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The substance and development of preservice teachers' knowledge during a field-based elementary physical education methods course

Rovegno, Inez Christine, Ph.D.

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U·M·I
300 N. Zeeb Rd.
Ann Arbor, MI 48106

THE SUBSTANCE AND DEVELOPMENT OF PRESERVICE TEACHERS' KNOWLEDGE DURING A FIELD-BASED ELEMENTARY PHYSICAL EDUCATION METHODS COURSE

by

Inez Christine Rovegno

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Kate R Barrett
Dissertation Adviser

APPROVAL PAGE

This dissertation had been approved by the following committee of the Faculty of the Graduate School at The University of North Carolina at Greensboro.

Dissertation Adviser Kate R. Barrett

Committee Members [signature]

Sarah M. Robinson

Marie Riley

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Date of Acceptance by Committee

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The purpose of this study was to describe and analyze what and how seven preservice teachers learned during a field-based methods course. Two questions guided the research: (a) what was the substance of salient knowledge components of preservice teachers during a field-based elementary physical education methods course? and (b) how did these knowledge components develop?

A cognitive/developmental perspective informed this study. Knowledge development was viewed as growth toward increased differentiation and integration. Changes in knowledge structures were assumed to involve accretion, tuning, or restructuring with knowledge change resulting from the interaction of prior knowledge and current experience.

Research methodology followed guidelines of the interpretive research paradigm. All class meetings and field experiences were observed, interviews were conducted, and documents collected. Data analysis was inductive with themes derived from the data.

Theme one focused on the growth toward or a need for a fine-grained, integrated, contextual way of knowing. Knowledge components became more detailed, differentiated, and action-oriented. The preservice teachers began to make sense of content, children, learning, development, and teaching in more integrated ways. For several students these changes seemed to be developmental milestones.

Theme two focused on knowledge restructuring that moved toward increased differentiation and integration with the environment. Some cases of restructuring seemed to be distinct changes, almost reversals, in perspective; others were more of a consolidation of knowledge. The direction of development went from self to child, passive to active, detached to involved, separate to interactive.

Theme three was individual differences. Profiles of three students illustrated how different orientations toward learning influenced what and how they learned.

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I also would like to acknowledge the contribution of the preservice teachers who participated in this study and thank them for giving so freely their thoughts, feelings, and time. In addition, I am grateful to my family for their support during the writing of the study.

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CHAPTER I

INTRODUCTION

This study focused on the substance and development of preservice teachers' knowledge during a field-based elementary physical education methods course. It adds to recent research efforts to describe from a cognitive/developmental perspective how teachers learn to teach and the role that knowledge plays in this process.

Research suggests that knowledge development may be an important factor in learning to teach. In other domains novices and experts were found to differ in the quality and amount of their context-specific knowledge (Glaser, 1985, 1987). Compared to novices, the knowledge of experts was inferential, deep, highly organized, connected to practice and holistic (Dreyfus & Dreyfus, 1986; Glaser, 1985, 1986, 1987; Lesgold, 1984). This context-specific knowledge enabled experts to recognize patterns quickly, notice details, frame problems, and determine solutions, all the while keeping an eye on the larger picture. Initial findings from research in education indicate novice and expert teachers share these characteristics of novices and experts in other domains. Thus, the acquisition of context-specific knowledge, i.e., knowledge related to teaching and learning particular content, may be a critical factor on the journey

from novice to expert teacher.

While research comparing novice and expert teachers can help us understand the characteristics of the beginning and end stages of the learning-to-teach journey, studies on the sense preservice teachers make of their university and field experiences can give us insight into the learning/development process itself. This research can help us understand what preservice teachers know, what knowledge seems relevant to them at their stage of development, what particular knowledge opens the doors to broader understandings, and what preservice teachers can do and learn under a range of teacher education conditions. Understanding the substance and nature of teachers' knowledge development can help teacher educators recognize and name more clearly how preservice teachers see the world of teaching and learning. This understanding enables teacher educators to begin at the place preservice teachers inhabit and help them acquire knowledge of teaching.

The setting for this study was a field-based elementary physical education methods course in which guided learning by doing, supported by the study of theory, was a primary mode of learning. Under the guidance of the teacher educator the preservice teachers planned, taught, and reflected on their teaching supplementing these activities with the study of theory. Thus, this study examined what and how the preservice teachers learned in a practicum setting that integrated knowing about teaching and knowing how to teach.

Within the field of education there has been increased research interest in the learning of complex tasks in practicum settings with much of this research based on the work of Schon (1983, 1987). Schon (1983) suggested that real-world settings have an "indeterminate zone" in which problems often lack clear definition and solutions are not easily accomplished by linear, systematic problem solving. To cope with this complex setting Schon painted a picture of practitioners using an action form of knowing where tacit understanding, intuition, and on-the-go appraising, adjusting, and improvising are necessary components. To educate practitioners, Schon (1987) proposed a reflective practicum in which one-on-one coaching and reflection on action are important components. Despite recent interest in Schon's work and the potential it has for informing our thinking about the nature of teachers' knowledge in practice and teacher education, few studies using his ideas have been completed. Much remains to be learned. For example, we need to uncover how practitioners and teachers develop intuition and tacit understanding, and how they learn to name problems, frame solutions, adjust, and improvise in action. In addition, as the knowledge practitioners use is often context-specific, the substance of this knowledge may vary greatly across different domains. Thus, research also needs to study critical knowledge particular to the various fields.

The literature on practitioners' knowledge and

novice/expert differences suggests that research on knowledge development in practicum settings has the potential for adding important insights to our understanding of teacher education. This study is part of those research efforts.

Purpose of the Study

The purpose of this study was to describe and analyze what and how seven preservice teachers learned during a field-based, elementary physical education methods course. It set out to document the ways their knowledge of teaching unfolded over the semester. Two questions guided the research:

1. What was the substance of salient knowledge components of preservice teachers during a field-based elementary physical education methods course?

2. How did these knowledge components develop?

Research methodology followed guidelines of the interpretive research paradigm. All meetings of the methods class and field experiences were observed, interviews were conducted, and documents collected. Data analysis was inductive with themes derived from the data.

Researcher's Value Orientation

It was suggested that the report of interpretive studies begin by outlining the researcher's value orientation because research is not and can not be value-free (Bogdan & Biklin, 1982; Du Bois, 1981; Erickson, 1986; Goetz & LeCompte, 1984). As pointed out by Goetz and LeCompte (1984):

> Theoretical frameworks, conceptual systems, and philosophical orientations are bound inextricably to all phases of research activity regardless of whether their uses are conscious and explicit or unconscious and implicit. (p. 33)

Interpretive studies are the researcher's interpretation of the participants' interpretations of what happened in the setting (Geertz, 1973). They are up-front subjective. The theoretical lenses through which the researcher looks at the data are explicit; what the researcher values is made known. This is done so that the reader can better interpret and evaluate the study.

Two value orientations were central to this study. First, the goal of research was viewed as a search for understanding--more specifically, understanding the individual meanings the preservice teachers made of what happened in the setting. Second, to interpret the findings a cognitive/developmental lens was selected.

Research as a search for understanding. In keeping with the interpretive research paradigm, my goal for this study was to better understand and describe the preservice teachers' perspectives on learning to teach. Understanding meant to make sense of and interpret. Understanding within a research setting does not mean, however, discovering "the truth" or a single reality. The world, even a small portion of it, is complex; research settings differ in innumerable and often unseen ways, and what appears to explain one situation may only weakly account for another. In seeking

understanding rather than a single truth, Geertz (1973), an interpretive researcher in anthropology, lent guidance:

> The essential vocation of interpretive anthropology is not to answer our deepest questions, but to make available to us answers that others...have given, and thus to include them in the consultable record of what man has said. (Geertz, 1973, p. 30)

Thus, the goal in this study was to understand and interpret how preservice teachers' knowledge of teaching developed. Their stories are powerful in that they offer not the view but a view of learning to teach, a view of how knowledge unfolds over time. Finding the generalizable in the particular stories is up to readers, each with a knowledge of his or her unique situation (Erickson, 1986).

Cognitive/developmental psychological lens. In keeping with the goal of understanding individual meanings, a cognitive/developmental perspective was selected as the primary theoretical lens. In brief, cognitive psychology suggests that preservice teachers are not empty vessels to be filled with knowledge, but rather individuals who actively constructed understandings making sense of what happens based on prior knowledge. Developmental psychology guided me to look for patterns and common pathways of development, yet at the same time, individual differences. More simply, I asked, "what was similar?" and "what was distinct?" It was assumed that development resulted from the interaction between an individual and the environment; thus, personal history, the learning environment, course content, and human interactions

were all carefully considered as factors that could account for what was learned and how. As cognitive/developmental psychology was a primary lens, a more detailed discussion of the specific theories, frameworks, premises, arguments, and research findings that informed this study is necessary. This discussion is presented in Chapter II.

Organization of the Dissertation

Chapter II presents the research and theory that served as the theoretical backdrop for the study. Research from developmental and cognitive psychology are discussed first followed by research on teachers' practical knowledge, novice and expert differences, teachers' content and pedagogical content knowledge, and the development of knowledge in field experiences. Chapter III describes research methods including a discussion of the research decisions and the evolution of the research questions. Chapter IV describes the context in which the preservice teachers' knowledge developed. The focus is on the learning experiences.

Chapters V through IX are the interpretive account or research findings. Three major themes were found. Chapter V presents the data and Chapter VI a discussion of the first theme: the growth toward or a need for a fine-grained, integrated, contextual way of knowing. Chapter VII presents the data and Chapter VIII a discussion of the second theme: knowledge restructuring. Chapter IX presents the data and discussion of the third theme: individual differences.

Chapter X is a summary of the study.

CHAPTER II

THEORETICAL BACKDROP

This chapter presents the theoretical perspectives that informed this study. Observations of the setting, interactions with the participants, and the sense I made of what was said and what happened were all filtered through these theoretical perspectives. Theories, frameworks, premises, arguments, and research findings from this literature were used as conceptual tools to frame the study, refine the analysis, and link the research to broader scholarly contexts. Thus, the literature served as a primary informant in this study.

The first two sections of this chapter review literature from developmental and then cognitive psychology. The last four sections review literature on teachers' practical knowledge, novice and expert differences, teachers' content and pedagogical content knowledge, and the development of knowledge in field experiences.

Relevant Frameworks and Concepts from Developmental Psychology

Developmental psychology was a primary theoretical lens for interpreting this study. The study of development is the study of change over time. Developmental research chronicles and tries to explain life-span changes in a variety of

domains. Salkind (1985) defined development as "a progressive series of changes that occur in a predictable pattern as the result of an interaction between biological and environmental factors" (p. 2). Development is not random. There are predictable patterns, there is invariance.

Developmental research focuses on individuals interacting with their environment although the amount of research attention paid to the environment varies with different theoretical models. Originating from Darwin's theory of evolution, a premise of developmental research is that developmental change is an adaptation (Dixon & Lerner, 1984). In other words, behaviors and the sense that individuals make of their world develop in order to adapt to changing biological and environmental factors. Change is thus embedded in biological history and the social context. Dixon and Lerner (1984) summarized:

> In the developmental `tradition' there is a stress on the history of the organism; on the functional, adaptive features of behavioral and mental ontology; and on the study of the role of the environment or context in such ontology. (p. 11)

In addition to patterns and commonalities across individuals, developmental research also focuses on individual differences. For example, the ipsative approach to developmental research looks at intraindividual continuity and change and describes how a person's unique attributes and style of reacting to the environment affects his or her own development (Lerner, 1986).

Individual differences occur for two reasons. First, each individual's cognitive, physical, affective, and social history; uneven development of these different domains; and widely-varied environmental factors insure individual differences (Baltes & Reese, 1984, p. 495). For example, individual differences would be anticipated in preservice teachers across the country as preservice teachers have had widely different life experiences and were enrolled in a variety of teacher education programs. Second, within cultures conditions change over time so that the conditions that influence the development of one cohort will be different for a later cohort. The course of development for a twenty-year-old school teacher at the turn of the century would be expected to differ from a twenty-year-old's development today. Due to the combination of environmental and cohort differences it is important to consider place and time when interpreting or generalizing the results of developmental research (Schaie, 1965).

Several developmental concepts were used to interpret the data in this study. They were (a) the orthogenetic principle, (b) developmental sequences and phases, and (c) developmental milestones and tasks. These concepts were conceptual tools which helped me clarify and refine my understandings and link the data to broader theoretical contexts.

The orthogenetic principle. Werner (1957) proposed the

orthogenetic principle as an overarching principle of development. He wrote:

> Wherever development occurs it proceeds from a state of relative globality and lack of differentiation to a state of increasing differentiation, articulation, and hierarchic integration. (p. 126)

The characteristic of increasing differentiation and integration is readily found in the developmental literature. One example is Piaget's description of how the reflexes of infants become differentiated in that the grasping reflex adjusts to the differences between grasping a rattle and a finger and then later becomes integrated with perception so that the infant can now coordinate seeing and grasping a variety of objects (Miller, 1983).

Werner (1957) called his orthogenetic principle a "heuristic definition" which can be used "in the interpretation and ordering of psychological phenomena" (p. 127). This means the principle can be applied to a range of tasks and domains to better understand and describe their developmental process. For this study the orthogenetic principle was applied to the changing relationship between a preservice teacher (subject) and her immediate environment (object). In terms of the orthogenetic principle, an individual's subject-object relationship with the environment moves from embeddedness in and domination by the environment to increased differentiation, separation, autonomy, and distance, and to redefined ways of finding integration,

relationship, and attachment with the environment (Kegan, 1982; Werner, 1957). Werner (1957) suggested several specific meanings of this increased subject-object differentiation and integration:

> Increasing subject-object differentiation involves the corollary that the organism becomes increasingly less dominated by the immediate concrete situation...less impelled by his own affective states....[has a] clearer understanding of goals,...can manipulate the environment rather than passively respond to the environment....[has a] more accurate assessment of others...[and] there is less of a tendency for the world to be interpreted solely in terms of one's own needs and an increasing appreciation of the needs of others and of group goals. (p. 127)

Kegan (1982) who proposed a life-span model of personality development, pointed out that adaptation is about both differentiation and integration. He said his model

> offers a corrective to <u>all</u> present developmental frameworks which univocally define growth in terms of differentiation, separation, increasing autonomy, and lose sight of the fact that adaptation is equally about integration, attachment, inclusion. (Kegan, 1982, p. 108)

Maintaining Kegan's emphasis on both differentiation and integration, the orthogenetic principle informed this study in that the process of making connections and increasing autonomy were both viewed as important human endeavors.

<u>Developmental sequences and phases</u>. The second developmental concept that guided this study was the idea that patterns of human development can be described as developmental sequences or phases. This concept is prevalent in developmental psychology. The most well-known developmental sequences being the stage theories of Piaget,

Freud, Erikson, and Kohlberg.

The major differences in stage theories is that they focus on different domains: Piaget--cognitive, Freud--psychosexual, Erikson--personality, and Kohlberg--moral. Stage theories also have similarities (Miller, 1983; Salkind, 1985). First, rather than viewing developmental change as continuous and quantitative, stage theories view development as a passage through qualitatively different stages that are a psychological restructuring. Previous stages form the basis for, are incorporated into, and are transformed by successive stages. Second, stage theories posit that stages occur in a predictable order and direction. The stage sequence is universal across all individuals. Although the timing and rate of stage changes may vary the order is invariant.

Having their roots in stage theories, two more recent developmental theories were important for this study. Perry (1970) and Belenky, Clinchy, Goldberger, and Tarule (1986) proposed developmental frameworks for understanding positions or perspectives on knowing. Both frameworks described a sequence of perspectives on knowing with the later perspectives being more complex or advanced than earlier ones. Neither claimed to be stage theories; thus invariance and universality were not pertinent. With a predominantly male sample, Perry (1970) found nine positions which moved from simple, dualistic thinking to an acceptance of

relativism, multiple perspectives, and, lastly, the evolution of commitments. Belenky et al. (1986) whose sample was women, reported five ways of knowing: silence, received, subjective, procedural, and constructed. These ways of knowing will be described later.

These two frameworks were developmental in that they outlined possible phases during the lifespan when an individual tended to hold a particular perspective. Further, the early perspectives could be incorporated into the later, more complex ways of looking at the world. Moreover, these frameworks were viewed as developmental by the participants in each study. As Perry (1970) noted:

> Those students whom we saw as "progressing" made their own awareness of maturation clear, explicitly or implicitly, and conveyed a sense of satisfaction in it....In short, the students experienced quite consciously an urge toward maturation, congruent with that progression of forms [positions] we were learning to see in their reports. (p. 50).

The concept of developmental sequences and phases was also used by Pearson (1986) who described six heroic modes or archtypes: innocent, orphan, martyr, wanderer, warrior, and magician. These archtypes are different ways of viewing life goals and the meaning of life. Each is associated with a developmental task. The developmental journey Pearson (1986) depicted differed from stage theories in that the order of the developmental tasks was fluid and not emphasized.

Pearson's (1986) model was a three-dimensional, ever-widening spiral. Like Kegan (1982) who spoke of an

alternating, life-long revisiting of the themes of autonomy (differentiation) and inclusion (integration), Pearson (1986) described the developmental process as a revisiting of themes and issues each time with a greater depth of understanding.

> Each stage has its own lesson to teach us, and we reencounter situations that throw us back into prior stages so that we may learn and relearn the lessons at new levels of intellectual and emotional complexity and subtlety....And it is not so much that the spiral gets higher, but that it gets wider as we are capable of a larger range of responses to life and, hence, able to have more life. We take in more and have more choices. (Pearson, 1986, p. 13)

The frameworks of Perry (1970), Belenky et al. (1986), and Pearson (1986) are presently more narrow in scope and content than the major stage theories. Nevertheless, they carry on the work of refining our understanding of the process of development. These frameworks offer helpful conceptual tools that focus attention on phases of time when an individual tends to think in certain ways, revisiting of themes, and a fluid rather than linear view of sequences so that development brings more options.

Developmental milestones and tasks. The third developmental concept used in this study was developmental milestones and tasks. The term "developmental milestones" is borrowed from motor development where the term is used to describe the sequence of important motor tasks children learn in infancy (Roberton, 1984). Motor milestones include sitting up alone, standing up with help, creeping, standing alone, and walking alone (Shirley, 1933). These milestones

are "dramatic accomplishments" for children (Roberton, 1984, p. 52). They are also adaptive in that they enable children to function more effectively in their environment.

Developmental tasks are similar. Havinghurst (1952) first addressed the concept. He wrote:

> A developmental task is a task which arises at or about a certain period in the life of the individual, successful achievement of which leads to his happiness and to success with later tasks, while failure leads to unhappiness in the individual, disapproval by the society, and difficulty with later tasks. (p. 2)

Havinghurst (1952) outlined a series of developmental tasks that spanned the life-cycle. He considered a wide range of tasks to be developmental, for example, learning to walk, learning to read, learning an occupation, adjusting to menopause, and developing a life philosophy (Havinghurst, 1952, p. 4). These tasks may be physical tasks learned by all individuals, but were most frequently tasks relating directly to an individual's goals or to skills necessary for adapting to a particular culture.

