Beatty, 1995, p. 81). Among these charity kindergartens were two in Boston's North End. Teachers in these schools, directed by Pauline Shaw, taught children in "home-like Kindergartens" where their "faces were washed, and their clothes made clean and comfortable" and "lunches of bread and milk were served daily at ten o'clock" (Beatty, 1995, p. 74).

It was in Pauline Shaw's charity kindergartens that the first recorded child study experiment in America took place. In 1880, four of her kindergarten teachers assisted psychologist G. Stanley Hall in a systematic study to determine "what young children knew as they entered primary school" (Beatty, 1995, p. 75). This study found in a "striking way the advantage of the kindergarten children..." (p. 76) in comparison with those who had no kindergarten experience. Among the outcomes of this study was support for kindergartens, which in turn validated the role of early childhood teachers. As a consequence, teachers began to seek information from scientific research that they considered critical to their work. Another outcome of Hall's initiatives was the establishment of his reputation as the one responsible for bringing "...science out of its ivory tower and making it accessible to the public through the child study movement" (Bjorklund & Bjorklund, 1992, p. 16, bold in original). Science at this time was considered "radical and progressive; science was new; in certain circles, science was high
status and an earmark of a more professional approach to the study of the child and his education" (Bloch, 1991, p. 100).

By the turn of the century, Hall’s leadership in the child study movement (manifested through his research, teaching, and summer institutes for teachers) contributed to three important outcomes: (a) a belief that science provided valuable knowledge about how children learn; (b) the formation of regional child study associations which provided forums for advocating for and sharing information about children; and (c) the creation of child research centers for the study of children. It was at this point that the image of teacher as caretaker began to give way to a new image of teacher—as a professional with a knowledge base informed by science. This image was soon joined with the expectation that the practice of teachers be informed by what was known about how children learn and develop. Much of this knowledge about children’s development came from child research centers, the first of which were established in the Midwest, in an environment dependent upon agricultural research.

It was in Iowa where Cora Bussey Hillis, a mother and farmer’s wife who had lost several of her children during infancy, became convinced that parents needed to know more about children’s health and development. She advocated for the development of child research centers, proclaiming, "If research can help us raise corn and hogs, why not children?" (Bjorklund & Bjorklund, 1992, p. 17). The growing interest on the part of parents in child development research, combined with outcomes of Hall’s leadership within the field of developmental psychology, converged with the desire of female teachers to be known as professionals. In combination, these
three factors were highly influential in linking the field of early care and education with research in the field of developmental psychology.

As a result of this increased emphasis on a scientific basis for early care and education, turn-of-the-century schools of education in public and private universities began to establish kindergarten training programs in which child study and developmental psychology were jointly studied and explicitly linked to teacher preparation and practice. At the University of Chicago, a leader in the Progressive Movement, John Dewey, challenged the Froebelian hold on early childhood curricula and the relatively passive role of the teacher in kindergartens. Dewey suggested that there was a "middle term between leaving a child to his own unguided fancies and likes or controlling his activities by a formal succession of dictated directions" (Dewey, 1900, p. 151). Dewey's theory of schooling, most often labeled progressivism, focused squarely on the interests of children and the provision of educative experiences that were related to children's everyday lives with materials that were "real," encouraging "games related to their homes and family members" (p. 86). Dewey emphasized the creation of "democratic" learning communities in which teachers and children determined together many of the activities and tasks to pursue. Some of these pursuits continued over extended periods of time, with teachers creating "setting[s] with props and the outline for a script" (Cuffaro, 1995, p. 45) and providing "space, materials, time, and ... genuine attention" (p. 47).
From this perspective, teachers were to be active but not directive. The teacher was considered a member of the community whose responsibility included shifting from a position of authority toward one of participant in a social group. As a result, "the teacher loses the position of external boss or dictator and becomes the leader of group activities" (Dewey, 1963, p. 59).

In 1909, Patty Smith Hill at Teachers College spear-headed the "final showdown" in the move away from "orthodox Froebelianism toward progressive kindergarten pedagogy" (Beatty, 1995, p. 116) a move that joined the fields of child development and early childhood education. There, she participated in experiments with the kindergarten children enrolled in Teachers College’s laboratory school to explore the principles of Edward L. Thorndike’s learning theory. These research experiments were among the first efforts to "develop new preschool theory and practice that applied psychology to education" (p. 116). A significant outcome of this merger of disciplines and associated knowledge was an expectation that individuals who wanted to teach (typically young women) needed to learn a particular body of knowledge. This expectation was in sharp contrast to earlier beliefs that "charity, sentimentality, and sisterhood" were the only requirements for being an effective early childhood teacher (Hewes, 1995).

As teachers began to assume more of an instructional and less of a playmate or caretaker role, corresponding pedagogical changes included a broadening of activities from music-making and gardening to the teaching of discreet skills such as those identified in Patty Smith Hill’s "Habit Inventories," published in 1923. These
"Habit Inventories" included lengthy lists of activities as well as the expected associated behavioral outcomes. Such inventories became popular as a means for evaluating and reporting on individual children's development (Beatty, 1995, p.117). They also represented the dominant theories of child development that were emerging within the field of psychology and their influence on early childhood education.

From the turn of the century until the 1920's to 1930's, the field of early childhood education was becoming increasingly linked with developmental psychology, setting in motion a definition of the professionalization of early childhood teachers that has persisted for the duration of this century. Both public and professional images of early childhood teachers have included the expectation that teachers have a particular knowledge base above and beyond their abilities to nurture and care for young children. This knowledge base has, in turn, reflected key tenets of child development theories. Among the dominant theories of this century that have been linked to teacher preparation and practice in the field of early childhood education are maturationism, behaviorism, constructivism, and--most recently--social constructivism.

The Influence of Theories of Child Development on Pedagogy

Theories of child development serve to organize, integrate, and generate hypotheses about changes in children's biological, social, cognitive, and emotional development. As such, theories of child development help answer the questions "How do children learn?" and "What are the determinants of their learning?" The answers to these questions have direct implications for the knowledge, beliefs,
principles, and practices embraced by teachers of young children. Since the turn of the century, there have been four dominant theories of child development which have emerged within the field of developmental psychology and have had significant influence on the field of early childhood education, and subsequently, on teacher roles. Following is a brief description of the first three theories; the theory of social constructivism will be discussed in a separate section to follow, under contemporary perspectives.

Maturationism

Early maturationists, such as the teachers in Pauline Shaw's charity kindergartens as well as those in Froebelian kindergartens, believed that children develop according to a "master plan" and that their development mirrors the evolution of the species. The notion that "ontogeny recapitulates phylogeny" (Bjorklund & Bjorklund, 1992; Vasta, Haith & Miller, 1995), made prominent through the research of G. Stanley Hall, legitimized this interpretation of child development, and served as a guidepost for much of the early developmental research. Hall's beliefs influenced researchers' and teachers' expectations that development emerged in predictable patterns and sequences and that the study of and practice with children should document and support this unfolding. Even though these beliefs dominated the field, Dewey and the progressives challenged the notion that the environment was an insignificant factor in influencing the development of young children.

Nevertheless, maturationists views persisted, during the early part of the century, resulting in teacher practice such as that described previously, with a teacher's role that was predominately passive so
as not to interfere with the natural unfolding of children’s growth and development.

In the 1930’s, Arnold Gesell, a student of Hall’s, began to study the influence of genetic processes on young children’s development. While he did not agree with Hall that human development mirrors the evolution of the species, he shared Hall’s belief that "complex biological mechanisms guide development" (Vasta, Haith & Miller, 1995, p. 19) and called this theory maturationism. Gesell’s research at Yale University utilized innovative observational methods in studies of large groups of children of many different ages in order to generate normative data on early development (Santrock, 1994). While he discovered variation in rate of development, he likewise documented observable patterns and sequences of behavior. From these studies, Gesell established statistical norms which continue to serve as the basis for average ranges of development typically used by medical personnel, and to a lesser degree by parents and teachers in the United States today.

This normative data as well as the further articulated tenets of maturationist theory were added to teachers’ knowledge base with direct implications for their practice. For example, learning contexts influenced by maturational theory tended to include materials appropriate to the behaviors associated with a particular age group. There was an emphasis on individual developmental milestones and teacher practice was represented more by observing and recording development than by direct instruction.

Although Gesell’s maturational theory failed to have a long-term impact on developmental thought (Hilgard, 1987) (primarily
because it was ultimately regarded as an oversimplification of development), it has continued to influence early education practice, especially with respect to parents’ and teachers’ conceptions of children’s maturational "readiness" to learn (Graue, 1993; Shephard & Smith, 1986). And yet, developmental psychologists and educators then and now have critiqued the theory’s failure to incorporate the educational influence of the environment on children’s development. This orientation stands in sharp contrast to a major premise of both behaviorist and constructivist theories--which is that children are significantly influenced by their environments. In spite of this common feature of both theories, they also stand in sharp contrast to one another.

**Behaviorism**

The behaviorist approach is best known through the work of John B. Watson, Ivan Pavlov, and B. F. Skinner. These behaviorists viewed development as a "continuous, rather than discontinuous, or stage-like process" (Hetherington & Parke, 1993, p. 9). Unlike maturationists who are stage theorists and consider children as developing and learning with little direct instruction, behaviorists believe that children are relatively passive learners whose behaviors are shaped by conditioning. Pavlov’s and Watson’s research, conducted primarily on animals, focused on classical conditioning or the co-occurrence of stimulus and response. Skinner focused on operant conditioning or the consequences of behavior. Behaviorist theory as defined and developed by these three posits that experience and learning are linked and that the environment is the major factor in explaining the behavior of an organism. From this
perspective, changes in development result from the processes of classical and operant conditioning, rather than inborn biological processes (Vasta, Haith & Miller, 1995).

As this theoretical perspective took hold, it had a major impact on the practice of early childhood teachers. No longer were teachers to stand aside and observe children's development from a distance. Instead, they were now teaching from a transmission orientation, expected to direct children's learning through the design and implementation of systems of rewards and punishments, determining in advance which behaviors were to be extinguished and which were to be strengthened. Thus, the role of the teacher was to establish conditions for children's learning based upon knowledge of the relationship between stimulus and response.

Throughout this period, beginning in 1913 when Watson first announced his theory of behaviorism until the 1960s, "American psychology was strongly influenced by the behaviorist point of view" (Bjorklund & Bjorklund, 1992, p. 15). Watson systematically studied conditioned processes in controlled environments, believing that the goal of psychology "should be to predict and control behavior" (p. 16). This practice of controlled experimental studies contributed to the definition of a "scientific approach" to child study; outcomes from his research also influenced a "scientific approach" to child rearing (e.g., schedules for feeding and sleeping).

Hall used the simple conditioning process to explain how development changes over time, influenced by conditions in the child's environment. This key tenet later served as the cornerstone of his book, Psychological Care of the Infant and Child, published in
1928, in which Watson suggested to parents that "children were entirely the products of their upbringing and environment" (Vasta, Haith & Miller, 1995, p. 17). B. F. Skinner likewise influenced parents’ and teachers’ beliefs and practices related to children’s development. In 1957, Skinner expanded his theory to include the stance that language, like any other behavior, was learned through traditional learning principles. Therefore, teachers and parents could shape the emergence of children’s language by selectively reinforcing certain sounds and words over others (Hetherington & Parke, 1993, p. 255).

These examples typify the focus and practice of teachers who embraced behaviorist theory. Behaviorist teachers determined what conditions were reinforcing to children; they focused on specific objectives; and they actively directed children’s activities which were simplified through breaking down activities into discreet, sequential steps. In a behavioral teaching and learning context, the role of the teacher was to transmit knowledge. Behaviorist teachers made decisions on what knowledge to transmit based upon normative data of the ages and corresponding stages of development.

These "token economies" in which children received external reinforcement for particular behaviors continued to position children in a passive role and teachers in dominant, directive roles. Children were acted upon and made dependent upon adults for direction in their learning and development. Children were not expected to learn from one another but rather from their physical environment. In these classrooms learning was prescribed, set up with tasks and tokens, and directed by teachers. This behaviorist interpretation of
the teacher’s role differs dramatically from a constructivist perspective, where teachers are expected to facilitate children’s active engagements within their learning environments to encourage discovery and exploration.

Constructivism

The roots of constructivist theory began over sixty years ago with the work of Jean Piaget, a French epistemologist and psychologist, who determined that the construction of knowledge is adaptive and not transmitted or taught. Rather, children adapt previous mental structures based on their active engagement within particular contexts. To these contexts, they bring a history of knowledge construction influenced by their perceptions and conceptual experiences. Piaget noted,

The current state of knowledge is a moment in history, changing just as rapidly as knowledge in the past has changed, and, in many instances, more rapidly. Scientific thought, then, is not momentary; it is not a static instance; it is a process. More specifically, it is a process of continual construction and reorganization (Piaget & Inhelder, 1971, pp. 1-2).

From this perspective, the teacher no longer transmits predetermined knowledge but rather creates learning contexts in which the "...mapping of actions and conceptual operations that had proven viable in the knowing subject’s experience" (von Glasersfeld, 1996, p. 4) are created through experiences of investigation and exploration. Constructivism is "a theory about learning, not a description of teaching. No 'cookbook teaching style' or pat set of instructional techniques can be abstracted from the theory and proposed as a constructivist approach to teaching" (Fosnot, 1996).
Rather, because knowledge is constructed by individuals, the role of teaching is "to put students into contact with phenomena related to the area to be studied.... [and] to have students try to explain the sense they are making...to try to understand their sense" (Duckworth, 1987, p. 123, italics added).

Whereas the maturationists generally emphasize age as leading to a new developmental stage and the behaviorists emphasize processes of conditioning for influencing children's learning, constructivists have consistently emphasized the provision of appropriate experiences which provide a constant interplay between children and their environment (Fosnot, 1996; Brooks & Brooks, 1993; Kamii, 1985; Forman & Hill, 1984; Piaget & Inhelder, 1971). When children's explorations and investigations result in surprising, unpredictable outcomes, they are provoked to seek knowledge for solving those dilemmas because "new experiences sometimes foster contradictions to ... present understandings, making them insufficient and thus perturbing and disequilibrating the structure, causing us to accommodate" (Fosnot, 1996, p. 13).

Piagetian-influenced constructivists believe that children and adults seek states of equilibration through self-organization in an effort to balance contradictions to their previous knowledge base. Disequilibration results from conflicts between previous knowledge and new and competing knowledge. Construction of knowledge results from continually assimilating new information, accommodating old ways of knowing, and subsequently adapting behaviors to represent new knowledge constructions. The process toward self-organization is influenced by a spiraling process that
transforms old ways of thinking rather than one which is simply an additive, accumulation of new knowledge. The spiraling process is an interplay between a child’s "logical constructs on new experiences and information...[and a corresponding response by the child’s] reflective, integrative, accommodative nature" (Fosnot, 1996, p. 14).

Piaget, along with Freud and Erikson, was a stage theorist. Until the last decade of his career he focused his research and writing on the belief that children enter the same stage of cognitive development (sensorimotor, preoperational, concrete, and formal operational) at approximately the same age and in the same order. However, during the 1980’s, at the close of his career, Piaget began to reformulate his theory and "moved away from a static stage theory toward a delineation of the successive possibilities and logical necessities generated by subjects as they attempted to explore and understand various problems" (Fosnot, 1993, p. 7). Regardless, most Piagetian-influenced early childhood teachers typically prepare activities and tasks representative of his stages of cognitive development that are "age appropriate" for preschool (preoperational) children are characterized as "hands-on," often within "play-based" classrooms that include "learning centers" such as sand and water tables designed to provide materials for children’s exploration (Brown, 1982; Kamii, 1985).

From this perspective, teachers’ understanding of children’s progress in moving through Piagetian stages of development is less dependent upon a recognition of children’s specific knowledge, their acquisition of discreet skills, or small modifications of behavior, than it is on children’s use of operations to organize, retrieve, and utilize
strategies for constructing knowledge. Examples of these operations include children’s achievement of object permanence, the ability to conserve, mastery of class inclusion, and progress through increasingly complex levels of classification, cause and effect relationships, and applications of time, to name a few. These operations are deemed supportive of children’s construction of knowledge and are the foci of Piagetian-influenced and related early care and education programs.

Constructivist-influenced teachers then depend not only upon keen observation of children’s processes of knowledge construction, but also on knowledge of ages and stages of development, and skills at guiding or facilitating individual children’s constructions. Teachers' responsibilities in these classrooms are wide-ranging because they are the orchestrators of the environment, the "watchdogs" of individual development, and the providers of experiences which parallel the dynamic nature of development as expressed through ages and stages of development.

Although remnants remain from maturationist and behaviorist theories in contemporary early childhood teacher practice, constructivist perspectives have dominated teaching practice, curricula aims and materials for children, and teacher education programs since the 1960’s. And yet, in spite of the widespread belief that individuals must construct their own knowledge, preservice teachers have continued to be taught by teacher educators from a predominately transmission orientation. Only within the last decade, in particular, have teachers and researchers recognized the reciprocal informing between children’s and adults’ cognitive and social
development and sought to know more about the relationship between the two. It is this relationship that is at the center of the theory of social constructivism a theory which has significant implications for the education of early childhood preservice teachers as well as young children.

Contemporary Perspectives on the Development of Children, Teachers, and the Field of Early Childhood Education

The previous chapter provided a brief historical overview of the changing role of the early childhood teacher and the influence of theories of child development on teachers’ pedagogy. Contemporary theoretical interpretations of how children learn continue to influence teacher practice, with social constructivist theory emerging as a dominant source of influence within the field of early childhood education. In addition to this new theoretical orientation, there are also new ideas emerging about the role of the teacher in a constructivist-influenced classroom and the processes of teacher development. Contemporary school reform efforts include not only the challenge of bringing teachers up to par in light of dominant theories of development, but transforming the role of teachers away from a directive and prescriptive stance toward one of inquiry. To this end, both preservice and in-service teacher development programs are in increasing numbers informed by reflective practice and teacher research.

In the second half of this chapter, I will describe key tenets of social constructivist theory, in particular, the role of social relations on cognition, the zone of proximal development (also referred to as zoped) and the use of cultural signs and tools as they relate to
learning and development. I will then describe the influence of reflective practice and teacher research, in particular collaborative action research, on teachers’ roles. The position that results from this review and analysis of the literature is that it is not only crucial to teacher reform that theory informs practice inside the classroom but that the practice of preparing teachers is also congruent with the key tenets of theory. In other words, truly "authentic pedagogy" (R. S. New, personal communication, June, 1997) requires congruency between the processes through which teachers construct knowledge and the processes through which teachers themselves guide children’s construction of knowledge. Such a congruency goes beyond the ability to simply explain one’s practice with theory; rather, it requires "practicing what we preach."

Social Constructivist Theory

During the past decade, the social constructivist theory of Lev Vygotsky, a Russian psychologist, has become increasingly influential within the field of early childhood education. Key tenets of social constructivism include the position that knowledge is socially constructed and is influenced by individual and collective sociohistorical, sociocultural, and developmental entities. Major distinctions between social constructivist and constructivist theories include both an expanded role of the sociocultural context in the construction of knowledge and a shift away from ages and stages as the primary foci for informing teacher practice.

Both perspectives agree that learners construct knowledge, yet most Piagetian-influenced constructivists (e.g., Rheta DeVries, George Forman, Catherine Fosnot, Constance Kamii, & Lawrence Kohlberg)
typically describe development as a process of self-organization. In contrast, Vygotskian-influenced social constructivists (e.g., Laura Berk, Jerome Bruner, Elice Forman, James Wertsch, & Barbara Rogoff) typically view learning as "not merely a conceptual change but involve[ing] reorganization of goals, task understandings, motives and interests" (Forman, Minick & Stone, 1993, p. 8). From the perspective of social constructivists, this reorganization takes place as a result of "social interaction [which] is essential to children's [and adults'] learning and cognitive development...[through] work with more skilled partners in sociocultural activity" (Rogoff, 1993, p. 125).

It is through joint activities that learners co-construct their knowledge with others (Rogoff, 1995; Forman, Minick & Stone, 1993; Berk & Winsler, 1995). Learning occurs at points of negotiation of meaning as each person's psychological processes mediate (and are mediated by) the group (Chang-Wells & Wells, 1993, p. 86). As a result, learning is not a simple process of internalization or acquisition of knowledge but rather a process of "constructive transformation" (Stone, 1993) that is achieved through "participatory appropriation" (Rogoff, 1993, 1995). Participatory appropriation refers to a "process by which individuals transform their understanding of and responsibility for activities through their own participation" (Rogoff, 1995, p. 150) as they "gain skills and understanding of [an] activity" (Rogoff, 1993, p. 139). Appropriation in this sense is a process of transforming rather than of collecting "stored possessions (such as thought, representation, memories, plans)... and [instead] treats thinking, re-representing, remembering, and planning as active processes" (Rogoff, 1990, p. 18).
While such active processes fill most school classrooms, which are "unusually crowded social environments, group work is rarely encouraged" (Forman & Cazden, 1985, p. 324). As such, teachers are missing major opportunities to capitalize on the premise that knowledge is socially constructed. Such social construction occurs in two primary ways: (a) between learners with unequal levels of expertise and knowledge, representative of peer tutoring exchanges and (b) among learners who share similar levels of expertise and knowledge and who can therefore engage in "equal status collaboration" (p. 324). Within peer tutoring exchanges, the tutor typically "helps inform, guide, and/or correct[s] the tutees’ work" (p. 329). However, collaboration requires a "mutual task in which the partners work together to produce something that neither could have produced alone" (p. 329). It is within such collaborative exchanges that knowledge is most likely to be socially constructed, through "social interactional processes" (p. 341).

Language plays a key role in mediating these social interactional processes, both intermentally (with others) and intramentally (with self). During the preschool years, children develop not only social speech but "private speech." The primary goal of private speech is "not communication with others but communication with the self for the purpose of self-regulation or guiding one’s own thought processes and activities" (Berk & Winsler, 1995, p. 37). In fact, for Vygotsky, language was considered the "tool of the mind" because it influences "thinking and behavior--that of another person or one’s own" (p. 21). As such, language serves as a mediator between previous ways of knowing and new constructions
which are first generated through "collaborative activity, [and] only later...become internal mental processes" (Wertsch, 1985b; 1991).

While language is considered the most influential and important tool or sign,"...works of art; writing; schemes; diagrams; [and] maps...." (Vygotsky, 1981a) are examples of other psychological tools. Not only are new constructions or higher mental functions internalized through the use of these tools, but so too are the signs and sign systems, so that eventually the learner is mediating knowledge construction silently, using inner speech intramentally. It is at this point that the learner becomes more capable of self-regulating learning and thus behaving more purposefully and thoughtfully.

Higher mental functions of cognitive development, "molded by social life" (Rogoff, 1990, p. 22) and dependent upon the use of "language or other cultural tools to guide or mediate cognitive activity...." (p. 5), result in "voluntary attention and voluntary memory" (p. 36). These "voluntary" mental functions, in turn, serve to self-regulate and self-organize the transformation of potential development toward actual development. The mental region in which this transformation occurs was described by Vygotsky as the zone of proximal development or zoped. Vygotsky concluded that we can assess the construction of knowledge by determining both the learner's actual and potential levels of development; he defined zoped as "the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving

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under adult guidance or in collaboration with more capable peers" (Vygotsky, 1978, p.86, italics in original).

Teachers whose practice is influenced by social constructivist theory provide tools for mediating, representing, and documenting children's learning and support and extend the potential development of children by creating joint activities. Rogoff (1990, 1993, 1995) refers to the process of teaching or tutoring within joint activities by the more skilled partner as "guided participation." In the classroom the more skilled partner may be a more competent peer or a teacher. This guidance is not "top down," although at times it could be. Rather, it is a side-by-side engagement in which knowledge is socially constructed, through the use of offering assistance or "scaffolding" (Berk & Winsler, 1995; Rogoff, 1990). For scaffolding to be successful, it is dependent upon the intersubjectivity or the mutual understanding that is achieved between people in communication (Berk & Winsler, 1995; Forman, Minick & Stone, 1993), often with joint activities. Moll and Whitmore (1993) suggest that scaffolding can be provided in these contexts through "systematic instruction." Systematic instruction is characterized by experiences determined by teachers based upon their understanding of what children need to extend their learning. Thus, not only do children make cognitive gains through collaboration within joint activity, self-regulation, and tool use, but so do teachers. Therefore, teacher education programs must provide a teaching and learning context in which teachers learn to teach with others and which provides tools for mediating their knowledge constructions
In summary, these theoretical tenets of social constructivism, including the role of social activity, the importance of language, and the concept of zoped, have implications not only for children’s construction of knowledge but adults’ as well. As a result of theoretical advances beyond stage theory, the new image of the child as co-constructor is joined by a new image of the teacher as an active participant in new constructive processes. Implications of this common ground between children and adults for the education of early childhood preservice teachers includes: the raising of standards and expectations for teachers as the role of teachers and teacher educators shifts from transmitter of knowledge to co-constructor of knowledge; the inclusion of tools and signs within teacher education programs for the purposes of mediating this knowledge construction and related practice; and, the provision of joint activities within which preservice teachers and teacher educators participate and as a result transform their thinking and practice. To this end, reflective practice and collaborative action research contribute to operationalizing this new image of the early childhood teacher.

The Movement to Reform Teacher Education

The current movement to reform early childhood teacher education and improve the quality of teacher practice has been significantly influenced by recommendations to raise professional standards (NCATE & NAEYC) for teacher certification (Spodek & Saracho, 1988, pp. 65-66). Coupled with institutional reform recommendations focused on raising standards associated with teacher education are reports published by special interest coalitions
such as the Carnegie Task Force which emphasize the context within which teachers themselves work. The Carnegie report, *A Nation Prepared: Teachers for the 21st Century*, notes that, while there is a need for change in schools and school policies, there is "a growing awareness that further progress is unlikely without fundamental changes in structure...[because] the biggest impediment to progress is the nature of the system itself" (Cornbleth, 1985, p. 24).

Within the context of these discussions, some question whether teachers can adequately be prepared to warrant certification in four year undergraduate programs (Tom, 1989). This concern appears tied to the belief that the length of preservice teachers' education programs positively correlates to teachers' ability to successfully move through stages of professional development which range from mere "survival, to internalization, and finally a maturity stage of development" (Katz, 1972). Others posit alternative views, noting that it may not be the amount of time but rather the types of experiences and opportunities provided in preservice teacher education programs that prove to be more influential in promoting effective teaching. Recommendations emphasize the need for experiences in which teachers "reflect about the outcomes of their teaching; spend time modifying their practice; and focus on re-evaluation" (Fuller, 1969). Current research on changing practice in preservice teacher education supports this latter position, particularly when those changes include an explicit focus on reflective practice and teacher research.

*Teachers as reflective practitioners.* Reflective practice is considered the cornerstone of an inquiry orientation to teaching.
(Roth, 1989; Tom, 1985), and as such, is viewed by many as a key component of contemporary teacher education and development (Sparks-Langer & Colton, 1991). Others consider reflective practice as essential to professionalizing the field (Han, 1995). Reflection is a "way in which teachers construct the meanings and knowledge that guide their actions in the classroom" (Francis, 1995, p. 229). As such, reflective practice is a dynamic, inquiry-oriented process that connects classroom experiences, including children's learning, to a teacher's construction of knowledge.

Contemporary reflective practice is rooted in the seminal work of Donald Schon (1983), in which he described two major levels of reflective practice, reflection-in-action and reflection-on-action. Teachers are expected to move through these levels of inquiry and increasingly automatize their ability to "think on their feet." As New has noted (1992), later, a third level of reflection was added by Killion and Todnem (1991) called reflection-for-action. This level is similar to Van Manen's definition of "anticipatory reflection," a form of reflection that guides and directs future thinking and practice (Van Manen, 1991, p. 512). As teachers gain competence at reflecting "on" action and move toward anticipating future action, they become more capable of responding to the emergent and sometimes uncertain nature of children's socially constructed knowledge. The ability to anticipate future action is a self-regulated behavior appropriated through preservice teachers' participation in social relationships with children and other teachers, particularly when the adults engage in collective reflective practice mediated through cultural signs and tools.
Previously considered a separate domain of the intellect, the construction of knowledge is increasingly acknowledged to be a matter of both the heart and the mind—an affective and a cognitive process (Cuffaro, 1995). Contemporary studies focused on teachers as reflective practitioners have reported outcomes representative of both categories of knowing, with affective processes seen as resulting in improved personal knowledge. Included among personal knowledge outcomes are the development of confidence (Francis, 1995; Zellermayer, 1990); empowerment (New, 1994); passion (Greene, 1986); agency and positive self-concept (Calderhead & Gates, 1993; Clandinin, Davies, Hogan, & Kennard, 1993), as well as mindfulness and thoughtfulness (Van Manen, 1991). Reflective practice and cognitive outcomes associated with professional knowledge include increased flexibility and improvisational teaching (Jones & Vesilind, 1996); the ability to use pedagogical principles to analyze teaching events (Sparks-Langer, Simmons, Pasch, Colton & Starko, 1991); and the ability to direct, inform, and finally transform practice (Clarke, 1995).

These outcomes have major implications for teacher education programs designed for preservice early childhood teachers, especially when the goal is to promote skills and attitudes of inquiry and an understanding of social constructivist principles of children’s learning and development. Such an orientation to preservice teacher development goes beyond knowledge of curricula to include confidence in the capacities of children to fully participate in co-constructing their knowledge with others and the teacher, for example. This reflective positioning of the teacher, from which
practice is guided as much by thoughtfulness as pedagogical principles, is associated with higher levels of reflection.

While movement toward these outcomes is a goal of many teacher education programs, the purposeful practice of reflection is challenging for most preservice teachers for a variety of reasons, the most common of which are beliefs about teaching generated from previous educational experiences. In addition to the conflict produced by the contrast in educational experiences, preservice teachers are typically young and female with limited teaching experience.

Research on the ways in which prior knowledge and experiences "sideline" teachers from teaching differently than they were taught (Darling-Hammond & McLaughlin, 1995), indicates that regardless of which competing theoretical beliefs preservice teachers may have come to embrace (Lortie, 1975; Tabachnick & Zeichner, 1984), they are reluctant to take on the roles associated with new theoretical beliefs. Prior experiences and beliefs often act as "filters" (Hollingsworth, 1989), preventing teachers' adoption of new skills and knowledge that seem counter to their "intuitive screens" (Goodman, 1988a). As a result, preservice teachers typically focus much of their early reflections on (a) the challenge of avoiding prescriptive instruction and (b) the struggle of how to respond appropriately and effectively to children's needs and interests. To promote teacher reflection at a higher level of inquiry, preservice teachers "need to be engaged in learning experiences that confront traditional beliefs, in experiences where they can study children and
their meaning-making, and in field experiences where they can experiment collaboratively" (Fosnot, 1996, p. 59).

One way in which teacher educators can provide support and direction for reflective practice is through the creation of opportunities for preservice teachers to engage in collective reflection. Collective reflection is dialogic inquiry with others in which teachers acknowledge their common struggles as well as successes and consequently generate multiple perspective from which to consider future actions. The ability of young, female preservice teachers to take the risk of "making public" their opinions, questions, and struggles through collective reflection is a second challenge because all too often they have not been encouraged to speak up, effectively losing their voices (Belenky, Clinchy, Goldberger & Tarule, 1986; Gilligan, Lyons & Hammer, 1990; Clandinin, Davies, Hogan & Kennard, 1993). This loss of voice or agency often results in a passive rather than active stance. For social constructivist preservice teachers engaged in collective reflective practice, this stance is especially problematic from a theoretical perspective, because it is through the expression of their needs, concerns, and perspectives while considering those of others that they can become actively engaged in the experience of co-constructing knowledge with others.

Preservice teachers' ability to manage this collective reflection not only requires them to speak up and reveal their thoughts, beliefs, and hypotheses but also requires them to handle a multiplicity of information from a variety of people. Such "participatory appropriation" of multiple perspectives requires "higher-order
abilities...[of] understanding and applying abstract concepts" in order to "negotiate, determine a focus of inquiry, and infer the best response to a challenge" (Thies-Sprinthall & Sprinthall, 1987, p. 65). Several related bodies of research suggest that this ability is partially determined by stage of development and conceptual level.

Preservice teachers' stage of ego development as described by Jane Loevinger (1976) provides one framework for considering ways preservice teachers may respond to the task of engaging in reflective practice, particularly collective reflective practice. Ego development includes "moral and personality development, cognitive complexity, and interpersonal style" (Oja, 1993, p. 6), and provides "the frame of reference that structures one's world and within which one perceives the world...as the learner takes steps along the way of differentiation and complexity" (Oja, 1991, p. 41).

Loevinger's framework includes seven stages and five transitions through which individual progress. Knowledge of preservice teachers' stage of ego development may inform the teacher educator of the ways in which a preservice teacher is capable of co-constructing knowledge through collective reflective practice. For example, preservice teachers functioning within Loevinger's prior Conformist stage would typically recognize differences among members of a group and yet remain insensitive to individual differences. Whereas, preservice teachers who are functioning within Loevinger's self-aware transition level from Conformist to Conscientious stage would be expected to exhibit an "increase in self-awareness accompanied by the beginning development of situational logic and awareness of individual differences" (Oja & Smulyan, 1989,
From this stance, preservice teachers at this stage of development would be more capable of accepting multiple perspectives within a sociocultural context than others who are functioning in earlier stages such as the Conformist stage, for example.

A preservice teacher's conceptual level also sheds some light on challenges of engaging in abstract thought and tolerating uncertain, and at times, unpredictable environments such as those representative of collective reflection and key tenets of social constructivist theory. Conceptual level (CL) (Hunt, 1971) is defined as "(1) increasing conceptual complexity as indicated by discrimination, differentiation, and integration, and (2) increasing interpersonal maturity as indicated by self-definition and self-other relations" (Hunt, Butler, Noy, & Rosser, 1978). The degree to which preservice teachers exhibit these abilities is linked to their ability to guide decisions about practice through reflective practice. As preservice teachers hypothesize with each other on how to return to the classroom and extend earlier experiences shared with children, they are often faced with the challenge of tolerating the uncertainty about whether their plans will be appropriate and "successful."

Not only does experience, ego development, and conceptual level influence a preservice teacher's ability to engage in reflective practice but also tools used to mediate construction of knowledge about teaching. A preservice teacher's ability to construct knowledge with others is tied to both her innate, genetic heritage and the degree to which she is consonant with the meaning and use of cultural tools and signs that mediate such development (Smagorinsky, 1995, 195)
toward "higher psychological functioning" (Berk & Winsler, 1995; Moll, 1994; Tudge, 1990). Higher psychological functioning enables preservice teachers to develop an orientation to teaching that is guided by "voluntary attention" and "voluntary memory" (Rogoff, 1990, p. 36) as they develop practice which is self-regulated and self-organized. From this orientation, preservice teachers develop a "different type of reflectivity: a certain mindfulness" (Van Manen, 1991, p. 513) which is manifested in increased confidence, flexibility, improvisational teaching, and a willingness to take calculated pedagogical risks and engage in analyses of practice, among others.

One way preservice teachers reveal their abilities to engage in reflective is not only through their spoken language but also through their writing. While discourse is considered the preeminent mediational sign and is central to most reflective practice, particularly collective reflection, there are a variety of other tools commonly used to mediate teacher development toward reflectivity and inquiry. Among the most common are reflective journals, collaborative reflection through storying, video tape, and audio tape transcriptions.

The reflective journal is perhaps the tool most used to mediate and document preservice teacher reflective practice (Jones & Vesilind, 1996; Francis, 1995; Sparks-Langer, Simmons, Pasch, Colton & Starko, 1990; Zeichner & Liston, 1987). A reflective journal is not a compilation of entries representing a rambling record of classroom events, although these kinds of entries are often recorded, particularly in initial journal entries of preservice teachers. Rather, reflective journals are intended to engage the writer in exchanges.
with self and others such that "... every text embodies, enacts, or realizes a social act, a movement toward an other" (Summerfield, 1987, p. 33). To this end, journals are not simply a record but function as a mediational tool. When journals are "initiated, required and overseen by someone other than the writer," journals become more like a "displaced serial conversation; the drafting of a possible meeting of the minds [both intermentally and intramentally]; a representation to be presented, shared" (p. 34).

In a study of preservice teachers' reflective practice conducted by Dawn Francis (1995), the role of journal writing on the convergence of preservice teachers' "personal theories" was investigated. Journal writing was guided by organizing preservice teachers' journals into four sections and requiring them to write about different aspects of their teaching and class readings. Examples of these sections ranged from a simple recounting of teaching days to critical summaries of readings and analyses of "critical incidents" from their teaching. Many of these entries were shared with a "critical friend" or explored within small groups. The focus of this collective reflection was to consider questions about beliefs, problems associated with teaching, and the role of the teacher in lessons to follow.

In this study, preservice teachers noted that they not only began to feel responsible for their own teaching but for their critical friend(s), as well. They identified "increased awareness of the need to observe detail and of a need to view observation, interpretation, and judgment as being constructed within personal belief systems. Links between personal theory, teacher thinking, and action became
explicit" (Francis, 1995, p. 236). Finally, some preservice teachers indicated they experienced an increase in confidence in their ability to "construct and articulate personal knowledge" (p. 239) as they moved away from reflecting on a technical level toward more critical analysis. This movement toward critical analysis appears to have been, in part, due to the collective reflections on journal entries among "critical friends."

Outcomes from this study indicate that "individual reflection is enhanced by group and paired collaboration" within dyads of "critical friends" (Francis, 1995, p. 240). Perhaps the anticipation of recording one's reflections coupled with the knowledge that those reflections would be shared within a collective proved especially influential for preservice teachers. Results of such studies suggest that preservice teachers who extend their private reflections into a public forum not only reveal their individual developmental level and potential (i.e., their zoped)—they also generate collective zones for development (Moll & Whitmore, 1993) that include one another and the teacher educator. This public stance associated with journal sharing seems to quicken the pace of reflection, support multiple perspective-taking, and magnify the impact of journal narratives, thus increasing the momentum for preservice to move away from a transmission orientation toward one of inquiry.

These implications from research are consistent with key tenets of social constructivist theory. As teachers engage in collaborative reflection they socially construct their knowledge within a context where there are opportunities for more experienced learners to support, guide, and extend less experienced learners'
knowledge construction. In these contexts, multiple perspectives are mediated through verbal discourse (Rogoff, 1990; Rogoff, Baker-Sennett, Lacasa & Goldsmith, 1995; Berk & Winsler, 1995), resulting in shared meaning (Kaye, 1982), shared responsibility, and shared ownership of solutions.