Havinghurst's developmental tasks were based on learning. He wrote, "to understand human development, one must understand learning. The human individual learns his way through life" (Havinghurst, 1952, p. 1). For Havinghurst, development proceeds by continually learning tasks appropriate to an individual's stage of the life-cycle with earlier tasks setting the stage for later ones.

Other psychologists included the concept of

developmental tasks in their theories. Erikson (1950), for example, proposed an eight-stage theory of life-span psychosocial development. In each stage he identified a crisis or task that an individual confronts. For example, the task for stage four, middle childhood, is industry and mastery of skills; the task for stage six, young adulthood, is learning to develop meaningful, intimate, relationships. Each of the eight tasks is present throughout the life-span but is most significant at one particular stage (Miller, 1983, Salkind, 1985).

Oerter (1986), in an attempt to synthesize and build on the concept of developmental tasks, proposed a taxonomy that organized developmental tasks for all domains in five levels ranging from broad to narrow in scope. For example, a broad task was dealing with morality across the life-span, and more narrow tasks included preparing for a final exam and pregnancy. Oerter's taxonomy suggests it would be appropriate in this study to apply the concept of developmental task to the narrow domain of learning to teach.

Reminiscent of Perry (1970), Oerter (1986) noted that individuals view developmental tasks as tasks that enhance development. Furthermore, he suggested individuals actively contribute to their own development.

> The developing individual, as an agent of his or her own development, takes a future perspective by both perceiving cultural demands and setting developmental goals of his or her own. (Oerter, 1986, p. 243)

Describing the developmental process as the learning of

a series of tasks over time seems helpful and appropriate. Developmental milestones and developmental tasks are similar. They capture the idea that learning a certain task can be a significant part of the developmental process. These tasks come to the forefront at particular times in the life-cycle as a result of the individual's efforts to manage environmental demands. For this study, the concepts of milestones and developmental tasks suggested that some knowledge or skills may be critical factors in learning to teach, factors that were more significant at some points in time than at others.

Relevant Frameworks and Concepts from Cognitive Psychology

A second major theoretical perspective used in this study was a cognitive perspective on learning. In cognitive psychology there is a growing line of research on the learning of complex, real-world, domain-specific tasks such as chess, radiology, physics, and elementary school science (Glaser, 1987). Teaching is also a complex, domain-specific task the learning of which thousands of teachers-to-be confront annually. Several premises from this research were used in this study to interpret and explain the data.

Schemata as knowledge structures. The first premise is that knowledge structures, called schemata, store and organize knowledge. Anderson (1984) wrote:

> A schema is an abstract structure of information. It is abstract in the sense that it summarizes information about many particular cases. A schema is structured in

> the sense that it represents the relationships among components. (p. 5)

In other words, a schema is a generalized summary of an individual's past interpretations of a range of similar situations or ideas.

Schema is not a new concept. In the early part of the twentieth century Bartlett and Piaget described the concept of a schema as a way of conceptualizing how knowledge was organized and acquired (Thorndyke, 1984). More recently, as researchers in cognitive psychology looked at the learning of complex tasks or the acquisition of real-world knowledge over years of time, the notion of schema again gained popularity.

Rumelhart and Ortony (1977) suggested that schemata are embedded within other schemata and exist at all levels of abstraction. Thus, schemata can represent, at a detailed level, knowledge of simple acts, objects, or events. In addition, they can represent, at a more abstract level, knowledge underlying broad plans of actions and highly complex concepts that hierarchically encompass other, more concrete actions and concepts.

Schema use: Comprehension. As knowledge structures schemata function in perception, comprehension, and learning. In comprehension schemata serve as frameworks for making sense of an encountered situation or idea. Schemata provide a

> general model of a situation....[and] the act of comprehension can be understood as the selection of appropriate configuration of schemata to account for the

situation. (Rumelhart & Norman, 1978, p. 43)

To comprehend, generalized schemata are attached to a situation and are instantiated. Instantiation means assigning specific, concrete values to the generalized aspects of the schemata (Resnick, 1984; Rumelhart & Ortony, 1977). A situation or idea is, thus, perceived or understood to be a specific instance of abstract schemata. In other words, abstract schemata produce a concrete representation giving an idea or situation meaning.

Anderson (1977) described comprehension as a constructive process because information is not simply taken in, but made sense of in terms of schemata which summarize past experience. As similar situations are not exactly alike and past experience is continually updated, a situation or idea will not likely be interpreted the same way twice--meaning must be constructed.

Schema change: Accretion, tuning, restructuring. Although researchers are beginning to examine how schemata are acquired and change, little is known (Resnick, 1984, Anderson, 1977). Rumelhart & Norman (1978) proposed three qualitatively different ways: accretion, tuning, and restructuring. These three modes of learning account for changes in schemata in much the same way as do Piaget's concepts of assimilation and accommodation.

Accretion is defined as "the encoding of new information in terms of existing schemata" (Rumelhart & Norman, 1980, p.

335). It is "simply the accumulation of new information" (Rumelhart & Norman, 1978, p. 44). In comprehension an appropriate schema is instantiated. With each instantiation an additional case of the schema is encoded and stored in long-term memory. In turn, the schema is enriched and the schema's range of applicability increases (Resnick, 1984). Accretion has occurred.

Tuning is the development of new schemata by slow refinement. Over time and with many applications a schema is assumed to undergo gradual change. Schemata become more accurate, generalizable, specialized, and less variable (Rumelhart & Norman, 1978). Restructuring is schema creation. It is called restructuring because new schemata are built on the patterns of old schemata (Rumelhart & Norman, 1978).

Schema restructuring and tuning occur "when existing memory structures are not adequate to account for new knowledge" (Rumelhart & Norman, 1978, p. 45). These processes may resemble clear moments of insight, but are likely to occur more slowly and unevenly.

> At times this modification of the organizational structure seems to be accompanied by a "click of comprehension," a reasonably strong feeling of insight or understanding of a topic that makes a large body of previously acquired (but ill-structured) information fit into place. (Rumelhart & Norman, 1978, p. 38)

Strike and Posner (1985) noted, however, that the restructuring of complex concepts is most often a slow, piecemeal process "characterized by temporary advances,

frequent retreats, and periods of indecision" (p. 221).

Knowledge restructuring occurs on both small and large scales (Anderson, 1977; Vosniadou & Brewer, 1987). Vosniadou and Brewer (1987) suggested restructuring can be global, as in the stage-like changes in children's cognitive development described by Piaget, or domain-specific, meaning content or context-specific. Domain-specific learning may involve two forms of restructuring: weak and radical. Weak restructuring involves acquiring more knowledge and changing or increasing the relationships among concepts. Vosniadou and Brewer (1987) suggested the change from novice to expert within a domain is weak restructuring. Experts know more, make more connections among concepts, and have both more abstract, overarching, and more detailed ways of interpreting situations than novices. Radical restructuring involves substantial change in the structure and content of the schemata.

Problem recognition and restructuring. Strike and Posner (1985) suggested that for restructuring to occur an individual must recognize that there is, in fact, a problem; he or she must be "dissatisfied" with the interpretation of a given situation or idea. Prior to the need for restructuring, an individual makes sense of experience by attaching the "best" available schemata regardless of whether the resulting interpretation is inaccurate, inadequate, or inappropriate (Shuell, 1986). For example, a "mistake," from

the adult perspective, made by a child in long division is not a mistake but a reasonable instantiation of the most appropriate schemata (Shuell, 1986). "Mistakes" are the sense an individual logically makes of a situation or idea based on prior knowledge. These "mistakes," which may be robust, will continue and restructuring will not occur unless the individual first becomes dissatisfied and recognizes a problem. Thus, problems and issues arising in a setting and recognition of inappropriate or inadequate ways of framing situations are born out of dissatisfaction with what was once a logical, reasonable, perfectly acceptable explanation.

Recognition of problems as problems is not a simple matter.

> Intellectual problems do not simply emerge from experience. They are, rather, more likely to be the product of a discrepancy between the intellectual expectations generated by our current conceptions and our actual current capacity to explain experience in terms of these conceptions. (Strike & Posner, 1985, p. 214)

Problems are actively constructed--they do not just appear on the scene ready to pounce on the unsuspecting victim. Individuals, based on prior knowledge, make sense, find meaning, uncover problems, detect issues. To recognize a problem the schemata one draws on to make sense of a situation must, for one reason or another, be found inadequate. Strike and Posner (1985) suggested dissatisfaction occurs because the current interpretation is no longer necessary or it is not in accord with other

knowledge, beliefs, or viewpoints.

In addition, for restructuring to occur the person must be confronted with alternative explanations that more powerfully account for the information (Anderson, 1977; Strike & Posner, 1985). Strike and Posner (1985) pointed out these alternative interpretations must be "minimally" understandable, "plausible," and "fruitful." In knowledge restructuring,

> a person becomes committed to a conception because it helps interpret experience, solve problems, and, in certain cases, meet spiritual or emotional needs. A new conception should do more than the prior conception for the person, if it is to be considered fruitful, but it must do so without sacrificing any of the prior conception's benefits, or must provide sufficient incentives for any required sacrifice (Strike & Posner, 1985, p. 220).

Knowledge restructuring is an active, reorganization of meaning which seems to arise from dissatisfaction with a current way of thinking. More than finding an answer to a problem, it is also recognizing, in the first place, that there is a problem. Knowledge restructuring has emotional overtones. It means being discontent, recognizing a different way of thinking is more compelling, and finally arriving at commitment to a new understanding.

Teachers' Practical Knowledge

The stance taken toward teachers' knowledge in this study was informed by a growing body of research that described teachers' knowledge as practical, contextual, interactive, experiential, and personal.

Teaching is by nature a practical activity. As Yinger (1986) noted, teachers' knowledge is directed toward doing. Teachers transform, arrange, and present content, organize and carry out activities, recognize and solve problems, explain, encourage, prompt, correct, and show. The world of teaching is one of action.

Schon (1983, 1987), whose research on professional knowledge seemed pertinent for this study, analyzed thinking and acting in the practical, real-world setting. He called attention to the "indeterminate zone" of professional practice in which, he suggested, problems often lack clear definition and solutions are not easily accomplished by linear, systematic problem solving. Schon (1983) related the nature of professional thinking to its embeddedness in its context. The setting of teaching shares the qualities of the professional practice context described by Schon (1983). The teaching environment is uncertain, unpredictable, complex, goal-oriented, idiosyncratic, and laden with conflicting goals and dilemmas (Clandinin, 1986; Clark & Lampert, 1986; Floden & Clark, 1988; Lampert, 1984; Yinger, 1986).

Schon (1983) suggested the knowledge of practitioners takes the forms of knowing-in-action and reflection-in-action.

> Our knowing is ordinarily tacit, implicit in our patterns of action and in our feel for the stuff with which we are dealing. It seems right to say that our knowing is <u>in</u> our action. (p. 49)

Complementing knowing-in-action is reflection-in-action, a process during which practitioners reflect on their actions while acting and adjust, restructure, and/or reframe what they are doing or are trying to do. Schon (1983) wrote:

> When intuitive, spontaneous performance yields nothing more than the results expected for it, then we tend not to think about it. But when intuitive performance leads to surprises, pleasing and promising or unwanted, we may respond by reflecting-in-action....[This] reflecting tends to focus interactively on the outcomes of action, the action itself, and the intuitive knowing implicit in the action. (p. 56)

Thus, Schon painted a picture of practitioners using an action form of knowing where tacit understanding, intuition, and on-the-go appraising, adjusting, and improvising are necessary components.

Like Schon, researchers studying teachers' knowledge found that teachers in the natural setting seem to acquire practical knowledge (i.e., knowledge directed toward practice) that reflects the environmental demands (Clandinin, 1986; Elbaz, 1983; Lampert, 1984). Teachers' knowledge seems to be context-specific, yet flexible (Clandinin, 1986; Elbaz, 1983). This means knowledge that is linked to specific situations, e.g., how to help a particular child with a specific task, yet is sensitive to changes in the context so that the teacher's actions can be tailored to a different child or a similar task. In accord with the uncertainty of practice, teachers' knowledge also seems to enable teachers to function interactively (Clark & Lampert, 1986). As teachers can not predict how each child will respond to each

task, teachers must be able to observe and react continuously to what unfolds in their classrooms. Further, as teaching is a goal-directed activity, teachers' knowledge seems to be goal-oriented (Clandinin, 1986; Elbaz, 1983). What the teacher intends to accomplish is factored into the sense made and the actions taken.

Elbaz (1983) called teachers' knowledge "experiential;" that is, it grows out of practice yet shapes practice. For Elbaz, experiencing practice included both the "inner" personal experience and the more public interaction with the environment. Clandinin (1986) also found a personal dimension to teachers' knowledge. In particular, she found emotion and morality to be important components of the meanings teachers made of teaching.

Differences Between Novices and Experts

Starting with de Groot's (1965) studies of master and less experienced chess players to present-day work, a consistent picture of expert performance across many domains is beginning to emerge (Glaser, 1985, 1987). One finding of this cognitive psychology research is that experts and novices differ in the amount and quality of their specific knowledge of the task (Lesgold, 1984). In summarizing the research on expertise, Glaser (1987) wrote:

> the performance of highly competent individuals indicate the possession of, rapid access to, and efficient utilization of an organized body of conceptual and procedural knowledge. (p. 82)

Compared to novices whose knowledge structures have been found to be literal, surface-level, and less differentiated, the knowledge structures of experts are inferential, deep, and highly organized (Glaser, 1985, 1987). The knowledge of experts is organized in broader categories and situations, and events are recognized as instances of more overarching principles.

Experts use their knowledge to anticipate what will follow, as an "anchor" for information in short-term memory, and as a "framework" for remembering (Lesgold, 1984). They can quickly access their knowledge. "Experts develop the ability to perceive large meaningful patterns....This pattern recognition occurs so rapidly that they take on the character of the `intuitions'" (Glaser, 1986, p. 923).

Another important finding from the novice/expert research is that experts know more about applying their knowledge (Glaser, 1986, p. 917). Experts' knowledge and the ways they make sense of situations are connected to conditions of practice, i.e., concrete ways of framing and solving problems (Glaser, 1985, 1986, 1987) Their knowledge is action-oriented. Novices lack strong references to practice. Thus, with their highly organized, fine-tuned, practically oriented knowledge structures, experts have the ability to recognize patterns, frame problems, and generate solutions quickly leaving the information processing capacity free to attend to other matters (Glaser, 1986).

Dreyfus and Dreyfus (1986) proposed a five-step model of skill acquisition from novice to expert. In the early stages novices tend to break down situations into discrete components and deliberately apply abstract, context-free rules to solve problems. Their decision making is analytic and detached. In the later stages experts recognize patterns, problems, and solutions holistically and in context. Their performance is quick, fluid, effortless, and often based on tacit understandings. If experts have time to reflect, they reflect on the whole, concrete situation, including the way the problem is framed, and the differences between the present problem and solutions and past similar problems and solutions. Expert decision making is subjective and involved.

The novice/expert literature within the broader field of cognitive psychology is beginning to paint a picture of expert performance in complex, knowledge-rich contexts. This work, similar in research design to cross-sectional research designs in developmental psychology, alludes to the possible content and direction of the pathway an individual will follow from novice to expert. Teaching is also a complex, knowledge-rich task and researchers have begun to compare novice and expert teachers using the research from cognitive psychology for theoretical support. Initial findings suggest that novice and expert teachers may share characteristics of novices and experts in other domains.

Clark and Peterson (1986) proposed that a primary difference between novice and expert teachers is the quality of their knowledge structures or schemata. Compared to novices, expert teachers' knowledge of pupils, classroom events, and subject matter, like the knowledge of experts in other domains, was broader, deeper, more complex, more differentiated, and more integrated (Calderhead, 1983; Carter, Sabers, Cushing, Pinnegar, & Berliner, 1987; Clark & Peterson, 1986; Leinhardt & Smith, 1985; Peterson & Comeaux, 1987). In other words, expert teachers knew more and made more connections among concepts. Similarly, Ropo (1987) found the experts had more goals, these goals were hierarchically structured and the experts, but not the novices, connected their goals to specific student outcomes. Finally, Peterson and Comeaux (1987) found that expert teachers, like other experts, relied more on overarching principles in discussing classroom events.

The quality of the expert teachers' knowledge seems to enable their teaching actions in several ways. First, experts were better able to anticipate what was going to happen in a class. With their rich knowledge of children and classrooms, experts, even before meeting a class, had a good sense of what kinds of behaviors to expect (Berliner, 1986; Berliner, 1987; Calderhead, 1983; Housner & Griffey, 1985). For example, Calderhead (1983) found that beginning teachers with little knowledge about children could not anticipate the

kinds of problems children had with specific content, nor did they have a clear appreciation of children's individual differences within the class. Due to the lack of strong knowledge structures for understanding children, they relied on being able to react to what happened.

Second, the knowledge structures of expert teachers seemed to enable their perceptual abilities. Experts were found to recognize quickly and accurately what was happening (Berliner, 1987). They knew what was important and what was irrelevant to attend to. The "typical" was ignored, the "discrepant" noted. Experts looked beyond surface characteristics and made inferences about what they saw. They gave more support for their interpretations. Novices and postulants failed to recognize significance.

Third, it may also be possible that novice teachers have less access to their knowledge due to weaker, less numerous connections among components of knowledge structures. Arzi, White, and Fensham (1987) reported that beginning teachers' knowledge of science concepts (e.g., energy) that spanned several disciplines such as physics and chemistry appeared to have meaning only within a specific discipline. Beginning teachers were unable to recognize the connections across disciplines; thus, some important content knowledge was not "functionally available" during teaching as its meaning was accessed only within specific disciplines. It seems beginning teachers may "know" in one sense but not recognize

their knowledge as relevant. Better quality connections among concepts may help teachers use their knowledge flexibly and apply it to a range of situations.

Finally, experts were found to have more of an orientation toward students. Ropo (1987) found that experts were more concerned with analyzing student answers while novices were more concerned with their own teacher behavior. Similarly, Housner and Griffey (1985) found that expert physical education teachers were more concerned with student learning.

Thus, expertise in teaching appears to be similar to expertise in other complex tasks. Expert teachers seem to differ from novices in large measure because of the quality of experts' domain-specific knowledge of what happens in classrooms. This knowledge is broad, deep, differentiated, integrated, and connected to practice enabling expert teachers to make better sense of the teaching/learning process.

Teachers' Content and Pedagogical Content Knowledge

Recently, L. S. Shulman (1986a, 1986b, 1987) has called the attention of the research community to the lack of research questions focusing on teachers' subject matter or content knowledge. He suggests the emphasis on generic teaching skills without consideration of content has left us with an unbalanced understanding of teaching.

Through his research on the knowledge base of teaching,

L. S. Shulman (1986a, 1986b, 1987) identified a particular form of teachers' content knowledge that is important to this study, that is, pedagogical content knowledge. Pedagogical content knowledge is defined as:

> the understanding how particular topics, principles, strategies, and the like in specific subject areas are comprehended or typically misconstrued, are learned and likely to be forgotten, (L. S. Shulman, 1986a, p. 26)

and

> the ways of representing and formulating the subject that make it comprehensible to others. (L. S. Shulman, 1986b, p. 9)

Thus, pedagogical content knowledge seems to be at the intersection of content and pedagogy. It is a practical form of content knowledge that is oriented toward the dynamics of teaching and learning.

Shulman and his colleagues suggest that teachers' content and pedagogical content knowledge are important specialized knowledge bases that teachers rely on in teaching. Research found strong content and pedagogical content knowledge enabled a range of teaching actions while weak knowledge was limiting. Teachers with broad, more integrated knowledge elaborated on content and used alternative approaches while teachers with narrow and unintegrated knowledge did not (Roehler et al., 1987; Roth, 1987). In a similar finding Smith and Neale (1987) reported that without strong content knowledge teachers were unable to generate their own metaphors for explaining science content to children. Also, Carlsen (1987) found that teachers with

weak content knowledge asked more questions, relying on mostly low cognitive level questions, and that students talked less during the class. The strong content knowledge teachers asked fewer questions but the students talked more. Finally, Gudmundsdottir (1987a) and Wilson and Weinberg (1988) found that student and novice social studies teachers' major discipline of study, e.g., anthropology, history, political science, etc., provided the conceptual framework for understanding and teaching all social studies content. Lack of knowledge of the frameworks of other disciplines restricted the ability both to learn and teach new subject matter accurately or in depth.

The strength of teachers' knowledge has also been linked to student achievement. Peterson, Fennema, Carpenter, and Loef (1987) found positive relationships among strong pedagogical content knowledge, pedagogical content beliefs, and first graders' achievement in arithmetic problem solving.

The Development of Knowledge in Field Experiences

Although field experiences have drawn considerable research attention and student teaching has long been regarded as one of the most critical components of teacher education, the development of knowledge and the psychological process of learning in field experiences have not been widely studied. Recently, however, there seems to be a growing interest in the ways knowledge develops in the field.

Knowing "that" and knowing "how". A helpful conceptual

tool for thinking about the development of knowledge in field experiences is the distinction made by Gilbert Ryle (1949) between two forms of knowing, i.e., knowing "that" and knowing "how." Knowing "that" is knowing about something. Knowing "how" is an action form of knowing, or, as Schon (1983) puts it, the "knowing in action." In terms of this study, knowing "that" is knowing about things such as teaching, children, content, and the context of education. Knowing "how" is the performance of teaching.

The distinction between knowing "that" and knowing "how" is helpful because it clarifies that teacher education and field experiences are concerned with two different forms of knowledge. Most university-based course work, including work in professional foundations, liberal arts, and methods courses deals with theoretical knowledge and other kinds of knowing "that." Teacher education is based on the assumption or hope that this knowledge can or will be transformed into or at least inform knowing "how" to teach. Field experiences are the component of teacher education traditionally counted on for this transformation and the consequent development of know-how. Recognizing the fundamental distinction between knowing "that" and knowing "how" gives a clearer picture of the role and demands of field experiences in teacher education.

The results of several studies suggest both preservice and inservice teachers have difficulty connecting their

knowledge "that" and their knowledge "how." Research focusing on what six elementary education majors learned in two contrasting teacher education programs found that student teachers in both programs had difficulty using the knowledge and attitudes gained at the university (Feiman-Nemser & Buchman, 1987; Feiman-Nemser, Buchman, Ball, & Lawrence, 1986). Both programs expected and promoted research-based and theoretical knowledge use in field experiences. Despite agreement with and sincere efforts to implement ideas promoted by their programs, several of the preservice teachers were unable to transform knowledge "that" into knowledge "how." Similarly, Calderhead and Miller (1986) found student teachers' lessons were based on personal teaching experience and observations of other teachers rather than theoretical knowledge acquired in college course work. Finally, Russell (1986) and Grossman and Richert (1988) reported beginning teachers had problems translating theoretical knowledge for practice. For example, one teacher's attempts to teach first graders volume conservation was not in keeping with her theoretical knowledge of Piaget's theory of children's cognitive development (Russell, 1986). There was a "gap" between her theoretical knowledge and her knowledge-in-action and a clear difference between knowing "that" and knowing "how."

Inservice teachers also report the same problem. Smith and Neale (1987) looked at the development of knowledge as a

result of inservice training in the conceptual change approach to teaching science. After studying the teachers' beginning efforts with this approach, the researchers concluded that the teachers were not able in practice to transform quickly or consistently knowledge "that" learned in the inservice training into know-how. With new knowledge they lacked the "speed and automaticity" that experts have in perceiving and processing information. Russell (1987) found that despite the traditional perspective that theory should be learned first and then applied to practice, the experience of an inservice teacher refuted this notion. She spoke of being "comfortable" with knowing how to teach before she found significant meanings and interest in theory.

Thus, both preservice and inservice teachers experience problems bridging the gap between knowledge "that" and knowledge "how." One study suggested, however, that integrating knowing "that" and knowing "how" within one course may prove helpful. Roehler et al. (1987) looked at the development of knowledge "that" of preservice teachers who were enrolled in different reading methods courses. Students in field-based methods courses with integrated field experiences acquired more expert-like knowledge than students in university-based courses with no or separate field experiences. Their research suggests that the amount of experience integrating knowledge "that" and knowledge "how" influenced the quality of preservice teachers' knowledge

"that."

Thus, there seems to be a gap between knowing "that" and knowing "how" that is difficult for preservice and inservice teachers to cross. The present system of teacher education depends on the development of teachers' knowledge at separate times and separate settings. Referred to by Feiman-Nemser and Buchman (1985) as the "two-worlds pitfall," the reliance on two separate worlds, university and field, with two forms of knowing, for teacher education rests on the "fallacious assumption that making connections between these two worlds is straightforward and can be left to the novice" (p. 63). Integrating field experiences and removing some of the traditional separateness of the university and field setting may help. Nevertheless, it seems the process of transforming knowledge "that" into knowledge "how" despite efforts, expectations, and intentions is not automatic or easy for teachers.

Opportunities and limitations. Although it is difficult to compare studies, as settings and research questions differ widely, it appears field experiences as a setting for knowledge development can offer opportunities for yet also set limitations on knowledge growth.

Yinger (1987) looked at what and how preservice teachers learned in field-based methods courses and student teaching. He found that the structure of field experiences provided two distinct modes of learning: learning by watching another

person teach and learning by doing. Common sense suggests a connection between these two modes of learning and the two forms of knowing. Learning by watching, as with other modes of learning common in the university setting such as learning by reading, learning by listening to lectures, or learning by discussing would develop by design knowledge "that." This knowledge "that" may be about teaching actions but for it to become knowledge "how" it must be transformed. Thus, learning by watching in field experiences can inform know-how but not be know-how. In contrast, know-how learned by doing may be reflected on or discussed as knowledge "that," but in performance it is knowledge "how." Field experiences thus provide opportunities for students to develop both knowledge "that" and knowledge "how" through two modes of learning, learning by watching and learning by doing.

In addition, Yinger (1987) found two corresponding ways of thinking. When learning by watching the preservice teachers took the perspective of "outsiders." What they learned was more general, more evaluative, less oriented toward action and less concerned with broader educational issues and justifications. As the preservice teachers gained responsibility for teaching they functioned in a learning-by-doing mode and their perspectives shifted to those of "insiders." Their observations became more purposeful and closely linked to the problems of practice. Actions were

connected to results and were seen and felt as part of the broader, multidimensional context of teaching. They learned by doing in context and what they learned was more specific and holistic.

Allison (1987) also found a differential impact on what preservice teachers observed during field experiences based on whether they had an insider or outsider perspective. Preservice physical education teachers and classroom teachers with a physical education minor observed more details about the children's movement when they were responsible for teaching the class, i.e., as insiders, as compared to when they had partial responsibility or when they were outsiders observing the children someone else was teaching.

Similarly, Grossman and Richert (1988) found that different but complementary ways of knowing arose out of university course work and field experiences. From field work students gained survival skills and an understanding of how children learn subject matter. In addition, as the preservice teachers planned for their field experience lessons, they learned new subject matter and increased the depth of their understanding of subject matter they had previously learned. From course work students gained an understanding of their subject matter and an "image of the possible" (p. 58), an image of what could be in schools.

Yinger (1987) suggested that learning by doing enabled preservice teachers to "see the big picture" (p. 306). As

learning occurred in context the knowledge structures developed were more holistic including all parts of the picture and relationships among these parts. Holistic, integrated knowledge structures are characteristic of experts in general (Dreyfus & Dreyfus, 1986; Glaser, 1985; Yinger, 1987) and expert teachers in particular (Berliner, 1987; Roehler et al., 1987). Thus, learning by doing seems to provide an opportunity for gaining knowledge structures that are more closely related to the knowledge structures of expert teachers.

Yinger also suggested that learning by doing enabled preservice teachers to "learn to do the right thing at the right time" (p. 307). Because actions are seen in relation to antecedents and consequences, the opportunity is there to evaluate an action in terms of the intention behind the action and its effect. In addition, as observations made while doing are richer and more purposeful (Allison, 1987; Yinger, 1987) than observations made while watching another person teach, the quality of the evaluation would be stronger. In learning by doing actions are not done or felt in isolation but rather as integrated parts of a whole.

Research also suggests that learning in field experiences has limitations. The teachers' concerns literature (Fuller, 1969; Fuller & Brown, 1975) and the socialization literature (Tabachnick & Zeichner, 1984; Zeichner & Tabachnick, 1981) describe field experiences as

times when preservice teachers focus on self-survival and develop or maintain conservative perspectives. Lanier and Little (1986) in their review of research on teacher education summed up what we know about learning from experience:

> It now appears possible, as well as likely, that substantial amounts of field experience foster a 'group management' orientation, in contrast to an 'intellectual leader' orientation in teachers' thinking about their work. (p. 550)

Evans (1986) found that preservice teachers who observed and assisted in early field experiences gained knowledge about children and daily life in classrooms that they did not learn in the university setting. She cautioned, however, that preservice teachers' unguided or unquestioned interpretations of what happened can be "biased," "faulty," and "ambiguous" (Evans, 1986, p. 41). In her study even the use of observation instruments intended to guide observations did not solve this problem as the preservice teacher focused on a more narrow range of concepts than what was intended by the use of the instruments. Evans (1986) concluded:

> If learning from field experience is to be instructional (i.e., designed for learning), the student teachers' attention needs to be directed to what is significant. Interpretation of what is observed needs to be shaped by pedagogical notions or principles to avoid reliance on their own limited experience. (p. 41)

There is concern and evidence (Evans, 1986; Feiman-Nemser & Buchman, 1985, 1987; Feiman-Nemser et al., 1986) that preservice teachers in field settings react to social forces

and make decisions based on personal experience rather than direct their own learning by reflection, theory, and knowledge of broader educational goals such as children's learning and development.

The problems seem solvable. As Lanier and Little (1986) wrote, "The problem is not that field experience cannot be valuable, but that its value is dependent on prospective teachers' being properly prepared to learn from it" (p. 551). It seems leaving preservice teachers to their own learning devices by sending them out in the field to observe and assist cooperating teachers may not have the affect we desire. Guidance, time for reflection, and discussions about the sense preservice teachers are making of field experiences seem necessary and important.

CHAPTER III

RESEARCH METHODS

The purpose of this study was to describe and analyze the development of salient components of preservice teachers' knowledge during a field-based elementary methods course. The aim was to examine the sense that preservice teachers made of the content and teaching of elementary physical education--to uncover the issues, insights, problems, and understandings they thought were important. Fundamentally, this study was concerned with the preservice teachers' meaning-perspectives on the content and process of learning to teach.

As the purpose of the study was to give an in-depth analysis of the perspectives of the participants, the interpretive research paradigm was selected as the framework for the research methodology. A brief description of the assumptions and aims supporting this model follows.

Assumptions and Aims

The theoretical premise for interpretive research rests upon philosophical assumptions about reality. Instead of viewing reality as stable across time and settings, researchers view reality as socially created, constantly emerging, and, thus, culturally and historically embedded (Erickson, 1986; Smith, 1983). Rather than isolate

predetermined variables and eliminate complexity by controlling for all other variables, reality is studied holistically and in context because there are tacit dimensions that are lost when you break the whole down or study it out of context (Polanyi, 1966). In the words of Trudy, the bag lady in the play The search for signs of intelligent life in the universe, "After all, what is reality anyway? Nothin' but a collective hunch" (Wagner, 1987, p. 18).

Studies guided by the interpretive paradigm describe what is happening in a setting and the meaning these actions hold for the participants (Erickson, 1986, p. 121). The setting is examined holistically, the participants' perspectives are described, and an attempt is made to capture the setting's complexity (Patton, 1980; Rogers, 1985). Interpretive research provides a detailed "thick description" (Geertz, 1973) reflecting the perspectives of the individuals in the setting and relates this description to the researcher's perspective on the setting and the relevant theoretical disciplines (Aguilar, 1981; Goetz & LeCompte, 1984). Within the field of education, Erickson (1986) suggested that a central topic for interpretive research is "the nature (and content) of the meaning-perspectives of teacher and learner as intrinsic to the educational process" (p. 120).

Selection of Setting

The following two characteristics were important in the selection of the methods course setting:

1. It was a field-based course.

2. The textbook was Physical education for children: A focus on the teaching process (Logsdon, Barrett, Ammons, Broer, Halverson, McGee, & Roberton, 1984).

Goetz and LeCompte (1984) pointed out that the theoretical perspective and personal interests of the researcher are used to select the setting for the research. A field-based course was selected because knowing "that" and knowing "how" are combined in this setting. Field-based methods courses share characteristics with the setting Schon (1987) described for developing professional knowledge, artistry, and expertise, that is, a practicum setting including coaching and learning by doing. Little research has been done on the development of preservice teachers' professional knowledge in settings of this nature. Schon's (1983, 1987) work, recently attracting attention within the field of education, suggested these settings may be important for professional education. The study of knowledge development in a field-based methods course seemed timely and potentially valuable.

At a more personal level a methods course that used the Logsdon et al. (1984) textbook was selected because this is the textbook I use. Studying preservice teachers'

understanding of the approach described in the textbook gave me a way to connect to my own teaching and foster my own professional growth.

Gaining Entry

At the end of the Spring semester I secured permission from the teacher educator of a field-based methods course using Logsdon et al. (1984) to conduct the research in her course during the following Fall semester. (The year the fieldwork was completed is not being reported to help protect the identity of the participants.) In the Spring the teacher educator introduced me to five preservice teachers who would likely enroll in the course. I then met with three of them individually and two together. The teacher educator and a researcher who had been studying the perspectives of the same preservice teachers during two courses in the Spring semester were present during all of these meetings.

The Spring semester meetings were viewed as preliminary meetings for the purpose of informing the preservice teachers that they would be asked in the Fall if they would participate in the study. During these preliminary meetings the preservice teachers were told that the purposes of the study were to understand (a) the sense they made of the methods course, (b) what they were learning, (c) their attitudes about course content and method, (d) how they felt about teaching the children, and (e) what the course meant to them. All classes and field experiences would be observed,

informal interviews and three formal, one-hour interviews would be conducted, and their class work would be collected. They were told they could participate in the study as much or as little as they wanted including limiting the number and length of interviews and that in no way would their participation affect their grades. Student and school identity would remain anonymous. Finally, the teacher educator would not have access to the research report until the methods course ended.

In the Fall I attended the first class meeting. Seven preservice teachers, including the five met in the Spring, were enrolled in the course. All seven were asked if they would participate in the study. Information discussed in the Spring meetings was reviewed. A human subjects consent form was distributed to the seven preservice teachers, the teacher educator, and a graduate assistant who handled the arrangements for field experiences. All nine signed and returned the form. Each preservice teacher agreed to and did participate fully in the study.

Researcher Role

Interpretive research can involve extensive face-to-face interactions with participants. The "role" the researcher plays in these interactions demands careful consideration (Bogdan & Biklen, 1982; Goetz & LeCompte, 1984). To facilitate the research, the attempt was made to maintain the role of an inquisitive, nonjudgmental, supportive, honest,

friendly, nonparticipant observer. The intent was to be trusted and accepted into the social setting, yet still retain the perspective of a researcher.

Toward these ends the students' opinions were sought and respected. The full purpose of study was disclosed. The preservice teachers were told the research questions. Their guidance was sought on how they were learning to teach and what additional questions they thought should be asked. Thus, the participants both answered and, at times, supplied the questions.

Although I did not advertise, neither was my identity hidden. The preservice teachers knew I was a doctoral student at the University of North Carolina at Greensboro. Because two of the authors of their textbook were faculty members of this university it was possible that the preservice teachers assumed I supported the approach to elementary physical education that they were learning. Therefore, they may not have perceived me as being nonjudgmental. They may have hidden their feelings and told me what they thought I wanted to hear. To counteract this possibility they were frequently assured that <u>their</u> perspective was wanted and that they should feel free to disagree with what they were learning and the teacher educator. They were also asked several times in formal interviews not if but how they disagreed with the teacher educator and the approach to elementary physical education

described in their textbook. Sometimes they explained the ways they disagreed and other times they pointed out they had not disagreed with either the approach or the teacher educator.

My sense is that the preservice teachers were open, honest, and direct. They did not speak with restraint. They were willing, often eager, informants. The preservice teachers seemed to freely and forcefully discuss their views including complaints about the teacher education program at their university, the methods course, the teacher educator, their textbook, and their classmates.

Bogdan and Biklen (1982) suggested the appropriate amount of researcher participation in the setting depends on each individual setting. In this study the intent was to be a nonparticipant observer of the setting. Maintaining a nonparticipant role, however, did not prove to be simple or, at times, desirable. There was a need to establish relationships with participants that would enable the collection of the quality of data necessary. As considerable time was spent talking with and trying to probe the depths of each preservice teacher's thoughts and feelings, I could not remain unknown by or unconnected to them. The preservice teachers came to know me as I came to know them. It seemed the relationships with the preservice teachers required some degree of reciprocity. There were occasions when reciprocity meant a nonparticipant observer role was not possible.

For example, during the semester some of the preservice teachers, at times, asked me questions about what they should do with a certain child or situation. Their questions were natural. They were accustomed to talking with me about their teaching and they knew I was an experienced teacher. My initial response was to ask them what they thought. Sometimes this deflection was enough and they talked through the problem and found their own solutions. A few times, however, they persisted and asked again for my opinion. In these instances I gave them my opinion. Maintaining an honest, open, reciprocal relationship seemed more important both personally and in terms of the research goals than being concerned about "contaminating" the data.