This shared understanding results in what Moll and Whitmore (1993) describe as "collective, interrelated zones of proximal development as part of a transactive teaching system" (p. 21). As members of a group remain engaged in the pursuit of joint activities, not only the knowledge base of individual members but also of the group continues to change. This process contributes to the establishment of a transactional cycle in which the group leads individual learning while at the same time, individual learners influence the construction of knowledge within the group.

Such a cycle is evident around the joint activity of teacher narrative through what Jean Clandinin calls "storying" (1992; 1995). Clandinin’s interest is in the epistemological and composite nature of teachers’ knowledge, which she refers to as personal practical knowledge (Connelly & Clandinin, 1988, p. 25). A teacher’s knowledge, from this perspective, includes both her personal history and her on-going professional knowledge as it is transformed through a cycle of practice, reflection, and more practice (Clandinin, Davies, Hogan, & Kennard, 1995).

The recursive cycle which occurred through storying in this study included not only preservice teachers but mentors and supervisors, in a practice described in related research as "looking on with someone" (Johnston-Kosik & Kennard, 1990). As preservice
teachers used discourse to describe their practice and posed questions and hypotheses, they also, according to Clandinin and colleagues, invited those looking on to offer their own perspectives. It is through such discourse, constructivist theorists posit, that the social construction of knowledge contributes to the creation of a community of inquirers "engaged in learning experiences where they [can] study children and their meaning-making,...in field experiences where they... experiment collaboratively" (Fosnot, 1996, p. 216).

Preservice teachers who participated in the Collaboration for the Improvement of Teacher Education (CITE) study likewise shared journal entries through "think aloud" journals, completed after each teaching day during head teaching weeks (Sparks-Langer, Simmons, Pasch, Colton & Starko, 1990). Journals were part of this program that was aimed at assisting preservice teachers to become more reflective and were used to record their experiences in "guided experimentation and analysis in simulation and field experiences" (p. 26). Entries were directed by three questions posed by the teacher educators which solicited information about the source of the idea for a teaching event, factors that influenced the outcome(s), and preservice teachers' opinions about ways in which their thinking and practice might change in the future. The use of these questions focused preservice teachers' writing and the sharing of their entries with one another. Results from this study revealed that "90% of all CITE students...appear[ed] to...meet the program goal of using pedagogical principles and some contextual information to analyze teaching events..." (p. 29).
Even as Clandinin and the CITE researchers document the benefits of writing and sharing journals, video tape as a reflective medium has also proved beneficial for documenting preservice teachers' experiences in the classroom. Videotape has been used for supervisory purposes (Frager, 1985), for documenting teachers' meaning-making in classrooms (Copeland, Birmingham, DeMeulle, D'Emidio-Caston & Natal, 1994), and for informing preservice teachers' practice in early childhood classrooms (Cliatt, Shaw & Blake, 1990). In the latter case, preservice teachers were videotaped teaching children and later asked to evaluate their teaching experience as they reviewed their tapes. Preservice teachers noted that they were better able "to see...strengths and weaknesses" and plan future teaching as they increased "confidence in their teaching abilities" (pp. 12-13).

In summary, the engagement in reflective practice by preservice teachers appears to be supported and guided by their use of a variety of media or tools that assist them in documenting and reviewing their teaching practice. The sharing of documentation with others seems to positively influences teaching practice and provides valuable opportunities for the incorporation of multiple perspectives into their teaching and learning. These shared experiences help create and inform "communities of teachers" in which knowledge is socially constructed both for the individual and the group, especially when the group is interested in systematic research of classroom experiences by all members of the collective.

Teachers as researchers. Interest in teacher research has developed concurrently with the interest in developing reflective
practitioners. Indeed, teachers have increasingly been referred to as researchers (Fosnot, 1989; Duckworth, 1987; Black & Huss, 1995) when their classroom efforts are characterized by collaborations and interventions focused on real problems or issues in their classrooms. Such teacher-initiated studies or projects are typically qualitative and involve the documentation of classroom teaching and learning through the use of journals, video tape, field notes, and photographs, for example. As teachers generate and use documentation in their reviews of classroom experiences and couple documentation with systematic cycles of inquiry, they are positioned to socially construct an inquiry-oriented stance toward teaching.

Teacher research within schools and teacher education programs is represented by "teacher as researcher projects" (Black & Huss, 1995), "partnership research" (Castle, 1995; Cole & Knowles, 1993), and collaborative action research (Oja & Smulyan, 1989; Crawford, 1995; Zellermayer, 1990). Both beginning and experienced teachers appear to benefit from such research, although beginning or preservice teachers may require more guidance by the teacher educator. In the following studies of teacher research focused on collaborative inquiry, preservice teachers' and experienced teachers' questions, hypotheses, and needs are made public, so that peers and teacher educators share in the work and support each other's inquiry.

Black and Huss (1995) implemented Teacher as Researcher (TAR) projects with master's level students enrolled in early childhood teacher education courses over five semesters. Their intention was to "help...students to develop reflective teaching
practices...provide them with experience in qualitative research, and...encourage autonomy through individual pursuits of an area of study" (p. 3). The intent of the researchers was to model and provide opportunities for students to use constructivist teaching strategies and reflective practices in their field placements. Results from their analysis revealed a wide range of advantages to individual students, including greater insight into their children’s thinking and learning and increased ability to evaluate effectiveness of practice.

Not only were there important insights for the student teacher-researchers but also for the teacher educator-researchers. Among insights gained by teacher educators included: the need to support and guide students throughout the process; the recognition of variation among students’ "thinking about their projects, [and, therefore] needing different types of guidance at different times" (Black & Huss, 1995, p. 6); and the importance of validating students’ work when project outcomes were shared, providing them with opportunities to gain new perspectives on their work through their partnerships with one another and their teacher educators.

The act of forming partnerships for action research begins to address the need for collaboration both among and between teacher educators and preservice teachers (Castle, 1995) who conduct classroom research. These partnerships begin to transform the traditional teacher educator’s teaching orientation as transmitter of knowledge toward one of partner and co-constructor of knowledge with preservice teachers. Partnership research provides opportunities for both the teacher educator and preservice teachers
to pursue similar interests, engage in similar processes of inquiry, yet view the experience through different lenses, thus generating multiple perspectives.

Action research of this sort "is essentially a social process and the knowledge generated through the research process has its origins in human action, interaction and reflection" (Crawford, 1995, p. 239). Action research was first described by Kurt Lewin in the early 1940’s as dependent upon "...observation of the effects of action in context" (Kemmis, 1980). This work included teaching collectives because Lewin believed in the value assigned to the "power of group interaction in producing commitment and change in attitude and behavior" (p. 3).

Of the major forms of action research, collaborative action research is dominant in the United States. This approach to teacher inquiry and reflection "represents a renaissance within educational research" (Oja & Pine, 1987, p. 96), and is characterized by these four elements: “(a) its collaborative nature; (b) its focus on practical problems; (c) its emphasis on professional development; and (d) its need for a project structure which provides participants with time and support for open communication" (Oja & Smulyan, 1989, p. 12).

Teachers who engage in collaborative action research depend upon a recursive cycle of "planning, acting, observing, reflecting, and revising" (Oja & Smulyan, 1989, p. 17). The intention of collaborative action research within preservice teacher education programs is that there will be both an immediate change in practice as well as an impetus for ongoing professional development by teachers. This ongoing growth is in part due to the continued participation by
teachers in a collaborative research group within which the mechanism and potentials of the social construction of knowledge are made visible.

In the Action Research on Change in Schools projects (ARCS), Oja and Pine (1987) used a developmental framework for gauging the impact of collaborative action research on individual teachers' personal and professional development (p. 97). The focus of the projects was on making programmatic change within two school contexts. One significant outcome of the ARCS projects was the creation of a collective within the broader school context from which teams of teachers were able to illuminate those principles and practices in use in their schools, to question them, and subsequently to reconsider them. For these teachers it was "the process of collaborative action research that had an enduring value" (p. 113), as teachers noted that "it was their experiences on their teams that would transfer into their own classrooms, schools, and districts" (p. 107).

Michael Zellermayer (1990) developed an action research design which included four phases through which a cohort of eighteen experienced teachers participated in order to learn new skills for evaluating students' writing processes in order to design possible interventions. His goals included influencing teachers' ability to take pedagogical risks and to teach improvisationally as a result of collaborative reflection. Zellermayer functioned as an "intervention administrator" who directed the "intervention... administered on a group...expected to result in group action and in the participants' reflections upon those actions" (p. 340). No efforts
were made to track the change in knowledge of individual teachers. Strategies for supporting teacher change included meetings in which teachers identified obstacles to change. The cycle of inquiry for these group reflections included describing a "classroom experience, inquiry and analysis, planning for classroom implementation of the experience, and implementation leading to further classroom experiences" (Zellermayer, 1990, p. 343). Concurrently, teachers wrote in journals and designed interventions in group meetings, then returned to their journals.

The combination of tools and strategies for inquiry, coupled with the sharing of the responsibility for generating a plan by the group, contributed to teachers' significant change in knowledge and in attitudes. As a result of this group's action and their collaborative reflections, teachers noted an "increase in confidence about teaching, and an ability to identify helpful versus unhelpful interventions and attitudes during teaching" (Zellermayer, 1990, p. 347).

These findings have implications not only for experienced teachers but also preservice teachers who become inquirers as a result of engaging in collaborative action research and collective reflection. While preservice teachers must certainly develop basic professional knowledge that includes information about curricula and teaching strategies, for example, it is the meta-analysis of teaching that seems to influence a move away from a transmission orientation toward one of inquiry. Such an inquiry orientation to teaching and learning is developed by both beginning and experienced teachers in the municipally run pre-primary and infant-toddler schools of Reggio Emilia, Italy.
The Case of Reggio Emilia: Protagonists, Partnerships, and Progettazione

Reggio Emilia is a town of approximately 130,000 people in a north-central province of Italy. It is the fourth wealthiest city in Italy and for years has devoted over 10% of the town budget to help support the municipal preprimary schools and infant-toddler centers which serve children from infancy through five years of age (New, 1991). Today there are over thirty schools scattered throughout the city in neighborhoods in which families are closely tied to the activities and intentions of their children, the teachers, and the school community.

The first of these schools was built in the spring of 1945, funded by the sale of an "abandoned World War II tank, a few trucks, and some horses" (Malaguzzi, 1993, p. 42). This school of the tank was soon followed by seven more, all built by the parents of young children and members of the community, with the help of other women, members of the National Liberation Committee (CLN) (p. 42), and a young teacher, Loris Malaguzzi, who became the founder of what is now called the Reggio Emilia approach to early education.

This school building project is but the earliest collaborative initiative by the "three protagonists and interactive partners of the school: children, educators, and families" (Rinaldi, 1993, p. 104), and is representative of their continued partnerships and collaborative efforts today. This brief introduction into the history of Reggio Emilia's early childhood initiatives also demonstrates the connection of the school context within the larger social system and a
determination to provide children with quality early care and education that has been described as "the best in the world" (Newsweek, December 2, 1991).

Fundamental to the provision of quality early care and education is the philosophy of schooling which was described by Malaguzzi (1993) as "a system of relationships" (p. 63). This system of relationships is supported by an organization "achieved because of the convictions by all concerned that only working together so closely will they be able to offer the best experience to...children" (Gandini, 1996, pp. 20-21). This organization supports the relationship of the schools with the greater social context as well as relationships between and among children, educators, and families. For example, teachers teach in pairs and typically remain together for many years. Teachers also discuss with one another experiences in their classrooms, share documentation, and make plans for future classroom experiences informed by multiple perspectives offered during such meetings. Teachers are often supported by the fine arts teacher or atelierista, the curriculum coordinator or pedagogista and/or a classroom assistant. Likewise, children remain in the same cohort for three years and are taught by the same pair of teachers. Thus, both teachers and children are provided time and continuity of experience for engagement, resulting in the creation of trusting, supportive, and stimulating contexts for teaching and learning.

Much of what is now world renowned about Reggio Emilia has resulted from a an image of the child as "rich, strong, and powerful...with rights rather than simply needs" (Rinaldi, 1993, p. 102). From this perspective, children have the right to
"communicate and interact with others" (p. 102-103). These rights and needs are manifested in children's curiosity, wonder, desire to explore and discover, socially construct and represent their knowledge within a learning context. This learning context includes "projects [which] provide the backbone of the children's and teachers' learning experiences" (Gandini, 1996, p. 22) in these schools.

Collaborative projects. Progettazione, as defined by Carlina Rinaldi, Pedagogical Director of the Municipal Preprimary Schools in Reggio Emilia, refers to "the design and organization of contexts (thoughts, materials, places and professional knowledge) that will most effectively foster learning and the knowledge-building processes, and thus exchange relationships and communication among all the 'protagonists' of the infant-toddler and the preschool" (Innovations, Fall, 1996).

Historically, Reggio Emilia's progettazione can be traced back to a curriculum approach referred to as "project work" introduced during the Progressive Education era at the turn of the century. During this time, John Dewey referred to projects as reconstructions (1916) and Kilpatrick called this approach to curriculum a project method (1918). Project work is also similar to discovery learning as described by Bruner (1961) and Thelan's group investigation model (1960).

More recent interpretations of project work include the "in-depth study of a particular topic that one or more children undertake" (Katz & Chard, 1987, p. 2) and "children's in-depth investigations of topics that interest them" (Hartman & Eckerty, 1995, p. 141). Within each of these definitions, it is emphasized that
projects take time, are dependent upon the interaction among and between children and their environment, and provide a continuity of experience. The aspect of time is especially critical to the success of project work, because rather than constructing knowledge through learning discreet skills and disconnected information, "projects require children to connect related information that is usually learned over time" ( p. 141).

Reggio Emilia's interpretation of progettazione or a kind of "projected curriculum," distinguishes itself from other contemporary and progressive curricula approaches and yet is similar to recent notions of emergent curriculum described by Jones & Nimmo (1994) in which the authors describe the way in which curricula has a source--and that it is implied--thus requiring those with responsibility for the system to support and clear the way for emerging themes within learning and teaching communities (J. Nimmo, personal communication, April, 1998). Likewise, progettazione is a concept that "... defines the complex way in which teachers plan together in those [Reggio Emilia] schools." As Lella Gandini has noted,

It implies considering the schools as a system where collegiality and collaboration support: relationships among the children, educators and parents; relationships with the community; organization; and opportunities for learning and the co-construction of knowledge. Progettazione implies making predictions and flexible plans that take into account all these aspects in the context of the life of the school; it is a dynamic process that generates documentation and is re-generated by documentation (L. Gandini, personal communication, June 10, 1997).
The role of teachers in developing and participating in progettazione is complex and multifaceted. Teachers have been described as "provocateurs" (New, 1991, p. 28) and "partners, nurturers, and guides" (Edwards, Gandini & Forman, 1993). They guide children's inquiry through their use of particular strategies for supporting and guiding learning and the provision of a variety of media that afford children close representations of their knowledge (Forman, 1994). Teachers participate in and provoke children's inquiry by posing questions, generating hypotheses, offering suggestions and media, while documenting the process. These processes of inquiry and documentation do not begin and end with children, but extend to their teaching partners, as they observe, question, and record one another's practice.

A key element of progettazione not only requires choosing a topic worth pursuing, but includes "spiraling experiences of exploration and group discussion followed by representation and expression..." (LeeKeenan & Edwards, 1992, p. 31). The concepts of symbolic languages or the hundred languages of children are metaphors which Reggio Emilia teachers use to refer to the many ways in which children represent and communicate their constructed knowledge, and include dance, drama, shadow play, drawings, paintings, and sculpture, to name a few. This spiraling between experiences and symbolic representations characterizes not only children's work but also the work of teachers in Reggio Emilia. Teachers also utilize various forms of knowledge representations. They depend upon sketches of children's work as part of their field notes, photographs of classroom experiences, and audio tape.
transcriptions of conversations with children to represent and communicate their knowledge about teaching and children’s meaning-making.

Thus, progettazione in the municipally run pre-primary schools of Reggio Emilia represents more than the mechanics associated with an in-depth pursuit of a topic. Rather, the term progettazione embeds children’s project work within the learning and teaching context of adult activities within the school, such that the two are inter-related. As such, children’s project work serves as a reflecting pool of the sociocultural context of learning and teaching in these schools. It embodies a framework for teaching and learning that is reciprocal, spiraling, and shared—a framework of partnerships among protagonists who are dependent upon documentation as they collaboratively attempt to create learning experiences which support both the rights and needs of children to communicate and learn with others.

Documentation. Progettazione as a curriculum strategy distinguished from the traditional view of project work as children’s work because teachers in Reggio Emilia also use symbolic languages to document their construction of knowledge with one another and young children. Documentation is generated through careful observations captured through the use of cultural tools such as audio tape players, cameras, and notebooks. Teachers, pedagogistas, atelieristas, and at times administrators meet together each week to share and collectively reflect upon documentation efforts of projects and potential projects. This collective reflection is dependent upon reviews of documentation captured through these cultural tools and
the actual representations of children's knowledge such as drawings and constructions. Collective reflection often becomes collaborative as decisions are made on ways to continue to challenge, scaffold, and extend children's meaning-making. Thus, the documentation serves as a vehicle for continuous curriculum assessment and planning.

Documentation in Reggio Emilia also serves additional purposes. Often, selections are taken from ongoing documentation and organized in panels and displays of children's work to reveal the life of a project or even a moment during a single day. These panels and displays are as much a part of the classrooms and corridors of the schools as are the tables and chairs. The influence of these representations on the school culture is significant. They reveal representations of children's construction of knowledge; demonstrate a respect for children's work; validate the competencies of children; and communicate a sociohistorical perspective to parents, teachers, and children of the school culture. In addition, documentation panels and displays reveal teacher ideas for and understanding of young children, including the ways in which they co-construct knowledge.

In this sense, not only does documentation extend the worth and work of children's co-construction of knowledge but it also serves as a mediational tool for teachers as well. As teachers engage in "collaborative reflection (so that outcomes are often in the form of collective understandings)..." (New, 1992, p.17) they socially construct new knowledge as they investigate, reflect, and represent children's construction of knowledge. This aspect of Reggio Emilia's work expands upon current understanding of teacher research and
development and is consistent with key principles of social constructivism.
CHAPTER TWO

PURPOSES AND PROCEDURES

Purposes

Goals and Aims of the Study

The over-arching goal of this study is to describe a reconceptualization of early childhood preservice teacher education in a particular setting. To this end there are two aims of the study. The first is to describe a framework for the creation of a shared culture for teaching and learning in which collaborative projects can serve as the primary communal activity for both children and preservice teachers. While the advantages of project work are numerous for children, the focus of this study is on the advantages for learning and development of preservice teachers. A second aim of this study is to describe the processes and some of the consequences of participating in this reconceptualization of preservice teacher education. This aim will be achieved by documenting changes in both knowledge and practice of selected preservice teachers enrolled in an undergraduate early childhood teaching methods course.

A basic premise of this study is that, in order to develop a collaborative inquiry orientation to teaching informed by social constructivist theory, preservice teachers must learn to teach in a context that is similarly oriented. I will make a compelling case for
the design of such a teaching and learning context that utilizes collaborative projects as a framework and focus for joint activity.

**The Research Question**

How does the implementation of collaborative projects within the course *FS 635, Teaching and Learning in Early Childhood Classrooms*, influence changes in the beliefs and practices of early childhood preservice teachers toward collaborative inquiry-oriented teaching?

**Subsidiary Aims**

1. To describe the relevant conditions for creating an inquiry-oriented context that draws upon social constructivist theory to inform teaching and learning.

2. To consider ways in which the implementation of collaborative projects contribute to the creation of a community of learners based on developing relationships among teachers and children.

3. To identify the ways language and tools—in particular, those associated with documentation—represent and mediate preservice teachers’ construction of knowledge.

4. To describe the changing role of the teacher educator through her participation in the implementation of collaborative projects.

**Research Design**

The design for this study utilizes many of the analytical tools, strategies, and instruments (e.g., journals and collaborative projects) developed for the course *FS 635, Teaching and Learning in Early Childhood Classrooms*. This particular study also qualitative and
quantitative strategies and measures aimed at generating data related to both the processes and outcomes associated with the implementation of collaborative projects. In particular, the focus of this study is on the change in thinking and practice over time as particular preservice teachers participate in activities related to collaborative project work. To this end, the design includes much more than the tasks and assignments associated with the course syllabus (see Appendix A). Rather, it is a study of the purposeful creation of a context for teaching and learning framed by the implementation of collaborative projects within which there is time and opportunity for preservice teachers to integrate theory (social constructivism) and practice (reflective action).

This integration of teaching and research methodologies might well be referred to as praxis (Freire, 1970/1996) given that the process of this study has served as the means for moving both myself and preservice teachers I teach toward inquiry-oriented teaching. This movement is has been operationalized by the convergence of social constructivist theory, principles and practices associated with the Reggio Emilia approach to early education and teacher research, including reflective practice. As a result of this convergence, the design as well as the findings of this study have emerged from and are to be considered "in relation" to one another--a concentric of many shared experiences.

Situating the Study

For the purposes of this study and the course I teach, I have systematically created a sociocultural context within which preservice teachers learn about teaching and how to become good
teachers through their development of collaborative inquiry with one another and the children they teach. In this sub-cultural environment, the systematic design for children's learning also contributed to the development of their teachers. Such an environment embodies critical features that influence development, as represented by anthropologists Super and Harkness's (1986) "developmental niche." The critical components include: "elements associated with the physical and social settings...; culturally regulated customs of child care and child rearing; and the psychology of the caretakers" (p. 552).

In this study, the setting is also a part of the study. The classrooms and spaces within which preservice teachers teach, reflect upon their teaching, and learn about teaching contribute to a particular sub-cultural context. This context includes the provision of space and occasions (including necessary tasks and routines) in which relationships are established, utilized, and ultimately changed among teachers and children. The child and teacher populations develop relationships within this setting representative of the unique mission of a laboratory school in which the children, teachers, and parents share in the experience and goals associated with the professional development of preservice teachers.

The design of this study (and course) represents my belief that learning to teach is best actualized within the collaborative efforts of children and adults and that much of what is good practice for children is likewise good practice for the adults who teach them. This congruency between best practice for children and adults is representative of particular beliefs, values, and goals associated with
doing a better job while pushing the norms and standards for determining what is necessary to become a good teacher. Good teaching in this setting is mediated by the use of tools and signs and framed by the shared experience and responsibility of collaboratively implementing projects with young children.

Practices associated with these beliefs, values and related experiences are situated within the course content and practicum expectations. These practices are based in part upon principles which have emerged from social constructivism, the work of educators within the preprimary schools of Reggio Emilia, and my own beliefs and values about how to best educate early childhood preservice teachers. These beliefs include the necessity of providing adult learners with many of the same practices and conditions that contemporary literature touts are appropriate for children. Through the purposeful design of this environment, I have attempted to operationalize Seymour Sarason's call for educational reform made more than twenty years ago:

Schools are not created to foster the intellectual and professional growth of teachers. The assumption that teachers can create and maintain those conditions which make school learning and school living stimulating for children, without those same conditions existing for teachers, has no warrant in the history of man. (Sarason, 1972, pp. 123-124)

The setting. This study of 24 preservice teachers who implemented collaborative projects with preschool-aged children took place at a child development laboratory school at a New England state university. The school is situated on the outskirts of campus at the end of a paved lane sandwiched between hay and cornfields and
juxtaposed to a dairy barn complex and horse paddocks. While the building is relatively new, the school has a long tradition going back to the 1920's, when the nursery school programs were first opened for three and four year old children.

Most of the classrooms were built with large glass sliders and outside decks overlooking the fields in an attempt to connect the classrooms to the rural surroundings. The exterior of the building resembles a barn-like structure, constructed out of red metal siding. The original farmhouse, located across a parking lot from the school, houses the classroom where preservice teachers attended lectures each week, met after class to have lunch, and attend team meetings and/or meet with me. Across the hall from the classroom was a second room referred to as the Documentation Workshop where teaching teams stored artifacts generated from their collaborative projects, including children's drawings, constructions, and a variety of materials. This space was also used by teams to discuss and create documentation panels. It was also in this space as well as my office in the school where preservice teachers pulled up their chairs to television monitors to watch video tapes of their own teaching days and those of their teammates. The school and farmhouse complex provided a valuable and necessary place within which preservice teachers could create a working space for themselves as they met to share ideas, prepare for their teaching days, attend lecture, and teach children.
The Participants

The child population. At the time of the study, the school served 135 children ranging in age from infancy through kindergarten in both full day and nursery school programs. These programs were staffed by seventeen early childhood teachers and preservice teachers. The 24 preservice teachers who participated in this study taught with two of those teachers in the nursery school classrooms. These cooperating teachers had taught in the nursery school program for over ten years. Ann taught the three and four year old children while Jane was the teacher of the four and five year olds. They shared the same two classrooms, meeting periodically to determine what materials to move in and out of the classroom, to plan curriculum themes for the year, joint parent evenings and prepare their open houses for greeting new children. Both lived on the outskirts of the community and knew most of the parents and children before they ever entered the nursery program.

The demand for the nursery school had remained strong for decades. It was typical for parents to complete applications to the programs when their children were infants, although this did not guarantee a spot in the program. The nursery school programs typically had waiting lists. There were only two criteria that guaranteed a child would be admitted. The first was if a child applied who had special needs and the nursery school program was

1All names of participants in this study are fictitious.
deemed an appropriate placement by the child’s team. The second
criteria was if a sibling was already enrolled. In fact, a few parents
over the years have actually admitted planning the birth of their
children so that younger ones would be sure to attend. As a result,
Jane and Ann often taught siblings from the same family with a two
year old coming in the morning and an older brother or sister
following in the afternoon. Parents often stayed after arrival, visiting
on the playground with one another, the preservice teachers and
Ann and Jane.

The nursery school curriculum had recently begun to change
prior to the study. Along with the preparation of Piagetian-
influenced tasks and activities and the integration of whole language
practices for example, Ann and Jane began to implement
collaborative projects. These projects were typically implemented
during the early weeks of the semester, prior to the implementation
of the preservice teachers’ collaborative projects. The teaching
assistant for each nursery school program who had previously taken
the course and assisted in the implementation of projects along with
preservice teachers enrolled in the course.

The preservice teacher population. Preservice teachers were
enrolled in the course FS 635, Teaching and Learning in Early
Childhood Classrooms because it was a requirement for all majors in
the Young Child Option of the Department of Family Studies. In
addition to these Young Child majors, a few students also enrolled in
the course as part of their preparation for entering the Department
of Education graduate program, particularly if they had limited
teaching experience. Occasionally, students enrolled because they
were majoring in related fields such as occupational therapy or psychology and desired experience teaching young children.

Of the 24 enrolled during the study in the semester in which this study took place, eighteen majored in the Young Child, two in Family Studies, one in Sociology, one in Psychology, and one in the Education graduate program, specializing in early childhood education. Only one of the 24 students had taught in the laboratory school classrooms prior to the course, although many of them had made observations there as part of other course requirements. For the majority of them, it was their first time to teach in any classroom with young children. Most of their prior experiences with children had been as camp counselors, sports instructors, or baby-sitters. Of these 24 students, all agreed to participate in the study; however, only ten agreed to be interviewed following the course which was the final phase for gathering data for the study.

The teacher educator. My positions as teacher educator for the course and as researcher for this study were quite similar. Prior to the conception of this study I had developed a tripartite role which included the roles of learner, researcher, and collaborator. The study design provided me a more formalized and systematic context for this three-dimensional role as I went about my work of studying and educating preservice teachers.

My particular orientation toward educating preservice teachers was based upon an “asset” model rather than a “deficit” one. However, when I began teaching in 1982, I assumed preservice teachers had very little knowledge or skill and therefore needed me to tell them how and what to teach. In my early years as a teacher
educator, therefore, students at that time taught small groups of young children individually, guided by prepared written plans and directed by stage theory and a thematic curriculum approach. I have since come to believe that preservice teachers as well as children are much more competent and capable than I had previously thought. My current belief about adult learners mirrors that held by many who have embraced Reggio Emilia educators' view of young children as "rich, strong, and powerful" (Rinaldi, 1995, p. 102).

Now instead of treating preservice teachers as empty vessels to fill, I work to create a safe environment in which preservice teachers' vulnerability when attempting new ways of teaching is protected by the shared experience and responsibility of teaching and learning with others. My goal is to make use of their skills and talents, their desires to teach, and their interests in children by creating a context which provides them enough time, interaction, and continuity of experience to develop the roles of learner, researcher, and collaborator that I associate with good teaching. This context is developed around the provision of joint activities from which they are required to reflect and teach with others, make decisions with others, and consequently share the responsibility for their shared decision-making.

I provide a safe environment for their teaching so that they will take pedagogical risks as they operationalize their decisions. These risks are associated with a new way of teaching and thinking about teaching for many of them. They must now make decisions on how to proceed from day to day. For many preservice teachers such flexibility and improvisation is filled with uncertainty and ambiguity.
Nevertheless, as they make their initial attempts to take the lead from their children, I seek out those attempts and find ways to make them public as I recognize their work and their effort with other teachers and children they teach. My goal is to support their cycle of approximations toward competencies associated with collaborative inquiry.

In this context, my role of learner is actualized as much from their struggles and their perceived "failed attempts" as it is from their successes. As I document and use their teaching I conduct research on how to alter my practice and determine what information to provide them. I use their teaching experiences as the "grist for my mill" by sharing their experiences with other preservice teachers as examples of how to guide and support children's learning, alter media, or ask higher level questions, for example. I often tell them if they will make an attempt, I will be there to help them make sense of it. The "making sense of it" includes my naming it, connecting it to theory and particular teaching strategies, shaping their attempts by modeling, posing questions, and role-playing simulated classroom scenes with them.

In my role as collaborator I am an active participant on each teaching team. I am a part of their scheduled team meetings. I video tape their teaching, and write summaries for each of their teaching days (which include both suggestions for their individual practice and notes to the team for extending project experiences). Finally, I talk with them about my roles as learner, researcher, and collaborator and how I actualize these roles through their teaching and learning, thus socially constructing knowledge about my own
teaching. In short, I "practice what I preach" because for me it is the only way I have found to ensure the necessary congruity between the key tenets of social constructivist theory and the development of collaborative inquiry within this particular context.

The Practices. The course FS 635, Teaching and Learning in Early Childhood Classrooms, is divided into three phases over a sixteen week semester: (1) orientation, (2) implementation, and (3) interpretation. The orientation phase is a foundation and covers the first five to six weeks. Preservice teachers are randomly placed in teaching teams and provided opportunities to get to know one another, the children in the classroom, and the logistics of implementing projects. During this phase they do not implement projects. Instead, they focus on developing relationships with one another, the children they teach, and the principles and practices associated with collaborative project work. To support and inform these efforts, they read three texts: Engaging Children's Minds: The Project Approach (Katz & Chard, 1989), Scaffolding Children's Learning: Vygotsky and Early Childhood Education (Berk & Winsler, 1995), and First Steps toward Teaching the Reggio Way (Hendrick, 1996) which provide a basic introduction to projects and social constructivist theory. Additionally, articles related to reflective practice and projects are read and discussed. Because preservice teachers attend their practicum once each week and children come either three or four days per week, preservice teachers are assigned to a teaching team of three to four teachers and teach the same group of children for the entire semester.
Time is scheduled for teaching teams to meet in and out of class, alone and with me. In class, I design a variety of activities intended to develop relationships within teams and across teams. These activities involve many of the same tools and processes for learning that teachers will be using as part of the implementation of projects.

Preservice teachers attend a lecture classroom twice each week in addition to teaching in the children’s classroom once each week. Included in lecture topics are introductions to the key tenets of social constructivist theory, discussions regarding the worth and value of collaborative learning, and demonstrations and discussions about particular teaching strategies and reflective practices associated with project work in this setting.

During the implementation phase which lasts approximately six weeks, teaching teams implement their projects. They have already chosen a topic by closely attending to children’s' play, listening to conversations, and posing questions to children. During this phase, the focus during class lectures is on documentation and reflective practice along with reviews of earlier readings and topics as preservice teachers' practice dictates.

During this phase, preservice teachers are expected to develop both teaching skills as well as conceptual and theoretical understanding for guiding their practice. Throughout the implementation phase, preservice teachers are challenged by when to document and how to use documentation. Coupled with video and audio tapes of each teaching session, preservice teachers are provided written feedback by me. These teaching summaries are
intended to offer personalized attention for the development of each teacher's ability to use particular teaching strategies and to guide the evolution of a project.

During the final interpretation phase, preservice teachers reflect upon the entire project in order to develop their post-project analysis and create three documentation panels. Their analysis is orally presented to their peers and less formally to parents and children. Documentation panels serve as a foundation for their analyses. The decisions to select particular events to include on these panels are often made after hours of deliberation as they engage in collaborative reflection. Their analyses are focused both on their children and on themselves. They describe accomplishments and struggles, changes in knowledge for children and themselves, and describe the impact of collaborative teaching on their notions of what it means to become good teachers.

**Procedures**

**Data Selection Strategies**

A complete set of data was generated for 24 preservice teachers in the sample because the same tools and procedures used to generate data were entwined and embedded within the assignments and practices of the course. These included the following: reflective journal entries, conceptual level scores, video tapes of teaching, team meeting transcriptions, post-project presentation transcriptions, and documentation panels. The analysis of data occurred in two phases. The first phase involved a quantitative analysis of data for the sample (n = 24) and sub-sample (n = 6) generated from reflective journals, conceptual level scores,
and video tapes of teaching. Results from this analysis will be reported in Chapter Five.

The second phase involved a qualitative analysis of data for the sub-sample generated from all sources of data for the quantitative analysis. In addition to these sources, transcriptions from retrospective interviews, following the end of the course were conducted with the sub-sample and transcribed verbatim. The findings from this analysis will be used to create an image of novice collaborative inquirer conveyed through the use of portraiture. These findings will be reported in Chapter Four.

Finally, the role of the teacher educator in creating the contexts for this study and course will be described in Chapter Three. Data from many of these above mentioned sources were used to provide typical examples of experiences for selected preservice teachers in the sample.

Portraiture as Methodology

Portraiture will be used to capture and reveal the nature of change of preservice teachers toward collaborative inquiry-oriented practice. Described by Lawrence-Lightfoot and Davis (1997) as a "genre of inquiry and representation that seeks to join science and art, portraitists seek to record and interpret the perspectives and experience of the people they are studying....shaped through dialogue between portraitist and the subjects...." (p. xv). This genre is particularly useful in my role as the teacher educator and practitioner-researcher. Throughout the study my voice and my actions are intertwined with the voices and actions of the preservice teachers I teach. Through the use of portraiture, my role as more
experienced learner in preservice teachers' social construction of knowledge and subsequent decisions to act is provided a place in the analysis and interpretation of their early steps toward collaborative inquiry.

The creation of a portrait of novice collaborative inquirer will become apparent as themes emerge from cultural scenes comprising elements of the setting, psychology of the participants, and practices. Scenes which actually occurred during the study will be re-created. Cultural scenes are defined by Spradley and McCurdy (1972) as information shared by two or more people that defines some aspect of their experience. Cultural scenes are closely linked to recurrent social situations. The latter are settings for action, made up of behavior and artifacts that can be observed by the outsider; the former are the definitions of these situations held by the insider (p. 24).

Throughout the study, as the implementation of collaborative projects continued over time, there were numerous opportunities for recurrent social situations and the sharing of information as preservice teachers socially constructed their knowledge and subsequently determined actions in response to their changing knowledge base. The primary sources of data for the creation of the portrait of novice inquirer included: reflective journals, transcriptions of team meetings, videotapes of their teaching, and post-project analyses, documentation panels and retrospective interviews.

The painting of a portrait is a representation of what an artist most desires to reveal; it is an image created through her own inquiry, experiences, and interpretations of her experiences with her subjects. I have found the texture and form for my emerging image
of novice collaborative inquirer through the voices of six preservice teachers: Kaitlin, Hannah, Mary, Leah, Nancy, and Alice. By voice, I mean their thoughts, words, and behaviors as revealed through their reflective journals, video tapes of teaching, audio and video tape transcriptions of their post-project presentations, conversations, team meetings, and retrospective interviews.

My interpretation has not only been influenced by their voice but also by my participation with them as I have shared in the experience of what it means to develop a critical stance for both of us. Our ability to develop such a stance has emerged as we have remained mindful and focused on the learning of those we teach. For example, when I teach, I use their experiences as the playing field for focusing their attention and shaping their practice by naming, guiding, modeling, and provoking their approximations toward the development of inquiry-oriented teaching. In turn, as they teach, they use their children's attempts to construct knowledge as they document and reflect upon those attempts and the relationship of those attempts to their future practice. As a result, preservice teachers return to the classroom more mindful, prepared for the possibilities and poised to think critically about the impact of their practice on children's learning.

The image for this portrait has been socially constructed as has the practice and knowledge of these novice inquirers. As the portraitist I have determined to develop an image through the telling of their stories on two levels. As I approach the canvas, I will first draw a sketch, through a simple description of the chronology of events conveyed through a timescape (Forman & Gandini, 1994) for
each project. Second, I will continue to fill in the image with a second layer of texture and form through my selection of particular cultural scenes, focused on what I believe to be among the most significant and compelling events for their development toward inquiry-oriented teaching.

With each layer, I will attempt to answer the questions: How do collaborative projects provide a framework for the development of early childhood preservice teachers' inquiry? What does the development of collaborative inquiry among selected preservice teachers look like? What are the teaching and reflective practices that support such development? And finally, how does the development of collaborative inquiry impact the experiences of the children they teach.

The Selection of the Sub-Sample

Selection of the sub-sample was made in two stages. The first stage included requests of participants in the sample to participate in retrospective interviews following the end of the course. Full representation by members of teaching teams in these retrospective interviews was required in order for them to be included in the sub-sample. Of the 24 preservice teachers (enrolled in the course), ten (comprising three teams) agreed to be interviewed. The second stage of selection minimized variability across the teams who would comprise the sub-sample. The criteria for this stage of selection included choosing teams which:

- were comprised of the same number of teachers;
- taught the same age children; and,
- taught the same number of project days.
Two teams were selected which met these criteria. Each team was comprised of three teachers each of whom implemented projects with a small group of three and four year old children, for the same number of days (nine days across three weeks).

Analysis of the Data

Reflective journals. The primary purposes of reflective journals in this study were to (a) provide preservice teachers a strategy for reflecting on their classroom assignments and teaching experiences, (b) provide me an opportunity to guide their inquiry through my questions and comments, and (c) generate data for the study. In addition, journals provided me with important insights about the challenges faced by individuals and teaching teams and provided opportunities for building relationships between myself and students. These journals were interactive but not dialogic. In these reflective journals preservice teachers were asked to respond to a series of questions posed by me each week over the course of the semester. These questions were clustered loosely around their reflections on three topics: practice; readings or class discussions; and team collaboration.