Later data analysis revealed that the few times my opinion was expressed did not seem to alter directly or indirectly the substance of the knowledge components described in this study. In other words, the content of what the preservice teachers learned did not seem to be affected. The research project on the whole, however, did have an important impact on the process of learning to teach for the preservice teachers (see Chapter IV for a more in-depth discussion). The formal interviews, in particular, gave them a chance to reflect on what they learned and how they felt. This reflection seemed to serve as a learning experience. Thus, the actual process of interviewing the preservice teachers made me a participant in their teacher education during the

methods course. An attempt was made to maintain the role of a nonjudgmental, friendly, interested, nonparticipant observer, but I could not be detached. I was part of the social setting and, at times, became a participant.

Data Sources

Erickson (1986) wrote:

> the task of fieldwork is to become more and more reflectively aware of the frames of interpretation of those we observe, and of our own culturally learned frames of interpretation we brought with us to the setting. (p. 140)

Toward this end a range of data sources was used with each source having the potential to shed light in different ways on the participants' and researcher's frames of interpretation. Although all data sources are important because each can contribute unique kinds of data, they also function interactively. What is found through one data source may help interpret or be a stimulus for what is or what can be found through another data source. For example, Whyte and Whyte (1984) wrote that "observation guides us to some of the important questions we want to ask the respondent, and interviewing helps us to interpret the significance of what we are observing" (p. 96). The data sources included field notes, informal and formal interviews, relevant documents, and a continuous review of the literature.

Field notes. Three sets of field notes were kept: (a) nonparticipant observation notes, (b) research notes, and (c)

a personal reflection journal. Nonparticipant observation notes were taken over an entire semester (August 27--December 15) during all class meetings and field experiences (29 days), and any conference between a preservice teacher and the teacher educator that I had knowledge of and was able to attend.

Nonparticipant observation notes included detailed descriptions of the setting, the actors in the setting, the structure and content of the activities, the interactions among actors, and what was said to whom. In other words, nonparticipant observation notes described what happened. As soon as possible after each class the notes were reviewed, expanded, and typed. Events that were observed but not noted due to the restraints of time or circumstances were described fully.

The second set of notes, research notes, was written throughout the study including the months spent collecting and analyzing data in the field and the months spent analyzing data after leaving the field. Research decisions, tentative interpretations, possible alternative interpretations, emerging themes, and speculative assertions that needed further probing and verification were noted. The purpose of the research notes was to document the evolution of the research decisions, the sense I was making of the preservice teachers' experiences, and my growing consciousness of the theoretical frames of reference used to

interpret the data.

The third set of notes was a personal reflection journal. The purpose for this journal was unrestricted. In this journal were noted feelings about the research process; writing a dissertation; being a graduate student, teacher educator, and researcher at the same time; and my interactions with my doctoral advisory committee members (Erickson, personal communication, September 4, 1986). These notes tended to reflect my state of mind throughout the study.

Interviews. Whyte and Whyte (1984) wrote that observations alone are not enough because they do not "reveal to us what people are trying to accomplish or why they act as they do" (p. 94). Because the purpose of the study was to uncover the sense the preservice teachers made of the methods course, observations were not enough; formal and informal interviews were a critical data source.

Three formal interviews were conducted with each preservice teacher. The length of interviews ranged from approximately 35 to 105 minutes with about 80% of the interviews lasting 60 minutes. Formal interviews were audio-taped on two separate cassette tape recorders. Most interviews took place in small conference rooms in the student center on the campus of the preservice teachers' university. All 21 interviews were transcribed. The first round of interviews and most of the second interviews were

transcribed during the semester the course met. The remaining interviews were transcribed after the course ended.

The formal interviews were semi-structured. Several open-ended questions were planned for and asked each preservice teacher. Responses were probed to gain increased depth, clarity, and specificity. A few questions, asking about specific incidents and past interview topics, were tailored for each preservice teacher.

Informal interviews took place throughout data collection. These interviews tended to be brief conversations occurring during class time and the 30-minute car ride to and from field experiences. Occasionally notes were taken during these interviews but the usual procedure was to reconstruct the conversation in writing as soon as possible afterwards.

Documents. All of the preservice teachers' written work was collected and photocopied. This included class notes, lesson plans and evaluations, dialogue journals, one quiz, and the midterm exam. In addition, all class handouts were collected and dated.

Literature. In this study the review of literature was seen as ongoing, rather than a process completed prior to data collection. As the data were gathered and analyzed, the relationship of the emerging themes to the scholarly literature was explored. The literature became part of the basis for interpreting the findings. Because of this

interplay with the literature, the literature became a data source that continuously informed the study.

Data Analysis

The data analysis section is divided into two parts. First, the general process of data analysis will be described. Second, a narrative of the research decisions made and the evolution of the research questions (Erickson, 1986) will be presented.

Process of data analysis. In this study, rather than predetermined categories being imposed on the data, data analysis was inductive.

> Data analysis is the process of systematically searching and arranging the interview transcripts, fieldnotes, and other materials....Analysis involves working with data, organizing it, breaking it into manageable units, synthesizing it, searching for patterns, discovering what is important and what is to be learned, and deciding what you will tell others. (Bogdan & Biklen, 1982, p. 145)

All data sources were triangulated and categories, themes, and patterns of knowing were derived from the data.

Data analysis for interpretive studies using fieldwork starts at the beginning of data collection and the time spent on analysis--small at first--increases as the fieldwork progresses (Lofland & Lofland, 1984). In this study data analysis was begun by reviewing field notes and documents after each day of data collection. Tentative interpretations were added to the research notes. Periodically, all fieldnotes, documents, and completed interview transcripts were reviewed and data were categorized. Through reviewing

and categorizing, an understanding of what was happening in the setting grew. The themes that emerged were then interpreted. Support for the interpretations, in the form of direct quotations and descriptions from fieldnotes, was gathered. Concepts from cognitive and developmental psychology were used to explain the meanings of the findings. The interpretive account was written.

Part of analysis was a search for confirming and disconfirming evidence (Earls, 1986; Erickson, 1986). This search occurred throughout data collection and again at the end of data analysis. During data collection tentative assertions were made, then verified or refuted by further observations and interviews. Emerging understandings were used to guide the fieldwork. At the completion of data analysis all data were reviewed again in a purposeful search of the written record for disconfirmation of interpretations.

Research decisions and the evolution of the research questions. The first phase of fieldwork was guided by the following research questions:

1. What are the preservice teachers' knowledge and attitudes about content and instruction of elementary physical education?

2. Who and what influences their knowledge and attitudes? How do these influences interact? In particular, what is the influence and interaction of biography and methods course experiences and context?

3. What happens when the preservice teachers teach and/or observe children, and how do preservice teachers' actions relate to their knowledge, attitudes, biography, and methods course experiences and context?

The first research question was primary. This question dealt with the substance of the preservice teachers' knowledge and was approached from a psychological perspective. Questions two and three concerning the affects of biography and the social context were developed to explore possible sociological dimensions.

The sociological dimensions were of interest for two reasons. First, some teacher socialization literature suggested that pretraining years are a powerful factor influencing what teachers think and do (Lawson, 1986; Lortie, 1975; Tabachnick & Zeichner, 1984; Zeichner & Tabachnick, 1981). These years, during which teachers are students, leave an indelible imprint on views of teaching. The affect of undergraduate training is not considered strong enough to overcome past experience. Thus in this study, the role of the preservice teachers' biography initially seemed important to examine.

Second, other socialization research proposed that aspects of the social context of field settings such as cooperating teachers, children, accountability to standardized tests, and predetermined curriculums can be strong socializing agents for preservice teachers (Goodman,

1985; Ross, 1986; Templin, 1979, 1981; Zeichner & Tabachnick, 1981). This view of teacher socialization seemed to suggest that the social context of the field experiences in this setting needed research attention.

Thus, I went into the setting open to both psychological and sociological interpretations of what was happening. The observations during the first several weeks tried to describe everything that happened and everything that was said. Although mindful of the research questions, the intent was to maintain as broad a perspective as possible.

The first round of interviews was begun after four weeks of observations in the field. The goals of the first interviews were the following:

1. to continue to build rapport, trying to maintain a friendly, concerned, curious, nonjudgmental relationship with each preservice teacher

2. to learn about the preservice teachers' biographies in particular, their physical education, athletic, and recreational experiences from Kindergarten through college and their experiences working with children

3. to ask the preservice teachers what they were learning and how they viewed the content, method, and philosophy of children's physical education.

4. to ask if the preservice teachers saw connections between their current views and their previous experiences.

Initial analysis of field notes and the first set of

interviews led to a decision to narrow the study and focus on the substance of the preservice teachers' knowledge, i.e., the first research question, and how this knowledge developed. Thus, less time was spent probing attitudes and the connections between current views and biography, and more time on the changes in knowledge components. The first research question was clarified to be as follows:

1. What is the preservice teachers' knowledge of elementary physical education and how does their knowledge change?

The narrowing of the study to a focus on knowledge substance and development did not become apparent at once: researcher notes did not describe nor do I remember being conscious of a change at this point in time. Later analysis, however, of the second interview guide, transcripts of the second interviews, and the fieldnotes revealed that prior to the second interviews probing was for what changes had occurred in their knowledge and how. As the semester of data collection progressed I became more consciously aware and then more firm in the conviction that the substance and development of knowledge were the directions for the study to follow.

The chief reason the substance and development of knowledge were attended to more closely was that strong evidence was found of changes in knowledge structures, and these changes seemed important to the preservice teachers.

They spoke in detail about how they used to think, how their thinking had changed, why it had changed, and how these changes were important to their growth as teachers. The substance of what they were learning and the changes in their knowledge seemed to me to be critical moments in their teacher development.

The reason I began to spend less time on the preservice teachers' biographies and the social context of the field setting was that these dimensions, despite a strong display in the teacher socialization literature, were not, in this setting, emerging as major themes. In the case of biography, the preservice teachers, overall, did not describe many connections between their past experiences with elementary physical education, sport, and physical activity and their thoughts and feelings about course content. This may be, in part, because they had little or no experience themselves in elementary physical education. Only one preservice teacher described having what she considered to be a structured instructional elementary physical education program. Two remembered physical education as primarily playing games and recess substituted for elementary physical education for the other four preservice teachers.

In the case of the social context of the field setting, the only aspect of the social context that seemed to have more than a minor impact on the preservice teachers' knowledge was the children. One possible explanation for the

difference between this finding and the findings of other studies (Goodman, 1985; Ross, 1986; Templin, 1979, 1981; Zeichner & Tabachnick, 1981) lies in the difference between this field setting and other preservice field settings.

Traditionally, preservice teachers in field experiences work with cooperating teachers in functioning classrooms often teaching predetermined curriculums. Research on teacher socialization revealed that cooperating teachers, children, accountability to standardized tests, and predetermined curriculums affected student teachers (Goodman, 1985; Ross, 1986; Templin, 1979, 1981; Zeichner & Tabachnick, 1981). In this study the preservice teachers were not sent into functioning classrooms. Instead, classes of children were brought to the gymnasium and the teacher educator and the preservice teachers controlled the content and conduct of the lessons. The cooperating teacher handled administrative details and served one time as a demonstration teacher for several of the preservice teachers. She taught her own classes in a different gymnasium during the time the methods course met and thus had limited contact with the preservice teachers. Furthermore, at Onondaga Lake Elementary School no physical education textbooks were required, no national standardized tests evaluated children's motor development progress, and no school curriculum materials determined the preservice teachers' lesson content. Thus, context factors found influential in other research settings were limited or

nonexistent in this setting.

Based on the strong evidence of changes in knowledge structures and my sense that biography and context were not emerging as major themes, after the first interviews the substance and development of the preservice teachers' knowledge became the principal research direction. The following three questions guided the second and third interviews:

1. What have you been learning about the content of elementary physical education?

2. What have you been learning about teaching elementary physical education?

3. What have you been learning about children?

In the interviews I probed to discover how knowledge and feelings had changed. The preservice teachers were asked why these changes occurred and what these changes meant to them. They were asked about their concerns, problems, and insights. Attention was paid to social interactions and other contextual factors but to a lesser degree.

During approximately the last two weeks of fieldwork there was an intentional return to a broad perspective looking at both psychological and sociological dimensions. The attempt was to view the setting through fresh eyes. Everything was questioned. The focus was on re-asking "what is happening here?

Although the focus of the study had narrowed during

fieldwork, after the methods course ended some time was spent working on a comprehensive, fine-grained categorization analyzing both the psychological and sociological dimensions. My purpose for analyzing both dimensions was to see what information the data held. Each idea, thought, and action was sorted into as many appropriate categories as possible. Eventually, I had a sense of the range and strength of the data and felt comfortable narrowing the focus of the study again to the psychological dimension. I made the decision to limit the study in the following ways:

1. The study would focus on the substance of the preservice teachers' knowledge and how this knowledge developed. The research questions were revised to be (a) what was the substance of salient knowledge components of preservice teachers during a field-based methods course? and (b) how did these knowledge components develop? Cognitive and developmental psychology would be the theoretical lenses for the study.

2. To limit the length of the report, components of curricular knowledge would not be included. Using L. S. Shulman's (1986b) description, curricular knowledge was taken to be "the full range of programs designed for the teaching of particular subjects and topics at a given level" (p. 10).

3. An analysis of the social interactions and other contextual factors that influenced the substance and development of knowledge would not be included.

After setting the final direction for the study the data were categorized continuing the fine-grained, detailed analysis only with the data related to the revised research questions.

Determining Salience

This study describes salient knowledge components the preservice teachers discussed during the semester. Salience i.e., what was important, was determined by both the preservice teachers and researcher. First and foremost, components deemed salient were those insights, ideas, problems, issues, concerns, and patterns of knowing, feeling, and acting the preservice teachers discussed with either the greatest passion or frequency. The salient components were those the preservice teachers said were significant, the topics that were themes of interviews, class discussions, or written work.

Second, the knowledge components described in this study were also the ones I found most compelling or most representative of what happened during the semester. They held significance for me. This is an interpretive study, meaning that the results are my interpretation of the preservice teachers' interpretations of what happened. Although the aim was to understand and accurately represent the sense the preservice teachers made of their world, field notes, interview questions, reactions to the preservice teachers during interviews, and analysis of what was found were also unavoidably filtered through the sense I make of my

world and the theoretical perspectives that hold meaning for me.

One important factor affecting the knowledge components the preservice teachers found salient was the teacher educator. In this study teacher development was not viewed as a natural unfolding of knowledge untouched by outside influences, but rather, the sense preservice teachers made of instruction and experience. The teacher educator was an instructional force in their knowledge development. She structured course experiences and presented teacher education content, i.e., ideas about elementary physical education content, children, learning, development, and teaching. It was these experiences and this content that the preservice teachers encountered. In addition, the teacher educator reacted to the preservice teachers' reactions by discussing what happened, modifying or presenting new teacher education content, or structuring new experiences. In large measure, the pace of the class and the day-to-day teacher education content were determined by what was happening with the preservice teachers and the children in the field experiences. Thus, this study is more than a study of what the preservice teachers' learned on their own through early teaching experience, but also included the sense they made of what was taught through instruction and guided learning-by-doing presented or structured by the teacher educator who had specific learning goals in mind.

The theoretical base for this dissertation holds that individuals construct knowledge (Anderson, 1977). Thus, even though the teacher educator presented and structured course content affecting the preservice teachers' knowledge components, it was the preservice teachers who determined salience. As Strike and Posner (1985) suggested, problems are recognized as important due to an inability to account adequately for situations or ideas based on currently held knowledge. Knowledge development is minded by prior knowledge. For the preservice teachers, issues and insights were recognized as such because of the interactions among course content, experiences, and prior knowledge. They were not issues or insights because I or the teacher educator told them this knowledge was important and worthy to be an issue to confront or an insight to embrace. Ideas were presented and situations arose that the teacher educator and I thought were important, but were not problematic, meaningful, or salient to the preservice teachers. For example, the teacher educator seemed to me to emphasize lesson and unit objectives. She devoted considerable class time to writing these objectives and she frequently mentioned how objectives guide teaching. The only participant in the study who found significance in a new understanding of objectives was I. Objectives did not appear to be a salient knowledge component for the preservice teachers. Thus, the knowledge components described in this study were a blend of those the preservice

teachers found salient, those the researcher found compelling, and those arising from the sense the preservice teachers made of course experiences and content.

CHAPTER IV

THE CONTEXT OF THE STUDY

The purpose of this chapter is to describe the context in which the preservice teachers' knowledge developed. As the research sought to examine what and how the preservice teachers learned, the learning experiences were the features of the context that held the most importance for this study.

The course, entitled Teaching Elementary School Physical Education, was referred to as the elementary methods course. The two-credit course met from 8:10--12:00 on Wednesdays and 9:10--11:00 on Fridays for a full semester. The preservice teachers taught for 10 of the Wednesdays at Onondaga Lake Elementary School in a near-by community. The class met on the campus of Alexandria University for the rest of the Wednesdays and all Fridays. The four-hour time-span on Wednesday allowed for traveling time to and from the field experiences. The course was considered "field-based" because the ten field experiences were the central course experiences. Course time not spent at Onondaga Lake School was spent planning for and reflecting on the field experiences.

As previously stated, the textbook for the course was Physical education for children: A focus on the teaching process (Logsdon et al., 1984). The textbook provided a

framework for developing the content taught in field experiences and reading assignments aimed at understanding concepts of teaching, learning, and development.

When the class met at Alexandria University they met in a classroom designed to hold about 25 students. For most classes the students or teacher educator moved desks and chairs into a circle or semi-circle. In the front of the classroom there were two chalk boards approximately four feet by four feet. When the students met in small groups they either moved desks and chairs into small circles in the corners of the room or a group would meet in the graduate student lounge or another nearby, empty classroom.

Onondaga Lake Elementary School was approximately a 30-minute drive from the University. The school, a complex of several buildings, served about 1200 children in a rural community. The methods course met in the larger of two gymnasiums which had what appeared to be a regulation-sized basketball court with bleachers. The bleachers were usually pushed against both walls. The gymnasium had a grey tile floor, grayish-green cinder block walls, a high, dark ceiling with exposed heat pipes, and rusted metal girders supporting the roof. The fans for the heating system, when they were on, were noisy. There were no windows. When the preservice teachers taught, the gymnasium was divided into four ample-sized quadrants. Sometimes benches were used to separate the sections.

The Planning, Teaching, Reflecting Cycle as Course Structure

The course was structured around a planning, teaching, and reflecting cycle. The preservice teachers spent most of the class time planning to teach two series of lessons, teaching these lessons on Wednesdays, and then reflecting on what happened and planning for the next lessons (see Table 1).