Reflective journal entries (n = 24) were coded using a coding scheme based on the criteria from a battery of measures used by Vicki LaBoskey (1994) to study reflective thinking among preservice teachers. For these measures, criteria for judging written responses represented three categories: Reflective (R), Unreflective (U), and Indeterminate (I) (see Appendices B & C). Six of twelve questions originally posed to guide journal entries by preservice teachers in this study were selected for coding (see Appendix D). The selection...
of the six questions was based on similarities with questions used in the LaBoskey study as well as time during the semester when responses to these questions were made by the preservice teachers. A decision was made to average the scores from two questions at three different time intervals (for a total of three scores): (a) time one was prior to the implementation of projects, (b) time two was during the implementation of projects, and (c) time three was following the completion of projects. Journal entries for each preservice teacher were scored by an outside rater. This rater was trained by the researcher by reviewing the criteria and randomly selected journal entries in order to ensure a reliability and comfort with the meaning of the criteria. This rater was a former student of the researcher's and a recent graduate of the Early Childhood graduate program. The researcher then randomly selected six journals and scored entries. Average proportion of agreement between raters across all six questions was .86.

In the second phase, journals were analyzed to search for the emergence of themes and patterns in the sub-sample which would illuminate the re-creation of cultural scenes. Reviews were organized through the use of data displays (Grossman, 1990) and conceptual memos (Miles & Huberman, 1984). Data displays were simply charts on which data was organized and classified. Clusters representative of themes and patterns were created and cross-analyzed with time. These data supported the re-creation of cultural scenes. To triangulate the data, I shifted among journal entries, video tapes of teaching, audio tape transcriptions of team meetings, and retrospective interviews. The intention of this analysis was to
explore the nature of change and to create a portrait of the development toward collaborative inquiry-oriented teaching by selected preservice teachers.

The data generated from these journals revealed the emergence of common themes across preservice teachers' entries. For the purposes of this study, themes were defined as recurrent and shared ideas, perspectives, or beliefs about a topic. While there was evidence of these common themes, each preservice teacher revealed her own feelings, beliefs and style of inquiry not always shared by others. In this regard, data from journal entries were used to understand both individual as well as shared experiences and feelings by teaching teams.

**PCM.** *The Paragraph Completion Method (PCM)* is a measure of Conceptual Level (CL), used extensively in the field of teacher education (Sprinthall, Sprinthall, & Oja, 1994). CL is defined in terms of "(1) increasing conceptual complexity as indicated by discrimination, differentiation, and integration, and (2) increasing interpersonal maturity as indicated by self-definition and self-other relations" (Hunt, Butler, Noy, & Rosser, 1978).

The PCM consists of five paragraph stems (Appendix E). Preservice teachers were asked to complete the PCM once during the lecture class time prior to their implementation of projects by writing at least three sentences to complete each stem. PCM scores can range from 0 "not scorable" (not enough information) to 3.0, in increments of .5. The conceptual level (CL) score is determined by computing the average of the three highest scores. The level of the CL score is reflective of the degree of complexity and evidence of
interpersonal maturity in the written response (Miller, 1981). A CL score represents a particular "conceptual system in regard to teaching and learning" (Sprinthall, Sprinthall, & Oja, 1994, p. 389). Teacher attitudes associated with these conceptual systems can be clustered into three stages (see Appendix F).

The analysis and interpretation of the PCM scores are based on these three clusters or stages. High CL teachers (Stage C) with scores between 2.0 and 3.0 tend to be autonomous; prefer unstructured situations but can adjust to any level of structure; consider their work as providing inner growth, self fulfillment; and, are field independent. Low CL teachers (Stage A) with scores ranging between 0.0 and 1.4 see knowledge as fixed; need detailed instruction; believe teaching is "filling the students up" with facts; and are very uncomfortable with ambiguous assignments. One of the hypotheses of this study was that students with low rather than high CLs might be more challenged by the lack of structure and predictability when implementing collaborative projects guided by children’s interests.

**Video tapes.** Video tape clips of each teaching day for the sample (a total of 72 clips) were coded using an adaptation of one section of a Checklist for Rating Developmentally Appropriate Practice in Early Childhood Classrooms (Charlesworth, Mosley, Burts, Hart, Kirk, & Hernandez, 1990, see Appendix G) made for this study. This adaptation (Appendix H) was made using Developmentally Appropriate Guidelines in Early Childhood Programs, Revised Edition (Bredekamp & Copple, 1997) and the text, Integrated Curriculum and Developmentally Appropriate Practice (Hart, Burts & Charlesworth,
Preservice teacher practice was rated on six items including: theoretical perspective, emphases on curriculum, organization of the curriculum, teacher preparation and organization for instruction, instructional activities, and learning materials and activities. These items were adapted from the original checklist because they were most representative of the kinds of practices, tasks, and experiences associated with the teaching of collaborative projects in this study. The scoring for each item on each tape was situated across a Likert scale from 1 to 5. A score of 1 was defined as close to 100% inappropriate practice, a score of 3 indicated a fairly even split between appropriate and inappropriate practice and a score of 5 was considered to be close to 100% appropriate practice.

Three raters assisted the researcher. These raters had previously taken the course and/or served as teaching assistants for the course. The checklist was piloted with all raters by coding selected tapes and discussing differences in scores until there was consistency in defining and using criteria. The time for each tape varied from 10-45 minutes, therefore, video tapes were played halfway, then coded for five minutes. Inter-rater reliability was established between two of the raters and the researcher by coding seven video tape clips, originally coded by the researcher. Average Spearman correlations across raters on the total practice scores was .90.

Video tapes served three general purposes for the course and the current study: the development of preservice teacher practice; the documentation of the evolution of collaborative projects; and, as a mediational tool for teachers’ and children’s construction of
knowledge. For example, video tapes were used by teams to connect separate teaching days as each teacher shared tapes with one another. Tapes were used in team meetings and one-on-one conferences with me to guide decisions regarding teaching strategies on which to focus attention. Finally, tapes were occasionally used to extend classroom experiences for children by using tapes as a memory of previous experiences in the classroom.

Team meetings. Team meetings were semi-structured, providing me with an opportunity to "use a clinical supervision method [to] enhance the development of reflective practice..." (Roth, 1989, p. 34) of preservice teachers. The primary goal of these meetings was to "link knowledge to action...a critical component of inquiry and reflective practice" (p. 34). My role was one of mentor and more experienced learner. During these meetings I facilitated our engagement in a "recursive cycle" (Oja & Smulyan, 1989, p. 17) of inquiry which included sharing observations, reviewing documentation, participating in collective reflection, and collaboratively devising and revising plans for returning to the classroom. This recursive cycle is similar to MacKinnon's (1986) three-phase cycle of "reflective problem solving, reframing, and resolving." Through these shared experiences of inquiry both the creation of and the link between knowledge and action were socially constructed.

Two team meetings were scheduled with each project team. These meetings occurred following the first week and just prior to the final week of projects. Team meetings were audio taped for each team and transcribed verbatim for the sub-sample. Transcriptions
were analyzed for evidence of the emergence of themes or patterns of behavior which were noted and organized on data displays and used to triangulate data generated from journals and retrospective interviews, in particular. Team meeting transcriptions provided invaluable information regarding the process of recursive cycles of collaborative inquiry and the re-creation of cultural scenes.

**Post-project presentations.** Post-project presentations were oral presentations made by each team following the end of projects. These presentations occurred during the last three lecture classroom sessions of the semester and were intended to provide teams an opportunity to collaboratively reflect upon, analyze, and interpret significant events that occurred within their projects. Presentations were limited to 45 minutes each. The structure for most presentations included retracing the evolution of a project and describing the change in teachers' and children's learning through revealing events deemed significant by the preservice teachers. Preservice teachers were asked to include what they considered "successful" as well as "challenging" about their experiences and conclude with the ways in which these experiences contributed to their definition of good teaching in an early childhood setting.

Each presentation was videotaped for the sample and transcribed for the sub-sample. Transcriptions provided data for the development of a portrait of collaborative inquiry. Remarks during these oral post-project presentations were also used to illuminate analyses of reflective journal entries and transcriptions of team meetings and retrospective interviews.
Documentation. Post-project presentations were informed and guided by preservice teachers’ analysis of a variety of documentation. Documentation used during these presentations included: three documentation panels, a variety of artifacts created by children, and video tape clips of particular project events. Documentation as used in this study referred to the purposeful gathering and systematic organization and use of data which represented both processes and products associated with learning and teaching within collaborative projects. Once projects ended, preservice teachers were required to create three documentation panels which represented what they believed were the most significant learning events in the project for either children or themselves. The processes associated with this post-project analysis required a new level of negotiation and interpretation by each teaching team as they systematically organized and analyzed selections from their documentation stockpiles.

Retrospective interviews. My primary purpose for conducting interviews was to revisit themes which had emerged from my initial reviews of reflective journals, team meeting transcriptions, and post-project analyses. I desired a more intimate exchange and the time and opportunity to expand upon comments that I believed might serve to illuminate their experiences and contribute to the portrait of novice inquirer. I asked them to react to two video tape clips, one taken of their first teaching day and a second of their final teaching day. I was not only interested in their perceptions of how their teaching practice may have changed but how they felt about the
experience. I desired to provoke both a range of feelings and reactions to their collaborative teaching and reflective experiences.

Retrospective interviews were conducted with each preservice teacher in the sub-sample between April and July following the end of the course (the previous December). The format established for these interviews was semi-structured, focused on the topic of the implementation of collaborative projects. Interviews were guided by a set of questions (see Appendix I). Each preservice teacher was allowed to deviate from these time to time. Interviews were conducted in a variety of settings including my office, a local restaurant, and a private home. Interviews ranged from thirty to sixty minutes with the average interview lasting approximately 45 minutes. Each interview was audio taped and transcribed verbatim.
CHAPTER THREE

THE ROLE OF THE TEACHER EDUCATOR IN CREATING CONTEXTS FOR COLLABORATIVE INQUIRY FOR ADULTS AND CHILDREN

Schooling is a "system of relationships".... (Malaguzzi, 1993, p. 63).

The issue is not only how soon is the newborn infant ready to play his role as a member of a system, but how capable is the system of functioning as if the infant were already playing that role while he is learning to do so (Kaye, 1982, p. 36, italics added).

Just as young learners construct, so, too, do teachers (Fosnot, 1996, p. 216).

The reconceptualization of early childhood teacher education described in this research has been influenced and propelled by a confluence of contemporary interpretations of teaching and learning --including teacher research and reflective practice, principles of social constructivist theory, and the Reggio Emilia approach to early education, described earlier. In order to breathe life into this knowledge base and operationalize such a merger, it became necessary to reconstruct the environment within which preservice teachers and I teach and learn together to include the provision of space and occasions (including necessary tasks and routines) in which relationships are established, utilized, and subsequently changed among and between teachers and children.

The purpose of this chapter is to describe (the creation of) such a dynamic setting for supporting the education of early childhood
preservice teachers. A related aim is to illuminate the extent to which such a context for learning is dependent upon and transformed by the development of interpersonal and pedagogical relationships. The conditions for the establishment of these relationships are orchestrated in a manner that is intended to direct, guide, and ultimately sustain preservice teachers' thinking and practice. This setting—including the orchestration of activities within it—is built upon the premise that most preservice teachers will begin by functioning as if they are playing out the roles and activities associated with inquiry-oriented collaborative teaching. Thus, another essential component of the organizational and programmatic structure is that it supports preservice teachers as they develop relationships with one another and become more familiar with the processes and activities associated with collective reflective practice and collaborative teaching.

This chapter includes descriptions of experiences in which preservice teachers and I learn and teach together. A description of the conditions for creating a responsive yet systematic and purposeful environment for educating early childhood preservice teachers will be described by drawing upon experiences associated with teams of students who work together on a specific project of their choice. The discussion of these experiences and conditions has been organized within a timeframe for the fifteen week course (Teaching/Learning in Early Childhood Classrooms), which is divided into three phases: the orientation phase (weeks 1-5); the implementation phase (weeks 6-12); and the interpretation phase (weeks 12-15). Select experiences across these phases will be
described as they will reveal the ways in which my role as the teacher educator shifts from one that is initially predominately directive, then mediational, and finally non-directive, as I challenge preservice teachers' thinking and practice and as they respond to those challenges. Throughout these transactions, a concentric system of relationships is developed in which preservice teachers' early attempts to engage in collaborative inquiry subsequently lead to their emerging ability to create contexts for children in which similar processes of learning are supported.

**Conditions**

The fundamental conditions within this setting are conceptualized within two categories—organizational and programmatic—which are reciprocal and interdependent.

**Organizational Conditions**

Organizational conditions are those conditions that structure relationships both among and between people and with processes of learning. These include time and space (e.g., schedules and organization of space); opportunities for interaction (e.g., attending lecture, team meetings, and practica), and continuous experiences with a focus on joint activity (e.g., pursuit of a shared topic and team teaching the same group of children).

**Programmatic Conditions**

Programmatic conditions are those that provide the tools for coming to know and ultimately applying the principles associated with collaborative inquiry within project work. These include the use of reflective journals, in-class exercises, reading assignments, video tapes, documentation, and team meetings, all sub-conditions of
the ultimate programmatic one—the use of collaborative projects as a tool for educating early childhood preservice teachers. The influence and integration of these conditions will be revealed throughout each phase of the course within experiences situated in three locations: the lecture classroom, my office, and the children’s classroom.

**The Orientation Phase**

During the orientation phase, preservice teachers are immersed in the content of the course and the routines of their practica. We meet in the lecture classroom twice each week. In addition, preservice teachers participate in a four hour per week practicum in a classroom of three to five year old children.

As explained in Chapter Two, children come to the school in which this study took place, three or four times each week while preservice teachers attend their practicum on separate days. Teams are comprised of three or four teachers who teach the same small group of children throughout the semester. Children thus have a continuity of experience while each team has a common project and group of children to work with together.

Preservice teachers are assigned a small group of children during their first week based upon their pre-registration choices for a practicum day. For each morning or afternoon session, four preservice teachers are enrolled. The cooperating teacher for each session randomly assigns each preservice teacher to a small group of children which she has previously created. Thus, preservice teachers teach with two teams. One team is the team of preservice teachers who teach on a particular practicum day. The second team is the
Project teams. Project teams comprise preservice teachers who teach the same group of children but on different days of the week.

In the lecture classroom, preservice teachers complete three required texts (named in Chapter Two) which introduce the three broad areas of theory, research, and practice as illustrated by the Reggio Emilia approach and associated with concepts of developmentally appropriate practice. Related tasks include critiques of video tapes of teaching by previous preservice teachers and cooperating teachers in this setting as well as teachers in the preprimary schools of Reggio Emilia. Additionally, preservice teachers complete observation assignments of the classroom and children's play and teach a small group of children using activities prepared for them by their cooperating teachers. These activities are often related to the classroom theme or ongoing project initiated by the cooperating teacher with the children. Finally, preservice teachers respond to guiding questions in reflective journals in which they define and begin to analyze key concepts, ideas, and strategies associated with collaborative projects. These activities (teaching within the cooperating teachers' project, journal writing, classroom observations, and critiquing teacher practice) are designed to prepare preservice teachers for the implementation of their own projects to begin in the sixth week of the semester.

The Children's Classrooms

Preservice teachers first see the children's classrooms and are introduced to the program curriculum during the first week of the course (orientation phase). Preservice teachers' first practicum experiences include two days of observation of the children's
program prior to their participation in the program. During the first week, they meet with their cooperating teachers to review rules, routines, and schedules associated with the children’s program. They become familiar with the physical setting, locating paints, paper, and books, and exploring storage rooms filled with materials.

The children’s classrooms in which preservice teachers in this study teach are the first rooms visitors see when they enter the children’s school (see Figure 1). In all of the children’s classrooms, observation booths are built into one side of each room. On the opposite side of the classrooms is wall of glass over-looking the fields. Built along side a wall in the second nursery school classroom is a two story playhouse. Learning centers, traditional to many American preschool classrooms, are created throughout much of the space and include: easels; water, sand, and light tables; blocks and reading corners; computers; manipulatives; play-do and clay; and Piccolo, a large wooden riding horse.

The schedule of the day for both the morning and afternoon sessions includes outdoor play followed by circle time, small group time (which later becomes project time during the implementation phase of the course), snack, free choice, and a final circle before returning to the playground at the end of the session. The children’s program is rich with whole language opportunities, tasks that encourage discovery and problem-solving, music, and learning centers which change weekly. These experiences are loosely planned to reflect themes which change every three to four weeks depending on the interests of the children.
Figure 1: Floor plan of children's classrooms
Children are exposed to a variety of experiences, both teacher-directed and child-initiated. For example, children might choose to remain at an easel for a half hour or build in the black corner or play in the playhouse which also periodically doubles as a hotel, hospital, or grocery store. At the same time, teachers might invite children to work on a science project or add to a classroom mural. Computers are always a choice along with play-do or clay and dramatic play at the rabbit house constructed from a large hollowed log.

During this orientation phase, preservice teachers are not required to implement their own projects because it is important that they first develop relationships with one another, their children, cooperating teachers, and the principles and practices associated with project work. Instead, preservice teachers are provided activities prepared by their cooperating teacher to implement during small group time with the same group of children with whom they will later implement their own project. These early activities often reflect the curriculum theme or are a part of an on-going classroom project. Once preservice teachers begin participating in their weekly practicum (during the second week of the semester), they are introduced to the principles and practices commonly associated with project work during the lecture classroom time.

The Lecture Classroom

It is the first week of the course and I stand in front of the farmhouse classroom adjacent to the children's school as preservice teachers enter the place where we will begin our shared experiences and develop relationships. The desks are in rows, typical of many college classrooms. However, not so typical is the cavernous brick
fireplace and hearth stretching across most of an entire wall of the room. The mantel is empty and the logs cold, yet the vacuous fireplace is a bold reminder that we are coming together in a place that has previously been occupied by families who once lived in this house. It is a good and appropriate setting for us because we too will become a kind of family as we come to know one another and use this space. In so doing, we will create a place in which our intentions for learning are represented by our rearrangements and particular use of materials and equipment, furniture, readings, and processes of learning associated with collaborative inquiry.

On the opposite wall from the large brick fireplace hangs two documentation panels, created by preservice teaching teams from previous semesters as part of their post-project analysis. In this context, documentation panels typically include the systematic organization of a variety of records (e.g., photographs, transcriptions, and children’s drawings) and analyses by teachers of the significance of symbolic representations for teaching and learning. These panels were placed here as a memory of past experiences and relationships among preservice teachers and children within collaborative projects. They symbolize the possibilities of what is to come for new preservice teachers. This tradition of leaving a symbolic representation behind of previous course work reveals a part of the history of a classroom and is a common practice in the municipally run preprimary schools of Reggio Emilia. This tradition not only brings to life the work of previous preservice teachers it also demonstrates to new preservice teachers the possibilities for accomplishing what initially seems to many of them a daunting task.
In these early weeks, preservice teachers are challenged by the requirement to define and discuss the theoretical concepts and related practices associated with collaborative inquiry. Therefore, the application and subsequent use of these practices is introduced to preservice teachers through deliberate and systematic levels of exposure. First, they read about social constructivist theory and related practices (i.e., scaffolding and guided participation, documentation, zoped), discuss the relationship between the two, witness principles and practices in others' teaching, and begin to write about implications of the theory for their own beliefs and teaching. Such exploration requires time, interaction, and opportunity for reflection.

Among those theoretical concepts, philosophical ideas and related practices most central to this work are the following:

- environment
- documentation
- symbolic representation/tools and sign
- image of the child and 100 languages of children
- scaffolding and guided participation
- zone of proximal development
- participatory appropriation

The notion of environment utilized in this course includes both the social and physical possibilities created by the organization of space and time. In this setting, the environment is "seen as educating the child..." (Gandini, 1993) and as such serves as a teacher along with other members of the teaching team. This notion of environment is not static but is a dynamic system, responsive to
the needs, interests, and histories of children who work and play within it. An important part of this learning environment is the **documentation** of children's work and play. In this setting, documentation is defined as the purposeful gathering and systematic organization and use of data which represents both the processes and products associated with learning and teaching experiences within collaborative projects. Evidence of children's constructions of knowledge is **symbolically represented** through the use of photographs, transcriptions, children's drawings and constructions, for example. A representation is the "process by which knowledge becomes accessible to thought, becomes the images about which and by means of which we think" (Kaye, 1982, p. 119). Another essential idea of this context, is an **image of the child**, shared with Reggio Emilia educators, as "rich, strong, and powerful" (Rinaldi, 1993, p. 102). These competencies and associated knowledge are represented through children's use of a variety of media or symbolic languages which often become a part of the environment and reflect what Loris Malaguzzi has described as "**the hundred languages of children**" (Edwards, Gandini, & Forman, 1993). As young children explore and represent their environments they use a multiplicity of languages or "modes of expression, including words, movement, drawing, painting, building, sculpture, shadow play, collage, dramatic play, and music" (p. 3).

The term **scaffolding**, introduced by Wood, Bruner, and Ross (1976), serves as a metaphor for describing the "process by which an adult assists a child to carry out a task beyond the child's capability as an individual agent" (Stone, 1993, p. 169). As children
symbolically represent their knowledge, teachers use a variety of strategies including tools (e.g., writing utensils, paint, and clay) and sign (e.g., language and maps) for mediating children’s "influence on the surrounding environment" (Berk & Winsler, 1995, p. 21). These tools and signs function both as a link and as self-regulators for the development of higher mental functions as teachers support the extension of knowledge within children’s zones of proximal development. The concept of zone of proximal development or ZPD, in turn, refers to "the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers" (Vygotsky, 1978, p.86, italics in original).

The interpretation of learning is not one of a simple process of internalization or acquisition of knowledge, but rather describes a process of "constructive transformation" (Stone, 1993) that is achieved through participatory appropriation (Rogoff, 1995; 1993). Participatory appropriation refers to the "process by which individuals transform their understanding of and responsibility for activities through their own participation" (Rogoff, 1995, p. 150). Appropriation, in this sense, is a process of transforming rather than of collecting "stored possessions (such as thought, representation, memories, plans)... and [instead] treats thinking, re-representing, remembering, and planning as active processes" (Rogoff, 1990, p. 18).

During this first phase and throughout the course, preservice teachers often over-generalize the use of many of the concepts associated with collaborative inquiry. In many of these cases I allow
such over-generalizations, because it is a goal within this context to support preservice teachers' incorporation of theoretical knowledge within their practice in a very short period of time. Such incorporation occurs among preservice teachers as they engage in a variety of shared experiences orchestrated by me in which they talk about and use such concepts. For example, preservice teachers may refer to their ability to provoke children's inquiry through questioning by commenting, "I scaffolded them." Or, they might describe an episode in the classroom in which children worked together to solve a problem as "They co-constructed their knowledge." In these cases, preservice teachers' shift in language (e.g., from "questioned them" to "I scaffolded them") is an indication to me that they are beginning to analyze the complex relationship between their practice, children's learning, and theoretical concepts that inform practice.

Perhaps the most compelling challenge for preservice teachers in this context is their realization that they will need to make many decisions. Among the most difficult decisions include choosing a topic, determining which teaching strategies and combination of strategies to employ, and managing cycles of collaborative planning, teaching, and documentation necessary when implementing long-term projects. Many preservice teachers have opinions about what constitutes good teaching and good teachers. They realize that they now have an opportunity to emulate such teaching and create contexts for learning in which children and teachers learn together and share decisions and are often overwhelmed by the possibility.
It is during the second week that these realizations begin to form as I invite members of each project team to find one another and introduce themselves. The rows of desks in the classroom are moved into clusters. In these first in-class team meetings, which will be repeated numerous times during the semester, they share brief biographical paragraphs (written for the purpose of sending home to families with their photographs) and their first "concept maps" (Jones & Vesilind, 1996) on effective teaching (recorded in their journals (see Figures 2 & 3). The objective is for them is to come to know one another and share ideas represented in these summaries and maps about good teaching and their goals for becoming good teachers.

The concept map on effective teaching was part of their first set of journal entries recorded in response to guiding questions posed by me during their first week. The purpose of these questions is to provoke them to reflect upon teachers and teaching from their own experiences. To this end, they are asked to describe "effective teaching." One student writes, "Effective teaching is relating to children and helping them to form their own opinions and views about the world." Another writes that teachers from her educational experiences "who used creative tools and methods...and brought them out in the woods and had them build tools and caves...were the teachers that taught me the most--not the ones who had me sit in a class and listen to the professor read from the text." A third student adds, "an exciting, creative curriculum devised from the interests of the children helps create success and meaning in their education."
Preservice Teacher Introductory Paragraph

My name is Mary. For the past two summers I have worked at a nature camp and at a unique preschool. At the preschool, children of all abilities, including those with special needs, interact together to create a warm, loving and supportive environment. This summer at the nature camp I had the incredible opportunity to be a one-on-one assistant for a child with Down syndrome. Pursuing my bachelor's degree in family studies and my master's in elementary education will allow me to continue to enjoy children, make differences in their lives, and help them to grow. As difficult as it was to say good-bye to the children who I spent the summer with, I look forward to meeting and working with you and your children.

Preservice Teacher "Effective Teaching" Concept Web
Their journal entries and early conversations in the lecture classroom indicate to me that while these may be young and inexperienced teachers, they already know from their own experiences as learners some of the conditions and events that contribute to relevant and transformative learning experiences and provocative educational contexts. My challenge, at this point in the semester, is to find ways for these preexisting beliefs and values about good education and good teaching to be actualized in their practice in this setting.

**Video Tape Analyses**

By the second week of class, project work is introduced through their readings and video tape. Preservice teachers begin analyzing other peoples' teaching by using theoretical concepts and teaching strategies associated with collaborative inquiry. To support their analyses of the role of teachers and the evolution of projects, I provide them with questions to guide analyses of tapes of two projects implemented in Reggio Emilia, Italy. I begin with these tapes because they capture the energy, joy, and work of children discovering, hypothesizing, and representing their learning with one another and their teachers. Through these commercially produced tapes, the image of teacher and children as partners in which learning and teaching is transactional is brought to life in ways that the written word or spoken word in lecture simply cannot convey.

Preservice teachers first preview a video tape of a Reggio Emilia project called *To Make a Portrait of a Lion* (1987). In this tape preservice teachers witness the processes of discovery, long attention spans, and sophisticated renderings through drawing, clay, drama,
and paint by preschool-aged children of a 14th century lion statue in a local piazza. While this video tape reveals the attention to detail in children's representations and the variety of strategies for representing the lion, less obvious is the way in which the teacher provokes and guides the children's collaborative inquiry. Therefore, a second Reggio Emilia project tape is critiqued, *The Amusement Park for Birds* (Performanetics, 1994). In this video tape, the timeline for the emergence of the project, the relationship among multiple levels of symbolic representations, the use of a variety of materials, and the purposefulness of the children's collaborative inquiry with their teachers are described sequentially and in detail. I provide questions to preservice teachers to guide this second viewing focused on the strategies used by teachers to guide children's inquiry (see Figure 4). These video tape reviews, coupled with written descriptions of projects in their texts, orient preservice teachers not only to the strategies for implementing a project but to the rationale for collaborative project work.

Following these two reviews the focus in the lecture classroom shifts to work closer to home—the work of previous preservice teachers and master teachers within the laboratory school. These students and teachers bring into the lecture classroom their own video tapes and documentation which serve as a backdrop for their teaching within collaborative projects (see Figures 5 & 6). They describe how their projects evolved and what they, their teammates, and their children learned in the process. Even though they use theoretical concepts and name teaching strategies as part of their
Figure 4
Amusement Park for Birds Video Tape Worksheet

As you preview the introductory section of this video consider how you will answer the following questions.

1. What was the primary focus of each month?
   February
   March
   April
   May
   June

2. How did children re-represent their knowledge?

3. What media were used by children?

4. What was the sequence/cycle of those media?

5. What was the purpose of visiting the fountain?

6. How did projecting a slide of the fountain assist children in producing their own symbolic representations?

7. What were some examples of the E-R-E-R phase sequence?
Figure 5: Previous teams present their project

Figure 6: The space project is presented to a new class of preservice teachers

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descriptions, their application of those principles and practices seems far more attainable to the new preservice teachers. As one student later wrote in her journal,

...though I loved the lion and amusement park for the birds videos, it's hard not to feel defeated by the 'perfection' of the Reggio set up for project work. It's good to remember that it is okay to be at a starting point, rather than starting with a finished idea. I guess that’s common sense, but I think it’s hard not to get ahead of yourself sometimes.

As former students and master teachers describe the ways in which both they and their children learned, documentation supports their analyses of their projects. Documentation strategies typically shared include: video tape clips of their teaching; artifacts from children's constructions; and large panels on which photographs, transcriptions of children's conversations, children's drawings, and teachers' analyses of learning processes are systematically organized.

The stories often include teachers' individual and collective challenges and their struggle to learn, reflect, and teach as members of a team. However, most of their time is focused on the ways in which they and their children were transformed by the process. For example, when one former student’s team presented to this class, she shared a challenge common to many preservice teachers. This challenge is the requirement to enter the children’s classroom "prepared for the possibilities" yet without a prescribed plan. She went on to say that through reviews (with me and her teammates) of her teaching video tapes, she was able to observe how her practice changed over time,
At the beginning, I was really nervous at not having a set plan to bring into the classroom, but now I am fairly comfortable with playing on the children's ideas. I have learned how to distinguish between the things they say that I can use and what I can't. I can see a big difference after watching the video tapes in how relaxed I am. [Initially] I was very rigid, talked too fast, and couldn't get the words out. Now it seems to flow easier.

Members of these teams often comment on how they worked as a team by sharing the ways in which they shifted from working separately toward working as a collaborative unit. They often spend time describing the impact of creating documentation panels on their development as teachers. One student noted, "The panels allowed us to grow as a team and work like a real team cooperatively together, complementing and striving for a common goal." Another added,

"The panels were a lot of work so it gave our group a great sense of accomplishment. To put items on the panels we really needed to pull things out of the project. We needed to make a lot of decisions. The things the children learned and their process of learning jumped out when we pulled dialogue out and drawings and pictures."

By the end of these presentations, the new class of preservice teachers appear sure of at least two things. First, that the implementation of collaborative projects is gratifying but hard work, requiring time, reflection and constant interaction among teachers and between teachers and children. Second, there is a reciprocal relationship between documentation and practice in which documentation informs practice and practice generates documentation. By this time, most preservice teachers seem anxious to begin their own projects. I take advantage of their anticipation as I continue to orchestrate their collaborative learning.
Exploring Media

In the final weeks prior to the implementation of projects I organize team tasks in the lecture classroom focused on the use of diverse media. A common exercise is to assign a single task to all teams, yet provide each team with different materials (e.g., paint, wire, clay, Plexiglas, water colors, various sizes and types of paper and markers). The objectives of this exercise are broad-sweeping: (a) to expose preservice teachers to diverse media; (b) to provoke their analysis of the ways in which different media afford learners ease of representation (Forman, 1994); (c) to provide a shared experience in which each team is focused on a joint activity; and, (d) to practice how to document processes of learning.

One member of each team is assigned the job of the documentor while the remaining team members use materials to complete the assigned task. The documentor records the team's experience by taking Polaroid photographs, recording conversation on audio tape players, and writing field notes. If the task is to represent a large Hubbard squash, for example, the final representations will be influenced by the size of the paint brush and paper, the properties of wire, and/or the malleability of play-dough versus clay. The impact of these variations in media on teams' final drawings, paintings, or constructions are noted by each documentor and presented to the class.

Choosing a Topic

During the fourth to sixth weeks, I require teaching teams to decide on a project topic. They have only two weeks left to listen carefully to their children, observe their play, and recall children's
questions and interests. While choosing a topic may seem like a rather simple task, it is among the most difficult challenges faced by preservice teachers. To support them in this challenge I provide questions to guide their decision-making process (Figure 7). Teams meet to collectively respond to these questions during their class time. I situate this work in the lecture classroom for two reasons. First, it provides me an opportunity to listen in on their conversations and learn about the ways in which they are attending to their children's play and conversations. In addition, through their ideas about how to introduce a topic and prepare activities, I learn what they know about young children’s development and developmentally appropriate practice. Often, I make alternative suggestions which are more appropriate and provide them with tools for managing the wide range of choices associated with the implementation of projects.

A second reason for having such planning sessions in the lecture classroom is because they provide me a valuable opportunity to discuss with the entire class the advantages of particular topics being discussed and to invite the participation of all of them in shared activities. Often we go back to their texts, video tapes and previous team’s project presentations to consider different topics and the many ways teachers introduced them. This is one of the first times I arrange for a collective reflection and collaboration across the seven teams, the first of many more similar in-class exercises. These activities support my belief that the management of emerging experiences in which teachers and children are partners must first
be framed by the teacher educator outside of the children's classroom.

Figure 7

FS 635 Project Worksheet #1

<table>
<thead>
<tr>
<th>FS 635 Project Worksheet #1</th>
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</thead>
<tbody>
<tr>
<td>1. Identify at least two project topics which have met the criteria for relevancy noted in your text (Katz &amp; Chard, 1989).</td>
</tr>
<tr>
<td>1.</td>
</tr>
<tr>
<td>2.</td>
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<tr>
<td>2. List open-ended questions which should be asked during the early phase of determining which project to pursue. How will you introduce the choices? (relate to next question)</td>
</tr>
<tr>
<td>3. To help you determine how to introduce your project, list books, photographs, artifacts, and experiences you believe will generate interest and conversation among your children.</td>
</tr>
<tr>
<td>4. What other introductory material can you bring into the classroom? How will children use these materials as they investigate or represent aspects of the project?</td>
</tr>
<tr>
<td>5. Identify a minimum of two topics and create topic webs for both. Use these webs to further consider the relevancy and possibilities for inquiry.</td>
</tr>
<tr>
<td>6. Identify and schedule experiences such as field trips, visitors, cooking experiences, etc.</td>
</tr>
<tr>
<td>How will you or the children invite partners to the classroom?</td>
</tr>
<tr>
<td>How will you inform and involve parents? The larger community?</td>
</tr>
<tr>
<td>Will children be asked to bring in resources or supplies?</td>
</tr>
<tr>
<td>7. Identify ways children may represent their emerging knowledge.</td>
</tr>
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It is at this time that I introduce to teams two tools which I developed to guide their decision-making for planning, teaching, and documenting experiences throughout project work. These tools are the E-R-E-R sequence and the three circle diagram.

**The Explorational-Representational Sequence (E-R-E-R)**

Within every project there is a sequence of explorational and representational phases. The length of time within each phase is dependent upon a particular project. Critical to the notion of E-R-E-R is the intention of the teacher. An explorational phase is a period of time in which the teacher designs activities and experiences intended to support children’s co-construction of knowledge as they investigate and experience new perspectives regarding their topic of inquiry. A representational phase is a period of time in which the teacher designs activities and experiences within which children symbolically represent their knowledge through drawing, drama, clay, and story, for example.

A single activity might include both an explorational phase and representational phase, or an explorational phase may last for days. The important point is that preservice teachers must determine their primary objectives which include whether they intend for children to explore a topic or to represent their knowledge of the topic. This tool provides teams a strategy for analyzing their plans and sharing their ideas about how to proceed. For example, often team members can be heard asking one another, "What is our intention here? If we want the children to represent their knowledge, what media do we need to prepare?"
The Three Circle Diagram

This Venn diagram (see Figure 8) is a planning tool for guiding preservice teacher's decisions to create activities and tasks that provide multiple experiences for children's inquiry within collaborative projects. To this end, preservice teachers consider three aspects: (a) categories of learning (knowledge, skills, dispositions, and feelings) as identified by Katz (1987) and Katz and Chard (1989), (b) developmental capabilities of their children, and (c) type of desired activity—investigation, dramatization, or construction (Katz & Chard, 1989). They must constantly ask themselves questions regarding these three aspects. For example, what knowledge and skills do they intend to extend among the children? What dispositions for learning (e.g., creativity and helpfulness) do they wish to support? How would an investigation experience guide children's inquiry? When would a construction activity make sense to follow one focused on investigation? Together, the E-R-E-R sequence and the Venn diagram serve as planning tools to guide preservice teachers' choices of activities and subsequent collective reflections about those activities, decisions to pose a particular challenge to children and determinations of what to document (e.g., when to photograph/audio tape).
Figure 8
Venn Diagram

My Office: The First Round of Team Meetings

During the orientation phase, teams are required to meet with me out of the lecture classroom. The purpose of these first team meetings is for me to hear how they have determined to introduce their project topic to their children. While I sit in on various team meetings held in the lecture classroom, I require three formal meetings with each team in my office. Following the initial one, a second is scheduled after the first project week and a third just prior to the final week of the projects.

My role during these team meetings is reflective of my role in the lecture classroom. While in later team meetings I am increasingly collaborative and non-directive, during these first meetings I am typically directive, often giving mini-lectures in response to their ideas and plans. The following lengthy excerpt is typical of early meetings with teams for a number of reasons. First, they are often reluctant to trust their observations and choose a topic based on children’s interests in something. Instead, they tend to choose topics that are broad-sweeping and somewhat grandiose. For example, Nancy indicated in her journal following her team’s first
meeting that her team initially considered themes such as oceans, dismissing topics that they believed would be too simple such as pets, for example. Second, preservice teachers sometimes reveal their biases about children during these conversations. The following example regards gender. At these times, I must constantly be mindful of whether I will address issues unrelated to our primary discussion and, often, I choose not to pursue them in order to keep the team focused on their primary task.

Me: Why don't you share with me some of the topic ideas you have and we'll try to analyze them together.
Leah: Some of the trouble that we're having is...we were talking about the age group that we're dealing with, it's the three year olds. I'm not sure how interactive they're going to be in what we do.
Alice: We give them something to do and they are just like, yeah we did it and....
Leah: Yeah. They're not very into it. I know it's a hard job to get them to be active participants and we try to get their curiosity and to peak that...but I guess the problem we're having...is that what kind of a topic can we focus on that is going to help us to pull that from them?
Me: When do they seem most engaged, either individually or collectively?... Think of the whole morning. Outside, inside, free choice, small group and circle time? What do they do that you think they enjoy? What are they doing right now?
Nancy: Well, the girls are different from the boys. The boys have more fun with creative things on the floor such as the community busses and roads. They built bridges the other day but the girls get bored very fast. You'll find the girls off in the corner with the stuffed animals...the girls pay more attention to stories being read. Boys, you know, lose interest.
Me: OK. Is there a way to bridge the gap between what the girls seem to be interested in and what the boys seem to be interested in?
Alice: We were thinking of pets and incorporating...
Me: Could you combine construction with pets?
As the team discussed the possibilities for developing inquiry among their children, they considered asking children to draw or paint a picture of their own pet on the first day of the project. While this idea was not necessarily an inappropriate one, I took advantage of the opportunity to discuss why they might not invite children to use one dimensional representations, instead waiting until after children explored and constructed on a three-dimensional plane. This suggestion provoked the team to discuss the possibility of using a variety of other media such as clay, photographs of pets, magazine pictures of animals, and collages. At one point they returned again to their original idea about requesting their three year old group to draw on the first day. I once again redirected their thinking and planning, relating my comments directly to some of the content we were currently discussing in class:

Don't focus [primarily] on graphic representations because children have hundreds of languages to represent what they know. Now the trick is to say...what are their other languages?...What can you do to be their partner in representing what they know? In order to begin a project, you have to have an image of a project—the way it can go—and then, you have to give up a lot of your wishes for it and [instead] prepare for the possibilities.

There is a constant challenge faced by preservice teachers to plan activities for children prior to first engaging children in an exploration of a topic. These activities are typically close-ended, teacher directed, and reminiscent of preservice teachers' own early childhood experiences. My challenge is to know when to allow such activities to evolve and when to redirect them. I often describe my role on each team as one of ex officio member and more experienced learner. From this perspective, I offer suggestions—sometimes
strongly. Yet, if teams are insistent and I do not believe their ideas would be detrimental to children, I usually let them proceed. I then record those experiences on video tape and use those tapes in class or team meetings to point out the ways in which children's collaborative inquiry could have been more effectively supported. I often use what some might consider errors in decision-making or what some preservice teachers perceive as failures to point out what went well, what needs to change, and how we learn from attempts to operationalize particular theoretical concepts filtered (Hollingsworth, 1989) by our beliefs and values.

The first team meeting continues and we discuss our beliefs regarding children's capabilities. My intention during this part of our meeting is to be very sure to identify some of the ways in which three year olds are competent. Following our discussion in which we listed a variety of skills and abilities, one student summarized her thoughts by saying, "I guess our biggest stumbling block with the whole thing so far was the fact that we were putting them in a position of saying they are three year olds and we were limiting them before we even got started." To this comment I respond by saying,

Reggio Emilia teachers would say that children are powerful--children are competent. Our job is to think of events and experiences that release that competency. And so, you're right. I think what's happening is that you are adjusting your lenses a little bit and so for the next week or so, start looking at what they can do? For example, can they push a button and wait and pick out a Polaroid picture of their favorite stuffed animal? What can they do and where can you move them a little bit more? You know, that's where the zoped comes in....
Once again I return to concepts and content in their readings including Reggio Emilia educators' image of the child as powerful and competent. I use this notion along with developmentally appropriate practice and zoped to suggest to them that our image of the child is directly linked to decisions we make in the classroom. Further, as they remain open to reflection about their beliefs regarding children's competencies and good teaching, they will undoubtedly revise their goals regarding how to create contexts for supporting and extending children's learning.

This team meeting excerpt typifies a common challenge shared by me and preservice teachers, which is how to find ways to meet and challenge children's learning, together. It is critical in these weeks just prior to their projects that they believe they can enter the classroom prepared to meet the challenge of implementing a project, supported by me, one another, and a framework for managing their reflections, planning, teaching, and documentation. That is why I typically use phrases like "our job" and "we'll analyze together" as I orchestrate a wide variety of team tasks, offer tools for managing the many decisions, and plan exercises for revisiting and applying theoretical concepts and related practices.

During the final lecture class before projects begin, teams once again group their chairs together to generate then share with their entire class their plans for their first project days. Teams often offer suggestions to one another for modifying preparations for the first days. Through these shared experiences they begin to create a community of learners using many of the same strategies with one another as they will use in their teaching.
The Implementation Phase

During the implementation phase, analyses of projects, team meetings and reviews of earlier readings take the place of lectures on theory, teaching practices, and the advantages of collaborative learning and reflective practice. It is now the ninth and tenth weeks of the semester, just prior to the final weeks of the projects. Round two of team meetings are underway, guided by questions answered by preservice teachers prior to their meetings with me and often discussed within the lecture classroom (Figure 9).

The chairs in the lecture classroom are now left permanently clustered. The classroom is open hours before and after class time. Teams meet to have lunch, spread out their photographs and artifacts of children's work, review video tape clips, or listen to audio taped conversations. Occasionally teams invite members from other teams to join them, asking for their opinion and advice on how to proceed. Such cross-team collaboration has been routinized during the course of the semester particularly by in-class collaborative exercises prepared and framed by me.

I design in-class exercises in an effort to guide their analyses and reflections regarding how to extend their projects. Instead of critiques of video tapes of Reggio Emilia teachers or previous preservice teachers, I now bring video tape clips of projects-in-progress and we begin to analyze them for the purpose of supporting future planning by teams. In addition, we talk about events in projects that are particularly significant either to the children or to the ability of a team to determine how to extend previous experiences of children.
FS 635
Mid-Project Questions

1. Where are you in the E-R-E-R sequence?
2. What representation of knowledge has spiraled?
3. What do you think is the next step?
4. What examples of documentation do you have? Do you need?
5. How has the children's knowledge changed?
6. What information do you still need to provide? Revisit?
7. Do you plan to suggest/provoke a collaborative task? If so, what suggestions can you offer?

Among the most helpful in-class exercises shared by teams are: (1) revisiting and analyzing selected readings; (2) critiquing video tape clips of peers; and (3) analyzing significant project events. The goal during these exercises, described next, is to shift the decision-making and power of what to discuss from me to them through show-casing their work, validating their accomplishments, and providing a public forum for their collective reflections and collaborations. These experiences and their participation in them are framed by me in order to guide their learning, clarify concepts, and make explicit connections between their teaching and core principles and practices associated with collaborative inquiry.
Through these in-class exercises, preservice teachers discover the value of documentation because they now depend upon it to represent and mediate their analyses and collective reflective practice related to on-going projects. Such intermental activity is a necessary experience for preservice teachers' appropriation of knowledge and skills as they return to the children's classroom poised, mindful, and prepared for the possibilities.

Following are three scenes that represent selected in-class experiences. These are: (a) analyses of selected readings; (b) a critique of Rachel's video tape; and, (c) analyses of project events. These scenes illuminate the emergence of a new level of understanding and sophistication among preservice teachers' collective reflections and collaborations and portray changes in my role from a directive toward a mediational position.

Exercise #1: Analysis of Selected Readings

Preservice teachers are asked to come to class prepared to analyze examples from their text, *First Steps Toward Teaching the Reggio Way* (Hendrick, 1996). In this text, American early childhood educators describe projects in which they have adapted principles and practices associated with the Reggio Emilia approach to early education. What follows are two excerpts in which preservice teachers analyze the relationship between documentation and reflective practice. The first is an example of how collective reflection informed teachers' practice. The second is an example of the role of documentation in guiding children's learning. My primary role during these exercises is to make explicit the connections
between teachers' work described in the text and the current work of preservice teachers.

In the first excerpt, three preservice teachers share their reactions to the reading:

Jenn: Chapter 7, page 92. What they had done was transcribe the children's conversations on the leaves. They met as a team to read it together and they read it out loud which they found better than reading it alone. They used the dialogue to tell them what the children already know and think, what they feel, question, or wonder. They use their comments and their [the children's] interests to develop activities.

Me: So that was a team collaboration; a team reflection. Reflective practice is what we do a lot of in this class. It looks like journal writing, listening to audio tapes, looking at video tapes, talking with colleagues. There is individual and collective reflective practice. In this class we focus a lot on collective reflection. Why would I want you to be a part of collective reflective practice more than individual reflective practice?

Kasey: Because in a conversation you sometimes realize what others' see—something you didn't see.

Me: Right. So there is attention in this class to multiple perspectives. Multiple perspective-taking means considering different media as well as voicing and listening to multiple interpretations.

Me: Any other collective reflective practice examples [in this class?].

Tina: When you watch the video tapes of yourself?

Me: OK. Because you are using them as a medium. That's called video-stimulated recall. It stimulates you to recall events in your teaching or children's learning and then you make decisions and choices with your team, based on them.

In this excerpt, three preservice teachers engage in and describe the value of collective reflective practice. Jenn first identifies a passage in which collective reflection was influenced by documentation. Next she shares this example with her peers in a setting which invited diverse interpretations. For Kasey, who rarely
spoke out in class, this exercise gives her an opportunity to voice her opinion about the advantages of collective versus individual reflection and she also determines that reviewing video tapes was a collective activity rather than an individual one. This was an important acknowledgment because at this time in the semester, there are a few teams who continue to resist sitting down together to review video tapes of each other's project days.

For me, this example was also an opportunity to point out to the class the value and worth of transcribing audio tapes as part of collaborative inquiry. Since preservice teachers are not required to transcribe tapes, I try to take advantage of these kinds of opportunities to make a point that documentation has a positive impact on practice. Occasionally I bring transcriptions in to class. While preservice teachers listen to audio tapes and preview video tapes, they rarely take time to transcribe children's conversations until they begin to prepare their documentation panels and post-project analyses. The exception is when transcriptions are used in their teaching. Still, it is far more likely that they would bring an actual video or audio taped conversation into the classroom to use as a medium for assisting children's recall or provoking an extension of earlier experiences or ideas.

In the final excerpt, three preservice teachers and me use a single project from which to analyze the relationship between documentation and teacher practice. This example typifies the sharing of multiple perspectives that I encourage during our class time together. This kind of exchange is often new to students. Nevertheless, if I expect them to collectively reflect in their team
meetings without my participation, it is important for me to first model this process and demonstrate the advantages of such work. In the following excerpt, preservice teachers point out examples of the relationship between documentation and practice.

Tina: Chapter 9, when she was doing the water project. She mounts photos... gives a narrative of their experience... shows the some of the photos and asks them to remember and draw about the project. She realized that she had given them the opportunity to further their dialogue by looking at the photos of [their experiences] before.
Me: Have any of you used this strategy [photographs] before?
Amy: Another thing she did was ask them if they wanted to make boats and every time the material didn't work for one reason, she'd ask the children why they thought it didn't work....
Me: So, she used that [transcription of children's collective reflection] to inform her own practice.
Kim: Another thing....When she looked back on that [transcription of their conversations] she wished she had extended more on that [experience].
Me: And have you done that before? Wished you had done something different--asked a question.
Class: Yea.
Me: It is very important for you not to say, 'Oh, I screwed up again.' [Instead] we are saying, I had a missed opportunity but--I'm aware of it now. That's what learning to teach is about. It [includes] becoming aware of missed opportunities and taking advantage of them the next time [you teach or plan]. Because there is nothing more relevant than your own experience.

In this exchange, there were four active voices sharing various perspectives regarding the relationship of documentation to teaching. As we shared our opinions and analyses about other teachers' work we likewise validated the efforts we were making to use documentation within our own setting. Our process focused both on the mechanics of documentation (e.g., listening and altering media)
and operationalizing a belief that to learn to be a teacher is a lifelong process.

Through this shared experience we were creating shared meaning about what it means to become a good teacher. I took advantage of this teachable moment to infer that I believed good teaching was about taking pedagogical risks and learning from them. Implicit in my comments was an image of teacher as an active decision-maker, partner, and reflective practitioner.

Exercise #2: Critiquing Rachel’s Video Tape

During our next class time teachers critique a video tape of their peer, Rachel, recorded by me on the previous day when she taught in her practicum session. Video tapes serve multiple functions in this setting. First, they document the evolution of the project. Second, they record the change in practice for each preservice teacher and create an occasion in which I sit down with them to preview tapes so that we can point out aspects of their practice to target for improvement. Third, tapes provide evidence of children's learning. Fourth, video tapes connect each teaching day for members of a team so that preservice teachers who teach on separate days can see and analyze each day of the project. Finally, tapes are occasionally brought into the classroom by preservice teachers to help provoke children's recall of earlier experiences. Overall, video tape is considered by me and preservice teachers as the most valuable tool for documenting teaching and recording the evolution of learning for both teachers and children. As one preservice teacher noted,
I could look and listen to my strategies and critique myself. My fellow project members reviewed the tape as well and were able to give constructive criticism as to what needed to change and what was effective in my approach. When reviewing the video, we were able to effectively plan our next session based on what we saw and what we needed to emphasize or revise in order for collaboration to continue with our group of children and ourselves.

I chose the tape of Rachel because it was a turning point for her and her project team. Rachel's team was implementing a Caterpillar Project with four and five year olds. During their first project week I had repeatedly asked that they find a way to bring into the classroom real caterpillars and butterflies—dead or alive—yet they resisted.

Instead, during their first project week, the team continually brought in activities both prepared and directed by the teachers. The team was challenged by the principle of allowing children opportunities to explore while providing them with multiple media from which to represent their knowledge and experiences. For example, on one day a member of the team brought into the classroom precut and colored pictures representing the stages of the Monarch butterfly. Each child was handed a set of sequencing cards and asked to put them in order. This activity was implemented even though I had requested that it not be presented. When I met with the preservice teacher following this day to review and discuss her video tape of the experience, I asked her why she had planned an activity which was clearly counter to much of what we had discussed for five weeks. Her response was simply, "I know I shouldn't have but I couldn't help it. I have been taught one way for thirteen years
and now after five weeks you expect me to change. It isn't that easy!"

Following this first week, I met with the team for their second formal team meeting. In this meeting, I insist that they locate authentic materials and prepare activities in which children engage in discovery. An important principle that supports children's inquiry is to find ways to ensure that they experience a topic through multiple media including authentic materials. When children are brought into relation with real insects, leaves, and water their ability to investigate, closely observe, and generate hypotheses and representations are afforded maximum opportunity (Forman, 1994). The team agrees and we discuss a variety of options including bringing in mounted displays of butterflies and moths. As a result, Rachel brought in displays and real butterflies for children to hold.

Preservice teachers use seven guiding questions prepared by me to review Rachel's video tape (see Figure 10). These questions guide their reflections as they watch Rachel teach. As a result, when her tape ends, the collective reflective process that follows tends to be more cohesive and focused.

Rachel introduces her tape by saying,

> We had decided that we needed something real to bring into the classroom because we needed direction. We had gone over a lot of sequencing of caterpillars the week before and they had done drawings. Camouflage had come up and that is what we decided to pursue.
Worksheet for Analysis of a Project Video Tape

1. Which circle of the three-circle diagram provided direction for this part of the project?

2. Did you observe collaborative learning/peer tutoring? If so, what was the role of the teacher?

3. How was questioning used and what types of questions were asked?

4. Was there evidence of co-construction?

5. Did you notice an episode of cognitive disequilibration?

6. Identify two examples of scaffolding.

7. What re-representations of knowledge did you observe?

The video tape revealed the children’s full engagement in discovery as they remained focused for almost thirty minutes (see Figures 11 & 12). When one of the children, David, held a butterfly in his hand he was surprised at the sensation—or lack of it. He was in disbelief as he discovered that butterflies are so light that he could not feel them when they are placed in the palm of his hands. That was something I did not know and I realized that his amazement and wonder was shared with and affected me, his peers, and Rachel.

From this day until the end of the project, the wonder of butterflies and the investigations that guided children’s comparisons with moths and discoveries of their natural habitats was propelled
Figure 11: Children investigating butterflies

Figure 12: Children holding butterflies
for the children and teachers of the Caterpillar Project. Rachel wrote in her journal, "This day was a big step or turning point to our project because we finally were exploring...we had real butterflies to share with them." Consequently in the following weeks, children drew caterpillars, painted their own drawings of butterflies (eye spots and antennae included), constructed habitats intended to camouflage, and painted a collaborative mural that included plenty of grasses, leaves, and limbs for protecting their representations of flying butterflies and crawling caterpillars (see Figures 13 & 14).

Throughout this cycle of inquiry which included what is commonly referred to as "hands-on" experiences, children transformed their knowledge about butterflies because their minds were focused on the construction of new knowledge. As George Forman has noted, "the procedures required to produce change [in knowledge] do not come from the hands, but from the child's thinking about differences OVER TIME and how one difference LEADS TO another, not simply that two things are different" (G. Forman, personal communication, February 19, 1998).

What often propels the development of collaborative inquiry among teachers and children and between them and the topic are moments like this one. Not only did Rachel learn that children construct their knowledge over time but that the ability of preservice teachers to construct their image of good teaching emerges over time, leading to new experiences and understandings.

The remainder of the lecture class time is devoted to responding to the rest of the guiding questions. During this time,
Figure 13: Chris's drawing of a butterfly

Figure 14: Childs drawing of caterpillars
preservice teachers use a common language understood by each other and representative of their shared experiences of becoming collaborative inquirers. For example, concepts such as collaboration, higher order questioning, and co-construction are identified and discussed. I ask the class to respond to Rachel's use of questioning. Following is an excerpt of their analysis:

Mary: She used a lot of higher order questioning, like 'what do you think about this?'
Me: What kind of information was she seeking?
Mary: Knowledge [that] they already learned.
Tina: [She was] co-constructing knowledge.
Me: Right. She was expanding it....
Hannah: She was revisiting the previous week....She was introducing new vocabulary words such as mimicry, camouflage, eye spots, antennae, Tiger Swallowtail.

We continue to critique other preservice teachers' video tapes over the next few days. Our critiques of these tapes contribute to a sense of community as we validate one another's teaching and the efforts by teams. Even though most preservice teachers teach on separate days, they often implement an activity that has been planned by their team. As a result, the practice of individual teachers is both a reflection of individual knowledge and expertise a team's thinking and planning. Thus, teachers sometimes implement activities that would be unlikely for them to plan and implement on their own.

As noted earlier, I am present in the children's classroom as preservice teachers teach. My role in this setting is to document their teaching through video tape as I complete written summaries of their teaching. The purpose of these field notes is two-fold. First, to point out strategies for improving practice and second to offer
suggestions to teams for considering how to extend the project. In addition to these written summaries and video tapes, I occasionally support their teaching and documentation. For example, I might take a photograph, turn on an audio tape player, or offer assistance to a child. My goal is to assist and provide another perspective, not take over their teaching and documentation.

In addition to my video taping, writing field notes, and occasional assistance in the children's classroom, preservice teachers begin to partner with one another in the classrooms on a voluntary basis. This occurs for at least three reasons. First, as projects evolve, project activities tend to increase in complexity often requiring the presence of more than one teacher. The management of these activities is often a challenge for teams. One response to this challenge is that members of a team will rotate co-teaching with one another. This means that one member of the team joins a teammate voluntarily, because the team has determined that the activity might be more successful if two members of the team are present. For example, as will be discussed in Chapter Four, when the water project team decided to provide children with plastic piping to build their own underground pipe system, teachers co-taught (see Figures 15 & 16). The team determined this was necessary because of the variety and uniqueness of the materials and the need to manage pouring water, puttying joints, and rearranging buckets to catch the water.

Second, team members increasingly desire to be involved in as much of the project as possible. They want to be present and
Figure 15: Preservice teachers co-teach

Figure 16: Teachers co-teach to better support children's constructions
witness first-hand more of their project's days. As one preservice teacher remarked,

We wanted to see more of what we were doing. We didn't believe that going in once [a week] was good enough. When we went in on one another's days, we got to see more. So, therefore, we knew if the project was working and we knew what the children were being exposed to....That was something the we didn't do according to the course but that's something we chose to do.

Finally, the need to document these more complex activities periodically requires the participation of more than one teacher. While I am always available in the classroom to assist, by this time in the semester most teams arrange for a second or even third teammate to take photographs or write field notes while one teacher teaches (see Figure 17). As one preservice teacher recalls,

It was hard sometimes to remember to take photos or get the tape recorder to record conversations. We were always kind of like, 'oh, I have to do this too!' But I think we worked it out toward the end of the semester that one of the other teachers would come in and they would take photos....It was [then] a little bit easier to [remember] our ideas for [teaching] that day.

These changes in response to the collaborative management, teaching, and documentation of projects develop as preservice teachers assume increasing responsibility for their work. No longer is it necessary for me to direct their decision-making. Instead, my role continues to shift from a directive toward a mediational stance. In addition to responses to selected readings and critiques of video tapes, preservice teachers participate in a third in-class exercise, the analysis of project events.
Figure 17: Preservice teachers document for each other
Exercise #3: Analyses of Project Events

Preservice teachers arrive at the lecture classroom and settle into their permanently clustered desks. By this time, they have rearranged the furniture and stored stacks of documentation on the hearth. Each team now sits in a designated space. For example, the train project team now sits to my right, the water team on my left, and the leaf team back in the far left corner in the very spot where we first met to choose their topic. We are now approaching the final project weeks and most teams have two things on their minds—to maintain their momentum and begin to prepare their documentation panels and post-project analysis. The following exercise is a precursor to the many decisions they will soon make as they select experiences to represent on their panels and share in their oral post-project analyses.

Prior to attending class on this day, preservice teachers were asked to meet and choose what they considered to be a significant event from their project and come to class prepared to tell why. I structured their deliberations by asking that they:

1. Provide a brief and clear description of an event.
2. Determine what was pedagogically and developmentally significant.
3. Describe how the team will use their analysis to inform future plans.

This exercise was given to them for two reasons. First, I wanted to model one way to systematically reflect upon daily events in their projects. Second, I wanted each team to share with others a particular event that they believed would impact their future
practice or their reflections about children's learning. In this exercise, a third objective was to move them beyond simply collective reflection toward collaborative reflections from which they needed to make a joint decisions would be made. A preservice teacher from the train project begins,

We're the train project. We've been role-playing the conductor, the snack person, and the engineer.... I revisited doing the role-play again. Our event that we talked about was with Mary Kay—she knew, um, she's a real quiet person. So Friday she got right up and was willing to put on a conductor's jacket and hat; she went and collected the tickets; then she sat in the engineer's seat and started driving. She did this without any real cues. It was pedagogically significant because dramatization helps them to internalize their knowledge. We thought that because Mary Kay was able to act out the roles she not only knew the order but how to act them out. We also learned from this that role-playing and guided participation are significant teaching tools to help the children learn what to do versus telling them how to do it and what to do.... How will the knowledge be used? Well, we thought that dramatization and scaffolding will be [strategies] that we will continue to use in the project.

Often preservice teachers struggle with how to focus on events within projects and use documentation to guide planning and practice. Once preservice teachers are required to isolate events and consider the impact of them on their thinking and practice as part of a class assignment, it is my expectation that they will use this strategy to identify and analyze other events as they meet together. In this scene, the team not only acknowledged that Mary Kay made a change in her ability to take initiative and demonstrate her knowledge of various roles, but that the teachers had to consider what to do with that knowledge. The primary goal of this exercise was to encourage teaching teams to closely observe, collaborate, and
decide on how to use reflective practice guided by documentation to inform future teaching.

Following the end of their projects, teaching teams continue to deliberate using these same tools and strategies. During the interpretation phase, they continue to teach children and attend the lecture classroom, however, their projects have ended and much of their time is devoted to post-project analyses. These analyses include the preparation of an oral presentation to their peers, the creation of documentation panels, and informal presentations at an Open House for children and their families.

**The Interpretation Phase**

Once projects end, preservice teachers choose among mounds of documentation in order to isolate those materials, images, constructions, and transcriptions which represent important aspects of their project (see Figures 18 & 19). This documentation is organized onto documentation panels which are used during their oral presentation to the class. These documentation-related activities require a second level of reflection. This reflection is more global and historical in focus and includes thinking about teaching strategies, children's learning, phases of the projects, multiple ways children symbolized their knowledge, and points at which teachers may have made different choices. This post-project reflection is typically a validating and rewarding experience because teams are frequently surprised and delighted at how much was accomplished. They discover shifts in children’s knowledge and behavior as well as their own which they often had not previously noticed. As one preservice teacher recalls,
Figure 18: Preservice teachers choose documentation for panels

Figure 19: Preservice teachers create documentation panels
If we hadn't paused to do those panels we would have left the project not realizing what happened. I mean, there was dialogue that we found as we were doing our panels that all of a sudden just jumps out at you. You know—look what happened her! We picked out dialogue that I had never heard—I had never realized was there. That was really great. The panels also helped us formulate our presentation.

Occasionally, I ask teams to meet with me as they pour over their documentation to make decisions on how to analyze and interpret their project (see Figure 20). At this point in the semester, my role has become primarily non-directive. I offer advice and support; however, it is now time for each team to determine the story they believe is most compelling and important to share. And yet, teams are challenged by the amount of documentation generated by their project and which experiences to omit from their presentations. I provide general guidelines for the organization and preparation of their analyses. I require each team to create three documentation panels intended to represent three different lenses through which they will revisit their project (see Figure 21). They often deliberate for hours before they are able to make such decisions. The panels serve as part of their documentation coupled with video tape clips, displays of children's work, and books of photographs not used on the panels.

Preservice teams are given a limited time to present their analysis to the class. The requirement to select only a few experiences to highlight in their oral presentations forces them to isolate what they consider to be among the most important and significant occurrences and outcomes of their projects. As a result, this experience is often transformative. The final round of
Figure 20: The teacher educator and a teaching team discuss and analyze documentation.
Figure 21: The water team's documentation panels
negotiating, listening to multiple perspectives, and compromising on which parts of the project to highlight is often exhaustive, intensive, and sometimes confrontational. However, in the end, it is a reflection of each team's commitment to one another and the task. This post-project reflection is a culminating experience in which the "voices" of the individual teachers come together in a final pictorial and oral history of their teaching. Remarking about this final collaborative experience, one preservice teacher said,

I became aware and more confident in myself as an educator as we prepared for our presentation. I really began to see ways we met our goals of the project.... I became so excited about our project and about the panels we created. I saw mistakes I made, but I also saw positive action I had made. I found myself being able to present the information clearly. Being able to discuss the information with team members definitely helped me better articulate our work [during the presentation].

Following these class presentations, panels are positioned throughout the children's classroom for an Open House. Families are invited to attend during the evening to talk with preservice teachers and view the panels (see Figure 22). Informal versions of their oral presentations are shared with families. Even though parents had been kept informed about the progress of each project through letters sent home and periodic requests for resources and ideas, this is the first time they have seen documentation of their children's experiences with one another and their teachers.

This is a very exciting time for both the children and teaching teams. The preservice teachers are often surprised and pleased by the questions and interest expressed by families. As the children review the many photographs, representations of their work and
Figure 22: Children and parents view documentation panels
hear their parents read transcribed conversations, they recall the many experiences shared with peers and teachers.

**Chapter Summary**

Through the orchestration of conditions and provision of in-class exercises, I continually posed questions and dilemmas to preservice teachers in order to provoke them to tell me what they were thinking and how they would use their reflections to guide their practice. Throughout this process, I was reassured by John Dewey's observation that every reflective process involves at least two sub-processes, including "a state of perplexity, hesitation, [and] doubt, and an act of search or investigation...." (1978, p. 188)

As preservice teachers shared their hesitations and doubts and collectively searched for explanations and direction, we developed and became dependent upon interpersonal and pedagogical relationships. By socially mediating our knowledge we created a community of discourse (Fosnot, 1996) characterized by "collective, interrelated zones of proximal development as part of a transactive teaching system" (Moll & Whitmore, 1993, p. 21). Thus, a transactive system emerged from and was nurtured by the "discussion and problem-solving in the context of shared activities, in which meaning and action [were] collaboratively constructed and negotiated" (Chang-Wells & Wells, 1993, p. 59). Consequently, as teaching teams left the lecture classroom to return to the children's classrooms to teach, they were better positioned to depend upon and trust their collective knowledge base and share in the responsibility of making decisions about their practice.
The next chapter describes this process of collective effort and change, in detail, among six preservice teachers who comprise two teaching teams. From their collective efforts and change in thinking and practice an emerging image of the development of collaborative inquiry among young, early childhood preservice teachers is portrayed.
CHAPTER FOUR

THE SOCIAL CONSTRUCTION OF COLLABORATIVE INQUIRY: AN EMERGING IMAGE

Old paint on canvas, as it ages, sometimes becomes transparent. When that happens it is possible, in some pictures, to see the original lines: a tree will show through a woman's dress, a child makes way for a dog, a large boat is no longer on an open sea. That is called pentimento, because the painter 'repented,' changed his mind. Perhaps it would be as well to say that the old conception, replaced by a later choice, is a way of seeing and then seeing again. (Hellman, 1973, p. 3)

In this chapter I reveal some of the ways some early childhood preservice teachers began to change their minds and mine about what constitutes the art and science of good teaching. Through their use of selected teaching strategies associated with this interpretation of curriculum coupled with recursive cycles of reflection and decision-making, they have come to share in current understandings of the roles and responsibilities of teachers in early childhood settings. Through their attempts to transform their thinking and their practice by developing attitudes and skills associated with this teaching and learning context, we have together begun to reveal the ways in which preservice teachers develop collaborative inquiry.

The development of an inquiry orientation toward teaching means that teachers think about their practice as it relates to the
learning of the children they teach. They not only think individually about their practice but they collaboratively reflect, with their critiques constructed as they question, negotiate, analyze, and document. Consequently, they adapt their teaching strategies and provision of experiences to young children based upon both individual and collective understandings of their role in children's learning.

Within this study, the development of collaborative inquiry among early childhood preservice teachers is a shared experience, inextricably tied to their ability to develop inquiry among themselves as partners on a teaching team and with the children they teach. As this process evolves, preservice teachers are challenged to make decisions about the design and implementation of relevant and meaningful experiences for preschool-aged children as they collaboratively implement projects. This stance of decision-maker is a new experience for most preservice teachers because it requires that they continually question, reflect, and modify their practice through recursive cycles of collaborative teaching and reflective practice.

The development of inquiry-oriented teaching does not occur in incremental steps, nor is it stage-like or learned simply by demonstrating competency through the acquisition of discreet skills. Rather, the development of inquiry results from a recursive cycle of teachers' focus on the relationship between their practice and children's learning. In this study, preservice teachers often behave as classroom researchers as they engage in reflection about their practice guided by documentation and corresponding adaptations to
practice. As preservice teachers participate with others, they make gains that alone might not be possible. When they collaboratively engage in such a recursive cycle, framed by the joint activity of collaboratively implementing projects with young children, inquiry is socially constructed.

Project work is "an in-depth study of a particular topic that one or more children undertake" (Katz & Chard, 1989, p. 2). While the emergence of a topic might come from children's interests evidenced in their play, it may also reflect "mutual interests on the part of the teacher and children; [or] those based on teacher concerns regarding specific cognitive and/or social concepts" (Gandini & Edwards cited in New, 1990, p. 7). Collaborative projects in this study are projects implemented by a team of teachers who share "resources, power, and authority" (Kagan, 1991, p. 3) with one another and the children they teach as they make decisions on how to develop activities and experiences associated with project work.

The purpose of project work with children is to support their development of collaborative inquiry through opportunities for critical thinking, problem solving, observations, the generation of hypotheses and engagement in investigations. In this study, the purpose of projects is similarly aimed--but it is for preservice teachers' development, too. Projects provide preservice teachers with a joint activity from which a framework for the social construction of inquiry is embedded. As teachers focus their practice and research on guiding the development of inquiry for their children, they likewise engage in collaborative inquiry with one another and their children.
It is as though the teachers' focus on children's inquiry is a reflecting pool for their own development. They use many of the same strategies that they introduce to their children. For example, they closely observe, hypothesize, and revisit and rerepresent earlier experiences as they reflect upon how to proceed. They become as dependent upon tools for mediating their knowledge as are the children. Preservice teachers use video and audio tape, photographs, children's artifacts from previous experiences, and their own field notes to collaboratively determine how to extend children's study. Thus this process is a transactional one as teachers and children participate in tandem in the social construction of inquiry within the joint activity of collaborative projects. It is the activity of collaborative projects which is the unit of analysis for this study.

Participatory appropriation is described by Barbara Rogoff (1995) as "the process by which individuals transform their understanding of and responsibility for activities through their own participation" (p. 150). Rogoff goes on to say that "through participation, people change and in the process become prepared to engage in subsequent similar activities" (p. 150). In this study, subsequent similar activities include preservice teachers' cycle of teaching followed by reflection followed by teaching again and again as they collaboratively implement projects.

This model of participation is a dynamic and transactional approach to viewing development. The development of collaborative inquiry is not considered a "collection of stored possessions...but rather treats thinking, re-presenting, remembering and planning as active processes that cannot be reduced to the possession of stored
objects" (p. 151) such as learning facts about children's development, developing particular teaching techniques, or planning for a particular day. Instead, the development of collaborative inquiry results from and is portrayed as a composite of experiences, knowledge, and relationships all focused on preservice teachers' development of inquiry as they collectively reflect upon their practice and collaborate on how to proceed.

In this chapter, the portrait of novice inquirer emerges from the teaching and reflective practices of six preservice teachers who for the first time, begin to purposefully and systematically address the relationship between their practice and the learning of the children they teach. Through their experiences of collaborative teaching and reflective practice with me, one another, and their children, the nature of this relationship is illuminated—evidenced as a move away from simply transmitting and receiving knowledge toward engaging in practices that support the social construction of knowledge.

Part One
An Introduction to the Leaf and Water Projects

The Leaf Project

The Leaf Project was implemented during the height of a vibrant New England fall. The six, 3- and 4-year-old children were surrounded by the texture, color and energy of falling leaves. Throughout the six-week-long project, the teaching team of Leah, Nancy and Alice guided the children's investigation of leaves as they planned a variety of experiences that ranged from an exploration of the out-of-doors, to the study of leaf veins through the use of light...
tables and magnifying glasses, followed with graphic representations, clay and paper constructions. During the closing days of the project, children negotiated how to use their bodies to represent the shape of a very large maple leaf, stem included.

The Teachers

Leah² was the Monday teacher of the leaf project team and was Euro-American as were all of the participants. At nineteen, she was among the youngest enrolled in the class, and yet she was one of the most experienced. While she had not taught in a classroom nor worked with preschool-aged children, Leah had volunteered in a variety of community programs. Among her experiences included working with youth in community outreach programs, volunteering for Peace Games, a program focused on teaching inner city children violence prevention and conflict resolution, and providing respite care for developmentally disabled children.

Leah was soft-spoken, enthusiastic and conscientious. She often waited to offer her opinions in class but when she did so she was thoughtful and provocative. She had early doubts about whether working with a team to implement a project would work for her, noting "I was skeptical about the whole thing" but quickly added "but I was willing to try it." Leah was viewed by her teammates as an optimist, someone who was "laid back, very calm, and contemplating." Leah wrote early in her journal that effective teaching including "relating to children and helping them form their

²All names of participants in this study are fictitious.
own opinions and views about the world." As Leah taught the children in her group, she developed an ability to purposefully and systematically support children's learning, noting in her final journal entry that "we take children's ideas and observations and use them to guide them on their path of learning. This path is constructed with everyday things that lead to a better understanding of the abstract concepts of the world in general."

Alice was nineteen years old and the Wednesday teacher for the team. She was the most tentative, soft-spoken teacher on the leaf project team and appeared most challenged by the dynamic and emergent nature of project work. She noted that "it takes me a long time to warm up to people" and remembered her first teaching days as "awkward" for her. While Alice was always willing to complete tasks given to her by her cooperating teacher and negotiated by her team, she was most reluctant to deviate from what she had predicted would happen.

Alice's reluctance to deviate from a prescribed lesson makes sense in light of her previous educational experiences and her limited teaching experience which were representative of a transmission model of education. For example, Alice's single past experience as an intern was during her senior year in high school when she went into a public school to read to second graders. She noted that "the classroom was very traditional" and that "I'm kind've stuck on traditional learning. I think it's great that they do this project work, but at the same time I think there should be other things, such as ABC's, 123's, and calendar."
Nancy was the oldest preservice teacher enrolled in the course and was the Friday teacher for the team. At 37, she was the mother of two teenage boys and had recently returned to school to continue her studies towards an eventual teaching certificate in early childhood education. Her previous educational experiences included twelve years of Catholic school and attending a community college. Other than her experience as a parent, Nancy had never taught young children nor worked in a classroom.

I recall my early impressions of Nancy as she entered the first day of class. She was a few minutes late and had to cross in front of the group to take a chair on the outside edge of class. She remained very quiet during that class time and for the next few weeks. I wondered whether her age would have an impact on her participation in class or on her collaborative teaching with women who were typically nineteen and twenty years old. She later told me she also wondered whether her teammates might expect her to do most of the work because she was the oldest. However, she quickly noted that was never the case.

Nancy had an infectious smile and intense brown eyes, framed by short brown curly hair. As she talked with me, her teammates, and the children she was typically very attentive. In fact, she tended to physically lean into the space she shared with those to whom she was talking. This physical stance conveyed to me her desire to listen intently, to take it all in and an eagerness to not only hear my point of view but to quickly offer how the exchange had provoked her own thoughts. Leah described Nancy as the group's "support" and her abilities to closely attend, actively listen and seek
out the opinions and ideas of others proved to be a strong asset to the collaboration within her group.

The Children

The leaf project was implemented with three boys and three girls, who were three and four years of age (Margaret, Jana, Helen, Allen, Peter, and Jason). All of the children had attended the nursery school program as two year-olds but this was their first time to be placed in a particular small group. They had been grouped by the cooperating teacher, Ann, who had also been their two year-old teacher. Ann's primary criteria for grouping children was to attempt to develop heterogeneous groups, mixing gender, personalities and abilities, for example.

These groups typically met for a small group activity or project work and shared snack together. The time they spent in their groups varied but was usually 20-25 minutes out of a three hour per day program. The rest of the time children were free to choose among a variety of activities including circle time, outdoor play, dramatic play, block play, reading and music activities, water, sand and construction, science and math centers.

Choosing the Topic

During the first five weeks of the semester the teams began to meet together in preparation for the implementation of their projects which began during the sixth week of the semester and continued through the twelfth week. During this time the "leaf team" shared their observations and ideas with one another about topics to pursue. Initially, they generated lists including broad topics such as mountains and oceans but soon settled on the topic pets because
some of the children were talking about pets and bringing stuffed animals to school. Nevertheless, the team made a decision to change the topic following their review of the video tape of Leah's first teaching day coupled with her beliefs about it. The team agreed that the children were bored and disinterested. They also were concerned that one of the children had recently lost two pets.

Following their meeting they asked to consult with me. We discussed what they thought would be relevant and meaningful for the children to explore. As we talked, we were sitting in the farmhouse lecture classroom watching the leaves drift down from the trees. It was fall in New England and we discussed that a focus on leaves might be worth pursuing. The team determined that not only were the changing leaves a meaningful and relevant topic but that there were ample and diverse resources and numerous opportunities for discovery and investigation. In addition, leaves would change, dramatically providing children an opportunity to study change over time, to hypothesize about what causes change, and to investigate and observe change. Following that "emergency team meeting," the team decided to introduce leaves as a topic to their children which continued over the next five weeks.