Field experiences were divided into two five-week blocks (Block 1 and Block 2). Block 1 occurred during weeks 4-8 and Block 2 during weeks 11-15. Weeks 1-3 primarily focused on planning for Block 1. Weeks 9-10 and Fridays during both field-experience blocks were spent reflecting on past lessons, discussing concepts about content, children, and teaching related to what was happening in field experiences, and planning for future lessons.

At Onondaga Lake Elementary School the preservice teachers taught two classes each Wednesday, the first at 9:15--9:45 and the second at 10:00--10:45. During the 9:15--9:45 time slot the preservice teachers taught a different grade and class of children each week, rotating grades K, 1, 2, 3, and 5 for each block. The first week of Block 1 the lesson content for 9:15-9:45 was gymnastics, the second week the content was dance, and the other three weeks in Block 1 and all five weeks of Block 2 were games.

During the 10:00--10:45 class the same fourth grade class was taught 10 times. The content of the five fourth-

Table 1

Course Schedule for the Elementary Methods Course

Weeks	Location	Activities
1-3	Alexandria University	Developing a model of teaching; planning Block 1
4-8	Block 1: Onondaga Lake School Alexandria University	Wednesday: teaching Block 1 Friday: reflecting on past lesson, planning next lesson, midterm exam on last Friday
	9:15--9:45 (small groups)	10:00--10:45 (small groups)
4	Grade K gymnastics	Grade 4 gymnastics
5	Grade 1 dance	Grade 4 gymnastics
6	Grade 2 games	Grade 4 gymnastics
7	Grade 3 games	Grade 4 gymnastics
8	Grade 5 games	Grade 4 gymnastics
9	Alexandria University	Planning for Block 2
10	Onondaga Lake School Alexandria University	Attending physical education workshop; planning Block 2
11-15	Block 2: Onondaga Lake School Alexandria University	Wednesday: teaching Block 2 Friday: reflecting on past lesson, planning next lesson attended NCAAHPERD Convention one Friday
	9:15--9:45 (total class)	10:00--10:45 (small groups)
11	Grade 2 games	Grade 4 games
12	Grade 3 games	Grade 4 games
13	Grade 5 games	Grade 4 games
14	Grade K games	Grade 4 games
15	Grade 1 games	Grade 4 games
16	Alexandria University	Discussion of different elementary physical education textbooks
17	Alexandria University	Final exam

grade lessons in Block 1 was gymnastics and the content for the five lessons of Block 2 was games.

For the 9:15-9:45 (grades K, 1, 2, 3, and 5) classes in Block 1 and the 10:00-10:45 (grade 4) classes in Block 1 and Block 2 the preservice teachers taught small groups of children. Each class of children was divided into four groups of four to seven children each. For the 9:15--9:45 classes in Block 2 the children were taught as an entire class. Usually three preservice teachers taught the entire class rotating approximately every five minutes. For the most part each preservice teacher taught one class per week alternating between teaching the 9:15 or 10:00 class.

Guided Learning-by-Doing

Guided learning-by-doing supported by the study of theory was the primary mode of learning during the methods course. Learning experiences were designed to help the preservice teachers learn about teaching and, more centrally, learn how to teach. While the cycle of planning, teaching, and reflecting served as the course structure it was also course content. The preservice teachers learned to plan, teach, and reflect on lessons by planning, teaching, and reflecting under the guidance of the teacher educator.

Planning as course content. The preservice teachers developed their own unit and lesson plans. The unit plan had six parts:

1. Unit focus statement.

2. Statement describing the background the children need for the unit to be successful.

3. Unit objectives.

4. Scope and sequence chart.

5. Evaluation plan.

6. Resource material.

The first planning experience was the development of the two scope and sequence charts (part four) for the Block 1 classes. The scope and sequence chart is an outline of the content to be taught and the equipment used for each of the five lessons. Four of the preservice teachers working as a group developed the fourth-grade gymnastics scope and sequence chart. This was done in class based on a unit focus (part one) given to them by the teacher educator. Two other preservice teachers selected the content for the five single lessons taught to grades K, 1, 2, 3, and 5. After completing both the scope and sequence charts, the entire class, first individually as homework and then as a group in class, discussed and agreed on unit objectives (part three) for the fourth grade gymnastics unit.

Block 2 unit plans were approached differently. First, the preservice teachers chose to teach a five-lesson unit on striking rather than five lessons each focusing on different content. Next, the preservice teachers and teacher educator together wrote the unit focus statement (part one) for the fourth-grade games unit and developed the unit objectives

(part three). Finally, the preservice teachers, in partners, developed a scope and sequence chart based on these objectives which the pair would use for their group of children. The teacher educator decided the content of the individual lessons taught to the 9:15-9:45 class (grades 2, 3, 5, K, and 1).

Most lesson planning was done as homework. The planning that was done in class usually involved making a rough draft of the content which the preservice teachers then, on their own time, developed into full lesson plans. The teacher educator assisted with this rough draft and every so often gave the preservice teachers a suggested set of tasks. The teacher educator planned the content for one 9:15-9:45 lesson in Block 1 (grade 5) and all of the 9:15-9:45 lessons (2, 3, 5, K, and 1) for Block 2. The teacher educator handed out a lesson plan format but the preservice teachers could modify this format to meet their own needs.

In addition to unit and lesson plans, class discussions were used to anticipate what might happen during teaching. The preservice teachers considered hypothetical situations and planned possible alternative courses of action. Immediately prior to teaching, the preservice teachers (in addition to setting up equipment) reviewed lesson plans, discussed as a group the content that would be taught, and practiced the tasks the children would be doing. During this time the teacher educator and preservice teachers frequently

discussed problems that might arise such as what will the children's movement look like in this striking task, what are some tactics for learning children's names, and what will it be like to have four teachers talking at the same time.

Teaching and reflecting on teaching as course content. Learning to teach by teaching was the core course content. The preservice teachers practiced teaching during field experiences. They learned by doing. The teacher educator assisted in this process primarily by structuring and guiding the processes of planning and reflecting on teaching. To a limited extent, she also guided teaching while the preservice teachers were teaching.

Considerable class time was devoted to reflecting on teaching. Many different forms of learning experiences were designed for this purpose, the two most notable being class discussions and written work.

Class discussions about what happened in field experiences occurred frequently and regularly on Wednesdays immediately following teaching and during the two-hour class on Fridays. The topics varied. The preservice teachers discussed what happened in field experiences, how they felt, and their problems and questions. They discussed individual children's movement patterns and possible strategies for helping particular children become more skillful. At times, theoretical concepts such as task design (Barrett, 1984), task structure (Barrett, 1984), and developmental sequences

(Roberton & Halverson, 1984) from assigned textbook readings were integrated into class discussions. For example, they discussed varying the task structure (the amount of children's decision making in a task) as a way to help children develop a variety of movement patterns. Thus, discussions included a mix of practice and theory.

Written lesson evaluations, unit evaluations, and dialogue journals were another form of reflecting on teaching. The preservice teachers were required to write lesson evaluations for each lesson they taught evaluating how they and the children did in meeting lesson objectives. In terms of unit evaluations, the preservice teachers were required to write an evaluation for their Block 2, fourth grade games unit only. For this unit evaluation they were asked to evaluate the children's progress against their objectives and to discuss any in-route changes they made in their unit plan and why. To assist in evaluating the unit the preservice teachers analyzed pre-unit and post-unit video tapes of each child. These pre-unit and post-unit tapes were made at the start of the first and last lesson of the unit. Each group of children was videotaped for one minute striking a ball continuously with a variety of body parts (the focus of the unit was "actively getting into position to strike the ball with different body parts while producing the appropriate amount of force for different game-like situations"). As part of the unit evaluation, the preservice

teachers analyzed the changes in each child's ability to strike a ball skillfully with a variety of body parts by comparing the tape from the first and last days.

The preservice teachers were required to write a minimum of four dialogue journals. As the teacher educator explained in the handout:

> The purpose of this journal is for you to reflect on your teaching throughout the semester and discuss your personal progress toward becoming "an effective teacher."

In conjunction with dialogue journals, the preservice teachers studied video tapes of their teaching. They were expected to meet with the teacher educator two times to review and discuss two of these taped lessons with her. (Not all preservice teachers did this twice.) The weeks the preservice teachers were not video taped they were supposed to audio tape their lessons. The preservice teachers incorporated in lesson evaluations and dialogue journals what they learned from listening to and watching their audio and video tapes. The teacher educator wrote back or "dialogued" with the preservice teachers by asking questions or making comments on what they wrote.

Guided learning-by-doing seemed to be an important mode of learning in the methods course. The preservice teachers learned about planning, teaching, and reflecting on teaching by engaging in these processes with feedback from the teacher educator. The day-to-day course content, in large measure, arose out of the ongoing dialogue among preservice teachers,

practice, and teacher educator.

Teaching as Observing, Interpreting, and Decision Making

The cycle of planning, teaching, and reflecting was a conceptual base for methods course structure and content. Another important conceptual foundation was the idea of teaching as an observing, interpreting, decision-making cycle (Barrett, 1984; Roberton & Halverson, 1984). In the course outline the teacher educator wrote:

> This course is developed around the idea that a teacher is first an observer, then an interpreter and finally a decision-maker. All experiences are designed to help you understand and become skillful in handling all aspects of these ideas.

The idea of teaching as observation, interpretation, and decision making was incorporated into course experiences. The class discussed and practiced observation as a teaching skill. They reflected on problems they had being observers during teaching, and the factors that influenced observation. Their observations and interpretations of the children's movements were discussed in lesson and unit evaluations and dialogue journals. Teaching decisions were based on observations and interpretations of past lessons. In addition, the preservice teachers planned for observing by developing observation guides for some of their lessons.

Other Learning Experiences

Several other learning experiences were important activities of the methods course. First, the preservice teachers as a group and then individually developed a model

of teaching that captured their view of what a teacher does. The preservice teachers were requested to bring their model with them when they observed the video tapes of their teaching with the teacher educator. They were to discuss their teaching against their model. For the final exam the preservice teachers revised their model or designed a new one and then presented it orally to the teacher educator.

Another learning experience was for each preservice teacher to study the model of elementary physical education presented in a different elementary physical education textbook (Dauer & Pangrazi, 1983; Graham, Holt-Hale, McEwen, & Parker, 1980; Hoffman, Young, Klesius, 1981; Kirchner, 1985; Nichols, 1986; Schurr, 1980; Siedontop, Herkowitz, & Rink, 1984). On the last day of class the preservice teachers reported the viewpoint of the author or authors they studied. The class then discussed the different models including the model presented in Logsdon et al. (1984) and their own views of what an elementary physical education program should be.

Grading

Grades were based on the following:

1.	lesson plans (four)	30%
2.	unit evaluation of fourth grade games	15%
3.	dialogue journal (four minimum)	20%
4.	midterm	15%
5.	final	20%

Although only four lesson plans were graded, the teacher educator evaluated and commented on all lesson plans

submitted. Thus, the preservice teachers were essentially graded on their knowledge about teaching, their ability to plan for teaching, and their ability to reflect on what happened in their classes. They were not graded on their teaching performance.

Research Project

A final major aspect of the context was the students' participation in the research process itself. This dissertation was part of a larger, longitudinal research project. Both the larger research project and the dissertation seemed to have an impact on the students' teacher education.

The larger research project looked at the sense the seven preservice teachers made of their teacher education over their last three semesters of preservice training and first year of teaching. The elementary methods course that served as the setting for this dissertation was taken in the Fall semester senior year. Spring semester senior year was student teaching. In the Spring semester junior year, the semester prior to taking the elementary methods course, most of the students took two other field-based courses: secondary physical education methods and elementary physical education content. A different investigator, a visiting professor, studied what happened during those classes and interviewed most of the students three times during that semester. Thus by the end of the elementary methods course,

most students had been formally interviewed six times and had been observed during every methods class and every field experience for two full semesters during which their words and actions were dutifully noted and were the focus of a visiting professor's research and a doctoral student's dissertation. Although the students' reactions to the research project varied, the research was clearly part of the context of the students' teacher education.

Fraizer said the research project "never bothered me," and that she viewed it "as totally separate from the course." Several others spoke about initially being nervous and then "not caring any more," or just "ignoring you." In other words, the students, after a while, seemed to grow accustomed to the presence of researchers or were never bothered in the first place.

> It hasn't influenced me in any way as far as like in the classroom. It hasn't. I don't study any different way because of this--no, not at all....Once in a while when we were in discussion I'd look over and you're just writing away. I'm so used to seeing you in class, or even [the other investigator] last semester that it would probably be weird not to have anyone sitting in there. Laughs. (B.J., interview)

Overall, the students thought they did not act in ways different from the ways they normally acted as students.

This does not mean, however, that the research project did not influence the students' knowledge development or what happened in the course. Quite the contrary, based on the students' comments I think the research project had a

powerful affect on the sense they made of field experiences and learning to teach.

First, the research interviews seemed to function as important times for reflection.

> It's made me think a lot. (Chris, interview)
>
> Having these conferences really makes you think about what you're doing, what you're learning....You know, finding out your philosophy. (B.J., interview)

Second, although the students did not think the research study influenced their opinions, the interviews directed attention to concepts or situations ordinarily not considered for any length of time.

> It made me think about things that you bring up in this interview that I hadn't really spent too much time thinking about. (Kit, interview)
>
> Sometimes I don't actually think about how I feel until I come here and then I really start thinking about it. And, I've become more, I guess, more firm in how I feel....You asked me those kind of questions and you didn't come back saying I think you should change. (Chris, interview)
>
> It really hasn't changed my way of thinking. (B.J., interview)

Third, as a time for reflection, the interviews seemed to help the student's clarify how they felt and what they were learning.

> It helped me realize exactly what it is I've been learning. (Marty, interview)
>
> Being able to overt all these things that are happening to you and to [the other investigator]. I think that has helped us all because we kind of get our feelings straight, not only emotionally but academically too as to what it is we know at this point and how we feel about what we know. (Tyler, interview)

Having a visiting researcher and a doctoral student take a deep and abiding interest in how they thought and felt seemed to say to the students, "your teacher education experiences are truly important." Their learning mattered to someone else--they were special.

> [I was] thinking about this last night...about how lucky I've been. And to think that what I'm learning is important to someone else is really special, that I have been a part of of some research to see what it is that we learned, and how we learned things, and what's good, and what's not. And it's made me feel really special. (Robin, interview)

> Knowing that there's somebody following you through and that somebody somewhere (whoever is the originator of all this) is interested in how we're learning to teach, I think, sparks an interest in me on how we're learning to teach. (Tyler, interview)

For some students the research project even seemed to cultivate reflection. Tyler said the process "creates kind of a different awareness of what you're doing." As I continued to ask Tyler how she was learning to teach she said she stepped back and asked herself, "how <u>am</u> I learning to teach?"

Although the researchers did not tell the students what they should think or feel, through the vehicle of reflection it seemed to help them come to a clearer understanding of teaching and their own teacher education. In interviews they were asked to reflect on what they learned, what this meant, how they viewed physical education, and how they were learning to teach. By asking the questions I directed their attention and pressed them to reflect, give examples, look

for connections, and, generally, make explicit feelings and thoughts which may have remained unexpressed or tacit.

CHAPTER V

THE GROWTH TOWARD A FINE-GRAINED, INTEGRATED, CONTEXTUAL WAY OF KNOWING: THE DATA

Three major themes were derived from the data. Chapter V presents the data for the first theme: the growth toward or need for a fine-grained, integrated, contextual way of knowing. Four examples are given. First, several students discussed learning that the tasks they presented to the children had a content focus and that they needed to ask themselves "what specific content do I want the children to learn in this task?" Second, one student, Kit, talked about learning the importance of breaking content down and using smaller-stepped progressions. Third, the students described their concern that they did not know what to expect. Fourth, B.J. and Marty discussed problems they had transforming their knowledge "that" into knowledge "how."

Tasks Have Content: What Do I Want?/What Should I Look for?

The first example of the growth toward or need for a fine-grained, integrated, contextual way of knowing was when several students grew to understand that tasks have content. Tyler's story is told first followed by stories of B.J., Marty, and Robin.

Tyler. Tyler said:

I guess I've had a big eureka since then and it's like I

> figured out part of how to teach....I was just sitting there doing some homework out in the hall in Stillwell Building and Dr. Watson started talking to me about my lesson plan...and she said "don't you realize that for each of these tasks you've got to find something that you're working on in each one?" And I thought--a focal point--you know, my focus. And, that was it. I thought, that is the key right there. That's the thing that I've been missing....I need a focus for everything I do. (Tyler, interview)

In a flash of insight the sense Tyler made of a component of her knowledge was restructured and came together in a way that enabled her to recognize its importance. Tyler understood that tasks were more than activities to assign the children, but that within each task there was content she was trying to teach. She realized she needed to ask herself for each task: "at this moment what exact content do I want the children to learn? " Or, more simply, "what do I want?"

The question, "what do I want?" is closely connected both conceptually and in the experiences of Tyler and the other students to a second question, "what should I look for?"

> The key to me is to know exactly what the focus is at that moment in your teaching. And before...I was getting all jumbled up with everything....So that's what I'm working on now. It's like before the lesson begins I kind of have my focus for each task and I know what I'm looking for. (Tyler, interview)

Understanding what content you want the children to learn and what to look for was a "big eureka" for Tyler. It was as if she jumped over a barrier to understanding teaching. Where before she was getting "all jumbled up," her new understanding of content enabled her to get "into"

the act of teaching in a different, more confident way. It was a developmental milestone.

> It's just so weird that it made me excited about teaching. Before I was disgusted....I was into it today because I had my focus. I knew what I was looking for....I think I've changed my attitude....It all goes back to knowing what you're doing in the lesson. If you know what you're doing in the lesson and know what your focus is then you're more confident and that confidence shows in your enthusiasm and then, you know, it's reflected in how the kids act. (Tyler, interview)

Thus, Tyler's new understanding that tasks are not simply activities but have content was an important step in her learning-to-teach journey and a developmental milestone during the methods course.

The answers to the two connected questions: "what do I want?" and "what should I look for?" seem to be based on pedagogical content knowledge, that is, knowledge of content for teaching (L. S. Shulman 1986a, 1986b). To review, Shulman described pedagogical content knowledge as including

> the understanding of how particular topics, principles, strategies, and the like in specific subject areas are comprehended or typically misconstrued, are learned and likely to be forgotten, (L. S. Shulman, 1986a, p. 26)

and

> the ways of representing and formulating the subject that make it comprehensible to others. (L. S. Shulman, 1986b, p.9)

Using Shulman's definitions, pedagogical content knowledge in physical education means (a) understanding the ways children perform, become skillful in, and come to understand the concepts and meanings of movement in games, dance, and gymnastics, and (b) understanding specific ways to elicit

skill and help children acquire knowledge of specific movement situations. For example, pedagogical content knowledge of the forceful overarm throw would include knowing the mature and developmental movement patterns (cf. Roberton & Halverson, 1984; Wickstrom, 1983) and knowing ways to elicit more mature movement patterns of individual body components, e.g., humerus, trunk, etc.