The Leaf Project Timescape

During the first week of the project the focus was on using leaves to make leaf rubbings and exploring the school grounds to gather leaves and talk about them. During the second week children investigated leaves. They used light, traced leaves, made clay prints and finally constructed leaves out of a variety of materials. During the final week children once again graphically represented leaves
and constructed a life size leaf using their bodies. The preservice teachers were most interested in supporting children's investigations of leaves by offering a diversity of media and experiences from which children could generate their hypotheses and pose questions. As the leaf team developed ideas for revisiting and re-representing earlier experiences they became more purposeful in their use of media and equipment as means of connecting one day to the next.

Throughout the evolution of the project, the leaf team began to change the focus of their collaborative inquiry as they continued to attempt to connect their teaching practice to the change in knowledge evidenced by their children. The leaf project timescape is represented in Table 1.

Table 1
Leaf Project Timescape

<table>
<thead>
<tr>
<th>Teaching week #1</th>
<th>Finding and using leaves</th>
</tr>
</thead>
<tbody>
<tr>
<td>Focus:</td>
<td>Teachers</td>
</tr>
<tr>
<td>Source:</td>
<td></td>
</tr>
<tr>
<td>Typical question for children:</td>
<td>Do you see any leaves? Do you want to make a leaf rubbing?</td>
</tr>
<tr>
<td>Typical question of teachers:</td>
<td>What do they know about leaves? What are they interested in knowing?</td>
</tr>
<tr>
<td>Shift in focus:</td>
<td>Leaves change color but they still have veins and stems; grapes change and look wrinkly and squishy.</td>
</tr>
<tr>
<td>Teaching orientation:</td>
<td>Transmission oriented and prescriptive</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Teaching week #2</th>
<th>Investigating leaves using a variety of equipment and materials</th>
</tr>
</thead>
<tbody>
<tr>
<td>Focus:</td>
<td></td>
</tr>
</tbody>
</table>
Children's theories about the function of veins and teacher's ideas about how to represent those theories through leaf constructions

What do you think goes through the vein of a leaf? What makes the leaves and grapes change?

How can we support and extend knowledge? How do we help them revisit and re-represent earlier experiences?

Children noticing the change in leaves and grapes gathered earlier and the similarities between their veins and those in leaves.

Teachers continuing to prescribe, yet using children's comments to extend earlier experiences; a beginning move toward inquiry

Creating their own leaves and collaborating to use their bodies to make a leaf

Children's discourse and emerging peer tutoring and collaboration

How can we make a leaf with our bodies? Draw me your very own leaf.

How can we continue their investigations? How can we support individual representations of knowledge?

When grapes are left on the vine they dry up and turn into raisins. When leaves fall off the tree they change color and shape and become brittle, but they are still leaves.

Teachers develop activities that directly reflect children's behaviors and construction of knowledge; emerging inquiry.
Examples of change included children's increased knowledge about leaf structure and function of leaf veins; increased ability to graphically represent leaves and increased social cohesion as a result of emerging collaborations. Decisions to modify teaching practice centered on developing strategies for scaffolding children's learning as teachers made decisions to co-teach, vary media, ask questions intended to "help children think about their thinking" (Forman, 1989), modify the environment and as Nancy later noted, "slow down our practice." As a result, the teachers engaged in more careful observation, listened more closely, documented more frequently, and began to self-regulate as they taught. Consequently, they were more capable of serving as learning partners with children as they socially constructed knowledge with them.

The Water Project

The water project co-occurred with the leaf project and was implemented in the same nursery school program but with a different group of three and four year old children. The topic was chosen primarily because of the team's observations of children's interest in water as they played in rain puddles and at the water and sand table. While initially the focus was on providing children with sink and float experiences, the project focus shifted in response to heavy flooding in the region. Traditional sink and float activities were replaced by children and teachers hypothesizing about the flow of water, constructing dams, exploring the functions of drains, and generating theories about how to construct water pipes.
The Teachers

Kaitlin was the Monday teacher and at 21, a senior majoring in family studies. Following graduation, she planned to attend graduate school in psychology and work with children. She enrolled in the course to gain experience with young children and saw herself more as a "playmate" than a teacher. Kaitlin had a somewhat laissez-faire attitude and as a result was willing to try new activities even when the team was unsure of the outcome. For example, during the final week of the project children were provided piping and water and encouraged to predict water flow, connect pipes and experiment. Kaitlin was the teacher who lay on the floor under the water table covered with water that streamed from leaking joints as she directed children in their efforts to plug holes and putty pipes.

Kaitlin was more than a playmate, however. While she periodically wrote about her feelings of inadequacy as a teacher she actively supported the peer relations of some of the water project children and noted that she was most interested in "the psychology of personality." She was particularly intrigued with developing her ability to question children in order to guide them toward new understandings and to use scaffolding strategies as a means to support children's feelings of competency.

Kaitlin was often the "master-mind" behind some of the project activities even though she depended upon her teaching team to determine how to implement them. She freely admitted during one team conference that she had dreamed up quite a complicated activity for children to predict and experiment with water flow yet had "no idea how to get there." Nevertheless, the team did find a
way to implement her scheme which was a culminating experience for the children during the final week of the project.

The Wednesday teacher was Hannah who at 27 had the most experience teaching young children. She had worked as a teacher and director of a community child care center for four years and had determined that once she finished graduate school she might enter the Peace Corps or pursue a career in child advocacy. Hannah had completed her undergraduate degree in English and therefore had enrolled in this course as part of her formal education in preparation for entering the early childhood education graduate program.

Hannah was capable of seeing the big picture in the classroom and would often move beyond a simple observation to consider what might be the causal factors. She noted that there were challenging children in their group and she wanted to engage them. However, she further observed that most of them were boys and questioned whether they would "do better in a different, quieter environment with less distraction?" As a result of her reflections, she changed the classroom space in which their children worked. She blocked off the area through the use of room dividers, moving furniture to ensure children had enough space to work. This allowed both the teachers and the children to engage in in-depth investigations without distractions from the rest of the classroom.

Hannah was a leader on the team and in the classroom yet she was careful not to take on too much of that role, noting that "I've always been sensitive about being too strong in a group, "taking over," or wanting to control things so sometimes I hold back...." Her sensitivity served her well as she shared ideas and suggestions while
listening to her teammates when they offered their own ideas about how to proceed. Consequently, team collaboration was viewed by all three teachers as successful because they equally shared in the responsibility of generating ideas, preparing for teaching days and implementing activities. In fact, they all commented that to teach collaboratively means that you are "all one teacher."

Mary was 21 years old and the Friday teacher for the team. She had worked in a summer camp for two years and in an extended public school program for preschool children with special needs. In her introductory letter to nursery school parents she noted that in the summer program, "children of all abilities, including those with special needs, interact[ed] together to create a warm, loving, and supportive environment." As part of this program, Mary had implemented a three day project with children and found it to be so exciting that children refused to leave school at the end of the day. However, even with these experiences, Mary was reluctant to act on what she knew about children's' learning and her teaching. As she reflected back on her early days in the water project she commented, "I didn't want to take any risks...I wanted everything to go perfectly."

Nevertheless, Mary did take some risks and make changes in her practice. I contribute this in part to her persistence, her ability to reflect, and her desire to continue to grow. Mary was always willing to "call a spade a spade." Following her teaching days she was able to acknowledge what she could have done differently, moving on to make plans to continue to approximate those competencies she most desired. She worked hard to find ways to ensure that children
lead the activities by developing her ability to question children so that she was guiding rather than directing their learning. In addition, with the support of a teacher from her team, Mary implemented activities late in the project in which her primary goals included exploration, observation and investigation without a clear idea as to how the day would end up.

**The Children**

The water team was implemented with two girls and three boys who were three and four years of age (Susie, Carry, Bobby, Eric, and Michael). All of the children had attended the nursery school in the previous year and yet this was their first experience working together in a small group. The cooperating teacher for this program was Ann who had also been the children's teacher the previous year. Ann had decided to limit the number of children in this group to five (the usual number was six) because she believed that two of the children would benefit from more frequent teacher support.

**Choosing the Topic**

During the weeks leading up to the implementation of projects, the water team coupled their observations of children's play with what they determined were the developmental needs of the children and their own ideas about what would be "dynamic and engage them." They wanted to choose a topic that would encourage the children to "work together, talk to one another and listen to one another." They provoked children's conversations about a variety of topics but admitted feeling frustrated and unsure as to which topic was most appropriate for their children.
These conversations and observations were followed by the team reflecting in their journals and creating topic webs. The concept of webbing was introduced during class and in their readings as a strategy for generating ideas for project topics and the potential direction for a topic. A web is "a mapping of key ideas that a topic comprises and some of the sub-themes related to it" (Katz & Chard, 1989, p. 88). The web for the topic of water was considered by the team to be their richest, with the most possibilities for engaging the children. (See Figure 23.)

Nevertheless, two of the team had some doubts about water as recorded in their reflective journals. Hannah wrote,

Notice they all love water, washing their hands, sometimes playing in the water table. Could do a project around water and all things that relate to it or we could do something else and use a water medium to explore that topic. [However] water might not be fascinating enough for them" (italics added).

Kaitlin also reflected on what would be a relevant and meaningful project topic when she wrote,

I have been trying to think of a lesson plan [topic] for two weeks and have found that it is not as easy as it sounds.... I like animals....The other idea the group had was what belongs in water. I think that it is a great idea but could get messy" (italics added).

The Water Project Timescape

As the team prepared for the first week of their project they were unsure how to introduce the topic of water to the children. Initially, the teachers were most interested in choosing a topic that was relevant to the lives of their children. They had observed that children loved to wash their hands, play at the water table and jump
in mud puddles. As they later reflected, "When we asked them about water, the children had ideas to share and many different experiences with water." The teacher's later noted that:

Figure 23
The Water Project Topic Web
We were looking for several key characteristics. Most of all we wanted the children to be interested in the topic....We also wanted to address individual needs...and encourage collaboration within the whole group. It was important to find something that could keep the children engaged, encourage them to work together, and listen to one another.

The teachers began by simply preparing a water play experience. Children made bubbles, added food coloring, and placed objects in water to find out if they would sink or float. During this first week of the project, the region was flooded with torrential rains. As a result, the focus changed during the second week toward an investigation of water flow. Children explored rain puddles, constructed dams, and began to hypothesize about predicting the direction of water flow and strategizing about how to redirect or stop water. During the final week children's previous experiences and predictions were extended. They investigated the classroom sinks and pipes, negotiated how to connect pipes, predicted water flow and finally constructed their own rain puddle, complete with rain, a drain, and underground pipes.

Throughout the project the teachers collaborated to develop experiences for the children that connected one day to the next by revisiting earlier experiences and using a variety of media to rerepresent those experiences. The team continually encouraged children to closely observe, use one another for support, and question themselves and those around them. As the water team used these strategies to guide their children's inquiry, they in turn discovered that they were using many of the same ones to guide their own thinking and collaborative inquiry.
For example, throughout the weeks of the water project, the teachers became increasingly proficient at ensuring a continuity of experience for their children so that the children would have time and opportunity to engage in in-depth study of water flow (see Table 2). Among their strategies were the provision of diverse materials coupled with suggestions and classroom set-ups for new constructions. With the completion of each new construction, children anticipated how they might use them on subsequent days. The use of children's previous work was purposefully extended as a strategy for guiding children's inquiry, creating anticipation for subsequent days and validating the worth of children's work. As a result, children began to "own" the project as they engaged in shared experiences and collectively made decisions on how to proceed with one another and their teachers.

Table 2
The Water Project Timescape

<table>
<thead>
<tr>
<th>Teaching week #1</th>
<th>Teaching week #2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Focus:</td>
<td>Focus:</td>
</tr>
<tr>
<td>Sink or Float activities</td>
<td>Constructing dams and experimenting with various quantities of water</td>
</tr>
<tr>
<td>Source:</td>
<td></td>
</tr>
<tr>
<td>Teachers</td>
<td></td>
</tr>
<tr>
<td>Typical questions for children:</td>
<td>Typical questions for children:</td>
</tr>
<tr>
<td>Which things sink and which things float?</td>
<td>What do children know about water; what are they interested in?</td>
</tr>
<tr>
<td>Typical questions of teachers:</td>
<td>Shift in focus:</td>
</tr>
<tr>
<td>When it rains a lot, it sometimes floods; some things float, others sink</td>
<td>When it rains a lot, it sometimes floods; some things float, others sink</td>
</tr>
<tr>
<td>Shift in focus:</td>
<td>Teaching Orientation:</td>
</tr>
<tr>
<td></td>
<td>Transmission and prescriptive</td>
</tr>
<tr>
<td>Teaching Orientation:</td>
<td></td>
</tr>
</tbody>
</table>

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**Timescape (continued)**

<table>
<thead>
<tr>
<th>Source:</th>
<th>Children's observations about rain water but teacher's idea to introduce dams</th>
</tr>
</thead>
<tbody>
<tr>
<td>Typical questions for children:</td>
<td>If dams have a hole, do they leak?</td>
</tr>
<tr>
<td>Typical questions of teachers:</td>
<td>How can we provide continuity of experience in order to investigate their theories? What kinds of experiences will promote co-construction of knowledge?</td>
</tr>
<tr>
<td>Shift in focus:</td>
<td>James' theories about where the water goes.</td>
</tr>
<tr>
<td>Teaching Orientation:</td>
<td>Evident yet infrequent prescriptive orientation; clear evidence of relationship between reflective and teaching practice</td>
</tr>
</tbody>
</table>

**Teaching week #3**

**Focus:** Investigating and co-constructing piping; predicting water flow

<table>
<thead>
<tr>
<th>Source:</th>
<th>Children's theories, questions, and comments; teacher's ideas about best ways to mediate and seek representations of knowledge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Typical questions for children:</td>
<td>How can we stop the water? How can we make the water flow through these pipes? When will the water stop flowing?</td>
</tr>
<tr>
<td>Typical questions of teachers:</td>
<td>What tools can we offer children to support their investigation? How can we simulate the rain puddle, grate and underground piping? When do we arrange for a second graphic representation of water flow?</td>
</tr>
</tbody>
</table>

**Hypothesis:** When piping is connected and valves opened the water will flow and be directed out and away from the drain spout; when valves are closed water flow stops and changes direction.

| Teaching Orientation: | Novice inquiry orientation; reflective and collaborative |

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As evidenced in the water project and leaf project timescapes, opportunities for both children and teachers to investigate the nature of leaves and water were extended, revisited and re-represented. To illuminate how teachers and children engaged in collaborative inquiry I will re-create some of the actual scenes from these project weeks.

**Part Two**

**Cultural Scenes**

I would like to now return to the canvas to continue the development of a portrait of collaborative inquiry among preservice teachers. In this section, I will re-create six cultural scenes which cover the time span across which the leaf and water teams traveled up until their final weeks of their projects. It is my intention to describe the nature of their change toward collaborative inquiry by revealing the ways in which their *joint participation* became increasingly central to the activity of implementing projects with young children. I have chosen these particular scenes because they exemplify times within each project when teachers were challenged by a disparity between their practice and their reflections about their practice. Included in these scenes is evidence of how their practice changed as well as their thinking about their practice. The scenes are not intended to showcase any particular component of collaborative inquiry. Instead, they are intended to illuminate the ways in which these three components are inter-related and nested within the activity of implementing collaborative projects.

These scenes will demonstrate how a single event can have a multiple impact on (a) an individual teacher; (b) the collective of
which she is a member; (c) a decision for how to proceed and; (d) the ways in which teachers attend to, think about, and guide children's learning. Finally, these scenes will demonstrate the relationship between teachers' efforts to guide their children's inquiry and in so doing, their own.

The Leaf Project

Scene 1: Changing the Topic

Leah sat down at a large square table with the five children in her group. Her materials were stacked on a tray behind her on a shelf. She visually scanned the group of children and began the activity by asking children if they had pets. As she questioned them she passed out books with pictures of animals in them and small plastic dogs of all types. Leah began questioning the children, "If you had a pet, what kind would you have?"

As Leah continued her questioning children looked at their books swooping their dogs into the air and down onto the table, turning pages and chatting to one another. Allen answered, "Mine died; one black and one white." Leah listened closely but did not respond. Instead she moved on to ask Margaret, "What do you have to say Margaret?" Margaret replied, "A cat."

Leah continued to question the children about the names of their pets, where they ate and where they slept. Later she brought out photographs of animals, handing one to each child and asking them to describe the animal in the photograph. Leah asked, "Do you know what that is?" pointing to Helen's photograph. Helen guessed, "A cat? A mouse?" (It was a ferret.) "Those are good guesses," responded Leah. This line of questioning continued until Leah
brought out markers and paper inviting children to draw their favorite animal, insisting the children give it a name. The children quickly took up the task, working at the table for approximately 20 minutes. The activity ended when all the children had finished their drawings and stacked up their materials to run off to wash hands for snack.

Later that day, Leah wrote in her journal:

I have just finished my first day of my project work and I am overwhelmed. I'm not sure how the kids reacted....I find it very hard to keep the three year old attention spans. I feel like I am not doing enough, saying enough. I am never good at impromptu questions/reactions. I guess I have a hard time thinking that three year olds will understand. I am having serious doubts whether I am cut out to be a teacher....

Ten years ago, I probably would have thought her activity was adequate and developmentally appropriate for three and four year old children. They looked at pictures of animals, played with toy dogs and drew pictures. The activity may have been appropriate with respect to talking about a topic familiar to children, reviewing photographs of pets, and comparing and contrasting toy replicas of dogs. However, it was inappropriate in this context because the goal was to develop inquiry among children and within Leah.

The fact that children were participating peripherally did not mean that Leah had not worked hard to prepare for the day. She had. The problem lay in where she had placed her efforts. First, she had generated a line of questioning that was low level and descriptive. One of the goals in this course is to encourage preservice teachers to use higher level questions, which have been found to provoke higher order thinking (Sigel, 1984). Second, Leah had
chosen materials that she believed would scaffold children's memories about animals. Instead of supporting children's recall, however, the picture books and toy dogs were a distraction because the materials had no personal meaning for the children. Third, Leah had been unable to create a shared experience for the children and as a result no shared meaning (Kaye, 1982) was co-constructed. Without shared meaning the children had no common ground from which to socially construct knowledge about the topic of pets. In short, the activity was teacher-directed with conversations limited between individual children and Leah, even though the children sat next to one another.

The team met to discuss what to do. They reviewed the video tape and as Nancy later wrote, "By the end of the video we all knew it was not working....We got very quiet. I became anxious and thought, 'Oh no, this is going to be a disaster.'" Alice reflected the same concerns in her journal when she wrote, "Oh no, what are we going to do now? We feel lost about what to try next." They decided to meet with me the next day. We sat down in the farmhouse classroom and I listened to what they had discovered. The video tape had corroborated Leah's opinion that the children were not interested in pets, at least as the topic was presented. The teachers were also uncomfortable pursuing pets because of Allen's recent loss. It quickly became evident to me, however, that they believed they should pursue the topic of pets, regardless of the children's interests or Allen's loss. When I assured them that they could change to a new topic, they were momentarily
relieved and burdened once again by the decision to choose a new topic that would be meaningful and relevant to the children.

As we met we looked out the window across the school yard, watching the leaves tumble down from the trees and it was as though the solution for a new topic came to all of us simultaneously. The preservice teachers exclaimed almost at the same time, "Leaves! Let's do leaves!" Nancy later wrote about their decision to change topics noting that,

The interesting thing to mention is that this type of learning allows for change in direction....Rather than struggling through this project (of pets) we were able to stop-evaluate-and reorganize our approach in order to foster the children's learning and our own (underline included in original).

The team's experience that afternoon can be described as a form of collective reflection, guided and mediated by their use of video tape and discourse. As they reflected upon the day, they "observed, reflected and revised" (Oja and Smulyan, 1989, p. 17) their plans and made an important decision to change their topic. The decision was significant because it was the first time that their participation in the joint activity of implementing a collaborative project changed the way in which they participated within the activity. They were not simply following the rules of choosing a topic nor beginning on a certain date to implement a project. Instead they were assuming a responsibility to change their minds based upon their documentation and their developing knowledge of learning as a social construction, one in which the teacher does not drag along her students but instead participates as a partner along with them within meaningful and relevant experiences.
The recognition that they had the freedom to change their minds was another important outcome of this event. Such a responsive teaching orientation supports the development of a teacher who is capable of "pedagogical thoughtfulness... a multifaceted and complex mindfulness toward children" (Van Manen, 1991, p. 8). Van Manen further describes this multifaceted and complex stance as recognizing the "diverse roles and responsibilities we bring to bear [when we teach]" (p. 8). For these teachers, they were just beginning to recognize that to teach well requires flexibility and thoughtfulness, a willingness to recant earlier plans, and the need to engage in recursive cycles of reflection about the impact of earlier decisions and subsequent classroom practice.

The challenge to collaboratively make a decision was a first step toward developing relationships with one another in which the preservice teachers relied on each other's judgment as they generated a shared meaning (Kaye, 1982) and subsequent shared responsibility about how to proceed. Even though Leah had been the teacher who first struggled, they all experienced varying degrees of discouragement, frustration, and concern because they shared in the responsibility of implementing the project. It could not be just one teacher's decision to determine what to do next because the collaborative nature of the project requires that they come together to make a joint decision. Such shared experiences keep teachers in relation and provide time and opportunity for them to socially construct inquiry.
Scene 2: The Process of Self-regulation

It was the sixth day of the leaf project and Nancy had joined Leah to co-teach. As Nancy noted in her journal the team had two primary objectives for this day. First, "to have the children re-visit looking at the grapes and to [generate] hypotheses on their findings and [second, to invite the children to] once again re-represent leaves with a second drawing"....

The grapes had been discovered by the children during the first week of the project when they ventured outside to explore and gather leaves, acorns, and fallen twigs. The teachers had stored the grapes in shoe boxes. Nancy knelt on the floor across the table from Peter, Helen, and Jana as Leah met with the rest of the group of children at a separate table. Nancy brought out the boxes and placed them on the table. The children crowded around to look into the boxes and began to talk about the grapes as they sorted through them, squashing them between their fingers:

Nancy: I have something to show you. Do you remember last week when we went for a walk...? Do you remember the grapes we picked? [a long pause followed as children continued to explore the grapes]

Helen: I remember—they're mushy.

Nancy: I want you to look at them. How are they changing?

Peter: They're all squishy!

Nancy: What is happening to them?

Peter: They are turning into, um, to ah,um, to ah -- -- -- raisins!

Nancy: That is exactly what they are turning into. And what does a raisin look like?

Peter: It looks like raisin bran -- it's a kind of cereal.

Nancy: They are not soft anymore and round like they were when we first picked them, like this one. They are changing. Can you see?...

Peter: They're wrinkly.

Jana: They're squishy. [A few moments later...]
Nancy: Peter will you come up here and tell Allen (who had just joined the group) about the grapes. He didn't see them yet.
Peter: I will show them to you. They are wrinkly.

Nancy's questioning guided the children's investigation as they closely observed and described their observations to one another. Her line of questioning was appropriate and evidenced her ability to provoke discourse among the children. Yet, there was nothing else that seemed to me to be particularly significant about this exchange. It wasn't until Nancy began to analyze the event in her reflective journal and during her retrospective interview after the project ended that I discovered that there were actually two scenes occurring simultaneously—one on the social, intermental plane and one within Nancy's head, on her intramental plane of development.

Nancy's ability to scaffold the children's investigation of the change of grapes to raisins may have turned out to be a far more significant event for her than for the children. It is her analysis of this event that is the real focus of this scene because it describes in part how inquiry among preservice teachers can begin. She discovered that when she focused on the ways in which she participated in supporting their inquiry, she in turn began to simultaneously self-regulate her own ability to engage in her inquiry about how to guide an experience in which she could "anticipate, predict and project" (Rinaldi, November, 1996).

Nancy's teaching had been documented on both video tape and audio tape. As she reviewed the documentation she reflected upon what was going through her head. She later recorded her thoughts in her journal noting that:
When Peter said they turn into raisins...you could see Helen and Janie's facial expression changing...and each repeated what he said. At that point I could hear in my head—ask this question; ask that question—ask about why—what happens to the grapes. I was asking specific, directed questions that reflected Peter's thinking.

As Peter began to answer Nancy's question about what was happening to the grapes, she almost answered for him but instead she recalls:

...I stopped...because what I was looking for in my mind, questions were coming into my head were, 'OK, the reason you're asking this question is because you want to know if he knows the difference. Where is his learning at?' And that was part of why I stopped that question. So, that's part of what changed.... That's when I had questions, they were coming into my head, first --'OK, what do I want to ask them?'

Teachers like Nancy who are mindful of developing an inquiry-orientation learn to establish links between activity on their intermental and intramental planes through their use of language. Vygotsky determined that the means by which individuals mediate the social construction of knowledge is through their use of tools and signs. He was most interested in the impact of the psychological sign, language, on learning because language functions both as a link and a self-regulating tool for the development of higher mental functions. For this reason, Vygotsky considered language the "tool of the mind" because it influences the "thinking and behavior—that of another person or one's own" (Wertsch, 1985b; 1991a; Kozulin, 1990, cited in Berk & Winsler, p. 20).

In other words, "language or other cultural tools guide and mediate cognitive activity"... (Rogoff, 1990, p. 5) resulting in
"voluntary attention and voluntary memory" (p. 36). Not only are new constructions or higher mental functions internalized or appropriated, but so, too, are the signs and sign systems so that eventually Nancy was mediating her own knowledge construction silently, using inner speech intramentally. It is at this point that she was capable of self-regulating her learning and thus behaving more purposefully and thoughtfully.

Nancy not only experienced this self-regulation during the children's investigation of grapes but again on the same day as she supported their drawings of leaves. Earlier in the activity Leah had asked the children to join with her in using their fingers to follow the edges of leaves. It was her intention to focus children's attention on the shape of leaves prior to asking them to draw a leaf, free-hand. The team was hoping for more detail in these second drawings, and described their objective for the task, "Not traced, not cut out, just from what they saw."

They talked about the shapes, colors and textures of leaves. At times, the children named the veins, stems and points on the leaves. As children finished this brief exploration of leaf shape, Nancy joined Jana, Helen, and Peter as they began drawing. For their drawing, she provided children with tools including paper, pencils, erasers and vibrant, yellow leaves as referents. She invited them to draw their very own leaf. As they drew she guiding their drawing through questioning:

Nancy: Can you look at the leaf?  
Jana: Well, not yet. Ahhh, it's a little kind've leaf.  
Nancy: Yes, that is. What are these lines there?  
Jana: Ahhh, these are grains.
Nancy; Grains? Veins, right?  
Jana: Yea. It brings food to us? (now, referring to her own veins)  
Nancy: Yes, I hear what you are saying, "the veins bring food to us."  
Nancy: Are you finished?  
Jana: Nope, not yet! (Nancy continues to observe Jana.)  
Jana: I did it!"

As Nancy guided children in their drawings she later recalled her thoughts in her journal,

I kept quiet and watched Jana. Jana was a child who stutters when rushed and was given the time necessary in order for her to re-represent what she saw. I found that by applying wait time I allowed her to project that back to me.

Wait time is a term commonly used in teacher education which simply meant waiting long enough following a question to give a child time to formulate a response and express it. It was typical for Nancy to talk too much, even answering her own questions before the children had an opportunity to process them. On this particular day, Nancy coupled wait time with questioning and the provision of appropriate tools and real objects to support and guide children's drawings and investigations of grapes.

She went on to describe that at the beginning of the semester, she "felt very scattered in her questioning and thought processes." Her ability to self-monitor her behavior would often come too late. While she was learning teaching strategies in the lecture classroom such as how to pose higher level questions, when to vary materials, and when to use wait time, when she entered the children's classroom, she was not always able to use those strategies when she needed them. Yet on this particular day, she commented that "I was
filtering and processing what I wanted to say to the children, but it was more coming in the moment and I was learning how to do that type of technique."

That type of technique involved more than what Donald Schon (1983) might call reflection-in-action. Additionally, the development of inquiry does not simply evolve from a teacher learning how to use wait time or ask higher level questions, for example. The development of inquiry includes more than methodology and reflection. It also depends upon the development of a disposition toward teaching that is thoughtful, what Van Manen refers to as the "tact of teaching" (1991). Philip Smith (1991) describes Van Manen's notion of tact as "an interpretive intelligence, a practical moral intuitiveness, a sensitivity and oneness toward the child's subjectivity, and an improvisational resoluteness in dealing with children."

Nancy knew Jana. She had begun to learn what Jana needed in order to best represent her knowledge and socially construct it with others. Nancy knew this because her work with this small group of children had been collaborative, reflective, and continuous, lasting over a period of weeks. During those weeks she had discussed for hours with her teammates what each of the children needed from them, how they might best support individual children as well as the group as a whole. She had seen Jana on video tape and heard her voice as she had reviewed audio tapes. She had photographed her and studied her first drawings of leaves. She knew Jana and she knew the kinds of supports that Jana and the rest of the children
most benefited from. As a result, Nancy summarized her interactions with Jana in this way:

When I was watching Jana, [she] was giving back to me all the week's...that we had presented different materials...she knew the leaves had veins, she knew that the food traveled through the veins. So there was knowledge that she had gained. I realized that through collaboration, representation, re-visiting and hypothesizing they had [all] learned something and I was a part of this learning. We had scaffolded their learning from an intermental plane to an intramental one.

Scene 3: Re-visit to Re-represent: The Relationship between Scaffolding, Intersubjectivity, and Symbolic Representation

We remain in day seven of the Leaf Project but shift our attention to the second table where Leah has provided Jason, Margaret, and Allen large yellow maple leaves, white drawing paper, pencils and a private and spacious space for drawing (see Figures 24 & 25). Leah's primary objective is to revisit to rerepresent— to once again encourage the children to graphically represent a leaf by drawing it free-hand—just as she had asked of them during her previous teaching day, two weeks before on day four of the project. A comparison of these two day's events will reveal some of the ways in which Leah's practice and the children's understanding and subsequent representations changed.

The focus of this scene is on the change in and the relationship among Leah's ability to scaffold children's symbolic representations, their shared meaning or intersubjectivity of the task, and their subsequent graphic representations of leaf-ness. As Leah became more capable of scaffolding children's drawings by creating a context for shared understanding of the task, the children's graphic
Figure 24: Jason draws a leaf

Figure 25: Leah guides children as they draw
representations became more sophisticated and representative of the
ness of leaves--the nature of leaves as captured by the attributes
and characteristics commonly associated with them (see Figures 26-
27 & 28-29).

In this setting the ness of a topic refers to the nature of a topic
--it's essential qualities or attributes. For example, the structure of
leaves includes points, stems, and veins. While they come in many
shapes, sizes and colors--there are more similarities than differences.
They have a particular smell and feel and as they fall from the limbs
of trees they float and twirl. When they lay on the ground or inside
the classroom for a period of time they change, shriveling up, and
turning darker colors. They symbolize a change in seasons, the fall's
harvest.

Preservice teachers are asked to "get in touch" with the ness of
their topic as they consider plans for providing children with diverse
experiences for coming to know that topic. In the case of leaves, the
preservice teachers decided to find ways to symbolically represent
the structure of leaves, rather than only their movements, color, or
smell. To this end, the team provided children with multiple media
that supported their investigations and symbolic representations of
leaves including light, photographs, drawings, clay, paint, string, wire,
wood, and paper.

Day 7: The second graphic representation. Before separating
the children into two groups of three, the six children stand around a
half-moon shaped table as Leah invites them to choose a leaf from a
golden pile of large yellow maple leaves which covers the table top.
There is much conversation among the children and waving of leaves
Figure 26: Jason's first leaf drawing

Figure 27: Jason's second leaf drawing
Figure 28: Margaret's first leaf drawing

Figure 29: Margaret's second leaf drawing
as though they were flags in the breeze. Leah asks the children to
now place their leaves onto the table as she removes the rest of the
pile. When she regains their attention she begins her introduction:

OK, everyone place their leaf on the table. Can everyone put
your hands in the air? Now, pick up your leaf and take the
other hand and trace the outside--see all the points? Can
you trace all the veins ... feel them?

Leah continues to demonstrate tracing the outside of her leaf
and following the ridges created by the leaf's veins. Children trace
along with her, holding up leaves for one another to trace while at
the same time shoving up the sleeves of their shirts to show one
another their own veins. Leah remarks, "Yea, those are your veins."
Helen replies, "The veins carry your blood. Look at mine (now
pointing to the veins on her leaf). I traced the veins" (as she follows
the ridges with her finger).

Following the children's "verbal outpouring" (Forman, Lee,
Wrisley, & Langley, 1993, p. 235) and finger-tracing, Leah moves
quickly to demonstrate a free-hand drawing of her own leaf. She
comments as she draws,

I look at the leaf, not trace it -- but look at it--to draw it....
This is the stem. Then it kind've branches off. Those are
the points (referring to her drawing) and then you can put
the veins in." She stops her drawing and looks up at the
children. "[Now] I want you to show me what you think a
leaf looks like.

Leah then invites Jason, Margaret and Allen to go on the other side of
a partition at a second half-moon shaped table. She has purposefully
arranged the chairs and table to ensure children have a private space
with plenty of natural light and space to draw. Leah kneels down
opposite the three children and begins by observing.
Soon, she supports Jason's work by holding his paper to keep it from sliding as he begins to draw. In response to her observation of Leah's assistance, Margaret readjusts her hand to better hold down her own paper. Allen tentatively picks up his pencil, looks at his leaf and asks Leah if this is what he should draw. Leah remarks, "Um hum, show me what it looks like...if you want to, you can show me what the veins look like." She then observes that Margaret has paused and is looking at Jason and Allen, yet has not made a mark. Leah waits and then suggests to Margaret that she begin by drawing a stem. Leah traces the length of the stem on Margaret's real leaf as she makes her suggestion. At this point, Jason states that he too wants to make a stem yet he appears uncertain as to how to begin. Leah then frames the stem on his leaf between her two hands so that Jason's attention is focused only on the stem of his leaf. He begins to draw and Leah comments, "Just this part here."

Leah continues to visually scan the three children and later moves behind Allen in order to place her hand over his to support his drawing. She does this because she notices that Allen's early marks were barely discernible. As she supports his hand, he moves his grasp down the shaft of his pencil and begins to draw with more force. Jason calls out, "I don't know how to make it." Leah goes to Jason and states, "It doesn't have to look exactly like it." During Leah's physical and verbal scaffolding of Jason's and Allen's drawings, Margaret periodically observes their drawing--engaged in a kind of silent collaboration with using Leah and the boys as she guides her own drawing. Margaret asks Leah, "Do you want me to draw some lines there?" Leah nods but does not comment and
continues to watch Margaret. The activity ends as the children join the other children in their investigation of grapes. Margaret is the last to leave the table, using extra time to carefully add the points on her leaf and write her name before she is satisfied with the completion of her task.

**Day 4: The first graphic representation.** Earlier, on the fourth day of the project, the six children sat around the two half-moon tables pushed together to form one large round table. Their plastic bags were filled with leaves, sticks and grapes collected from their previous project day. Leah asked them to open their bags and take out a leaf. Some of the leaves had become brittle and shriveled. As they looked through their bags there was much discussion among the children about their previous outside exploration and discoveries, especially when they picked the grapes found on a vine hidden next to the barn wall. The children were most interested in whether they could now eat the grapes. As their conversation continued, Leah asked them to trace the shape of their leaves with their fingers. She then gave each of them a piece of paper and a variety of broad-tipped and fine-tipped colored markers and invited them to draw their leaf: "I'll give you a piece of paper...Take a marker... Could you draw a leaf? Can you draw that one (pointing to the children's leaves)? Look at the veins."

The children began to draw. Leah moved around the table. Allen drew on top of his leaf, following the lines of the veins with his orange marker. Peter, sitting next to him, colored the "flesh" of his leaf. Jana paused and watched the others and began to draw without using one of the many leaves left on the table as a referent.
Margaret watched the other children for awhile before she began by first placing her leaf under her paper (as the children had done on day two when they had made leaf rubbings) but then changed her mind and put it on top of her paper and began to trace it. Peter was most interested in the grapes which he called blueberries and stated that he needed to draw a blueberry. Jason picked up a leaf and observed it and began to draw, quickly exclaiming, "I drewed a leaf!"

During the children's attempts, Leah commented on their work by stating "very nice job" to Jason and showing Peter once again his leaf asking if he could draw it. As he began to draw on top of his leaf she redirected him by pointing to his paper, "Show me how to draw it right here." She moved on to Jana and asked, "How are you doing, Jana? Is that your leaf?" She asked Helen, "Are you all done with your leaf?" When Margaret held up her traced leaf, Leah suggested she could draw veins on hers if she wanted to. As children finished their drawings they went over to the light table. They revisited leaves by looking at leaves spread across the surface of the table from which light emanated through a large Plexiglas top revealing more clearly the structure of the leaves. Following their exploration of leaf structure and observation of veins in leaves and in their arms and wrists, the activity ended and they ran off to play.

Scaffolding. The term scaffolding was introduced by Wood, Bruner, and Ross (1976) as a metaphor for describing the "process by which an adult assists a child to carry out a task beyond the child's capability as an individual agent" (Stone, 1993, p. 169). While not originally associated with describing the ways in which a more experienced learner supports that of a less experienced learner...
within his/her zone of proximal development, it nevertheless has become associated with teaching strategies influenced by social constructivist theory (Berk & Winsler, 1995).

There are two general dimensions of scaffolding evidenced in Leah's teaching. First and perhaps most obvious was the process-driven dimension, one in which Leah demonstrated during day seven the mechanics associated with restructuring a task through guiding, breaking down, and sequencing the steps of drawing a leaf. An important aspect of this process also included the way in which Leah communicated her intentions of the task and the way in which the children understood or "situationally defined" (Stone, p. 174) those intentions. Second is the interpersonal dimension of Leah's scaffolding technique. On day seven, unlike on day four, we have evidence of two fundamental aspects of this dimension: (a) the affective one and (b) the "symbolic status of the to-be-learned activity" (p. 179).

Leah's introduction of the task during her first teaching day (day 4 of the project) was too general and too brief. While the children all chose leaves and were provided similar tools and had some general notions about what to do, their interpretations of her intentions were disparate. Therefore, there could be no coalescence around a joint activity, a central component of scaffolding according to Berk and Winsler (1995). Instead, children defined the situation differently and were drawing on top of leaves, placing leaves under and over paper, and drawing blueberries. Leah's attempts to redirect their attention came too late, were not sustained nor meaningful, so that once the children began their separate tasks she
was unable to re-create a shared experience and resulting shared meaning.

However, on her second attempt, her introduction was more thoughtful and carefully orchestrated. She gave herself and the children more time to explore leaves and her verbal description of the task was succinct and detailed. As Leah recalled in her retrospective interview, "...my explanation was definitely a lot better because we got such a great drawing and such a detailed drawing from Margaret as well as the rest of the children." To ensure that children understood the task, she coupled her verbal description of how to proceed through the task with her own graphic representation demonstration.

Once she began working with her three children, she was careful not to move into their work spaces too quickly but instead stood back and observed. She differentiated her support, based on the individual needs of the children, alternating hand-over-hand instruction to framing parts of a leaf, for example. Her task analysis for sequencing the steps of the drawing were evident as she suggested steps of the task to each child rather than a global directive such as, "Can you draw me a leaf?" typical of her teaching on day four.

Leah's provision of support and guidance through systematic instruction (Moll & Whitmore, 1993) reflected her understanding of how to maintain a challenge for each child without overwhelming them. A major goal of scaffolding is to "keep children working on tasks in their ZPDs" (Berk & Winsler, p. 29). Leah was able to do this by restructuring the task and general environmental supports. First
she changed the markers to pencils. Next, she divided the tables with partitions to shut out distractions and ensured children had plenty of space and light. She later noted,

I liked the way we had decided to break up the tables and to give the children a little bit more room to draw. Giving them #2 pencils as opposed to fatter pencils. I know with Margaret's drawing we could give her a lot more control....as opposed to markers.

Remaining in relation over time in order to pursue an in-depth study of a topic supports the development of an "ethic of care" (Noddings, 1984) from which mutuality and trust emerge. As children and teachers remain in relation with one another and the topic, the importance and value associated with their shared experience develops. When children are asked once again by Leah to draw a leaf they attend more closely to their work because the task has achieved a worthy status shared by them and their teachers.

Leah's ability to restructure the task for each child was guided by what she had learned about their interactions with others during the previous weeks. As a result, she made a judgment about the type and amount of support each child needed. Unlike her earlier attempts, she could now sustain and adapt her participation in their separate and collective tasks. For example, had Leah moved into Margaret's space to hold her paper or guide her hand, Margaret may not have continued to draw. Leah and her team had already made an assumption that Margaret was a tentative learner and that her earlier tracing may have been due to her need to "capture the leaf--she wanted it to be perfect." Leah's decision to give Margaret
space, encouragement, and plenty of time supported her continued drawing and decreased the likelihood of pressuring her. As a result, Margaret produced a sophisticated drawing as compared to her earlier drawing which was a tracing of a leaf. While Jason was most effective at verbalizing his needs, Allen had also asked for help which had not been typical for him during earlier project days. In fact, he was reluctant to talk at all because he feared not being understood due to multiple mis-articulations which often resulted in a need for him to repeat an utterance. As Leah later wrote in her journal,

...the leaf drawing that Margaret drew—she understood my directions, my cues. I actually scaffolded her learning which made such a difference not only to her, but to myself as an educator. I understood that yes, higher order questioning works [for example]. Allen asked for help and without even really thinking, ... I had scaffolded his meaning-making.

**Intersubjectivity.** A teacher's ability to support and guide children's learning is dependent upon establishing intersubjectivity. Intersubjectivity is defined by Barbara Rogoff (1990) as "the sharing of purpose and focus among individuals—... a process involving cognitive, social, and emotional interchange (p. 9). Trevarthen (1980) earlier defined intersubjectivity as "both recognition and control of cooperative intentions and joint patterns of awareness" (p. 530). The change in Leah's ability to more effectively guide her children in their "joint patterns of awareness" was dependent upon their understanding of the task as she originally communicated the task, verbally and non-verbally. However, to support learning within children's ZPDs involves more than simply transferring "task
responsibility from the social (intermental) level to the individual (intramental) level (Stone, 1993, p. 171). Rather, the process is less an acquisition as it is participatory appropriation in which "individuals change through their involvement in one or another activity, in the process becoming prepared for subsequent involvement in related activities" (Rogoff, 1995, p. 142).

Leah's verbal and non-verbal participation changed significantly from her first to her second attempt to provoke children's drawings. In particular, recall the way in which Leah prompted the three children on day seven by not describing the entire sequence following her initial introduction. As the children began, she first observed then cued each child by inferring that they already had knowledge of how to proceed. Leah, did not begin by telling them that they must first draw the outside shape of the leaf or the stem. Instead, she first looked at their initial lines and placement of their pencils on the page and then made a suggestion as to what each might attempt next. She did not presuppose a drawing sequence nor insist that all three children adhere to it. She did assume that there was shared meaning or intersubjectivity and that they understood the task. As a result, her primary role was to offer only enough support to bridge their attempts as they learned on the edge of their individual ZPDs.

Each child's work both alone and with Leah had an impact on other children in the group. The shared meaning of the task was not only evident in their separate attempts at drawing a leaf but in the way in which they shared the experience with one another. Margaret made gains simply by observing the interactions and

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questions posed by Jason and Allen coupled with Leah's responses. As Jason began to draw his stem, Margaret in turn began to draw hers. As Leah framed the stem on the real leaf for Jason, Margaret observed and then proceeded to draw her stem. When Allen asked Leah for help as he began to draw the shape of his leaf, Margaret observed and continued to outline the shape of her leaf. The individual drawings were products of the ways in which children engaged in verbal and non-verbal transactions in their efforts to co-construct and thus transform their knowledge about how to draw leaves.

**Representation.** Representations are the "process[es] by which knowledge becomes accessible to thought, becomes the images about which and by means of which we think" (Kaye, 1982, p. 119). In this context, children's representations are revealed through their use of a variety of media or symbolic languages. Symbolic languages or what has become popularized through the work of Reggio Emilia educators as "the hundred languages of children" (Edwards, Gandini, & Forman, 1993) include socially constructed symbols such as paint, clay, drawings, written and spoken words, shadow, lights, and drama to name a few. Through these symbolic languages children reveal and share their representations and in sharing, socially construct knowledge. The process of "representing experiences and ideas with symbols (itself a constructive process) allows the creation of 'semiotic spaces'" (Fosnot, 1996, p. 26; Wertsch, 1991) where meaning is negotiated. Symbolic representations therefore are not simply static representations, but dynamic ones.
The processes associated with symbolically representing knowledge is mediational, both on an intramental and intermental plane of development; "a process of active individual construction and a process of enculturation" (Cobb, 1994, p. 13). When children represent on their intermental plane through symbols (e.g., drawing and language) which are "... the result of previous 'taken-as-shared' meanings by a community" (Fosnot, 1996, p. 28), they make public the meanings associated with those representations, as those meanings continue to be negotiated and socially constructed with others in the group. Thus, both representation and the symbols used to reveal those representations emerge from negotiations and participation with both the symbol systems and others who comprise a particular community of learners. From these experiences, shared meaning develops. It is on the intermental plane where the relationship of the children's representations, the development of intersubjectivity, and Leah's ability to effectively scaffold became the primary focus of this scene.

The relationship. Jason had been provided a variety of opportunities to symbolically represent leaves between his first (day 4) and second (day 7) graphic representations. When Leah first provided him and his peers with markers and paper and asked them to draw a leaf, Jason quickly took to the task exclaiming after a few minutes, "I drawed a leaf!" He did this with Leah providing minimal support. Following this initial graphic representation, the teaching team continued to create opportunities for the children to symbolically represent their knowledge with one another over the next three days. Through the provision of a "cycle of symbolization"
(Edwards, Gandini, & Forman, 1993), including the use of light, clay to make prints of leaves, paint for making hand prints to compare to leaf prints and finally wire, paper, and glue to construct leaves, children socially constructed knowledge about the shapes and structure of leaves. Following these experiences, Leah once again invited the children to graphically represent a leaf.

The team expected these second drawings to be more sophisticated than the children's first attempts, thus revealing their negotiated "taken-as-shared" (Cobb, 1991) knowledge about leaves and the symbol systems used to reveal that knowledge. On this second attempt, Jason was far more hesitant to draw and repeatedly asked Leah for assistance. In response to his pleas for guidance, Leah assisted him by offering both procedural and social support. Jason's attempt to draw mediated his new symbolic representation of a leaf as it in turn, mediated the way in which Leah focused her scaffolding. For example, she first assisted him by holding his paper so that he could begin. Next, she broke down the task for him by verbally cueing him and framing the stem of the leaf with her hands. She continually observed him and at one point assured him that he did not have to make his leaf exactly like the one in front of him, even though his would have the points, shape, and veins that he observed in the leaf. She smiled at him from across the table as he looked up to seek her out when he became hesitant as he approached the drawing of his stem. He also watched and listened to his peers work with Leah, taking cues from them as he drew.

While Jason's tentativeness might be due to a lack of information about leaf structure, I believe it was more likely an
indication of his recognition of the complexity and worth of the task. Leah's request of the children was contextually embedded in their previous experiences. As a result there was also a shared meaning regarding the worth and value of the task. Jason had co-constructed a representation of leaf-ness and knew that such a representation should include a particular shape, points, a stem, and veins. Such recognition resulted in both a hesitancy that he could graphically represent his knowledge as well as a sustained focus to make the attempt.

Jason worked hard to include a stem, veins, and points on his leaf, motivated by both his relationships to the task, his peers, and Leah which had developed over the previous weeks and were continuing to support his learning even as he struggled to complete his drawing. It is through these relationships—to task and to others—that collaborative inquiry contributes to the social construction of knowledge for both children and their teachers.

Leah's guidance and support was now informed and intentional. Her ability to individualize her support among the three children was informed by the shared meaning or intersubjectivity which had evolved over the weeks as she taught with the children and reviewed video and audio tapes of her peers teaching. She had come to know the children and know the ways in which their earlier attempts to symbolically represent knowledge had emerged and changed. Her ability to effectively support Jason and his peers was both a result of these past experiences as well as what was happening on this particular day. For her to "hit the developmental mark" by systematically diversifying her assistance, the children had
to likewise let her know what they needed from her—and they did. Jason repeatedly asked for specific help. Allen voiced his needs for one of the first times during the project. And Margaret was given enough time, space, and encouragement so that she could remain at her own pace in order to complete her work.

In this context collaborative inquiry is a joint endeavor among the teachers and children and between them and their individual and collective processes of learning. For preservice teachers to move beyond the mechanics of developing teaching skills associated with scaffolding, the context must provide them and their children with time for repeated opportunities to interact and symbolically represent knowledge, co-constructed through those interactions. The string of symbolic representations in these scenes evidenced a progressive move for both children and teachers toward higher mental functioning. When continuity of experience is infused with interaction (Dewey, 1933) and is contextually embedded, teachers and children are provided occasions for revisiting and re-representing previous attempts to symbolically represent their knowledge. Consequently, the change in sophistication of both the children's drawings and the preservice teachers' practice related to scaffolding went beyond what many believe is expected of preschool-aged children and their young, pre-service teachers in such a short period of time.

The Water Project

Scene 1: Learning to Anticipate, Predict and Project

Kaitlin and five children sat around a table. She showed photographs to them and asked, "Can everybody tell me about these
pictures? What's in all of these pictures?" Children shouted out their answers, "boats... buildings...people" and Kaitlin replied "Yes, but...." and continued to show more photographs until she finally asked, "What is this? A pool? That's right! What's in a pool?...That's a picture of water. We're going to talk about water today, OK?" Kaitlin then handed out a water bottle to each child filled with water and invited them to move to an adjacent table where she had placed a large rectangular tub. She asked them to help her fill up the tub. Some of them climbed onto chairs because the tub was too high for them to see into. As they filled the tub, Kaitlin brought out a large variety of objects including sponges, water wheels, beakers, rocks, leaves, straws, and Styrofoam. Added to all of these objects were bubbles so that the tub was spilling over with bubbles and toys, leaves and bottles. Kaitlin continued to question the children:

- What types of things do we use water for? (the children did not answer)
- Susie, you live close to the water, don't you? (the children did not answer)
- What kinds of things float in water? (Once again, the children did not answer)

The children did not answer Kaitlin's questions nor talk to one another because they were too busy exploring the water by pouring and scooping and making more bubbles. Kaitlin shifted her topic of questioning a few more times, first to swimming followed by suggesting they might construct a boat out of the items in the tub and finally back to questions of swimming and visiting the beach. Throughout her questioning, children rarely answered her. Instead they continued to play in the water until she moved them back to their original table to predict what combinations of food coloring
would turn the water into red then purple then blue. The activity ended as children stirred the water and begged for another turn with food coloring.

As with the leaf team, the water team had met twice during the previous week to choose their topic and prepare for the first day. Kaitlin wrote in her journal that their objectives were to "ask questions and get the children discussing to see where the possibilities lay in the future...." She had worked hard to generate a line of questioning and prepare materials and yet she noted,

...the kids just played, they totally ignored me.... It was a flop but I think it taught my whole team something because we went in thinking that we were gonna do dramatic play and get so much from them as far as conversation ...But we didn't get anything out of it and so it totally made us refocus our entire project....

The water activity was an appropriate sensory exploration experience common in most preschool classrooms. Yet the activity was inappropriate when the aim was to generate verbal outpourings from children so that teachers could scaffold their social construction of knowledge regarding the topic of water. The team's original intention was to provide the children a familiar experience and wait and see what the children would say or do. As Mary wrote later in the week:

I was hoping that by introducing water with the materials that didn't really represent anything like boats or rain...that perhaps the children would come up with one of these [ideas] on their own. We hoped by introducing water in a general way that maybe we would/could capture an interest and take it from there.... I guess we were expecting too much in terms of what we hoped they would come up with on their own.
Kaitlin, Mary and Hannah were up against one of the most common challenges faced by preservice teachers who attempt to move away from a transmission orientation toward one of collaborative inquiry. This challenge is how to move into children's learning spaces "to anticipate, predict, and project...." (Rinaldi, November, 1996) without taking over or on the other hand remaining too removed from the action. For example, instead of waiting to respond, altering her line of questioning, or removing some of the objects, Kaitlin remained steadfast in the implementation of the team's original plan. As a result her participation remained peripheral as she directed from the edge of the activity.

Kaitlin was unable to self-regulate her behavior and adapt her practice. As a result, she missed opportunities for scaffolding or supporting the children's social construction of knowledge. In addition she had intended the water and objects would serve as tools for mediating children's knowledge construction. Instead, the presence and use of these tools limited children's language because children did not need to talk to use them. Without children's discourse, Kaitlin could not determine a direction for her team to pursue nor could the children truly share in the experience even though they had all participated in it.

This activity is a good example of the ways in which both teachers and children remained on the margins of a shared experience. This peripheral participation continued for the remainder of the week. Teachers continued in the direction of planning variations on the sink and float theme. It was as though
the activities were barriers rather than bridges for teachers' and
cchildren's social construction of knowledge. As a result by the end of
the water team's first week, the only real shared meaning that
emerged was the belief by teachers that they had no direction, the
children were disinterested, and not engaged in the topic.

The team was aware that they had to relinquish their
"prescribed pedagogical approach" (Mallory & New, 1995, p. 3) to
investigating water. Rather than remain focused on what the
teachers believed were developmentally appropriate water activities
for young children they began to return to some of the key principles
associated with project work. For example, the pursuit must be
directed, in part at least, by the interests of the children and be
relevant and meaningful to their lives.

As the water team reflected on their first week through their
writings, reviews of video tapes and conversations in team meetings
they acknowledged that they had virtually ignored the flooding that
had occurred in the region earlier in the week. A video tape of the
third day of the project had documented one of the only genuine
conversations that had occurred among children during that week
when children recalled events associated with the week's flood:

Mary: What happened when we had all that rain at the
beginning of the week?
Susie: Big puddle.
Eric: I saw a big, big, big, big, big, big, big, big really high
puddle! It's too much. Houses flooded.
Bobby: Me and Mom were driving down the road to school
and we saw a tree floating on to the road!
Mary: That's right, that's what happens when there's too
much rain. And do our houses or our cars float?
Susie: Yea.
Michael: No they don't.
The documentation of this conversation on video tape provided the teachers an opportunity to revisit and reflect upon a conversation that might have gone unnoticed had it not been recorded. Documentation is not simply the purposeful recording of conversations or the gathering of data, however. It also includes the systematic use of data. In this context data is most often represented by photographs, children's graphic representations, constructions and video tape and audio tape recordings.

Teachers have to make decisions about when and how to use documentation in order to determine which documentation will serve as the springboard for a new direction, focus or line of inquiry. In the case of the water team, the teachers determined that the interest, astonishment and wonder associated with the local floods was represented in this conversation and worth pursuing. They further determined that the topic of water flow as it related to flooding appeared to be a relevant and meaningful direction for scaffolding children's inquiry. In this instance, documentation had "re-generated" (Gandini, June, 1996) the project, providing data for a renewed sense of direction and stimulating a heightened interest among the teachers and subsequently among the children.

Scene 2: A Turning Point

I move the three chairs in my office into a cramped semicircle and step over stacks of videotapes of previous teaching days as I make a path to my desk chair. I am preparing for the water project team's second meeting with me to discuss their collaborative project with three year olds. I search for an audio tape and check the batteries in my tape player. This is a meeting I want to be sure to
document because I have heard that Hannah has tape recorded a conversation with one of the team's three year old children and that the team believes they've captured an important event.

I look up as the three teachers enter through the front door office and walk past the reception area into my office door. As they approach me they are all smiling; they appear giddy as though they have a secret and are bursting to tell. Yet I have already heard their secret. This kind of news travels quickly as some of their classroom peers were teaching other children that day and later witnessed hearing about the conversation recorded on Hannah's audio tape player.

They move quickly into chairs dropping and stepping over backpacks. Before they are all settled, Mary who is usually the quiet one exclaims, "I was dying in my room. Oh, God, I can't even imagine what people (in my dorm) must have thought. Here I am listening to this tape--it was incredible...." I quickly pushed the record button on my own tape player and waited to determine how I might participate in their discussion and plans for future teaching days.

On the previous day Hannah had invited the children to visit the rain puddle on their way to the playground. While most of them ran off with Mary after a brief look and a couple of tossed rocks through the large metal grate, Michael hung back and began to talk with Hannah. What was incredible was that Hannah had remembered to take along her audio tape player and had recorded a conversation with Michael about his theories concerning water flow. Now the conversation was a shared experience with the rest of the teachers on her team. They quickly agreed that it symbolized a
turning point in their project because they now believed they had a sense of direction. Here is a sample of the conversation which so engaged the team members:

Hannah: Where did all that water go?
Michael: Even, even me have to, probably when that water, that we, that they come out, when it went all the way down there. I don't know what the people did to it.
Hannah: You don't know what the people did to the water?
Michael: Yeah, probably the people had shovels and them shoveled the water up and put under some and.
Hannah: You think so?
Michael: Yeah.
Hannah: And now it's under the sand so it's not in the road anymore?
Michael: Yeah.
Hannah: Did you see people in the road shoveling it?
Michael: No. Probably it does run into a drain and went down.
Hannah: It did? Do you have a drain in your road for that big puddle?
Michael: No.
Hannah: Well, what drain did it go down?
Michael: It probably went to a big drain that was up in the sky, so up, up, up,up?
Hannah: Way up in the sky, there's a drain?
Michael: No.
Hannah: But that's where the water goes, is way up in the sky?
Michael: Yeah.
Hannah: How does it do that. Does it fly?
Michael: No. It just goes up and then it, and then when it rains, that water comes down.
Hannah: Oh. So it comes up and then it goes down and then up and down.
Michael: No. Then that rain goes away.
Hannah: It goes away? Where does it go?
Michael: Probably it goes to my school and then it goes right down there (pointing to the drain).
Hannah: Do you think all the water comes down into this one drain at your school?
Michael: Yeah, right there.
Hannah: Wow.
Michael: Probably....
Now the team had an opportunity to collectively reflect and consider strategies for using what they learned about Michael's theories concerning water flow in order to further direct the project. In this context, collective reflection is dialogic inquiry with others which results in the generation of multiple perspectives from which to consider future action. Now the experience was shared by the team—it "belonged" to each of us as part of our collaborative experience of implementing the water project. It was for all of us to use in determining how to extend the children's inquiry of water flow. The teaching team's challenge was what to make of Michael's knowledge and how to proceed in a way that extended his learning while creating meaningful and relevant experiences for the rest of the children in the group.

Earlier in the semester, we had discussed principles and practices for guiding projects. At that time I suggested to preservice teachers a strategy for ensuring clarity about their intentions for planning particular experiences for children. I noted that I had observed a sequence of phases through which teachers may guide children's inquiry within projects. From this perspective, the phases of a project can loosely be described as either explorational or representational.

When a phase is explorational teachers intend for children to explore a topic. During an explorational phase, children should have opportunities to construct new knowledge with others in order to move forward in their learning. During this phase the intention of teachers is not to seek representations of children's knowledge but instead to provide them with new experiences from which they can
socially construct knowledge. Examples of explorational experiences might be a trip to a rain puddle, investigation of water pipes under sinks, or experimenting with water by pouring and stopping up sinks with drains.

On the other hand, if teachers' intentions are to generate representations of children's knowledge then all of these earlier examples of explorational phase activities could become representational ones. For example, should teachers desire children to represent their visit to the rain puddle, they might arrange for them to draw the puddle, photograph it, or construct their own puddle. Following this representational phase children might once again explore water flow by investigating water pipes and sinks, followed again by representations of this extension of the original experience of the rain puddle. In both the explorational and representational phases children socially construct knowledge. Yet, for preservice teachers just beginning to collaboratively teach within a project framework, it is important that they know what they intend the experiences to provide children and how these experiences propel their inquiry and the project forward.

As we continued our discussion of how to take advantage of the conversation we were mindful of these phases of a project and the three categories of activities from which teachers often choose, e.g., construction, investigation or dramatization. The team began to consider their options:
Mary: We were trying to figure out whether to go with the holes (in the drain) or evaporation.
Kaitlin: Well, I think the hole thing [pause]... we might be able to get them to construct more because of the piping and we can look under the sink and .... Like evaporation-- I'm a little worried that we won't be able to do much [with it].

Mary and Kaitlin's reflections are representative of the deliberations which occur frequently among teachers who teach within an "emergent curriculum" (Jones & Nimmo, 1994). These deliberations are about what to pursue and how to pursue it. Teachers are continually placed in the position of decision-maker as they determine what would be most relevant and meaningful to the children and how particular experiences would best provide children opportunities to further their inquiry. As preservice teachers collaboratively deliberate and make joint decisions they are compelled to think critically, to attend to their observations, to consider multiple perspectives often guided by documentation.

Later in the meeting we discussed how to provide children with experiences for simulating a puddle in order to study the flow of water away from a drain spout. In the following excerpt, I suggested they consider using equipment already in the classroom.

Me: You've got the water table (In the classroom). [Why not] have them construct the underground piping for the drain...you construct it out of tubes...[then] you construct the road that goes over the drain.
Kaitlin: I think that conceptually it might make sense if we made the road on the bottom of the water table.
Me: All right.
Kaitlin: Use the plug as the drain and just put screen on top of it so it looks like a drain...Then, have the piping underneath the water table.
Mary: And they could see that it was underneath the road.
Hannah: Well, to introduce it we'll look at drains underneath the sink and things like that?

Me: So what you do is you take them all over to the sink and you turn on the water and you say where is that water coming from? And then they give you their theories and you say, "what would happen if I put this plug in the hole?" And then you take the plug out and say, "I hear it. It's going somewhere. How could we find out where it's going?" So, you open the doors— "Oh, there's pipes!" And then Kaitlin could say or whomever, "Michael, remember when we went out [to the puddle]? Listen to what you said...," [play the tape]. So what you're after are theories, more theories and hypothesizing. And you're after helping them understand where the water goes and the connection between drains, holes, and pipes.

In this excerpt my role was quite directive. The team had engaged in a lengthy conversation about the many possible directions in which they could develop activities and had settled upon re-creating the rain puddle by having children construct one including underground piping. Yet they were unsure how to initiate their plan. The development of collaborative inquiry among preservice teachers does not happen simply because they share a joint activity and the responsibility for that activity. Rather, it is the responsibility of the teacher educator to know when and how to guide their teaching and reflective practice; when to be directive and when to get out of their way.

In this scene, I supported their collaborative reflections by offering specific recommendations and thus operating somewhat from a transmission orientation. Upon initial review, my practice might seem counter to the goal of developing collaborative inquiry. Yet often during the early weeks of projects, such a position by the teacher educator is necessary until preservice teachers gain more
experience in the classroom and with one another. As they become increasingly interdependent, trusting one another's judgment and knowledge about their children and teaching practices associated with project work, my primary role becomes increasingly mediatitional and finally non-directive (Moran, 1997; Bredekamp & Rosegrant, 1992).

In this excerpt we all participated in determining how to plan experiences for children to co-construct knowledge using tools and sign. As we engaged in collective reflection which soon became collaborative action we socially constructed our knowledge within a context where there were opportunities for the more experienced learner (myself) to scaffold the less experienced learners (the teaching team) by modeling and role playing, for example. Our multiple perspectives were mediated through verbal discourse (Rogoff, 1990; Rogoff, Baker-Sennett, Lacasa & Goldsmith, 1995; Berk & Winsler, 1995) resulting in shared meaning (Kaye, 1982), shared responsibility and shared ownership of how to proceed.

We engaged in the early stages of a recursive cycle often associated with collaborative action research in which Hannah had "planned and acted" (Oja & Smulyan, 1989, p. 17) to engage children in a conversation and tape recorded it. We were then able to "observe, reflect upon and revise" the direction for the project guided by her documentation and mediated by verbal discourse.

**Scene 3: A Revision and a Reaction to a Changed Activity Plan**

During the week prior to the sixth day of the project, the team met with me and decided to provoke children's theories by asking them to graphically represent the flow of water through drains and
pipes. To this end, they made plans for Kaitlin to prepare strategies and tools for encouraging children to remember their earlier experiences. I agreed that we needed to better understand the children's ideas. I noted, "I think [the children's theories about water flow through holes should be pursued because] there is confusion on our part about what they know and what they don't know...." Kaitlin spoke for her team when she said,

it would be really neat to have them be able to draw their theory....we were thinking that the actual representation probably might not be as instructive as if we could talk to them about their picture. I think they would be able to say like, this is where the holes are. So, it would be actually trying to get them to point out different things. Like they might have scribbles but they would know what it would mean.... We would just have to get them to talk about what was there.

The plan was to support children's recall of their earlier experiences through the use of a cycle of video and audio tape coupled with questions and materials for drawing. The intention was to support and guide their graphic representations and verbal outpourings by provoking their developing theories about water flow. However, on this day of the project neither the plan nor Kaitlin's feelings about her teaching evolved as expected. The purpose of this scene is to consider the affective dimension of what it means when a team of teachers not only share power, resources, and authority but also the commitment and vision for implementing a collaborative project.

The revision. To provoke children's conversation and drawings, Kaitlin began by asking the children to recall their visit to the drain next to the rain puddle. "What did we go outside to see?" When the
children responded, "water hole," Kaitlin persisted with her questioning showing a videotape of their previous visit to the rain puddle. Throughout her questioning children seemed uncertain as to how to answer her questions. For example, as they watched the videotape, Kaitlin asked, "What's that?" The children replied, "Water." Kaitlin responded, "No, it's a drain. What's down there?" (pointing to the grate over the drain). The children did not respond. Kaitlin continued to question them, "Where does the water go when it falls into the drain? What does the drain look like inside? Does anyone remember what's in there?"

Kaitlin stopped the video tape and played the audio tape of Michael's conversation taped on an earlier day with Hannah, "Let's see what Michael had to say." The children listened intently as they placed the sides of their heads onto the table close to the tape player. They kept very still and quiet. As they listened, Kaitlin repeated Michael's theory that water "went to a big drain that was up in the sky.... It just goes up and then it comes down." In response to her continued questioning following the tape, Bobby said, "It goes down the drain.... It stays down in the drain." Carry then added, ""It goes down the drain and there's some teeth in there and it chops the water up."

By this time, the activity had lasted for almost fifteen minutes. The children were becoming noticeably disinterested, turning around in their seats and looking away. Nevertheless, Kaitlin pushed on by asking, "Remember that flood--where did the water go? I'm interested in where the water.... draw [me] a picture of what happens to water... when ... where does it go?" She handed out half sheets of
white construction paper and pencils with erasers. The children began to draw, reluctantly. Bobby named his drawing, "that's the sink." Kaitlin asked, "Where is the water? Where is it going?" Bobby did not reply. Michael remained hesitant and did not draw. Kaitlin offered to get him started by drawing him a hole if he would then draw "where the water goes from there." As Michael made an attempt, he commented to Hannah that he was drawing "someone walking into the bathroom." At this point, Hannah asked Michael if he would like to go into the bathroom and look at the sink to see if they could find the drain.

The children and Kaitlin followed Hannah and Michael into the bathroom. They encircled the large round sink, stepping on the foot pedals and waiting for the water to stream from a center pipe out into a circular pattern like a small fountain. Holding his hands under the streams of water Bobby looked under the sink exclaiming, "It goes down there and comes back out again!" At the same time Michael walked over to one of the three toilets and flushed it. He then got on his knees and looked into and under the commode. Hannah asked, "Where did it go?" Michael replied incredulously, "I don't know... right down there in the hole.... I don't know where it is."

At this point Hannah suggested the children return to the classroom to investigate the classroom sink which had pipes leading from it located behind two cabinet doors. Hannah and Kaitlin sat two of the children on the counter on either side of the sink while the remaining two peered over the edge. Children took turns turning on and off the water. Their heads filled the airspace over the sink as they experimented with plugging and unplugging the drain, filling
and refilling the sink with water (see Figures 30 & 31). The teachers exclaimed, "I hear it!" Then Hannah asked, "Where do you think it's going?" Carry opened the cupboard doors to look and listen for the escaping water. The children crowded around. Hannah said, "OK, ready? When I turn it on everybody be quiet....I'm going to shut off the holes--the holes are closed .... (Then she opened the drain.) Did you hear anything? The children exclaimed, "It's down there! It's all gone!" Hannah continued to provoke their collaborative inquiry. She asked, "Will it happen again?.... Let's see what happens when you open up the holes."

The children peered into the sink and replied in unison, "It's going down!" At this point, Hannah began to summarize their investigation and theories about water flow through the drain and pipes, "Looks like the holes need to be open for water to go down...look at that spiral as it goes down...! When you open the drain [next time] let's look at the pipe to see what happens." The children continued to take turns, repeating their investigation and predicting that the water would go down and away. The activity ended as they listened intently to the swoosh of water through the pipes one last time.

The second half of the children's experience was clearly engaging, inquiry-oriented, and developmentally appropriate. Hannah was able to provoke their inquiry by leaving behind their paper and pencils and moving into an explorational phase. The care taken by the team to prepare the activity including the orchestration of the two teachers, choice of media, and line of questioning were unsuccessful and possibly beyond the children's zones of proximal
Figure 30: Children experiment with water flow at the sink

Figure 31: Children listening and looking for water

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development. The provocations failed to support an extension of their earlier thoughts because the children's thoughts and representations were inadvertently redirected away from their own theories toward the ideas of the teaching team. The children did not respond to Kaitlin's leads because they had no experience with water flowing through underground piping. Their pipes and drains were thought to be in the sky and contain teeth, not connected end to end, lying in rows buried underneath the road that lead to their school parking lot. Later the team would comment in their post-project reflection about this day by saying,

...it was clear that our approach [on this day] was too abstract. This caused frustration for both the teachers and the children. The frustration might have ended the project day, but instead the teachers encouraged continued interest [of the children] by shifting the focus to active engagement by exploring sinks. (italics added)

Teaching beyond children's zopeds. By "abstract" the team was referring to at least two aspects of the first half of this experience. First, they had provided the children with materials that did not afford ease for children's symbolic representations of what they knew. The paper and pencil task was one-dimensional and static yet the children were being asked to represent a three dimensional, dynamic process of water flow. Even though the team had taken great care to provide children with paper and drawing utensils that enabled them to erase and begin again, the tools limited the children's ability to represent the dynamic nature of water flow. Second, the children were asked to represent water flow through drains and pipes without first experiencing water flow through piping. In short, the children were being asked to produce a graphic
representation without first being provided relevant experiences from which to co-construct the knowledge necessary to graphically represent it.

Even though the children had their own theories about where the water flowed at the outside drain, none of Kaitlin's questions matched their current beliefs about water flow. While they had expressed a clear desire to answer Kaitlin's questions, there were no provocations posed to illicit Michael's drawing of his drain in the sky nor Carry's teeth that chopped up the water. Instead, while the teachers used provocative tools (e.g., video tape and audio tape) for supporting children's recall of previous experiences, their accompanying questions were from their own perspectives rather than from the children's. As a result, they "missed the developmental mark" and began to lose the focus of the activity and interest of the children.

Preparing for the possibilities. The team had carefully prepared the activity plan yet the children appeared to find the questions tedious and the task confusing. Once they attempted their drawings, they were not interested in talking about them even though Michael and Bobby did name their scribbles. Not until the end of the more formally planned activity when Hannah invited Michael and the others to explore the sinks did the children become engaged, anticipatory, and eager to share their observations and theories.

Such reflection-in-action (Schon, 1983) exhibited by Hannah's shift is sometimes supported by his/her preparation for the possibilities. In this teaching and learning context, preparing for the
possibilities is a strategy used by preservice teachers and encouraged by me throughout the implementation of projects. Such preparation includes determining alternative options that might be operationalized if a team decides to shift their focus due to "missing the developmental mark" with their primary plan. Preparing for the possibilities not only includes discussing other options but also includes writing and thinking about the implications for practice such as when and how to make such a shift. Mary wrote earlier about the application of this strategy in response to a guiding question posed by me to the class,

If a teacher goes exactly by the plans, he/she may be missing out on teachable moments and limiting the children's capacity to learn. This can also happen if a teacher jumps into the alternative plans. In other words, teachers must be able to read the behavior of the children and make "on the spot" judgment calls....[however], it is possible to plan for other possibilities and not always carry out those plans. It depends on the feedback the children are giving." (italics added)

From this perspective, preparing for the possibilities is more complex than "reflecting-in-action" (Schon, 1983). Reflection-in-action might have resulted in Kaitlin simply ending her request for children to draw. However, preparing for the possibilities is more similar to Van Manen's "anticipatory reflection" (1991, p. 512) from which teachers enter the classroom mindful of the possibilities and thus positioned to guide future thinking and practice. While Kaitlin was reflecting-in-action she was unable to shift to an alternative plan. However, Hannah was capable of such a flexibility. Hannah later associated "preparing for the possibilities" with her ability to remain flexible in the classroom when she wrote,
preparations [for the possibilities] allows you to be open to children's ideas rather than needing to be rigid and unchanging....to find that balance so that you are able to scaffold children's learning without completely directing it ... [by] having materials and previously thought out ideas ready.

The team had initially missed the developmental mark in preparing the plan for this day. However, because they had already discussed the possibility of visiting the classroom sinks and pipes, Hannah was able to take a calculated pedagogical risk, trusting that her shift was a viable one for the children and an acceptable one to her team. In fact, the team later described this day as "a day that elevated the mood of the group [of children]" and one in which the preservice teachers learned that "children needed experiences that actively engaged them." They went on to say, this discovery "relayed into a shift in our teaching and in the overall project.

The effects of this day did not end here, however. As Kaitlin seemingly moved with ease alongside Hannah, offering support to her successful line of questioning and suggestions for children's explorations, she was simultaneously engaged in an internal struggle -- a struggle not uncommon when preservice teachers in this context collaborate with one another.

"To be like one": The affective dimension of collaborative inquiry. This day had been scheduled as Kaitlin's teaching day. However, during the second half of the activity, Kaitlin assumed an assistant teacher position, giving over control of "her day" to Hannah. Paradoxically, as Hannah acted with self-assuredness bolstered by recollections of earlier team
discussions of possibilities to pursue, Kaitlin lost confidence in her ability to teach. Later that day Kaitlin wrote,

I am not confident in my ability to teach.... Today while team teaching, all of my insecurities came back again. Hannah has a lot more experience in the classroom with children than I do and I felt like I immediately took a second seat. Hannah has a "knack" with children and I am envious, but I have to admit my initial reaction after teaching was anger. I was angry the children responded so well to her and that she asked all the right questions. I was angry because I went into that classroom this morning feeling ownership over my teaching day.

Learning to collaborate is both a cognitive and an affective process (Cuffaro, 1995). Yet when collaborative teaching is a goal, I believe the focus in most preservice teacher education programs is more on the organizational and pedagogical logistics of collaboration. In this setting, however, I have come to regard preservice teachers' emotional or affective needs as equally important for me and the teams to nurture, acknowledge, and support.

Typically, preservice teachers spend most of their time writing and talking about how to extend children's learning or how to choose appropriate materials. However, when they are given the opportunity to write in self reflective journals each week and teach long-term with the same teachers, I believe it is more likely that they will talk about their feelings. Had Kaitlin not had her journal to write in nor grown to trust me, she may not have felt safe to share her feelings of anger and envy. Subsequently, her ability to reveal her feelings prepared me to support both her pedagogically while nurturing her self-assuredness and confidence. Kaitlin went on to write,
But then I thought about it. It wasn't my teaching day at all. One thing I have learned from working as a team of teachers is that we have to be like one. So what if she got the children to respond and I didn't. We got a lot of data from the children today...it was incredible documentation and I knew that having it on tape would be amazing [for us] to transcribe later.... a tremendous lead for the lesson plans that [will] follow. (italics added)

I appreciated her ability to convey and analyze her feelings and to ultimately reach an understanding of how to contextualize them as a member of a collaborative teaching team. I continued to be watchful and mindful of her lack of confidence and her struggle to balance her feelings of jealousy with the shared task of implementing her project with Hannah and Mary. As a result, I worked to find opportunities to point out to her the ways in which she was changing and how her participation was an important contribution to the collective efforts of implementing her team's project. Consequently, she remained in relation with Hannah and Mary sharing with them the work of implementing their project. The positive outcome of their many shared experiences as their project flourished dominated her periodic feelings of inadequacy. She continued to make gains in her teaching, noting in her last journal entry,

[For a while] I really thought I had no teaching ability whatsoever. I even decided that I wasn't going to finish my education minor.... [But now], I'm not saying I'm a born teacher, but at least I know now that if I ever decide to pursue it, I have the potential to be good.

Collaborative inquiry does not simply evolve because teachers share resources, power, and authority with one another and me. To be like one in this setting means that as teachers' participate in a
collaborative process of learning how to teach, they make changes in
the ways in which they learn from one another and me by
alternating the role of guided participation (Rogoff, 1995) with one
another. It is at this time that they begin to make shifts from a focus
on protecting and developing the self toward behaving in ways that
benefit self in relation to others. This shift is what Nell Noddings
refers to as "engrossment" (Noddings, 1984, 1992) which enables
teachers within settings to seek a balance between the development
and well-being of the individual and the collective.