As Tyler suggested, being able to answer the questions "what do I want?" and "what should I look for?" relies on the student's pedagogical content knowledge:

> You have to know your task. If you are looking at a vertical jump you have to know what you are working for....you need to know what's involved with a more mature vertical jump and what the [developmental] steps are. (Tyler, interview)

Strong pedagogical content knowledge has been positively linked to children's achievement and teachers' actions such as teachers being able to transform content and use alternative approaches. Weak pedagogical content knowledge has been linked to teachers having problems generating metaphors and helping children make connections from specific content to broader academic concepts (Feiman-Nemser & Buchman, 1987; Peterson et al., 1987; Roehler et al., 1987; Roth, 1987; Smith & Neale, 1987). It seems likely that strong pedagogical content knowledge of movement within games, dance, and gymnastics could give preservice teachers a fine-grained sense of what to teach and what to look for. Weak pedagogical content knowledge could leave them lost. On

leave them lost. On several occasions Tyler discussed the impact of weaker and stronger content knowledge on knowing what she wanted and what she should look for. For example, about a dance lesson she wrote:

> In terms of observation it was made obvious to me by viewing the dance lesson [on video tape] that I did not feel confident in my understanding of the material and thus, did not know what to observe for in the lesson. I had not realized the impact, for example, that the rhythm [the rhythm she used when she beat the tambourine] itself had on the behavior of the children and that the rhythm should have matched the verbal cues [when she told the children to jump, walk, run, and skip]. I did not know at the time that I should have been observing for variety in movement and consistency between that movement and the rhythm. By not understanding my focus within the lesson, I did not know how to observe. (Tyler, dialogue journal)

Tyler's weak pedagogical content knowledge undermined her teaching of the dance lesson. She did not know what she wanted or what to look for. In addition, her weak content knowledge affected her ability to give feedback and bring out skillful movement.

> Today with the dance lesson...maybe it's because I don't know the content well enough...that's why I was stuck--finished in ten minutes--because I couldn't bring it out. Therefore, I quit kind of thing. I couldn't see how going on and on (unless it's just practice [that] promotes development) [how] going on and on with that one thing would help....I feel you can't go on into more complex themes when they don't have quality of movement in the lower themes. So what do you do? Do you just let them go? Do you? I have a lot of trouble with feedback on that, you know....I think the feedback is my problem and knowing the material well enough to know how to get those behaviors that you want elicited. (Tyler, interview)

Tyler was in a bind. She did not know what she wanted, what to look for, or how to elicit quality, in part because she

did not know the content well enough. The results were predictable. She finished what was supposed to be 30 minutes of content in what seemed like 10 minutes, during which she said she had "displayed an unintentional sense of apathy or low energy level." She did not see the point of having the children just practice the same task over and over, yet she did not think she should go on to advanced themes when they did not have quality in the lower themes. What she did was a response that several students did or spoke of doing when they could not generate feedback appropriate for the children's responses--she repeated the task as feedback. The following is from her evaluation of the same lesson.

> Had I, however, written an additional objective it would have reflected a question of the relationship between my knowledge about physical education (and inherent subdisciplines) and my ability (or lack thereof) to extend, refine skills when teaching. It seems inadequate to simply suggest "using feedback with clarity" in an objective. More appropriate would be to define clarity from the beginning, such as, "to be able to use my current knowledge (i.e., biomechanics, themes and progression of, etc.) in order that I may give appropriate feedback which will produce some change in behavior, in time." From that perspective, my verbalization where the dancers were concerned was inadequate. I found myself repeating the task as "feedback." Therefore, the objective aimed at giving clear feedback falls short of that which is truly intended. I could easily repeat the task with clarity, but will I facilitate change? Unlikely. (Tyler, lesson evaluation)

Repeating the task as feedback is understandable. If a teacher has weak pedagogical content knowledge and thus does not know how children learn the content and how to elicit skillfulness with that content, there is little else

to do but "repeat the task as feedback" or move on to the next task after what seems like a reasonable amount of practice.

On reflecting on her lesson Tyler grew to a deeper understanding about the importance of content knowledge for teaching. It helped her know at a more detailed, concrete level what she wanted the children to learn, what she should look for, and what she could say to help the children become more skillful. This, in turn, influenced her teaching actions. Tyler contrasted her teaching of that dance lesson, a subject she knew little about, with a gymnastics lesson, a subject with which she was more comfortable.

> In contrast, relating my intentions through instruction and feedback within the context of the gymnastics lesson, was accomplished with an air of excitement. The source, obviously, of this vigor was the fact that I was much more comfortable with the content than with that of the other lesson. (Tyler, lesson evaluation)

B.J. Over the course of the semester B.J. also came to understand that tasks have a content focus and that it is important to know what exact content she wanted the children to learn and, in turn, what she should look for. Like Tyler, understanding what she wanted and what to look for seemed to be a developmental milestone as it indicated a clear, important change in her thinking and appeared to be linked to a change in her teaching actions. While an out-of-class discussion with the teacher educator probably triggered Tyler's new understanding, B.J. credited as the impetus

content knowledge gained when writing an observation plan. B.J. wrote:

> I felt much more aware of what I should be looking for. Including the observation plan along with the lesson plan was extremely helpful for me. Even if you write up your observational plan incorrectly, you still have to think about what you should be looking for, and how long to look for it. I found myself becoming more involved in analyzing what each student was doing. I noticed things that I'd never seen or given thought to before. I recognized the students who were unfamiliar with dribbling. I could see the ones who were uncomfortable; therefore, I could accommodate those individuals and make them feel at ease. (B. J., lesson evaluation)

While Tyler's new understanding seemed to be like jumping over a barrier which then allowed her to proceed on her pathway unencumbered, for B.J. the developmental milestone was more of a turning point.

> I can honestly say that my awareness of students' responses, individually and as a group, has increased tremendously. I don't quite understand why it, meaning the observational plan, brought about a drastic change in my mind during the lesson, but I'm glad it has. I can see which individuals are having trouble, and which ones need some special attention. (B. J. lesson evaluation)

The change in B.J.'s thinking felt "drastic." It was a change in direction, a reorganization of the way she saw the world of teaching. She now found greater meanings in what she observed and it looked like a new world.

Although unsure as to why the observation plan caused this change, B.J. thought the change resulted from putting her thoughts in writing.

> Once again the observation plan seemed to be extremely helpful. Even before we were using the observation plans, we knew what to look for, but now it seems to be stressed more. Maybe, in my own mind, I think it's more

> important because we're actually writing it in our plan. (B.J. lesson evaluation)

Planning for observation demanded that B.J. review the content and work with it in a detailed, fine-grained way. Her reaction to the observation plan is similar to the reaction of the preservice teachers interviewed by Grossman & Richert (1988). These teachers reported that in the process of planning lessons their knowledge of content grew. Planning for observation demanded that B.J. review the content and work with it in a detailed, fine-grained way.

There were other subtle differences between B.J. and Tyler. Before Tyler discovered the importance of knowing her content focus, she was, in her own words, disgusted with her teaching and felt that she unintentionally appeared apathetic. On the other hand, B.J. said her early lessons "went well." After her first lesson on dribbling with second graders, B.J. wrote, "all the student objectives were met." Her student objective for that lesson was to "demonstrate the dribble with the hands, feet, and hockey stick with control, use of space, and changing directions." She repeated the same lesson the following week with a class of third graders, but this time she knew her content better. She had completed an observation guide for the first time on the three forms of dribbling, and she had observed and reflected on the responses of the second graders the week before. The change in her understanding of what she saw was striking.

I noticed things that I'd never seen or given thought to

> before. I recognized the students who were unfamiliar with dribbling. I could see the ones who were uncomfortable, therefore I could accommodate those individuals and make them feel at ease. I did this by re-wording the same task to make it seem easier. Another thing I noticed, which I didn't last week, was that when using the hockey stick, most students push the yarn ball along with them instead of getting the "dribbling" effect. (B.J., lesson evaluation)

Suddenly she saw things she never saw before. Where previously everything "went well," now she could see that her skill development objectives were not being met. The observation plan forced her to think about the movement content and made her more consciously aware of observing when she taught. It makes sense that she thought her early lessons went well, because to her "unseeing" eyes they did. Ignorance was bliss.

For B.J. content knowledge was important in knowing what she wanted and what to look for. It was also important in generating feedback. B.J. described the children as being "unfamiliar with dribbling" and "uncomfortable." Her descriptions of the children's movement lacked specificity. Her solution, similar to Tyler's, was to "reword the same task to make it seem easier." She did not describe giving the children feedback on the quality of their movement patterns. Although B.J. knew what the mature pattern of the basketball dribble looked like she did not know how dribbling developed or how to elicit skillfulness in dribbling. She had strong content knowledge, i.e., knowledge of basketball and skilled dribbling, but weak pedagogical content

knowledge, i.e., knowledge of dribbling for teaching.

Hence, B.J. did not have a clear sense of qualitative changes to look for in the movement pattern of dribbling, and her descriptions of the children's movements reflect this weakness. She did not say in her lesson/observation plans, for example, to watch to see if the children pushed the ball nor did she write in her evaluation that the children's wrists stayed straight and that they slapped the ball. These pedagogical content concepts reflect knowledge of the development of dribbling (Wickstrom, 1983). As a skilled basketball player B.J. certainly knew the wrist pattern of a mature basketball dribble, and she recognized there was a discrepancy between the mature pattern and what she saw the children do, but her knowledge did not support a sophisticated range of teaching actions aimed at eliciting the development of a mature pattern.

Robin. Robin's reactions to the two questions: "what content do I want the children to learn?" and "what should I look for?" were in some ways similar to, yet in other ways different from Tyler and B.J.'s reactions. Like Tyler and B.J., Robin said the quality of her content knowledge affected her teaching. When she taught content for which her knowledge was strong, she felt more confident about teaching.

> I knew what I was after and you know if I didn't know what I wanted and I wasn't secure with maybe the skill that I was teaching, I'd be really panicked. But this stuff that I'm teaching I don't have any problem with. If I were teaching lacrosse or something it'd be something different. (Robin, interview)

> When I look back at gymnastics and compare it to now, now it's knowing what to do and just feeling confident about it. Before it was not knowing what they would look like....I think working with the content has helped. If I went back to gymnastics I think I'd be better at it and if we shifted to striking with the feet I'd be more confident now. I know a lot more now. I know more about what I can do. (Robin, conference with the teacher educator)

Robin linked content knowledge with confidence. The act of teaching, "working with the content," seemed to help her content knowledge grow. Her knowledge became more connected to how the children would look performing and what she could do as a teacher. Her knowledge thus became more context-specific and action-oriented.

Robin's reactions differed from Tyler's and B.J.'s in several ways. First, understanding the importance of knowing what she wanted and what to look for did not seem to be a developmental milestone for Robin within the time span of the methods course. Even though Robin's content knowledge of an early dance lesson was weak, it was evident from fieldnotes describing her teaching actions and from her written reflections on this lesson that she seemed to understand the importance of knowing what she wanted and knowing what to look for.

Robin also differed in her reactions to the observation plan. Although B.J. and others found the observation plan helpful, Robin thought it was a waste of time.

> I pretty much grasp what's going on. It's just the written stuff I've a problem with, this planning for observation with the lines and all this....[When you

> teach] you don't follow it. Basically, you've got something on your mind, what you're going to do, but you don't have that thing sitting in front of you to make sure you do it exactly.... To me this is just such a waste of time for me to sit there and plan for observing. (Robin, interview)

Thus, the observation plan was probably not a factor influencing Robin's developmental progress.

Marty. Marty also reacted to the questions, what do I want? and what should I look for? in ways that were similar to and different from other students. Like Tyler, B.J., and Robin her knowledge of content grew and she associated this growth with improvements in teaching abilities, in particular, her ability to observe movement. Like B.J., Marty began the field experiences either not seeing or not noting problems she had teaching and problems the children had learning. Her early lesson evaluations implied that her objectives were being met--a stance she gradually abandoned.

> My first student objectives were met. Most students were willing to share space with each other by willfully managing their body to avoid getting into the space of others. Some students had a little trouble traveling into open space. They wanted to group together in the center of our work area....These students were willing to seek a variety of solutions to each task. Some students copied each other. Some students had trouble deciding which body parts to travel throughout the gym on....I constantly reminded my students to think about safety and landing softly while they worked. I told them to think about balancing on different body parts before and during activity. (Marty, lesson evaluation)

> My teacher objectives were met....I gave specific cues to these students that improved their performance. I gave feedback when needed. I gave clear and precise directions. (Marty, lesson evaluation)

With the exception of repeating the above ideas, Marty did

not make any other comments about the children's movements in the remainder of the evaluation.

After viewing and discussing the video tape of this lesson with the teacher educator, Marty wrote another evaluation of what happened. Whereas her original evaluation suggested a successful lesson, she now noted problems.

> I lacked quality in this lesson. I did not know what I wanted to see or look at specifically. I had trouble getting students to use all the 5 different kinds of jumps. I should have told them to use 1 jump at a time and then watched them and see if they used it. I wanted them to jump for height but I didn't tell them to. These students were hopping and skipping and running instead of jumping. (Marty, dialogue journal)

As the semester progressed she wrote more and more detailed descriptions about the children's movement patterns and the "troubles" the children were having with specific movement content. She gave more possible interpretations of what she was seeing. She saw that her objectives were not being met and how the children's responses fell short. The significance of knowing what to look for was put in a positive light.

> My observation is getting better. I'm more comfortable with my observation ability now. One reason is that I now know exactly what I'm looking for (my major emphasis are clear in my mind). (Marty, dialogue journal)

> When partners were close together, hits went up and back to partners without a bounce, their knees were bent and they were hitting the ball from underneath. Sometimes these students would hit over their partner's head. I do not think this was done on purpose. I think they did not realize the amount of force they were applying to the ball. Sometimes the toss was too low or straight at

> the striker. I wanted the striker to move up or back to strike the ball but this did not work very well. When this happened, I stopped all my students and demonstrated what I wanted and then let them try it again. (Marty, lesson evaluation)

Throughout the semester Marty seemed to become increasingly aware of the problems that the children were having learning the content. Like B.J., Marty's knowledge about specific content she wanted the children to learn and her ability to see children's movement grew. This growth was not, however, the positive turning point B.J. said she had. Marty felt frustrated. Throughout most of the semester the questions, "what do I want?" and "what should I look for?" plagued her because she thought she did not know the answers.

> I don't know what to say in my evaluation because I don't really know what I'm looking for. I mean I see things, I don't know if that's exactly what I'm looking for, so I'm still kind of lost like that--I don't know exactly what I want I guess. I still have that problem with figuring out what it is, what I actually want....
>
> I was trying to walk around and make sure everyone's working and doing it right, what I was wanting. I mean it's hard when you don't exactly know what you're looking for. I mean I got part of an idea. I really don't know what's she's talking about, all the steps and stuff like that. I don't really know one right after the other what I'm actually looking for. (Marty, interview)

Thus, the meanings Marty ascribed to her understanding of the importance of knowing what you wanted and what to look for were different from the meanings of Tyler, B.J., and Robin. For Marty, the meanings were hooked into frustration.

Breaking Down the Content

The second example of the first major theme--the growth

toward or need for a fine-grained, integrated, contextual way of knowing--was when Kit came to realize the value of breaking content down. It seemed to me Kit's new understanding resulted in a big change in her teaching actions--a change that appeared to be a developmental milestone.

When observing Kit I noticed there was a distinct difference in her teaching actions. Fieldnotes described her newly evident enthusiasm, an increased energy level, and a faster pace. The next day, in her second interview, I started by asking her what she had learned recently about teaching.

> Kit: Just breaking skills down more. I had a hard time--I always started with something too hard and then it would fall apart. Now I've got more of an idea, more sequence, starting out small and gradually building to more complex. That's worked out.
>
> Inez: You had a good idea. You did that in class the other day.
>
> Kit: I had a great lesson! Nobody was watching me and I had a perfect lesson....I enjoyed it, I got totally engrossed, I forgot about everybody and everything....It was really different this time from all the rest. Before I really felt nervous and I worried about what I was going to say next....I was worried about the people watching me--if I looked crazy in front of them. This time I didn't worry about anything.
>
> Inez: So it seems like a real big hurdle, you've gone over a hurdle and you're not as nervous as you were or as worried as you were...
>
> Kit: Yeah. Yeah.

It was gaining greater understanding about progression

and how to break down and sequence the content as well as overcoming nervousness that seemed to bring about a change in Kit's teaching.

> I think with the games...it's just back to the progression. I can piece things together better...starting out simple. I can see what outcome I want and what sort of things I want to do. Before I would just be here and there and everywhere. (Kit, interview)

The importance of putting tasks in a logical progression had been discussed early in the course and Kit was able to do this. What she did now was more fine-grained. She examined the movement demands of her tasks and then broke down the content in the tasks so the children could work on smaller segments of the movement and progress by more gradual steps. When later asked to reflect back on the first teaching block when she taught gymnastics and to say how she now would teach rolling, she applied to rolling what she learned about progression with games content.

> I would just start with rocking to get the round shape in the tuck. They had a hard time. Now, if I knew what I do now about breaking things down better I would have done rocking before I did rolling and it would have gone a whole lot better because they lost it. In the middle their bodies would straighten out instead of being [demonstrates a tucked body shape]. So they would roll after that; they were picking themselves up instead of rolling. (Kit, interview)

There is little research suggesting the best progressions to use. Thus, most teaching decisions about progression need to be based on logic, common sense, and evaluating what is and is not working with the children. Kit saw when her progressions fell apart and she saw when they

worked well. She learned to develop smaller-stepped progressions and this technique made a difference in her teaching and was a developmental milestone in learning to teach.

Although Kit and I seem to portray this milestone as if it were quickly realized, the time for fruition was quite long. The beginning of this knowledge growth seemed to have occurred when Kit and the teacher educator met to view and discuss the video tape of Kit's second lesson of the semester. Together they uncovered that Kit had not taught the children about the transition between a jump and a roll and was presenting the content too quickly. They then discussed how to break down a lesson objective using as an example the ways to teach the transition between jump and roll. The following is the final part of this discussion.

> Dr. Watson: You give the outcome, this is the idea of the objective, then you break it down from here.
>
> Kit: It just hit me. When you put 1.2, 1.3, 1.4 on the tasks in the book, what you are doing is breaking down the task. That's what it is.
>
> Dr. Watson: [Referring to Kit's model of teaching.] When you look at the tape pull this out. Where on here have we been just talking?
>
> Kit: Allow for modification [referring to a section on her model]. If something's not going well, break it down and make it simpler until they catch on with it and then go on....I didn't understand about the different parts until you broke it down today. It will make it simpler and you will get more quality in the end.

The big change in Kit's teaching did not occur until seven

weeks and five field experience lessons after this discussion. It seemed it took a long time for her knowledge to germinate and appear in her teaching actions.