The implementation of collaborative projects depends upon the
development of teachers' relationships with the knowledge and skills
associated with their practice as well as with people. In this case
Kaitlin knew Hannah, trusted her and appreciated her skills and
knowledge. Kaitlin cared about the children and acknowledged their
excitement and engagement when Hannah guided their explorations
at the sinks and immersed them figuratively and literally into the
topic of water flow. Kaitlin was committed to the processes
associated with the collaborative implementation of their project and
was able to access our relationship to help her sort out her periodic
feelings of envy and inferiority. Her commitment to the project and
the generation of rich documentation to inform future planning for
her team was a shared priority. She knew where she, her teammates
and their children had come from and had an understanding of the
path they wished to take. That pathway was to be created by the
tracks of all the participants, children and teachers, and in the end no
one would be able to determine nor care who was leading, when.
Chapter Summary

A portrait of the emergence of collaborative inquiry among these particular preservice teachers was created from a composite of multiple layers comprising a system of relationships. Such a context emerged from the development of and inter-relatedness among interpersonal and pedagogical relationships. Experiences were shared and meanings socially constructed through their use of discourse and tools within recursive cycles of reflection and teaching. As these preservice teachers' participated in transactions with others and processes of learning their potential for the development (Rogoff, 1995) of collaborative inquiry began to be actualized.
CHAPTER FIVE

THE EMERGENCE OF COLLABORATIVE INQUIRY: A RETURN TO THE CANVAS

The overriding hypothesis of this study is that preservice teachers, who work within a context that includes the use of collaborative projects, begin to take steps away from a transmission teaching orientation toward one of collaborative inquiry. An underlying premise of this study is to portray preservice teachers' development by focusing on their change in thinking and practice as they make this move. Although the unit of analysis of this research is the processes involved in the implementation of collaborative projects, the dimension of change in preservice teachers' reflective thinking and practice is a primary focus. To this end, the qualitative analysis in the previous chapter (Chapter Four) utilized a dynamic interpretation of development—not the "possessions of a capacity or a bit of knowledge...[but rather]... the active changes involved in an unfolding event or activity" (Rogoff, 1995, p. 124, italics added)—in this case, the implementation of collaborative projects.

In this chapter, two of the primary sources for the qualitative analysis (Chapter Four) are now open to interpretation and analysis from a quantitative perspective. These data sources include entries from preservice teachers' reflective journals (RJ) and video tapes of
their teaching (VT). Preservice teachers' conceptual level scores (CL) have been added as a third source of data.

Results will be presented in four sections. These sections include discussions of conceptual level scores, changes in reflectivity and practice over time, correlations among reflectivity, practice, and conceptual levels, and of cluster analyses of reflectivity and practice. Measures used to generate these data are introduced in Table 3. The table shows variables, rating scale, and inter-rater reliability for each measure.

A Description of the Sample and Sub-sample

The sample includes 24 preservice teachers (100% participation) enrolled in the course, Teaching and Learning in Early Childhood Classrooms. Of this number, there are 23 females and one male from which assignments to seven teaching teams are made based upon teaching practicum schedules. Three of these teams are comprised of three preservice teachers each, four teams include four preservice teachers each. The sub-sample, discussed in Chapter Four and in the cluster analysis in this chapter, is comprised of two teams of three preservice teachers each.

Results

Conceptual Level Scores for the Sample and Sub-sample

In this section, there is a discussion of the conceptual level (CL) scores for the sample and sub-sample. Hunt's (1971) Paragraph Completion Method (see Appendix E) was given once to all the participants in the sample during the fourth week of the semester, two weeks prior to the implementation of projects. Due to the
Table 3

Table of Measures

<table>
<thead>
<tr>
<th>Variable</th>
<th>Scale</th>
<th>Inter-rater Reliability</th>
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<tbody>
<tr>
<td>Reflective Journals&lt;sup&gt;3&lt;/sup&gt;</td>
<td>-5 to +5</td>
<td>.86</td>
</tr>
<tr>
<td><strong>Time 1</strong></td>
<td></td>
<td></td>
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<tr>
<td>How would you describe effective teaching?</td>
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<tr>
<td>Describe and discuss a recent struggle, question, or challenge.</td>
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<tr>
<td><strong>Time 2</strong></td>
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<tr>
<td>When you plan for your day, what do you think about?</td>
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<td>Analyze a part of your last teaching day.</td>
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<td><strong>Time 3</strong></td>
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<tr>
<td>Has there been a time when you thought you lost momentum in your project? If so, describe.</td>
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<td></td>
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<tr>
<td>What have you learned about yourself? Children?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Videotapes of Teaching (DAP)&lt;sup&gt;4&lt;/sup&gt;</td>
<td>1 to 5</td>
<td>.90</td>
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<td>Theoretical perspective</td>
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<td>Emphases in the curriculum</td>
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<td>Organization of the curriculum</td>
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<tr>
<td>Teacher preparation and organization for instruction</td>
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<tr>
<td>Instructional activities</td>
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<td>Learning materials and activities</td>
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<tr>
<td>Paragraph Completion Method&lt;sup&gt;5&lt;/sup&gt;</td>
<td>0 to 3</td>
<td>.86</td>
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<tr>
<td>What I think about rules...</td>
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<td></td>
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<tr>
<td>When I am criticized...</td>
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<tr>
<td>When someone does not agree with me...</td>
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<tr>
<td>When I am not sure...</td>
<td></td>
<td></td>
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<td>When I am told what to do...</td>
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</table>

<sup>3</sup>Level of reflectivity was scored at three points throughout the semester using an adaptation of LaBoskey's (1994) battery of measures used to assess "spontaneous reflectivity" (see Appendices B & C): during the week prior to projects, mid-point of projects, and post-projects.

<sup>4</sup>These six variables were adapted (Appendix H) from Charlesworth, Mosley, Burts, Hart, Kirk, and Hernandez's (1990) Checklist for Rating Developmentally Appropriate Practice in Early Childhood Classrooms (see Appendix G).

<sup>5</sup>The Paragraph Completion Method (PCM) (Hunt, 1971) is a measure of Conceptual Level (CL) (see Appendix E). The PCM was completed by the sample during week four of the semester.
relatively short length of the semester (fifteen weeks) change over time for CL was not assessed.

Conceptual level is defined by David Hunt (1975) by "degree of abstractness (ability to separate, integrate, and/or discriminate many conflicting conditions) as well as by degree of interpersonal maturity (increasing self-responsibility)" (Oja, 1991, p. 46). Preservice teachers who have low CL scores tend to "seek simple and highly structured environments" while those who score high are more capable of "abstract thinking" and can tolerate "uncertainty" and behave more "flexibly" (p. 46-47). Table 4 shows the range in CL scores for the sample, including scores for the sub-sample.

These scores have been grouped within the three categories traditionally used to delineate the degree to which a person can think abstractly and thus tolerate less structured environments. (See Appendix F for description of categories/stages.) These three categories include: low CL scores between 0-1.4 (Stage A); moderate CL scores between 1.5-1.9 (Stage B); and high CL scores between 2.0-3.0 (Stage C). Of the total sample, four preservice teachers scored in the low CL range, nine in the moderate CL range; and, eleven in the high CL range.

CL scores within the sub-sample represent a range across the three stages and result in team CL profiles that are similar to one another (leaf team = 2.2, 1.9 & 1.4; water team = 2.5, 2.0 & 1.5). The average CL score for both the leaf and water teams is 1.9. The high scores in the sub-sample (66%) are atypical when compared to previous research in which beginning teachers and student teachers primarily scored in the low to middle range (Thies-Sprinthall &
Sprinthall, 1987b). CL scores for the sample, however, were more representative of expectations based on previous research with 54% scoring in the low to moderate range.

Table 4
Categories of Conceptual Level Scores for Sample and Sub-sample

<table>
<thead>
<tr>
<th>CL Categories</th>
<th>Sample</th>
<th>Sub- Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low 0-1.4</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>Moderate 1.5-1.9</td>
<td>9</td>
<td>2</td>
</tr>
<tr>
<td>High 2.0-3.0</td>
<td>11</td>
<td>3</td>
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Change in Reflectivity across Time

In this section, there is a discussion of the mean level of reflectivity scores for the sample and sub-sample computed at three time periods. The primary assessment of preservice teachers' thoughts and beliefs involved ratings of their weekly reflective journals. Specifically six entries, two before, two during, and two after the implementation of projects were rated for level of reflectivity. Scores were averaged for each time point for a total of three scores of reflectivity for each preservice teacher. The selection of the six questions was based on similarities with questions used in the LaBoskey study (1994). Journal entries were scored as either unreflective (e.g., self-orientation; teacher as transmitter of knowledge; broad generalizations), reflective (e.g., student (child) orientation; teacher as facilitator; and strategic thinking), or indeterminate (e.g., question not answered or entry includes somewhat equal reflective and unreflective responses). Mean
reflectivity scores for each of the three time points were computed for the seven teams in the sample which includes the two teams that comprise the sub-sample, described in Chapter Four. Figure 32 shows the means over these three time points.

As predicted, improvement in level of reflectivity is evident for the sample as a whole. The magnitude of the effect was substantial with average scores improving 3.8 points on this ten-point scale. Moreover, scores changed from the negative (which denotes unreflective thinking) to the positive side of the scale (denoting reflective thinking). The two teams in the sub-sample also showed positive gains in level of reflectivity over time, albeit less gain than the group as a whole (2.5 points for the leaf team and 2.2 for the water team). The fact that the teams in the sub-sample showed less change over time is hardly surprising, given that they began with higher levels of reflectivity. The sub-sample began with journals that were rated with positive, as opposed to negative, scores on reflectivity. This level of competency may have also been a factor in their willingness to volunteer to participate as focus teams for this study. In light of known volunteer effects (Rosenthal & Round, 1975), members of these teams may not be representative of the larger pool of preservice teachers.

**Change in Practice across Time**

Perhaps the most important question to ask is, Was there change in practice over time? This question is in regard to the extent to which participation in this course influences preservice teachers' interactions with young children in the classroom. The primary assessment of preservice teachers' practice for this analysis involves
Figure 32
Mean Reflectivity Scores for the Sample and Sub-sample

scoring video tapes for each preservice teacher during the implementation phase of the course.

Video tapes were scored using a Checklist for Rating Preservice Teacher Practice (see Appendix H) adapted for this study from six of 28 items included in a Checklist for Rating Developmentally Appropriate Practice (DAP) in Early Childhood Classrooms (Charlesworth, Mosley, Burts, Hart, Kirk & Hernandez, 1990, see Appendix G). Video tapes from each teaching session (recorded during the implementation phase of the course) were scored for a total of three video tapes for the sample (a total of 72 tapes). Mean practice scores were computed for all seven teams. Figure 33 shows the means for the sample and for the leaf and water teams that comprise the sub-sample.
As predicted and hoped for, improvement in the appropriateness of practice is evident for the entire sample. The magnitude of the effect was large, with average scores improving 1.25 on this 5 point-scale. The two teams in the sub-sample also showed positive gains in practice over time. However, unlike in the measure of reflectivity, the degree of change for the sub-sample across time was similar to the degree of change for the sample. Scores for the sample ranged from just below the mid-point of the scale (2.9—denoting more inappropriate than appropriate practice) to just over the next highest practice level (4.1—denoting more appropriate than inappropriate practice). Teams in the sub-sample scored both slightly lower and higher (leaf = 2.8; water = 3.0) than the sample at time one. Both remained higher than the sample at time two (leaf = 3.8; water 4.3). At time three, the leaf team (4.0) scored slightly below the sample (4.1) while the water team scored...
highest at 4.4. While the leaf and water teams in the sub-sample made their largest gains at time two (1.0 and 1.3, respectively), there appears to be a ceiling effect for time three. This ceiling is also suggested for the sample, with five of the seven teams making the greatest gains between time one and time two. Change in mean scores increased only .2 points (leaf team) and .1 points (water team) in time three. The range of mean scores for the sub-sample and sample at time one and three are similar (time one = .25; time three = .4) on this 5 point scale.

The mean scores for the two teams in the sub-sample remained above the mean scores for the sample following time one. The degree of change over time for the sub-sample was similar to the degree of change over time for the sample. The total change in mean scores for the sample is 1.2, while the total change in mean scores for the leaf team is 1.2 and for the water team is 1.4. Practice scores reflect the application of content associated with the course. As such, it is not surprising that practice scores for the sample and sub-sample reflect similar trends in change in practice over time.

The Relationship among Conceptual Level, Reflectivity, and Practice across Time

In this section, there is a discussion of the relationship among CL, reflectivity, and practice for the sample across time. One of the hypotheses guiding this study was that there would be a relationship among preservice teachers' conceptual level (CL) scores, level of reflectivity and appropriate practice. Spearman correlations were computed among and between all three sets of variables at each time.
point. The correlations among CL, reflectivity, and practice are shown in Table 5.

Table 5
Spearman Correlations and p-values for CL, Reflectivity, and Practice for the Sample across Three Time Periods

<table>
<thead>
<tr>
<th></th>
<th>RJ-1</th>
<th>RJ-2</th>
<th>RJ-3</th>
<th>VT-1</th>
<th>VT-2</th>
<th>VT-3</th>
</tr>
</thead>
<tbody>
<tr>
<td>CL</td>
<td>.23</td>
<td>.11</td>
<td>.32</td>
<td>.14</td>
<td>.01</td>
<td>.03</td>
</tr>
<tr>
<td>RJ-1</td>
<td></td>
<td>.48*</td>
<td>.52**</td>
<td>.10</td>
<td>.27</td>
<td>.20</td>
</tr>
<tr>
<td>RJ-2</td>
<td></td>
<td></td>
<td>.38</td>
<td>.05</td>
<td>.44*</td>
<td>.34</td>
</tr>
<tr>
<td>RJ-3</td>
<td></td>
<td></td>
<td></td>
<td>.03</td>
<td>.38</td>
<td>.14</td>
</tr>
<tr>
<td>VT-1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.11</td>
<td>.05</td>
</tr>
<tr>
<td>VT-2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.61***</td>
</tr>
</tbody>
</table>

*indicates significance at the p<.05 level, **at the p<.01 level, and *** at the p<.001 level

Conceptual level, reflectivity, and practice. There were no significant correlations found between CL and reflectivity and CL and practice. The correlation between CL and reflectivity at time three was moderately low (.32).

There was an expectation that there would be a relationship between CL and practice because the implementation of collaborative projects often means that preservice teachers must tolerate uncertainty due to the emergent nature of the curriculum. Nevertheless, no correlations were found. Hunt's (1971) research has indicated that teachers who score in the middle to high stages (see
Appendix F for descriptors) are capable of using "different teaching models in accord with student differences and making some appropriate adaptations" among others. However, it is interesting to note that practice scores at time period three for one preservice teacher in the sub-sample with a high CL score (2.0) was the same as a second preservice teacher in the sub-sample with a low CL score (1.4).

Reflectivity and practice. Correlations among reflective journal scores across the three time periods are moderate. While these correlations are not high, they do indicate stability within the measure of reflectivity over time. The correlation of reflective journal scores between time period one and two is .48 and between time period one and three is .52.

Correlations among video tape scores varied. There were no significant correlations between time period one and two (.11) and time period one and three (.05). However, there is a high correlation between time period two and time period three (.61). This relationship reflects a "learning curve" by preservice teachers in this study as they move into the middle and closing weeks of the implementation phase. Often during the first week of projects, preservice teachers and their teams are unsure what to expect, are intimidated by the video camera, and have not found a solid footing with their children on the direction of their project. The practice scores from these first weeks tend to vary somewhat but are predominately low.

It was expected that there would be a correlation between reflective thinking and appropriate practice. Nevertheless, no
significant relationships were found except for a moderate correlation between reflectivity and practice at time point two (.44). Once again, this second time point occurs during the peak of the implementation of projects. During this time, reflective journals were a critical tool for reflecting upon the evolution of the project, teaching, and children's learning. Thus, it was likely that journal entries would represent "real struggles' and include considerations of "alternatives to events in the classroom," criteria of reflectivity noted in the LaBoskey study (1994).

One reason for the lack of relationship between reflective journal scores and practice scores across two of the three time periods may be due to the dynamic nature of change. In this study development is measured as "active processes of solving mental and other problems (e.g., by thinking, recounting, remembering, organizing, planning, and contemplating)".... (Rogoff, 1995, p. 151). The focus is on the active changes through participation in joint activities with others. Therefore, taking snapshots of each preservice teacher's reflective thinking and practice at particular points in time, creates a static and individual image of this dynamic, transactional view of development. Such scores may simply capture a teacher's thoughts when she has extra time to sit and write and thus result in a reflective score. Or, appropriate practice scores may be generated from a preservice teacher's video tape who is implementing the team's plan when in fact, if teaching without a team, would never have thought of nor attempted such an activity.

In addition, change in development is not a smooth continuous phenomenon. Rather, development is discontinuous and is often
typified by false starts, large spurts, and small steps. For example, when we consider the change in height of individuals, we can predict that there will be a gradual increase over time and typically a growth spurt during puberty. However, how does one predict and measure the change in a preservice teacher's ability to take pedagogical risks or the impact on her future practice when she successfully differentiates support to three children's attempts to draw a leaf, for example? These examples of preservice teachers' development, described in greater detail in Chapter Four, are not easily recorded and are seldom captured and revealed with static measures such as those used to rate reflectivity and practice in this study.

Cluster Analyses: Reflectivity and Practice

In this section, a discussion of reflectivity and practice continues. However, no longer is the focus on change and the relationship between the two. Rather, the analysis of groups within the sample—one for reflectivity and one for practice—were conducted through two cluster analyses. Results from the cluster analyses were then classified into a four cell figure to create a cross-tabulation of scores for reflectivity and practice for the sample.

Reflective groupings. The first cluster analysis were the reflective journal scores for the sample at time periods one, two, and three (see Table 6). The similarity measure was squared Euclidean distance. The clustering method was Wards method, designed to optimize the minimum variance within clusters (1963). Results from the clustering reveal two distinct groupings comprised of 9 and 15 preservice teachers, each. In Group One (n = 9), reflectivity scores
were higher at each point in time as compared to Group Two \((n =15)\). Reflectivity scores changed over time for Group One from 0.28 at time one to 3.61 at time three as compared to changes in Group Two from -4.0 to 0.0.
Table 6
Reflectivity Groups Created from Clustering Mean Scores for Sample

<table>
<thead>
<tr>
<th>Measures</th>
<th>Group 1 (n=9)</th>
<th>Group 2 (n=15)</th>
</tr>
</thead>
<tbody>
<tr>
<td>RJ1</td>
<td>.28</td>
<td>-4.00</td>
</tr>
<tr>
<td>RJ2</td>
<td>3.33</td>
<td>-2.33</td>
</tr>
<tr>
<td>RJ3</td>
<td>3.61</td>
<td>0.00</td>
</tr>
<tr>
<td>Ave RJ</td>
<td>2.41</td>
<td>-2.11</td>
</tr>
<tr>
<td>VQ1</td>
<td>2.41</td>
<td>3.41</td>
</tr>
<tr>
<td>VQ2</td>
<td>3.60</td>
<td>3.54</td>
</tr>
<tr>
<td>VQ3</td>
<td>3.65</td>
<td>3.30</td>
</tr>
<tr>
<td>VQ4</td>
<td>3.70</td>
<td>3.50</td>
</tr>
<tr>
<td>VQ5</td>
<td>3.72</td>
<td>3.40</td>
</tr>
<tr>
<td>VQ6</td>
<td>4.06</td>
<td>3.60</td>
</tr>
<tr>
<td>CL</td>
<td>1.80</td>
<td>1.73</td>
</tr>
</tbody>
</table>
On the related practice measures, Group One scores for Practice were higher than Group Two scores for five out of six questions. The average across the three time periods for Group One is 2.41 on a 10 point scale of -5 to +5. In Group Two (n =15), reflectivity scores range from -4.00 at time one to 0.00 at time three. The average reflectivity score across the three time periods for Group Two is -2.11 on a 10 point scale of -5 to +5. While Group One scores for reflectivity remained above scores of Group Two at each point in time, the change between time one and time three for each group were similar (Group One =3.3; Group Two =4.0).

Practice groupings. The second cluster analysis was the practice scores for the sample (see Table 7) based on an average of the mean scores for the 6 questions from the Checklist for Rating Preservice Teacher Practice (see Appendix H). The similarity measure was squared Euclidean distance. The clustering method was Wards method, designed to optimize the minimum variance within clusters (1963). Results from the clustering reveal two distinct groups, comprised of ten and fourteen preservice teachers each. In Group One (n =10), average practice scores for each question range from 3.73 to 4.33 on a 5 point scale. Group Two (n =14) average practice scores for each question range from 3.08 to 3.40 on a 5 point scale. Scores were higher on every variable for Group One as compared with Group Two on measures for practice as well as on the related reflectivity measures.

On the related reflectivity measures, Group One scores are higher at each point in time as compared to Group Two scores. The range in change in reflectivity over time for Group One was 3.0
Table 7
Practice Groups Created from Clustering Mean Scores for Sample

<table>
<thead>
<tr>
<th>Measures</th>
<th>Group 1 (n=10)</th>
<th>Group 2 (n=14)</th>
</tr>
</thead>
<tbody>
<tr>
<td>VQ1</td>
<td>3.88</td>
<td>3.17</td>
</tr>
<tr>
<td>VQ2</td>
<td>3.91</td>
<td>3.40</td>
</tr>
<tr>
<td>VQ3</td>
<td>3.73</td>
<td>3.08</td>
</tr>
<tr>
<td>VQ4</td>
<td>4.00</td>
<td>3.30</td>
</tr>
<tr>
<td>VQ5</td>
<td>3.90</td>
<td>3.20</td>
</tr>
<tr>
<td>VQ6</td>
<td>4.33</td>
<td>3.40</td>
</tr>
<tr>
<td>RJ1</td>
<td>-1.50</td>
<td>-3.04</td>
</tr>
<tr>
<td>RJ2</td>
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<td>-1.25</td>
</tr>
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<td>RJ3</td>
<td>1.50</td>
<td>1.25</td>
</tr>
<tr>
<td>CL</td>
<td>1.75</td>
<td>1.80</td>
</tr>
</tbody>
</table>
points while for Group Two, the change in reflectivity from time one to time three was 4.3 points. While Group One scores are higher at each time point, Group Two scores reveal a greater change in level of reflectivity across time as compared to Group One.

Scores were higher on every variable for Group One as compared with group two on measures for both reflectivity and practice. The gain over time in level of reflectivity for both the Practice and Reflectivity Groupings was large, with the greatest changes occurring between time one and time two. This pattern is consistent with earlier findings of change over time for reflectivity.

CL scores for groupings. The average CL scores between Group One and Group Two for both the Reflectivity and Practice Groupings were practically identical. Although the similarity might be surprising, the lack of relationship between CL and reflectivity and practice is representative of earlier findings. Based on the lack of correlation in the previous section and similarity of CL scores for Groups One and Groups Two within the Reflectivity and Practice clusters in this section, there appears to be no evidence from this study that such a relationship exists.

In summary, trends in change over time for reflectivity seem to mirror those described in the previous section. The largest increases in level of reflectivity occurred between time period one and two with the tendency for a ceiling effect for both reflectivity and practice between time period two and three. Group One for each grouping or clustering scored higher on all reflectivity and practice variables as compared to Group Two. These results suggest that there are clearly two distinct groups for reflectivity and practice.
Cross-tabulation of Groupings

A comparison of the two clusters was made resulting in the classification of preservice teachers into one of four cells depicted in Figure 34.

A cross-tabulation of groups for reflectivity and practice was constructed with four cells. Cohen's Kappa was used to determine the relationship between these two groups. A moderate correlation of .39 was computed. Each number in each cell represents two scores for each preservice teacher in the sample, one for reflectivity and one for practice. The cells generated are: reflective with inquiry-oriented practice (R/I); unreflective with inquiry-oriented practice(U/I); reflective with non inquiry-oriented practice (R/Non); and, unreflective and non inquiry-oriented practice (U/Non).

Eleven preservice teachers with low scores for both reflectivity and practice are grouped in the unreflective/non-inquiry oriented

<table>
<thead>
<tr>
<th>Inquiry Oriented</th>
<th>Reflective</th>
<th>Unreflective</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(R/I)</td>
<td>(U/I)</td>
</tr>
<tr>
<td></td>
<td>6 7 9</td>
<td>12 14 24</td>
</tr>
<tr>
<td></td>
<td>12 14 24</td>
<td>18</td>
</tr>
<tr>
<td>Non-inquiry Oriented</td>
<td>(R/Non)</td>
<td>(U/Non)</td>
</tr>
<tr>
<td></td>
<td>16 20 22</td>
<td>3 4 5</td>
</tr>
<tr>
<td></td>
<td>16 20 22</td>
<td>13 15 19</td>
</tr>
<tr>
<td></td>
<td>21 23</td>
<td>21 23</td>
</tr>
</tbody>
</table>

Figure 34
Cross-tabulation of Reflectivity and Practice Groupings for the Sample
cell. The large number (46% of the sample) of preservice teachers who were placed in this cell, while disappointing, is not surprising given the short duration of the study (fifteen weeks). Six preservice teachers (25% of the sample) were classified as exhibiting reflective thinking and inquiry-oriented practice. Scores for seven preservice teachers (34% of the sample) classified them as either reflective thinkers and non-inquiry oriented practitioners or unreflective thinkers and inquiry-oriented practitioners.

Scores representing preservice teachers in the two teams which comprise the sub-sample are classified in three of the four cells. The leaf team (#6, #22, and #23) includes scores plotted in three cells while the water team (#7, #24, and #4) includes scores plotted in two cells. In both cases, team composition includes a mix of scores with the water team having one more member in the reflective/inquiry-oriented cell than the leaf team and the leaf team having a member in the emergent cell, reflective/non-inquiry oriented. Who are the preservice teachers represented by scores in these cells? Is there a relationship between preservice teachers' placements and their thoughts and practice as described in Chapter Four?

A cross-analysis. In order to further examine the meaning of the preservice teacher placement within these cells, excerpts from descriptions in Chapter Four will be used to sketch a profile of a preservice teacher who represents placement within three of the four cells. The aim of these brief sketches is to determine if preservice teachers' scores within these cells seems to hold true with their thoughts and teaching experiences described earlier.
Leah is now known as preservice teacher #22. She is placed within what is referred to as an emergent cell because placement in this cell means that while she is considered reflective, she has not achieved a high score averaged across time for her practice. Recall Leah's first and third teaching days. On her first day, she implemented the first day of the then pet project (later changed to the leaf project). On the first day of the project, Leah implemented an activity developed by her team on the topic of pets. She soon discovered that one of their children's pets had recently died and that the children were not particularly interested in pets. Subsequently, the team changed their topic to leaves. On Leah's third teaching day (the third project week), she began to vary her ability to support the diverse needs of three children in their efforts to draw a leaf. On this day, Leah's arrangement of space, tools, and provision of systematic instruction were appropriate and reflective of the various needs of her children. From this example, one could evaluate Leah's practice as not only appropriate but also reflective of her emerging collaborative inquiry.

Leah's early reflections about her first teaching day revealed her initial self doubt about her future as a teacher. She wrote, "I am having serious doubts about whether I am cut out to be a teacher...." Nevertheless, she continued to persevere, later writing, "I am working hard on my language...thinking and rethinking....There is so much information to remember." Toward the end of the semester, Leah wrote about her experience guiding the three children as they drew their leaves, "I actually scaffolded her learning which made such a difference not only to her, but to myself as an educator." Leah
was commenting about the fact that this teaching day was a turning point for her because she was applying selected principles and practices learned throughout the course. She also was engaging in relationships with children that were gratifying and representative of her beliefs about good teaching and what she had learned about herself.

From these examples of Leah's reflectivity and practice across time, I would agree that her placement within the R/Non cell is reasonable. However, I also believe that scores of her practice for even just a few more days would have placed her into the R/I cell. This is the reason for labeling these intermediary cells as emergent.

Kaitlin is now known as preservice teacher #4. She is placed within the U/Non cell. Recall her first teaching day in the water project when her sink and float activity and line of questioning were frustrating to both she and her children. As a result of the water team's first teaching week, they made a decision in the second and third weeks to engage children by rearranging space and providing them with tools and experiences in which they investigated water flow and constructed piping systems. During Kaitlin's second teaching day, she implemented the team's plan to try and provoke children's drawings of water flow through pipes. On this day, she was not able to engage the children in the task. Subsequently on that same day her co-teacher, Hannah, made a pedagogical shift and invited children to investigate sinks, drains, stoppers, and water flowing through faucets and pipes. On this day, Kaitlin struggled to accept her inability to provoke interest and guide children's inquiry,
yet she was quite reflective about her dilemma. Later that same day, Kaitlin wrote in her journal,

I am not confident in my ability to teach.... Today while team teaching, all of my insecurities came back again. I was angry the children responded so well to her [Hannah] and that she asked all the right questions.... But then I thought about it. It wasn't my teaching day at all. One thing I have learned from working as a team of teachers is that we have to be like one....

Throughout Kaitlin's teaching, she continued to struggle with her ability to apply the principles and practices taught in the course. In fact, in her final journal entry she reflected about her teaching.

It is frustrating for me to now know for sure that I am far from a good teacher. Yes, I know that I just said it takes practice and time, etc. However, I also think there is a certain skill that a teacher must possess and I don't think I have that skill. This is something I knew that became clearer and clearer as the semester continued.

I agreed with Kaitlin that her efforts to develop collaborative inquiry-oriented teaching was a constant challenge for her. However, I also believed Kaitlin was reflective throughout the semester. Therefore, her placement within the U/Non cell does not represent what I know about her, in situ.

Hannah is now known as preservice teacher #7. From our first encounter with her (when she tape recorded Grant's conversation at the rain puddle) to the day she supported Kaitlin by shifting the task to exploring sinks, Hannah has represented an experienced, collaborative, and reflective preservice teacher. Of the 24 preservice teachers in the sample, she has the most teaching experience (four years) and is one of the two oldest students enrolled in the course. In addition, she enjoys writing in her journal and in fact majored in English and Writing as an undergraduate student.
Her journal entries include a wide array of thoughts. Unlike many of her peers she is not as focused on the mechanics of the course as she is on the relationships with her teammates, the children she teaches, and reconciling her past and present teaching experiences. For example, she notes that among her greatest challenges is "letting go of my own agenda." Later, toward the close of the semester, she is asked to write on any topic she chooses. She writes,

I've found an increased trust this semester—in other educators, in children's capacity to learn, in my ability to succeed and fail and survive. At times, our project felt stuck and we were discouraged and quick to dismiss the importance of what we were doing. But, as time went on, I learned to trust the processes of learning for all of us—and was able to let go of a lot of unrealistic expectations and let the process unfold. Educators have a lot of influence...but they (I) must also learn to let go and let people and children do their thing—for when they own their learning, it is much more profound.

Chapter Summary

This chapter began with a description and analyses of results which placed preservice teachers into groups based upon scores of conceptual level, reflectivity, and practice. Groups were created using a variety of combinations of data in an effort to consider the development of reflectivity and practice from multiple view points. Average conceptual level scores for the sample and sub-sample were slightly higher than expected. Change in reflectivity and practice for the sample and sub-sample was evidenced across time. There was no apparent relationship between CL and reflectivity and practice in this study.
Preservice teachers were grouped by level of reflectivity and appropriate practice scores however there were no apparent relationships between these two measures for the sample and sub-sample. Relationships between reflectivity and practice were limited with correlations between practice at time two and three the strongest. Finally, approximately half of the sample did not evidence significant change in reflectivity and practice over time. The remaining half of the sample was split between those preservice teachers whose reflectivity and practice were emerging and those who reached a higher level of reflective thinking and appropriate practice.

While change in reflectivity and practice for the sample and sub-sample occurred, the nature of development among these preservice teachers was not clearly portrayed. This is true because in this study the social construction of knowledge related to good teaching is revealed in large part by the change in participation by preservice teachers as they develop pedagogical and interpersonal relationships. Consequently, development is represented by degree of change and the nature of change.

The findings from the cluster analyses and subsequent cross-tabulation have shown that there are relationships between some of the findings generated from the quantitative analysis and excerpts from scenes which served as the qualitative component of this study. Nevertheless, there are also discrepancies between the two. Thus, there is a need to "see and see again" (Hellman, 1973)--to return to the canvas again to reflect upon the creation of a more complete portrait of the emergence of collaborative inquiry among preservice
teachers. A summary of the key findings from this study and implications for future research and program design will be discussed in the final chapter.
Teachers are born, not made. The study described in this dissertation refutes this common adage, assigning power and potential to the social construction of particular as well as shared views on what it means to be a good teacher. The over-arching goal of this study was to describe a reconceptualization of early childhood preservice teacher education characterized by collective reflective practice and collaborative research as it took place in a particular setting. To this end, there were two aims of the study: (a) to describe a framework for the creation of a context for teaching and learning in which collaborative projects serve as the primary communal activity for both children and preservice teachers, and (b) to describe the processes and some of the consequences of participation in such a community of learners by documenting changes in both knowledge and practice of selected preservice teachers.

Throughout the course of this descriptive study--and the associated undergraduate course--the intention was to establish and maintain congruency between the processes through which teachers construct knowledge and the processes through which teachers guide children's construction of knowledge. This striving for congruency
took place within a complex web of relationships which supported the redirection of preservice teachers away from traditional "packaged curricula and prescribed pedagogical approaches" (New & Mallory, 1994, p. 3) to one of collaborative inquiry. One of the primary outcomes of the study (and a goal of my work as a teacher educator) was the emerging view of collaborative inquiry as representative of both good teaching and effective teacher development.

This reconceptualization of early childhood preservice teacher education was informed by key tenets of social constructivist theory, reflective practice and teacher research, and collaborative projects as witnessed in the preprimary schools of Reggio Emilia, Italy. While there have been numerous publications (cited in Chapter One) touting the contributions of social constructivism the design of teacher education programs, describing the strategies for developing reflective practitioners and teacher research projects, and reporting the advantages of project work for the development of young children, this study is the first to integrate these three separate components.

The findings described in previous chapters serve to illuminate some of the ways in which the development of selected preservice teachers changed from a traditional, transmission teaching orientation toward one of collaborative inquiry. Such a shift was evidenced by changes in reflective thinking and developmentally appropriate practice among many in the sample and particularly the sub-sample. While such changes were expected (and hoped for), it is the nature of change that is perhaps the more important to
contemplate. In what ways did collaborative projects contribute to a learning environment that supports the development of preservice teachers? How did the conditions of the learning environment create "particular places" (Gandini, 1984) that could influence the development of collaborative inquiry? In turn, how did change among preservice teachers influence the context within which they taught and learned? What was the relationship between the change among individual teachers and the collectives (teaching teams and larger classroom population) of which they were members? How did the use of tools--and documentation in particular--influence collaborative inquiry? What other factors contributed to the creation of pedagogical and interpersonal relationships? Finally, what were some of the outcomes associated with participation in these relationships?

A major challenge in formulating this discussion was how to separately describe findings associated with specific measures while maintaining a sense of their vital connection to the larger concepts of environment, relationships, and pedagogy as explored in this study. In turn, it was essential to insure that an examination of these three concepts would not result in losing sight of their mutual embeddedness in the larger enterprise of preservice teacher education. Thus, the discussion in this final chapter was organized in such a way that the "...parts making up the whole activity or event [in this case, the implementation of collaborative projects] ...will be considered foreground without losing track of their inherent interdependence in the whole" (Rogoff, 1995, p. 140, italics added).
The discussion must begin, however, by acknowledging the limitations of this study.

Limitations

The small size and homogeneity of the sample and sub-sample and the limited duration of the study are perhaps the most obvious and possibly significant limitations of this study. And yet, some of these limitations are consistent with features found in most undergraduate teacher education programs—in particular, limited time.

Ideally, this study would have continued for an entire school year. The potential for further development of collaborative inquiry for preservice teachers in the sample whose scores placed them in the "emerging" category certainly warrants continued study. Given that this option was not available, an explicit intent of this course design was to create tools and experiences (and developing attitudes and insights) that preservice teachers could take with them. In fact, even though this study ended, the development of inquiry appeared to continue (as recorded in retrospective interviews) for some preservice teachers in the sub-sample. As for the size of the sample, it is clear that this study requires replication with a larger and more diverse sample before results can be considered generalizable. At the same time, the intimacy of this small study facilitated the successful triangulation of both quantitative and qualitative data thereby providing a "thick description" (Geertz, 1973) of persons and personalities as they developed collaborative inquiry in a particular setting.
Other possibilities of study are the measures used to rate reflective thinking and developmentally appropriate practice, each of which are adaptations of measures used in the field of teacher education. Because these adapted measures were used for the first time in this study, it is likely that they may need refinement if they continue to be used in future studies. Furthermore, scores generated from each of these measures were taken only at particular and brief points in time across the study (e.g., only five minutes of each preservice teacher's video tape was scored). It is possible that an assessment of teaching practice may have differed had entire tapes (ranging from 10 minutes to over 45 minutes) been scored. This same limitation applies to the method used for obtaining scores for reflective thinking, which were based on 6 out of a total of 14 journal entries.

Perhaps the most significant limitation of the study was the lack of data regarding off-campus and after hours collaborations among teaching teams. While team meetings within the classroom context were audio taped and transcribed verbatim along with selected classroom lecture conversations, these records provided only a partial view of the numerous other meetings and conversations which occurred among each team in the sub-sample.

Following are implications for a reconceptualization of both teacher education and the future study of teacher development which are informed by findings from this study.

Implications for a Reconceptualization of Teacher Development

Implications include considerations for the teaching and learning environment, the establishment of interpersonal
relationships among participants, and a pedagogical approach that provides some assurances for the creation of shared experiences and meaning among preservice teachers. The discussion will begin with a summary of findings as they inform the role of the teacher educator in the creation of an environment that supports the type of learning described in previous pages.

The Environment

"...environments are regulators of our experiences." (Prescott, 1979, p.1)

"An environment is a living, changing system." (Greenman, 1988, p. 5)

The environment in which this study took place evolved as preservice teachers used time and space to create a community of discourse and practice developed in which they could implement collaborative projects. Although there have been numerous studies describing the influence of environments informed by social constructivist theory on the development of teachers, none have used project work to contribute to such a setting. Findings from this study suggest that the use of collaborative projects can help to create what Fosnot (1996) refers to as a "community of discourse" in which higher mental functions of both children and teachers can be purposefully "molded by social life" (Rogoff, 1990). Such a community is dependent upon experiences that are contextually embedded, with time, space, and opportunity to practice, reflect, and use "language and other tools to guide or mediate cognitive activity" (p. 5). The numerous opportunities for children and teachers to interact in this study contributed to the development of teachers’
ability to self-monitor and make decisions while teaching, representative of what Vygotsky referred to as self-regulation which often leads to a transformation of potential development (Vygotsky, 1978).

The emergence of an ability by preservice teachers to self-regulate and systematically organize their instructional strategies took place through a series of teaching and research tasks and routines (e.g., reflective journals, team meetings, in-class exercises, and documentation). These tasks and routines were joined by expectations that preservice teachers would revisit earlier teaching guided by collective reflection and informed by documentation. As a result of this convergence of required and expected activities, both practice and planning began to change. No longer did preservice teachers consider activities because they were simply related to a project topic. Rather, the preparation of activities was based on their relationship to children's previous experiences, to the topic of inquiry, and to preservice teachers' developing understandings of how to extend children's learning through provoking their inquiry.

Children's development of inquiry was evidenced as they began to demonstrate abilities to self-monitor, collaborate, attend to a task and remain engaged, and demonstrate a change in knowledge through drawings, constructions, and revisions of hypotheses (e.g., change in theories related to water flow and change in representation of leaf structure). In short, this study suggests that the need for both adult and child learners to socially construct knowledge within shared experiences can be similarly met through the implementation of collaborative projects.
Shared teaching and learning experiences supported young teachers' attempts at making and managing the many decisions necessary to implement collaborative projects with children. As such, the teachers in this study rarely evidenced that state of "analysis-paralysis" (L. Katz, personal communication, April, 1998) often ascribed young teachers who are expected to individually reflect upon their teaching even as they learn how to teach. Instead, tasks and routines associated with reflection and inquiry were shared, and consequently knowledge was constructed among members of teaching teams. Relationships emerged from these shared experiences, generating "collective interrelated zones of proximal development as part of [this] transactive teaching system" (Moll & Whitmore, 1993, p. 21).

The development of a collective senses of learning goals and possibilities-- and the influence of participating in such a communal zone on the development of individual teachers--may be the most important finding of this study. Such a phenomenon has the potential of affecting the "quality of participation [with]in the communal life...." (Garrison, 1995, p. 729) for teachers and children who, in turn, influence the contexts within which they learn. Once the zoped is considered as developing intramentally, even as it is collectively created intermentally, then "the participation of those in the life of the group to which they belong" (Dewey, 1916/1980, p. 87) will in effect, create opportunities for development not possible when learners remain separate from one another.
A System of Relationships

Teaching acquires its form within a complex relational web that seeks to affect the understandings and abilities of the individual members of that community (Davis & Sumara, 1997, p. 122).

In this study, preservice teachers not only engaged in collaborative inquiry because it was expected but also because they cared about their work, one another, and the children they taught. The resulting interpersonal and professional relationships which developed were supported by a environment and pedagogy of collaborative inquiry in which the initial orchestration and requirements of tasks and routines contributed to each team's interpretation and particular use of those tasks and routines. As such, the development of occasions for learning and freedom to participate in diverse relationships contributed to preservice teachers' sense of "ownership" of their education.

The development of relationships among teachers in the sub-sample appeared to contribute to their motivation to engage in recursive cycles of teaching, documenting, conferencing, writing, sharing, and teaching. Preservice teachers in both teams volunteered to co-teach and co-document for one another beginning in the second week of the projects. In addition, by the closing weeks of the semester when teams were focused on analysis and interpretation of their project experiences, they rarely asked me for advice or guidance. Instead, it was common practice to witness teams consulting one another, sharing their documentation and analyses, and discussing ways in which each team was developing their post-project presentations. As a result of this evidence of their emerging
autonomy and my desire to provide teams with freedom to create their own occasions for learning, my role changed from a directive toward a non-directive position.

Their shift toward interdependence was a manifestation of another outcome for most of the preservice teachers in the sub-sample. This outcome was the development of collective efficacy, described by most of them as having a sense of confidence. This sensibility was not the same kind of knowledge as knowing what is meant by a theoretical construct such as scaffolding or knowing how to revisit and rerepresent experiences. This sense of confidence and self-assuredness, expressed by many of the preservice teachers in the sub-sample through journal writings and retrospective interviews, was as Dewey (1925/1988) noted, a "quality, it [wa]s not knowledge. Experience [wa]s not always, or primarily, an "affair of knowledge" (p. 73). And yet, the social construction of such knowledge was a primary goal of the course in which the study took place.

A Pedagogy of Collaborative Inquiry

Education is not an affair of "telling" and being told but an active and constructive process (Dewey, 1916/1980, p. 43).

In this study, the "telling" was set aside and replaced with educational experiences in which the development of people and practice co-emerged within a context of "structured freedom" (Dewey, 1938/1963). A collaborative inquiry orientation toward teaching such as the one described here means that teachers are expected and helped to think critically and continuously about their practice as it relates to the learning of the children they teach. In
this study, preservice teachers engaged in collective reflection throughout the semester, during which time critiques and decisions were collaboratively constructed as they questioned, negotiated, analyzed, and documented with each other. From the beginning of the course and throughout fifteen weeks, preservice teachers were engaged in learning experiences in which their traditional beliefs and practices were confronted through their study of and participation with one another and the children they taught. In short, teachers learned together about children's development and co-constructed their child development knowledge as well as an advanced understanding of developmentally appropriate practices to a degree that may not have been possible had they each acted alone.

This reciprocal relationship between learning about teaching and child development (through learning with one another was brought to life as preservice teachers collectively pursued and shared experiences related to the implementation of collaborative projects. The collectives (represented by teams and groups of children), contributed to the standards for defining good teaching for each teacher. As a result of this experience, many if not most of the preservice teachers learned that to become a good teacher requires a commitment to learning to teach in relation to others. Hannah's reflection (in a journal entry at the end of the semester) reveals the impact of her relational experiences on her development as a teacher:
My teaching practice has evolved in many different ways ... throughout the semester in our project work. One of the most significant evolutions is that I learned to focus more on the interests and theories of the children ... to follow up on the information I was given by them. I also felt more comfortable sharing a group of children with other teachers, relying on collaboration to communicate my experience and gather information from different points of view.

As expected, preservice teachers initially implemented activities that were representative of more traditional teacher directed activities (e.g., drawing pictures of pets) and over-generalized concepts related to their practice. However, with time to engage in recursive cycles associated with reflection and teaching, preservice teachers began to make shifts away from traditional practices and tendencies to over-generalize. These shifts became most evident at approximately the same time during the study, and were recorded in the lecture classroom, children's classrooms, and in team meetings. Findings from the quantitative analysis corroborated those of the qualitative interpretation and suggest that Time Two of the study (which was at the height of the implementation of projects) was, in fact, a time when changes by preservice teachers—in reflective thinking, discourse, and modes of inquiry—appeared most dramatic.

It was expected that preservice teachers whose conceptual level scores were highest would be most successful at making such changes because they would be more tolerant of the uncertainty of this emergent environment. However, based on both the qualitative and quantitative data, this hypothesis appeared unfounded, in this study at least. Individual CL scores did not contribute to predicting
individual preservice teacher's development toward collaborative inquiry. Rather, diversity of CL scores within each team appeared to play a more important role. Each team of the sub-sample included preservice teachers whose CL scores varied. Given teams' collective successes at preparing experiences which extended and deepened children's inquiry (and their own), it may very well be the case that heterogeneity (as determined by CL scores) positively contributed to the creation of a collective in which diversity of ability positioned each team to respond to the variety of challenges and tasks associated with the implementation of collaborative projects.

A second factor may also have contributed to such shifts and that was the provision of real teaching experiences and the focus of reflective practices on those experiences. John Dewey noted that "thinking is the method of an educative experience.... [and that it is essential] the pupil have a genuine situation of experience".... (1964, p. 163) In this study, the use of tools, tasks, and routines (e.g., journals, in-class exercises, team meetings, classroom practice, and documentation) were maximized because all were contextually embedded and focused on a situation that was genuine for all involved—that of investigating a particular topic that was relevant for both teachers and children. Furthermore, few tasks related to teaching and learning were accomplished without the active participation of collectives (e.g., teaching teams and groups of children). In this study, the requirements to teach, reflect, and learn with others maximized the possibilities for active participation within a joint activity for both children and teachers. As such, students' interpretation of learning changed from that of a simple
process of internalization or acquisition of knowledge to a process of "constructive transformation" (Stone, 1993) achieved through "participatory appropriation" ((Rogoff, 1995; 1993).

Outcomes of preservice teachers' changes included their creation of occasions\(^6\) for teaching and learning including the implementation of complex and conceptually rich activities characterized by more advanced interpretations of developmentally appropriate practices. The leaf team, for example, created a particular combination of scaffolding strategies coupled with diverse media to support the collaborative inquiry of the children and to systematize and ground their teaching. This pattern of combining strategies and materials reflected both their own need to prepare for the possibilities and their knowledge of the importance of projecting occasions for children's that were not too prescriptive. Using a practice that was ultimately labeled *backstitching*, each preservice teacher in this group would begin her teaching day by looking back—beginning with the same tools and revisiting children's representations which ended the previous day's inquiry—as a springboard for the day's experiences. The team's creation of this occasion soon caused a "shift in the communal fabric" (Davis & Sumara, 1997, p. 114) during the course (and study), as

\(^6\)According to the *Oxford English Dictionary*, the original Latin meaning of *occasion* (*occasionem*) is related to events created from a "falling of things toward each other." The verb form of "occasion"—"to open oneself to the possibility of the unpredictable, to lay down a new path of understanding—in brief to forego the desires to predetermine teaching behaviors and learning outcomes" is found in Brent Davis and Dennis Sumara's article, *Cognition, complexity, and teacher education* (1997).
other teams began to use similar versions of the leaf team's backstitching strategy.

As projects evolved, teams met to discuss ideas, review documentation, and make plans for project activities which often became increasingly complex (e.g., constructing pipes, drains, and grates). Even as they occasionally contemplated dismissing their ideas as too difficult to implement, the water and leaf teams often plunged ahead. This sense of collective efficacy is representative of Winnicott's (1971) notion of "potential learning space"-a space in which the learner "sees herself as more capable than she really is" (Litowitz, 1993, p. 190).

Collective efficacy, however, was often not enough to ensure that plans would succeed. Rather, teams in the sub-sample ensured the successful implementation of these more complicated activities through decisions to co-teach and co-document. These decisions to voluntarily "pair up" in the classroom soon became common practice among other teams. As such, the practice of teams in this sub-sample began to influence the practices and routines within the larger environment.

These occasions and activities represent selected experiences of two teaching teams whose objectives for collaborative inquiry were shared yet whose practices sometimes differed. Such shared objectives, operationalized through the application of diverse and varied practices, represent a more advanced understanding of developmentally appropriate practices by these young teachers. For example, activities planned by the water team focused primarily on construction while experiences within the leaf project were primarily
dependent upon the use of "fine arts." Children learned about water flow and leaf structure through diverse experiences and their use of different media. Teachers varied their practice by adapting classroom space, extending time for inquiry, inventing strategies for managing practice, and supporting children's learning through guided observations (leaf project) or participation in the children's constructions (water project).

**Implications for Future Research**

This study has not only contributed to increased understandings regarding the promotion of preservice teacher development but has also revealed some implications for the study of teacher development. The change in preservice teacher development was not adequately portrayed through an investigation of separate competencies such as conceptual level, reflective writing, and developmentally appropriate practice related to inquiry oriented teaching. Rather, development is dynamic—a continuing phenomenon—not just simply an end point. This study of the emergence of collaborative inquiry among young teachers illuminated as much about their potential development as members of collectives (what they were about to do and about to become) as their actual development.

When collective reflection was guided and informed by documentation, opportunities for "taken-as-shared" (Cobb, 1991) meaning were created. In this study, while the purposeful gathering and systematic use of documentation within collective reflective practices was a shared experience, each preservice teacher appropriated a particular understanding, albeit in relation to others'
experiences within those events. Through the use of video tape, individual teaching experiences were repeatedly situated on the social plane of development as practice was made public. Indeed, video tape became a particularly powerful genre of documentation for teaching and reflection and represents another finding from this study that warrants further investigation. Such repeated and vicarious participation in each others' teaching made possible by video tape clearly contributed to preservice teachers' development and utilization of collaborative inquiry. As such, preservice teachers learned and taught within an environment in which the concept of competence included the larger collective.

Conclusion

People change through their participation and handle subsequent events in ways prepared by their changes in previous events (Rogoff, 1995, p. 56).

Throughout this study, the metaphor of portraiture has been utilized to convey the process of collaborative inquiry as it emerged over the course of a single semester. This portrait was based primarily on a qualitative analysis characterized by a "delicacy of distinction" among a small group of preservice teachers rather than a "sweep of abstraction" (Geertz, 1973) that might have been possible within a larger and more representative sample amenable to more sophisticated quantitative analyses. And yet, the final interpretation of these so-called liabilities of this study are that they are its strongest assets.

The intimate relationship between the researcher (myself) and subjects (six young women) allowed for a multi-layered interpretation of the emergence of collaborative inquiry in a small
space over a brief period of time. The dynamic and diverse nature of subjective exchanges documented within this so-called homogeneous sample provided clarity, color, and form to the proposed reconceptualization of preservice teacher education. And finally, the power of the collective research experience strengthened my commitment to a pedagogy of collaborative inquiry that supports an image of teachers-in-the-process-of-becoming. This recognition of competence as imagined potential is perhaps best revealed by one student’s own words:

I may not be a born teacher, but at least I now know that if I ever decided to pursue it, I have the potential to be good.

7Otherwise identified as an unreflective and developmentally inappropriate teacher.
References


New, R. S. (1990). Excellent early education: A city in Italy has it. Young Children, 45, 4-10.


Rinaldi, C. (1996, November). In-depth development of projects. Paper presented at the annual meeting of the National Association for the Education of Young Children, Dallas, TX.


To make a portrait of a lion. (1987). (Video tape recorded by The City of Reggio Emilia, Italy, Assessorato Scuole Infanzia e Asili Nido, Via Guido da Castello 12, 42100 Reggio Emilia, Italy.)


Appendix A

Course Syllabus for Family Studies 635 (Fall 96)
Teaching and Learning in Early Childhood Classrooms

Instructor: Mary Jane Moran  Office: CSDC
Phone: 862-2834  Office Hours: By appointment
Lecture: T, TH 9:40 - 11:00  Room: #4


Other: FS 635 Laboratory packet
Materials for documentation panels

Mission: The Young Child and N-K program in Family Studies prepares entering professionals to work with children from birth through six years of age and their families. It seeks to develop teachers, care givers and administrators who possess the knowledge, dispositions, and skills necessary to take the lead in establishing effective teaching and learning environments within their own group settings, their center/school/agency communities and within the profession. "To lead" means to be someone who is knowledgeable in child development theory and research, who can make well-reasoned judgments in complex situations with competing viewpoints, who is exemplary in his or her own practice, and who both takes initiative for planned change and collaborates effectively with others in the improvement of programs for young children and families.
**Goals:** In order to assume leadership roles within group settings, and eventually within the center/school/agency community and profession, students must understand child development and appropriate curriculum and teaching strategies based on both theory and research. In order to make informed teaching decisions, they learn to draw upon a well-grounded repertoire of strategies that takes into account the characteristics of the children and the environments of groups settings and centers/schools. Opportunities are provided for students to implement and critique a variety of teaching strategies and assessment techniques in collaboration with peers and practicing teachers. They are encouraged to join professional organizations, attend conferences, and eventually assume active roles. We work to establish a community of learners who share a common goal of improving classroom practice in their field through inquiry, critique, example, and collaboration with others in the profession.

**How This Course Meets These Goals and Course Format:** The subject matter of this course is the implementation of the project approach of early childhood teaching, and to provide opportunities for the students to engage in comprehensive child study. Students will be required to complete numerous child observations, develop a six week project for children between the ages of 3-5 and present an analysis of the development of the project. Students will work in at least two teaching teams and will be expected to collaborate on the completion of tasks necessary to implement a high quality nursery school program as well as the designing of a project for an extended period of time. Knowledge of preschool development is desirable but not essential for understanding the course material. When pertinent, available, and entertaining, guest lecturers and/or audiovisual presentations will be used to amplify or augment the required lecture and reading materials. All guest lectures and audiovisual materials will be considered as a likely basis for test questions.

**Objectives:**

1. To make a preliminary career decision about teaching or working with young children and their families.

2. To learn about basic teaching skills with children 3-5 years old.

3. To work in a peer teaching team to implement a six week long team project for children.

4. To create documentation panels and materials to support an oral presentation analyzing the project.
5. To perfect the ability to ask appropriate questions to young, document and transcribe children's responses, and share this information with your teaching team.

6. Engage in reflective teaching practices by participating in one-to-one, small group, and whole class reviews of your teaching.

7. To attend an evening open house to present projects to families.

EXAMS AND GRADES

Class attendance and participation: Regular class attendance and completion of reading assignments prior to class time as indicated on the course schedule is required of all students. After the first unexcused absence, points will be subtracted for subsequent unexcused attendance and resulting lack of participation.

Videos: Video tapes serve two functions: professional developmental and documentation of children's and teacher's language, learning and interactions. Careful review of videotape recordings of performance in the classroom is an effective strategy for improving one's teaching skill. It is natural to be a little nervous about seeing oneself on videotape. For example, many believe they look slightly heavier and appear to talk with a slightly higher voice. However, the ability to review one's actions, to observe one's movement and speech, and to reflect upon children's responses to presentations makes this technology an effective teaching tool. Students will be videotaped 2-3 times during the semester, at least one of which will be reviewed with the instructor or TA at a time to be determined.

Internships: All students have preregistered for one four hour laboratory session (8:30-12:30 or 12:30-4:30) per week. This internship includes one half hour prior to, and one half hour after the nursery school session for preparation, cleaning, and discussion. Any session missed must be made up or the student will receive an incomplete for the semester. Any substitution must be approved in advance by the instructor and/or Program Teacher.

Exams: There will be a 2 exams for the course. Each will count for 20 points toward your final grade. Questions for all tests will be taken about equally from the text and from lectures. Test score points will constitute 40% of the overall course grade points.
Summary of Grading:

Class participation reaction papers and journals 20 pts.
Exam 1 20 pts.
Exam 2 20 pts.
Project and practicum * 40 pts

TOTAL 100 pts

*Program teachers will assign grades for the 20% practicum component of this course. The instructor will grade projects, exams, papers and class participation.

Course Policies: Make-up exams will be given only if permission is obtained from the instructor at least a week in advance (for non-medical excuses). Permission for a medical excuse from an exam can be obtained by contacting the instructor as soon as possible.

<table>
<thead>
<tr>
<th>Class (dates)</th>
<th>Topic</th>
<th>Reading</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/Sept. 5</td>
<td>CFC Procedures and Guidelines Orientation (Sept. 6, 1:00 at CSDC)</td>
<td>CFC packet, pgs. 1-12</td>
</tr>
<tr>
<td>2/Sept. 10</td>
<td>Orientation continued; Language and redirection highlights</td>
<td>Hendrick, Ch.7</td>
</tr>
<tr>
<td>3/Sept. 12</td>
<td>Ways in which projects engage children's minds</td>
<td>Katz &amp; Chard, Ch. 1,2</td>
</tr>
<tr>
<td>4/Sept. 17</td>
<td>Social constructivist theory</td>
<td>Berk &amp; Winsler, Ch. 1, 2</td>
</tr>
<tr>
<td>5/Sept. 19</td>
<td>Becoming a constructivist teacher</td>
<td>Berk &amp; Winsler, Ch. 3, 5, Hendrick, Ch. 16</td>
</tr>
<tr>
<td>6/Sept. 24</td>
<td>Roles of the constructivist teacher</td>
<td>Berk &amp; Winsler, Ch. 6</td>
</tr>
<tr>
<td>7/Sept. 26</td>
<td>The Project Approach-An intro</td>
<td>Katz &amp; Chard, Ch. 3-5</td>
</tr>
<tr>
<td>Date</td>
<td>Event</td>
<td>Readings</td>
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<td>-----------</td>
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<td>-----------------------------------------------</td>
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<tr>
<td>8/Oct. 1</td>
<td>Reggio Emilia In-class team meeting #1</td>
<td>Hendrick, Ch. 1-2</td>
</tr>
<tr>
<td>9/Oct. 3</td>
<td>Topic Webs; project guidelines</td>
<td>Katz &amp; Chard, Ch. 6-7</td>
</tr>
<tr>
<td>10/Oct. 8</td>
<td>Strategies of Reggio Emilia Educators</td>
<td>Hendrick, Ch. 8-9</td>
</tr>
<tr>
<td>11/Oct. 10</td>
<td>Mid-term examination (Projects will begin Oct. 14)</td>
<td></td>
</tr>
<tr>
<td>12/Oct. 15</td>
<td>Your vision, your philosophy Co-constructing knowledge</td>
<td>Assigned readings</td>
</tr>
<tr>
<td>13/Oct. 17</td>
<td>Processes of projects re-visited</td>
<td>Assigned readings</td>
</tr>
<tr>
<td>14/Oct. 22</td>
<td>Teachers as researchers Documentation/transcription</td>
<td>Assigned readings Hendrick, Ch. 13 &amp; 15</td>
</tr>
<tr>
<td>15/Oct. 24</td>
<td>NO CLASS</td>
<td></td>
</tr>
<tr>
<td>16/Oct. 29</td>
<td>Processes of projects continued</td>
<td></td>
</tr>
<tr>
<td>17/Oct. 31</td>
<td>Analyzing sample projects Reaction paper #2</td>
<td></td>
</tr>
<tr>
<td>Oct. 24-29</td>
<td>Team meetings: Round 1</td>
<td></td>
</tr>
<tr>
<td>18/Nov. 5</td>
<td>Analyzing current projects In-class team meetings #2</td>
<td></td>
</tr>
<tr>
<td>19/Nov. 7</td>
<td>Teachers as learners: Previewing tapes</td>
<td>Assigned readings</td>
</tr>
<tr>
<td>20/Nov. 12</td>
<td>Utilizing reflective practice to aid professional development</td>
<td>Assigned readings</td>
</tr>
<tr>
<td>21/Nov. 14</td>
<td>Reflective practice continued</td>
<td></td>
</tr>
</tbody>
</table>

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Nov. 7-12 Team meetings: Round 2

Nov. 18-22 Student teacher Week #2

22/Nov. 19 Merging theory and practice Assigned readings
       Personal views of teacher change

23/Nov. 21 NO CLASS; NAEYC Conference

24/Nov. 26 EXAM

25/Nov. 28 Thanksgiving; NO CLASS

26/Dec. 3 Final preparation for oral presentations and panels

27/Dec. 5 Class Presentations #1 set

28/Dec. 10 Class Presentations #2 set

29/Dec. 12 Class Presentations #3 set

Open House, CSDC, 6:30-8:00 pm

Practica end Thursday, December 12 at 4:30 pm. Evening open house
will be that night from 6:30-8:00 pm.
Appendix B

Summary of Scoring Criteria for Pre-study Questionnaire

<table>
<thead>
<tr>
<th>SCORE</th>
<th>SAMPLE CRITERIA</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>.Response simplistic and certain</td>
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<tr>
<td></td>
<td>.Focus upon practical issues only</td>
</tr>
<tr>
<td>(-5) unreflective</td>
<td>.Emphasis on firsthand experience as the source of learning</td>
</tr>
<tr>
<td></td>
<td>.Teacher as transmitter of knowledge</td>
</tr>
<tr>
<td></td>
<td>.More concern for themselves and/or the subject matter than the student; self-orientation</td>
</tr>
<tr>
<td></td>
<td>.Short-term view</td>
</tr>
<tr>
<td>+5 reflective</td>
<td>.Indication of a real struggle with the issues; raises questions; evidence of uncertainty</td>
</tr>
<tr>
<td></td>
<td>.Propensity to consider alternatives and reconsider preconceptions</td>
</tr>
<tr>
<td></td>
<td>.Long-term view</td>
</tr>
<tr>
<td>(0) not indeterminate</td>
<td>.Concern for the needs of students</td>
</tr>
<tr>
<td></td>
<td>.Evidence of being open to learning about both practical and theoretical ideas; growth-oriented</td>
</tr>
<tr>
<td></td>
<td>.Teacher as facilitator of learning</td>
</tr>
<tr>
<td></td>
<td>.Recognition of the complexity of the educational enterprise</td>
</tr>
<tr>
<td></td>
<td>.Awareness of need for tentative conclusions and multiple sources of feedback</td>
</tr>
<tr>
<td></td>
<td>.Cannot be rated as -5 or +5 because they did not (0) answer the question or because it is just so difficult to assign another score, e.g., the answer has strong features of both reflective and unreflective responses.</td>
</tr>
</tbody>
</table>

8These criteria were used as part of a battery of measures of "spontaneous reflectivity."

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Appendix C

Indicators for Initial Levels of Reflectivity

<table>
<thead>
<tr>
<th>Commonsense Thinker</th>
<th>Alert Novice</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>(Unreflective)</strong></td>
<td><strong>(Reflective)</strong></td>
</tr>
<tr>
<td>-Self-orientation (attention on self and/or subject matter)</td>
<td>-Student orientation (attention on the needs of the children)</td>
</tr>
<tr>
<td>-Short-term view</td>
<td>-Long-term view</td>
</tr>
<tr>
<td>-Reliance on personal experience</td>
<td>-Differentiation of teacher and learner roles in learning to teach (learn by doing; trial and error)</td>
</tr>
<tr>
<td>-Metaphor of teacher as transmitter</td>
<td>-Metaphor of teacher as facilitator</td>
</tr>
<tr>
<td>-Lack of awareness of need to learn; feeling of already knowing much from having been in classrooms as a student</td>
<td>-Openness to learning; growth-oriented</td>
</tr>
<tr>
<td>-Overly certain conclusions</td>
<td>-Means-ends thinking; awareness of teaching as a moral activity</td>
</tr>
<tr>
<td>-Existing structures taken as givens</td>
<td>-Strategic thinking</td>
</tr>
<tr>
<td>-Broad generalizations</td>
<td>-Imaginative thinking</td>
</tr>
<tr>
<td></td>
<td>-Reasoning grounded in knowledge of self, children, and subject matter</td>
</tr>
</tbody>
</table>

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9 These indicators were used as part of a battery of measures of "spontaneous reflectivity." LaBoskey, V. K. (1994). Development of reflective practice: A study of preservice teachers. New York: Teachers College Press.

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Appendix D

Journal Questions Used for Coding Reflectivity

1. How would you describe “effective teaching?”

2. Describe and discuss a recent struggle, question or challenge you have faced.

3. When you plan for your day, what do you think about?

4. Analyze a part of your last teaching day.

5. Has there been a time when you thought you lost momentum in your project? If so, describe.

6. What have you learned about yourself? children?
Appendix E

PARAGRAPH COMPLETION METHOD (PCM)*10

On the following pages you will be asked to give your ideas about several tropics. Try to write at least three sentences on each topic.

There are no right or wrong answers, so give your own ideas and opinions about each topic. Indicate the way you really feel about each topic, not the way others feel or the way you think you should feel.

IN GENERAL, SPEND ABOUT THREE MINUTES FOR EACH PAGE.

(1) What I think about rules
(2) When I am criticized. . . .
(3) When someone does not agree with me. . . .
(4) When I am not sure. . . .
(5) When I am told what to do. . . .

Try to write at least three sentences on these topics.

*NOTE: These 5 sentence stems have been placed on a single page to save space. However, each question on the PCM protocol is on a separate page.


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Appendix F

DESCRIPTIONS OF HUNT'S CONCEPTUAL STAGES:
TEACHER ATTITUDES TOWARD LEARNING AND TEACHING

Stage A
- Shows strong evidence of concrete thinking.
- Sees knowledge as fixed.
- Employs a singular “tried and true” method.
- Exhibits compliance as a learner and expects the same from pupils.
- Appears low on self direction and initiative; needs detailed instructions.
- Doesn’t distinguish between theory and facts.
- Relies almost exclusively on advance organizers.
- Views teaching as “filling the students up with facts.”
- Stays at Bloom’s Levels One and Two regardless of student level.
- Enjoys highly structured activities for self and for pupils.
- Appears very uncomfortable with ambiguous assignments.
- Does not question authority.
- Follows a curriculum guide as if it were “carved in stone.”
- Verbalizes feelings at a limited level. Has difficulty recognizing feelings in pupils.
- Appears reluctant to talk about own inadequacies; blames pupils exclusively.

Stage B
- Evidences a growing awareness of difference between concrete versus abstract thinking.
- Separates facts, opinions, and theories about teaching and learning.
- Employs some different teaching models in accord with student differences.
- Displays evidence of teaching for generalization as well as skills.
- Shows some evidence of systematic “matching and mismatching;” can vary structure.
- Exhibits some openness to innovations and can make some appropriate adaptations.
- Shows sensitivity to pupil’s emotional needs.
- Enjoys some level of autonomy; self-directed learning a goal for self and for the pupils.
- Employs Bloom’s Taxonomy, One though Four, when appropriate.
- Produces evaluations that are appropriate to assignments.
Stage C

. Understands knowledge as a process of successive approximations.
. Shows evidence of originality in adapting innovations to the classroom.
. Appears comfortable in applying all appropriate teaching models.
. Is most articulate in analyzing one's own teaching in both content and feeling.
. Has a high tolerance for ambiguity and frustration; can stay on task in spite of major distractions.
. Does not automatically comply with directions--asks examiner's reasons.
. Fosters an intensive questioning approach with students.
. Can use all six levels of Bloom's Taxonomy when appropriate.
. Responds appropriately to the emotional needs of all pupils.
. Can "match and mismatch" with expert flexibility
. Exhibits careful evaluations based on objective criteria according to level of assignment.

---

Appendix G

CHECKLIST FOR RATING DEVELOPMENTALLY APPROPRIATE PRACTICE IN EARLY CHILDHOOD CLASSROOMS


__________________________  _____________________________
School ________________________  Principal __________________

__________________________  _____________________________
Teacher ________________________  Number of children in room____

__________________________
Number of adults___________

__________________________
Observed/rated by_________________________________________

Date(s)  Time(s)  Activity/Activities

__________________________  _____________________________

__________________________  _____________________________

__________________________  _____________________________

__________________________  _____________________________

__________________________  _____________________________

__________________________  _____________________________

__________________________  _____________________________

Five points are listed for rating each item. Under 5 the most appropriate practice indicators are listed, under point 1 the most inappropriate practice indicators are listed. Point 5 indicates close to 100% appropriate, point 4 indicates more appropriate than inappropriate. Point 3 indicates a fairly even split between appropriate and inappropriate. Point 2 indicates more inappropriate than appropriate. Point 1 indicates close to 100% inappropriate. Below each item there is a space for a brief description of what you observed or found out by questioning the teacher that underlies your rating.9

(Selected items from among first 10 on the original scale)

1. View of Growth and Development.

5...............................4...............................3...............................2...............................1

- Work is individualized
- Children move at their own pace
- Evaluated against a group norm
- Everyone is expected to achieve the same narrowly defined skills
- Everyone does the same thing at the same time

Description:
2. The Emphases in the Curriculum.

Learning occurs through projects and learning centers. Children’s ideas are extended, questions are encouraged, and interests are developed. All subjects are integrated into units.

Description:

Curriculum is divided into discrete subject and time units. Emphasis on reading first and math second. Social studies, science, health are included only if time permits. Art, music, and physical education are taught once per week by specialists.
3. Organization of the Curriculum.

Activities center on topics such as in science or social studies. Topic activities include story writing and story telling, drawing, discussion, hearing stories and informational books, and cooperative activities. Skills are taught as they are needed to complete a task.

Teacher directed reading groups. Lecturing to the whole group. Paper and pencil exercises, workbooks, worksheets. Projects, learning centers, and play are offered if time permits or as a reward for completing work.

Description:
4.  Teaching Preparation and Organization for Instruction.

Learning centers are set up which provide opportunities for writing, reading, math and language games, dramatic play. Children are encouraged to errors are viewed as normal and something from which children can learn.

Little time for enrichment activities. May be interest centers available for children who finish their seat work early. May be centers where children critique their own work complete a prescribed sequence of teacher-directed activities within a controlled time period.

Description:
5. Instructional Activities.

5..................................4.................................3.................................2...............................1

*Children work and play cooperatively in groups*
*Projects are self selected with teacher guidance*
*Activity centers are changed frequently*
*One or more field trips*
*Resource people visit*
*Peer tutoring*
*Peer conversation*

*Children work alone, silently on their worksheets or workbooks*
*Little, if any, peer help is permitted*
*Penalties for talking*

Description:

Concrete, real, and relevant to children's lives
Blocks, cards, games, arts and crafts materials, woodworking tools, science equipment, etc.
Flexible work spaces (tables, carpet, etc.)

Description:

.Limited primarily to books, workbooks, and pencils
.Permanent desks that are rarely moved
.Mostly large group instruction
.Playful activity only when work is done
Appendix H

CHECKLIST FOR PRESERVICE TEACHER PRACTICE

NAME OF STUDENT_____________________________________
PROJECT______________________________________________
ACTIVITY______________________________________________

Five points are listed for rating each item. Under 5 the most appropriate practice indicators are listed, under point 1 the most inappropriate practice indicators are listed. Point 5 indicates close to 100% appropriate, point 4 indicates more appropriate than inappropriate. Point 3 indicates a fairly even split between appropriate and inappropriate. Point 2 indicates more inappropriate than appropriate. Point 1 indicates close to 100% inappropriate. Below each item there is a space for a brief description of any questions or comments you need to make that relates to your rating.

1. Theoretical perspective (score last)

5..............................4...............................3...............................2...............................1

~Children socially construct their knowledge
~Teacher determines content and procedures; transmission of knowledge focused on the learning and teaching of discreet skills and knowledge

~Children use a variety of ways express their knowledge
~Children are expected to achieve the same narrowly defined skills

~Children learn at their own pace
~Everyone does the same thing at the same time

~Children are encouraged to offer their own perspective, ideas and theories which are subsequently incorporated into the curriculum
~Children's ideas, perspective, questions and theories are ignored or discounted

Notes:


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Appendix H

CHECKLIST FOR PRESERVICE TEACHER PRACTICE

NAME OF STUDENT_____________________________________
PROJECT_____________________________________________
ACTIVITY_____________________________________________

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~Children are expected to achieve the same narrowly defined skills

~Everyone does the same thing at the same time

~Children's ideas, perspective, questions and theories are ignored or discounted

Notes:


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2. Emphases in the curriculum

- Emphasis on co-constructing; discovery;
- Activities responsive to context of children's experiences; experiences are meaningful such that concept are contextually embedded in the daily lives of children
- Content across curriculum areas is integrated such that links across disciplines are comprehensible
- Concept and problem-solving oriented tasks provided for comparing, contrasting and communicating
- Children are encouraged to develop observational skills

Notes:

- Teacher determines content and procedures; transmissions of knowledge to focus on the learning and teaching of discrete skills and knowledge
- Content divided into discrete subjects and time units
- Activities do not allow for the integration of a diversity of content areas such as art, science, literacy and math
- Factual information stressed, imitation and repetition

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3. Organization of the curriculum

~Incorporation active and interactive learning
~Experiences and concepts are provided within child's ZPD (challenging yet appropriate when teaches by a more experienced learner)
~Opportunities and time for children to develop and expand language acquisition, and conceptual understanding through recursive cycles of structuring, restructuring, and connecting
~Previous experiences are revisited and (re)represented in order to extend children's knowledge
~Children work in pairs, groups and/or individually as dictated by the task and their interests and needs

~Teacher directed
~No evidence of individualized instruction—teachers to teach the group
Close-ended tasks
~Activities and tasks not related to previous days work and play
~Children work individually

Notes:
4. Teacher preparation and organization for instruction

- Teacher provides a variety of activities and materials
- Children work individually and in pairs or groups; children participate in shared experiences
- Teacher creates a secure emotional environment
- Teacher prepares environment for children to actively explore and interest with adults, children and materials
- Teacher acknowledge and builds on children's accumulated knowledge by including children's experiences, language and relevant world contexts

Notes:

- Materials are controlled by the teacher; activities planned in advance, prescribed by the teacher and not reflective of children's interests as evidenced in their play
- Children work individually, directed by the teacher
- Children's concerns, comments and questions are ignored by the teacher; children may be ridiculed, made fun of or chastised
- The classroom space is not conducive to supporting interactions, conversation and the sharing of ideas or collaborating on tasks
- Teacher limits time for exploration, investigation and construction; teacher ignores cultural diversity by using stereotypical materials and/or not incorporating diverse content and experiences
5. Instructional Activities

- Teacher develops children's confidence by using children's work, ideas and suggestions during the activity

- Teacher and peers co-construct knowledge; teachers actively listen, observe and engage in discussion and solicit children's representation of their work

- Teacher scaffolds children's learning by serving as scribes and connecting previous experiences to future ones

- Teacher encourages children to draw their own images, construct using their own ideas

- Teachers pose problems, ask questions, make suggestions, add complex tasks

- Activities vary and include various combinations of investigation, dramatization and construction

Notes:
6. Learning materials and activities

5..........................4..........................3..........................2..........................1

- Learning materials and activities should be concrete, real, and relevant to the lives of children
- Teachers use materials that are closed ended, and do not accurately represent real objects or materials

- Teachers prepare flexible work space for children
- Children's space is not adjusted to support the task or activity

- A variety of materials are provided including blocks, paints, clay, wire, and paper
- Materials are limited to books, workbooks and pencils

- Teachers prepare for active explorations and interaction
- Children learn in spaces not adapted to their interests or tasks;
- Materials and space severely limit dramatization, investigation and/or construction

- Teachers choose materials that children can easily manipulate
- Scale, number and complexity of materials not representation of children's developmental capabilities

Notes:

NOTE: Sources for this rating scale include items from the Checklist for Rating Developmentally Appropriate Practice in Early Childhood Classrooms (1987) and selected entries from Integrated Curriculum and Developmentally Appropriate Practice (1997).
Appendix I

Questions for Retrospective Interviews

1. Do you remember the first time things were coming together for you?

2. Did your practice change over time? If so, how?

3. Describe your practice in the video tape clip of your first teaching day. Your last.

4. Did your feelings change?

5. Of the tools that you used, which did you find helped you in your reflective practice?

6. What were some of the events that were significant to you? Why?

7. Was there a turning point for you? When?

8. How did documentation influence your thinking and practice?

9. What role did the journal play in your ability to reflect?

10. How did collaboration work within your team? What roles did each person play? Did you have a routine when you met together?

11. What impact did the creation of panels and the development of the post-project analysis have on you? How did you decide on your panel topics/themes?

12. Can you tell me what you were thinking? (as we watch a video tape clip of her teaching)

13. What were some of your early challenges?

14. In what ways did reviewing video tapes of your teaching influence your thinking and practice?