I Don't Know What to Expect

"I don't know what to expect" was a theme of discussions and interviews early in the semester. It was a concern raised by all seven students.

> You don't know what they can do. I've never watched them so I don't know what they can do and how far they can take it. (Kit, interview)

> I have a lot of questions just about kids in general. Like today, before class, I was asking Dr. Watson a couple questions like, "how do you think they'll do this," and she said, "well try it and see." I mean I would rather know before. I would like to know what to expect. I guess it's just experience, but you can't really learn experience. (B.J., interview)

Knowing what to expect means having a good sense of how children respond. It means imagining with fairly good accuracy how the particular children you will be teaching will respond specifically to the tasks planned. Knowing what to expect relies on strong pedagogical content knowledge and is part of the knowledge used to answer the questions, "what do I want?" and "what should I look for?" Having a sense of how children of different ages and abilities will respond helps teachers know what they can reasonably want and what they should most likely look for.

It is not surprising that preservice teachers voiced this concern. Experienced teachers have seen years of children moving and have orchestrated the interaction of

children with content many times. A rich sense of what to expect guides their planning and teaching. Preservice teachers' lack of experience both with children and content leaves them with a thin pedagogical content knowledge base on which to build their lessons. In the following quotes B.J. and Robin described situations in which knowing what to expect played a role in their teaching. In the first quote Robin felt writing what she wanted the children to do was not enough; she needed to see real (as opposed to imagined) children respond to her tasks. She did not know what to expect. In the second quote B.J. realized what she had expected was inaccurate.

> Were they getting at what I wanted and what was it that I wanted? I mean I had it laid out on paper, but I'd never seen it before. (Robin, interview)

> As far as the lesson purpose and objectives, I now see that I could have pushed them further and expected more from them. My planning underestimated their abilities and overestimated their attention span and concentration levels. (B.J., lesson evaluation)

The preservice teachers had already completed a field-based elementary content course so they had previous experience working with children. One possible reason they still felt they did not know what to expect was that their previous experience was mostly from what Yinger (1987) called an "outsiders'" perspective. They were now trying to make sense of how to teach and how children learn as "insiders." They had responsibility for planning and teaching the lessons

and although they may have observed children performing the same or similar content, the context for knowing had changed. Now they were in charge and that meant coming to know from an insider's viewpoint. Another reason may be that they had not seen children of this age perform this particular content. The depth and range of their pedagogical content knowledge were most likely weak. They had few instances of seeing, children perform the content from which to draw a picture of what to expect.

After working with the content and children, the preservice teachers gained a better sense of what to expect. Their knowledge became more practical, i.e., linked to the actions of teaching and children. It left them feeling "more comfortable" (Marty) "more confident" (Robin), and "prepared" (B.J.).

> Another thing that helped me with this lesson is that I taught the same lesson last week. I knew what to expect, more or less, and I was prepared to deal with almost anything that came up. (B.J., lesson evaluation)

I did not hear concern about knowing what to expect in the second part of the semester.

The Gap Between Knowing "That" and Knowing "How"

B.J. A theme of interviews, journals, and lesson evaluations that to me was most characteristic of B.J.'s efforts to become a teacher was her concern about her ability to express her knowledge and feelings in the act of teaching. She understood what she had to do, but did not put her understanding in action. She thought about it, but did not

say it. She knew but did not act. At times she seemed immobilized. She had knowledge "that," but not knowledge "how."

> I can follow [Dr. Watson], I just can't think quickly enough. I know what I have to work on but week to week I'm not doing it. Dr. Watson keeps telling me what I have to work on with my teaching, like she did today. And I know it; I put it in my lesson plan as one of my objectives, but I never get to it. (B.J., interview)

B.J. steadfastly worked on her problem. She listened to the teacher educator's suggestions and wrote these suggestions as teacher objectives in her lesson plans. She prepared lesson plans and reviewed her plans before teaching in a way she thought would help. Her problem remained unsolved.

> As for the teacher-focused objectives, I felt like I fell apart and different points kept entering my mind but I never acted on those particular thoughts. I thought I was prepared for the lesson, but I left out so much information I wanted to emphasize....I really need help on thinking quickly, on the spot. I don't think clearly when I'm out with the students. (B.J., lesson evaluation)

Overcoming her difficulty expressing her knowledge and feelings was important to B.J. and was a goal she set for the semester. She isolated two aspects to conquer. First, she aimed to increase her level of energy--she appeared unenthusiastic and uninvolved. B.J.'s concern was compounded because she also recognized how her actions influenced the children's.

> After reviewing my tape, I have found several areas needing improvement. There are two particular areas which I am really going to concentrate on for the rest of this semester. I could make a much longer list, but I'm trying to be realistic and I view these two aspects

> of teaching very high on the "effective" teacher list. (B.J., dialogue journal)

> To start, I need to teach with a higher energy level. My lack of energy is expressed and affects the students in a negative way. This is the most probable reason for the sluggish movement of my students. One thing I can say is that my lack of energy is not due to a lack of interest. I would tie it to a lack of confidence. I have been working on this and I feel more confident than previously. Hopefully and undoubtedly the energy level will increase along with the confidence. (B.J., dialogue journal)

The second task she set was to improve her ability to communicate verbally. She was often tongue-tied.

> The second area I need work on deals with communication. I feel much more comfortable than last Spring, but I still need some improvement. I'm finding myself at a loss for words, or repeating the same lines over and over. I've been trying to write exactly what I want to say in my lesson plans, and this has helped. (B.J., dialogue journal)

Thus, one reason B.J. thought she had problems expressing knowledge and feelings was a lack of confidence. She also offered a second possible contributing factor, i.e., the form of knowledge. When B.J. first learned about the content she was teaching or when she initially learned teaching skills such as analyzing movement, the form of this knowledge was different from the form used in the act of teaching. Knowing "that" was one thing, knowing "how" was a different ball game. B.J. said:

> Just because you know the content when you get out of [the elementary physical education content course] it doesn't mean you can teach it. I mean knowing it and putting it on paper, that's great. I mean that's probably the best start to have. But then, once you get out and actually try to apply it, it's almost like two different things. (B.J., interview)

Part of the content problem was the need to translate the terminology into language appropriate for children.

> It's real hard for me to communicate at [the children's] level when--I mean in Dr. Watson's class you take her midterm or final and she was always saying, "use the right terminology" and you get out there and you can't use that with these kids. (B.J., interview)

B.J. noted a similar problem with analyzing movement. She had first learned to analyze children's movement by watching slow motion video tapes. This type of analysis was far different than the full-speed, instant analyses demanded on the gym floor.

> B.J.: I really find myself just watching one student and really looking at what that person is doing and I block out what I'm doing, where I'm standing. I mean I have my back turned to the rest of the class which is terrible, but I find myself doing that a lot.
>
> Inez: Any idea why you do that?
>
> B.J.: I think especially with the jumping (because in [the elementary content course] we looked at that on the tapes and you look at that in slow motion and you're told what to watch) [when] someone's jumping you can't just glance and skim over it and say that was a good jump when you really did not analyze it. We spent hours looking at the tapes and just watching everything and for forward roll it's the same thing. But still, I still shouldn't concentrate on that one person. I know now, but I still do it. Laughs. (B.J., interview)

Thus, for both teaching skills and content knowledge B.J. had to translate her knowledge from one form to another, from theoretical to practical, from technical vocabulary to vocabulary at the children's level, and from slow-motion, one-person-at-a-time, instant-replay movement observation to

the fleeting, six-children-at-once movement observation she was faced with in field experiences. Teaching meant she had to know content and teaching in deeper, more flexible, context-embedded ways.

Marty. Like B.J. and several other students, Marty was concerned with her ability to express her knowledge. She said, "I don't know why I didn't say it. I guess it; I mean it was here [points to head]; it just didn't come out." Marty also found it difficult to translate knowledge from one form to another, both from thought to written and from movement to verbal. For example, Marty was discussing a lesson she taught and although she could not verbally describe the children's movement patterns without considerable probing and prompting from me, she did imitate the children's movement.

One reason Marty said she had problems expressing knowledge was that there was so much going on, so much to see and do that she simply could not respond.

> When I'm teaching I've got so many things up here in my mind going on that I know I want to do and that I probably should be saying....And I might forget it. And I might never mention what I really want. It's like that first lesson in gymnastics I taught. I mean Dr. Watson kept harping, "well, you don't have a whole lot of quality in this lesson." I was like, "well, if you look at my lesson plan I've got a whole lot of quality but I just didn't say everything that I wanted to say." And I knew after I looked at my lesson...on the video tape that there were a lot of things that I didn't say to the class when I was teaching but they were up here [in my head], but I didn't get them out. They were down on that paper but I just couldn't think of everything because everything else was happening. (Marty, interview)

CHAPTER VI

THE GROWTH TOWARD A FINE-GRAINED, INTEGRATED, CONTEXTUAL WAY OF KNOWING: DISCUSSION

At the center of the stories told in Chapter V was knowledge growth. This growth seemed to have two main characteristics. First, it became more detailed, fine-grained, and differentiated. For example, Kit's knowledge of rolling and striking became more "fine-grained" when she realized she needed to break the content down. Tyler's knowledge of tasks became more "detailed" when she recognized that there was a content focus in each task. B.J. and Marty's ability to observe, based on their content knowledge, became more "differentiated" when they said they were better able to see individuals within the group and recognize the details of the movement.

Second, the preservice teachers' knowledge became more contextual, i.e., connected to practice and action-oriented, and, therefore, more of an integration of knowledge of content, learning, development, and teaching. For example, when Tyler, B.J., and Marty realized they needed to know their content focus within their tasks, their knowledge of tasks became more linked to helping children learn. When they learned they needed to know what to look for, their

knowledge became more connected to eliciting skillfulness. When the preservice teachers were concerned because they did not know what to expect, they were calling for a more concrete and practical way of knowing. When Robin became more confident because she had "worked with the content," and therefore knew what the children's movement would look like and what she could do as a teacher, her knowledge had grown to be more action-oriented. When Kit realized she needed to break content down, her knowledge of progression became more oriented to the responses of the children in her classes. When Tyler revised her teacher objectives from "using feedback with clarity" to using "my current knowledge (i.e., biomechanics, themes, and progression of, etc.) in order that I may give appropriate feedback which will produce some change in behavior, in time," she had built stronger bonds among her knowledge of content, teaching, and learning.

Over the semester the preservice teachers' knowledge seemed to acquire more of the characteristics of practical knowledge; that is, it became linked to specific situations and practically oriented. In addition, their knowledge grew out of practice and shaped practice (Clandinin, 1986; Elbaz, 1983). The preservice teachers planned lessons based on their current knowledge, observed and reflected on what happened, and based on new understandings planned future lessons.

Similarly, the preservice teachers' knowledge was

growing in the direction predicted by research on the differences between novices and experts (Berliner, 1987; Calderhead, 1983; Clark & Peterson, 1986; Glaser, 1985, 1986, 1987; Housner & Griffey, 1985; Leinhardt & Smith, 1985). Their knowledge was becoming deeper, more connected, more fine-tuned, more important to practice, and more connected to specific outcomes. As Yinger (1987) suggested, learning by doing allowed the students to "see the big picture" (p. 306) and acquire more holistic, expert-like knowledge structures. Knowledge was experienced, felt in context, evaluated from within the situation, and refined in relation to what was planned to and did occur. Their knowledge became more context-embedded.

The preservice teachers linked the growth of pedagogical content knowledge to an increased ability to observe, analyze movement, give feedback, and elicit skillfulness. Stronger pedagogical content knowledge gave them a sense of direction--they knew in greater detail where to aim their teaching actions and they reported feeling "confident," "excited," "totally engrossed," enjoyment," and having "vigor." When their pedagogical content knowledge was weaker they seemed to lack a clear focus for their teaching actions; they were "here, there, and everywhere," they "did not know how to observe," and they spoke of problems generating feedback. They said they felt "disgusted," "panicked," "lost," "nervous," worried," and had "a low

energy level." Similar to the preservice and inservice teachers in the research reviewed earlier (Carlson, 1987; Gudmundsdottir, 1987a; Roehler et al., 1987; Roth, 1987; Smith & Neale, 1987; Wilson & Wineberg, 1988), the preservice teachers in this study found that strong pedagogical content knowledge enabled their teaching while weaker knowledge was limiting.

The development of pedagogical content knowledge was so important to some students that it seemed to take on the status of developmental milestones. The students spoke about these milestones as important changes in their thinking and teaching actions that enabled them to better manage their environment. For example, the recognition that tasks have a content focus was a developmental milestone for B.J. and Tyler. Kit's new understanding of progression and breaking content down is another example.

Thus, the preservice teachers' knowledge grew. They began to make sense of content, children, and teaching in more integrated, fine-grained ways. Their knowledge became more concrete and oriented toward practice. They relied on and began to value the connections they build among knowledge of content, children, and pedagogy within the school context. Like the preservice teachers interviewed and observed by Grossman and Richert (1988) and Gudmundsdottir (1987a), their knowledge was transformed into stronger, more usable forms for teaching.

Another transformation that was important for some of the preservice teachers was the change in the form of knowledge from knowing "that" into knowing "how." The literature reviewed earlier suggested this transformation is difficult, at best, and occurs with much less frequency than is desired (Calderhead & Miller, 1986; Feiman-Nemser & Buchman, 1987; Feiman-Nemser et al., 1986; Grossman & Richert, 1988; Russell, 1986). Even in programs where the aim of both faculty and students is the use of theoretical knowledge, in practice the transformation is difficult (Feiman-Nemser et al., 1986). The results of this study bear witness to this problem.

Several students spoke about the problems they experienced transforming their knowledge "that" into knowledge "how."

> Just because you know the content...it doesn't mean you can teach it....Knowing it and putting it on paper, that's great....But then, once you get out and actually try to apply it, it's almost like two different things. (B.J., interview)

They thought it, but did not say it, and wrote it, but did not do it. They knew but could not express their knowledge readily in action.

It appeared that many conditions existed in this setting that would seem to support the transformation of knowledge "that" into knowledge "how." For example, a primary learning experience for the students was practice teaching. Course activities centered on knowing "how"--deciding what was going

to be taught, teaching it, and then reflecting on what happened. The preservice teachers learned by doing as "insiders," therefore having opportunities to "see the big picture" and learn to do "the right thing at the right time" (Yinger, 1987). The preservice teachers were not sent out to the field unguided by a teacher educator. Through field experiences, dialogue journals, lesson plans and evaluations, conferences, examinations, and class discussions, the teacher educator read, heard, and saw the sense the students made of teaching. She evaluated and guided student interpretations and know-how.

Another important condition that would be expected to support the transformation from knowledge "that" to knowledge "how" was that often the students were trying to meet their own goals or learn a technique or concept that they found to be meaningful and important. Tyler wanted to individualize instruction, Kit wanted to use a better progression, B.J. wanted to "teach at a higher energy level" and say to the children what she wanted to say. Robin wanted to give quality feedback. In many cases they eventually succeeded but success took time. There was a gap between knowing and expressing this knowledge in practice. As B.J. pointed out, observing movement in slow motion on video tape was not the same as live action, knowing it on paper was one thing, speaking it aloud was different.

Thus despite supportive conditions, it took time to

build a bridge over the gap between knowing "that" and knowing "how." Although their knowledge was becoming contextual, integrated, fine-grained, and oriented toward practice, the journey toward expertise was just beginning and their knowledge still had the characteristics of novices. As Glaser (1985, 1986, 1987) suggested, novices lack the amount and strength of the connections among knowledge structures that give them ready access, ease of use, flexibility, and connections to practice.

CHAPTER VII

KNOWLEDGE RESTRUCTURING: THE DATA

The second of three major themes derived from the data was knowledge restructuring. Knowledge restructuring is a clear change in perspective and a reorganization of the sense made of one aspect of teaching (Anderson, 1977; Rumelhart & Norman, 1978; Strike & Posner, 1985; Vosniadou & Brewer, 1987). In each case of restructuring the preservice teachers grew to see part of the world of teaching from a different point of view. These knowledge changes moved in a developmental direction toward increased differentiation and integration (Kegan, 1982; Werner, 1957). Four examples are given. Six students discussed a change from going through the motions to going after learning. All seven students discussed learning that the children were eager, trying, and wanted to learn. Several students gained awareness of the interactive nature of teaching. One student learned to evaluate her directions based on the children's understanding rather than her teacher behavior.

The Change from Going Through the Motions to Going After Learning: The Light Went on for Me on Wednesday

The first example of knowledge restructuring was a change from going through the motions to going after learning discussed by six of the seven students. This knowledge

change was, to me, one of the most critical of the methods class because it brought the students closer to what Feiman-Nemser et al. (1986) called one of the central tasks of teaching--helping children learn. The description of this change is introduced through the voice of Tyler.

Tyler said:

> The light went on for me on Wednesday. I realized I had just been going through the motions and that [from now on] no matter what, I was going to persist and go after what I wanted--and I did (Tyler, interview).

In a flash of understanding Tyler's view of teaching was restructured and her new understanding was subsequently a street light to guide teaching actions. Tyler learned that telling the children the task to do was not enough, telling tasks was not teaching--it was just going through the motions of teaching. Teaching meant she had to actively go after the response she wanted from the children.

> What I've learned more than anything, and I never learned that in [my secondary methods class last semester], it's, I would just get out there, just like I did in the beginning of this class, and do every task [hits the table several times in an even rhythm] bam, bam, bam, bam. And if I got through the task, it was more of a matter of pleasure principle kind of thing. You know it was just a matter of getting through it and making myself feel better but not necessarily making myself a better teacher. You know it's over with kind of thing. (Tyler, interview)

This was an important insight for Tyler as it enabled both her education as a teacher and her teaching. Before this insight she seemed to have a sense of detachment from what was most certainly one of the goals of field

experiences, i.e., learning to teach. Tyler's desire to get through it overpowered her interest in becoming a better teacher. In addition, running through her tasks without going after what she wanted kept her detached from the teaching environment. Before this insight she viewed teaching as more of a one-way street running from teacher to child. Letting go of a tight, predetermined lesson plan and becoming actively involved in the course of what was happening. She no longer kept her distance.

One factor contributing to Tyler's early detachment from the teaching process was nervousness, mostly being nervous about being watched. She found field experiences a nerve-racking ordeal. Several other students also reported being nervous, so nervous, in fact, that other thoughts were blocked from their minds. Tyler set a goal to overcome her anxiety by the end of the semester.

> [I'm working to] not let the anxiety of the lesson overwhelm me like it used to. And it still does a little because everything gets real rushy and that kind of thing....[I'd like to work on] getting over that infamous thing that I have wrong with me and that is fear of people watching me when I'm--you know I've got to get over that this semester because next semester is it [student teaching]....I can remember back [to]...the very first time I ever worked with kids in a physical education context....It was just a taste. You go out to Willa Player Elementary School and I was a basket case. It was a blur. All I can remember is just faces from that. I was very nervous and I was actually angry that I had to do it, if that makes sense to you. (Tyler, interview)

Having to deal with her considerable nervousness took time and thought. Thus Tyler had limited cognitive resources

to focus on the tasks at hand--learning to teach and helping the children learn. Under the watchful eyes of her peers, a teacher educator, and a researcher, worrying about her self-concept was understandably more important. Developing confidence, feeling more comfortable in the role of a teacher, and the dissipation of nervousness went hand-in-hand with the development of Tyler's knowledge.

For Tyler the path of knowledge development went from going through the motions to going after learning. Six of the seven students discussed following this same developmental pathway. They talked about initially going through the motions and feeling detached from the teaching or learning process.

> [Dr. Watson] would say, "well, what did they do?" I'm like, "I don't know." Laughs. You know they did what I asked them to. They didn't give me any trouble and I lasted and I lived through it and at first that was the only thing I thought of. It was like getting through it. And it made me happy. (Frazier, interview)

Frazier spoke of living through it. Others spoke of "just getting by" "just standing there," "letting problems [with skill development] go by," "letting it slide because I wanted to get this over with." Several discussed or were observed presenting a task and then marching onward to the next task after a few cursory comments to individual children. There was little or no reaction to either the quality of the children's responses or the effectiveness of the task itself toward meeting the objectives of the lesson. They went on before they got what they wanted. Like Tyler,

other preservice teachers contrasted these initial feelings and actions with later feelings of being "involved," "into it," "excited," and "engrossed." Instead of going through the motions they became active participants in the teaching/learning process. From their initial role as metronomes they became choirmasters.

Going after learning seemed to have two levels. The first level meant getting the children to do what you said. In other words: if you say it, get it. Students associated two teaching actions with this level. The first was being able to stop the class and make the children do what you said. The teacher educator had each of the preservice teachers practice this skill while teaching the entire class of children. For Marty it was a noteworthy developmental task.

> Marty: If I hadn't said "no pushing no running no talking," they would have done it all I'm sure. And even though I said it, they still did it. Then I stopped them and made sure that they got down that direction. I was trying to get them to follow directions.
>
> Inez: So you learned that, to get them to follow directions.
>
> Marty: And if they don't follow them, stop them, make them do it until they do it. Make them stop, and continue to work and if they don't do it, stop them again. (Marty, interview)

A second teaching action associated with going after learning was being able to sound as though you meant what you said. Frazier, who did not have this problem, summed up the

actions of those who did:

> I watched people walk around and teach their lessons. They were very sheepish which was normal because they might be shy and not have as much bravado as maybe some of us do, or [they were] uncertain of what they're doing. They just don't seem to say things like they mean them, like "I want you to try to do this!" [said loud with emphasis]. It's more like "well I'd like you to try to do this" [said softly with some uncertainty]. (Frazier, interview)

For some preservice teachers the first level of going after learning meant having command in your voice. It meant getting the children to do what you said. It meant being actively in charge of the class. The second level went deeper; it reached down to learning. It meant expecting and helping the children to work on improving performance and learning as much as they could. Frazier summed up the two levels:

> The first thing that I'd look for would be, are they actually doing what I've asked them to do. And then once I'm convinced that that's happening, I'd say, are they trying to do anything different....really working at trying to maybe change something?

Or more simply:

> "Ok, now that they're busy, what actually are they doing?" (Frazier, interview)

Although six students discussed a change from going through the motions to going after learning, the meanings they found in this change differed. B.J. said:

> In the past I would give the students a task, observe them, and then go on to the next task. Now, I'm giving a task, observing the students' responses individually, and if it's not what I'm after, I re-state, refine, or simplify the task. (B.J., dialogue journal)

B.J. attributed two possible reasons to going on before she

got what she wanted. The first was her fear that the children were bored or frustrated.

> I had a problem trying to get what I was after. I didn't elicit the movement(s) I actually wanted to see. I didn't have enough patience or tolerance to drag the task out. I should have stuck with it until I got what I wanted. I was afraid that some were frustrated because they couldn't perform the task, while some were bored because the task was too simple for them. (B.J., lesson evaluation)

B.J.'s use of the word "tolerance" and the phrase "drag the task out" portrays going after learning in a negative way. Her commitment to her new understanding of teaching seems to be on tenuous ground.

A second reason B.J. marched through her tasks was that she initially thought she was supposed to follow her lesson plan exactly--no deviations allowed.

> I didn't realize until our third or fourth week at Onondaga Lake Elementary School this semester, that it's OK to assign tasks even if they're not planned for, or to skip tasks which aren't appropriate as the lesson progresses, or to only get through half of what you planned for. I think this is why I've been so tense when I teach; because I'm too worried about following my lesson plan! (B.J., dialogue journal)

Being able to modify a lesson plan in action seems to be an important teaching skill. Learning is not so predictable that a teacher can plan a lesson that will guarantee that all the children will learn all that was planned. A lesson plan is a best guess as to a way to get what the teacher wants. The more expert a teacher the better the guess. Preservice teachers with weak pedagogical content knowledge would probably be less able to predict how much content the

children could learn and more likely to plan tasks that would not work. Being able to modify their plan in action could be a helpful teaching skill, yet B.J. thought changing her plan was not "OK." The importance of careful planning was an emphasis of the methods course and B.J., being a diligent student, did what she thought she was supposed to do. She stuck to her plan and in the process did not respond appropriately to problems the children were having. She covered rather than taught the content and did not move to interactive teaching.

A third student whose teaching actions changed when she learned teaching meant going after learning was Marty. Like B.J. and several other students, Marty, at first, thought the children were bored and moved quickly through her tasks sometimes running out of tasks to do. One Wednesday I noticed a difference in Marty's teaching. She seemed more confident, more in command. She was going after learning. Marty and I discussed the lesson. When I asked her what she associated with the change in her teaching she said:

> Well I actually knew what I was looking for, or what I wanted and then what I was looking for. And if I didn't get it then I more or less stopped them and tried to get it. So I just kept holding onto the same thing. (Marty, interview)

Marty felt her teaching was better. Her knowledge of content and her teaching seemed to consolidate and she held on to the quality she wanted. Her lesson evaluation also reflected this change.

> At first, the students did not have an "alert" body position. They did not move to get under the ball, they were not in a ready position. They were standing flat-footed and not on their toes. Their knees were straight and they were not ready to move to the right or left to strike a ball. They just stood still. If the ball was not tossed straight to them, then they did not hit it, so I stopped everybody, then I demonstrated the "alert" ready position and we all worked on this task without the ball for a while. Finally, all these students were using the ready position that I wanted. (Marty, lesson evaluation)

Marty's descriptions of the children's movements in this evaluation are to the point and much more detailed than her earlier ones. She knew the content better. This may be because she saw the children doing the same movement the previous week. In addition, during an interview held the night before she taught, she and I probed the specific body positions she wanted to see in the ready position. When she taught her lesson a change was apparent. Thus, it seemed that clear, detailed content knowledge was instrumental in helping Marty go after learning.

The importance of content knowledge was a strong thread running through many of Marty's issues and insights. Throughout the semester she consistently attributed positive changes in her teaching to improvements in her content knowledge. Likewise, problems she had teaching were traced to weak content knowledge. For example, as discussed in Chapter V, Marty spoke several times about not knowing what she wanted and what to look for. She said it was hard making the children do what she wanted when she did not know exactly

what this was herself. At these times she seemed directionless in her lesson. Knowing exactly how you want the children to perform guides teaching. If the task you are using or the feedback you are giving is not working then you change the task or feedback and direct your actions to get the children's responses closer to the goal. Going after learning requires content knowledge.

Robin was the one student who did not discuss a change from going through the motions to going after learning occurring some time during the semester. She never spoke to me about going through the motions, and field notes contained evidence that she was going after what she wanted in the very early field experiences.

Robin's story illustrated individual differences. Her story was illustrative not simply because she was the one out of seven, but also, and more so, because of the different meaning she made of going after learning. Unlike other students who found satisfaction in this understanding, Robin found it frustrating. First, she was frustrated because going after learning was only one of the many things she needed to manage when teaching in field experiences.

> Robin: You think about safety...organization. You think about which task you're supposed to do next. You think about how you're going to give this child feedback, how you're going to scan over everybody....How you can challenge each individual, how you can help their individual needs, how you can keep them motivated, on task, self-directed....[And asking:] "were they getting at what I wanted?" and "what was it that I wanted?" I mean I had it laid out on paper, but I'd never seen

> it before. And, I'm trying to see it and I'm trying to deal with the tambourine at the same time and spacing and keeping them attentive to me and not everybody else, wondering, "am I doing this right?" And everybody else is looking, I mean I sweat, panic sweat for the first five minutes because we were trying to travel and they weren't actually traveling. They kind of kept looking at other groups....I was like you shouldn't have sweated that. You should have expected that these kids were going to look around and were going to hear other tambourines and be wondering what everybody else was doing. And you know you've got Dr. Watson sitting there, right there. I mean I knew she was there watching me. And as much as I want her to, it's still--I was panic stricken....
>
> Inez: When you feel yourself panic, what do you remember feeling or thinking about. What's going through your mind?
>
> Robin: Rush. I was just like quick, do something--make them. You know I think I said this, I think I said to them, you guys are making me crazy here. You're not doing what I'm asking you. Please. Pleeease. It was just a sense of heat. (Robin, interview)

Going after learning in the midst of everything else that was happening was difficult.

Second, Robin was frustrated when she was not able to analyze skillfully the children's movement and respond appropriately. Analyzing and responding to children's responses is at the heart of going after learning. It is an on-the-feet skill requiring quick thinking and a will to act. Robin said she needed to work on "the ability to see what's not working and figure out what it is you need to do to make it work." This ability was important to Robin and she was frustrated when she was not skillful on command. She spoke of being "scared" that she would react by "standing there not knowing what to say or do" and of feeling "trapped" when the

only feedback she could think of was to say indiscriminately "that's a good one, that's a good one, that's a good one." Although Robin felt the importance of going after learning, she was frustrated because she lacked the ability to do all that she wanted all of the time. Understanding was one thing; doing it and doing it consistently was another.

The gap between knowing "that" and knowing "how." Robin keenly felt the gap between knowing that she should go after learning and knowing how to do it consistently. The same held true for the other students.

The most telling example of how difficult it was to consistently go after learning was when the preservice teachers first taught the entire class of children. The change in the number of children was dramatic and going after learning was put on the back burner. The teacher educator asked the students if they wanted to have the chance to teach all of the children at once. Robin summed up the feelings of many. "Scary," she said, "I just don't think I can control them....We need the experience. As much as I don't want to, I think we ought to."

Teaching the entire class was a big moment. The teacher educator made it clear the preservice teachers were taking it one step at a time: helping the children learn was not the focus--being able to organize the children was. The preservice teachers were nervous, excited, and scared. Afterwards the general consensus was that it was not as bad

as they thought it would be, but it was not easy either. Robin summed up her experience:

> What my mind was thinking about was just organization, making sure everybody was doing it. And I was just trying to see and it was really difficult...all I could see was people and balls going....I knew what I wanted, I wanted some underarm throws and reaching. I saw some overhand throws and knew I didn't want that, but as far as skill and anybody doing anything right, I had no idea....It was the first time I've ever had that many people so I was overwhelmed by that and just trying to make sure the organization was going right. And I guess if I were to really set out to look for skill I might have been able to see it, but honestly...as far as skill, I saw nothing. I saw nothing. I couldn't even tell you if anybody caught a ball. (Robin, interview)

Thus, Robin found that when she had to deal with many children her observation skill regressed and she did not go after learning. As a teacher educator I do not find this alarming. Certainly, given time and facilities, the jump from small-group to large-group teaching could have been made in smaller steps, and Robin may not have felt such regression. Nevertheless, the regression does not mean Robin lost her ability or desire to go after learning or that she would not quickly get beyond her initial and understandable feeling of being overwhelmed. Regression or not, to me, observing and going after learning with 25 or more active children is never easy.

In summary, understanding that to teach they had to do more than tell the children the tasks and elaborate with a bit of individual feedback was important knowledge for the preservice teachers. Teaching was not that easy--they had to

become more involved with the teaching/learning process and work hard to get what they wanted. They had to go after learning. Several factors were found to encourage going through the motions. Among these were being nervous, having a lack of content knowledge, being concerned that the children would be bored, and thinking that teachers were supposed to follow a lesson plan exactly. On the other hand, confidence, an easing of tension, and strong content knowledge seemed to facilitate going after learning. Finally, understanding did not mean the preservice teachers were able to consistently, in practice, focus on children's learning.

The Children Are Trying

A second example of the restructuring of a knowledge component was when the preservice teachers learned that the children were, in general, not being bad, not misbehaving on purpose, but rather were eager and trying. The preservice teachers came to understand that the children wanted to learn. Frazier and Tyler summed up the group's sentiments:

> I don't know if I said it before, but I'm really convinced they're eager...I'm convinced that they're not being bad....I'm convinced that they really want to do it, they're not trying to be bad. (Frazier, interview)

> They really don't do things on purpose that you think are bad and you want to choke them. Laughs. They're not doing it on purpose. It might just be a matter of development. They might be on a lower cognitive level than you are talking to them. Or, perceptually they're off on something and they can't. And, it's not being bad like I always thought it was. (Tyler, interview)

This finding, like many in the study, is based primarily on retrospective accounts; that is, the preservice teachers said they once thought or acted in a certain way and now they think or act differently. That the preservice teachers previously thought the children were not trying or were intentionally being disruptive was not, at the time, a major topic of interviews or class discussions. As Strike and Posner (1985) suggested it is unlikely the preservice teachers would report their own interpretations as problematical until they were dissatisfied with these interpretations and had embraced a new way of understanding. The preservice teachers usually spoke positively about the children. There were situations, however, when I sensed, based on brief comments, facial expressions, and tone of voice, that the preservice teachers were unjustifiably blaming the children for not learning what they were teaching. My interpretation was that the children were either progressing as best as could be expected or did not understand what to do because the preservice teachers had not adequately explained the task. In fact, during data collection my sense of what was happening was strong enough initially to title this knowledge component "blaming the children." When I did the primary analysis of my data, however, I realized I did not have sufficient evidence from the preservice teachers' perspectives to characterize this

component primarily as blaming the children. It was the preservice teachers' strong retrospective accounts of the change in their thinking that gave this component its tone and content. Thus, I titled the component "the children are trying."

Understanding that the children were eager and trying was an important insight because it helped the preservice teachers more accurately interpret the children's responses. In the following passage Robin described a teaching problem she had because she misinterpreted the children's responses.

> After my conference and watching the tape, I got very upset with how I handled a situation....I went over to them [two children] twice with the attitude that they weren't trying what I had asked and wanted, when in actuality they were....[The kind of the task] along with other possible things such as some other unclear directions led those two to look like they weren't following directions and that they were more interested in sliding and running after balls. Unaware of my mistake and impatient by their problem with misdirection and too much force with striking, I approached them as if they were goofing off. It was actually like I was mildly scolding them and saying if they couldn't use light taps and keep the ball between them, I would separate them. [It was] my mistake and lack of patience and my inadequacy in not realizing they were trying and that all they needed was a little refocusing. Try harder next time, Robin! (Robin, dialogue journal)

In coming to understand that the children, in general, were trying, the preservice teachers integrated previously unconnected knowledge. In the first example Tyler and Robin connected knowledge of development to their interpretations of children's responses. Tyler spoke about the forward roll, Robin about tossing ahead of a moving player in games.

> Things that they do in the roll are probably

> developmental. The roll that...the PE teachers are used to doing themselves, if they're proficient at it, is not going to be the same as [the children's] roll. And [the children] are not going on their heads and flopping on their backs because they're trying to be funny for the most part, but it's something that through practice and...giving verbal cues and that kind of thing, they're going to improve, in time, given enough practice. (Tyler, interview)

> I seem to have found that you can tell them, "throw it in front of the person" or tell them to do something and they might really be trying to do that. They just can't. They can't do it. They're just not to that level. It's hard for me to understand that as well. And before I thought it was just like, "don't you understand what I'm saying?" type thing. But, it's actually, it's just a developmental thing. (Robin, interview)

Thus, Tyler and Robin built an interpretation of the children's responses by integrating in knowledge of development. It was not that the children did not understand, were lazy, or not trying, but that the children's movement patterns were predictable developmental movement patterns. They were the patterns that all children performed in the process of learning a skill.

In another example, Kit made connections among what she learned in an education course, her recognition that the children might simply be having a bad day, and her understanding that the children wanted to learn.

> I guess I've learned they really want to learn. They really pay attention whether they can do it or not. It might look like they're goofing off sometimes, but if you reach that person, that really if you get to that person, they want to learn....We've got this one girl and she was kind of hard on me the first lesson I had. And she got really frustrated and I tried to tell her, "just don't worry about it, we're just practicing and this is not an earth shattering thing, we just want you

> to try it." And she got really mad and frustrated with it. And the next time she comes in, she's raring to go...before she didn't want to do anything.
>
> So, she just might have had a bad day--just had a really rotten day. And I feel like that. So you can sympathize with them instead of (like they were talking about in the education class) jumping on the kid. You're acting on the behavior and not the kid. And if you can relate to that behavior you're getting inside of them. I know what they're going through, I've had rotten days--kind of let things slide. They're not disruptive or anything. (Kit, interview)

Having a bad day was something Kit could understand and understanding helped her be a better interpreter of what was happening in class. Thus, the preservice teachers' insights that the children wanted to learn was strengthened by connections to other knowledge. Knowing that the children were trying and eager was a more integrated way of knowing.

The teacher educator was one source of this insight. Throughout the course she reinforced positive ways to interpret the children's actions:

> The children's enthusiasm is natural, they are not being naughty. (Dr. Watson, class discussion)

> You don't know the reasons why children don't want to participate. Is it because they have on a dress? Have they just eaten? Just let them know you are concerned and interested, not impatient. (Dr. Watson, class discussion)

Class discussions commonly focused on multiple possible explanations for children's actions. As Frazier suggested, multiple explanations became a framework for interpreting children's responses.

> Frazier: I've learned more about children in that class than I have in any other class, you know, why kids

> might not be doing what I asked them to do, why they might interpret something I say as something other than I meant. So I'm learning about that kind of stuff.
>
> Inez: How are you learning about that with the children?
>
> Frazier: Well, it helps that Dr. Watson is like, "well, if they don't do it, here are some possible reasons why: there is a possibility that they don't understand a word you said or they're just bored to death." I mean they're not always positive. Laughs. But at least it puts it in a framework that you can understand it. And I think that's changed the way I look at children. (Fraizer, interview)

This new outlook on children seemed a positive change for the students. For example Tyler said:

> I think that I've become more tolerant because I know that they're not misbehaving necessarily, sometimes they are, but I know it's not always that. So I think my [inaudible] tolerance has increased a little bit. (Tyler, interview)

Learning that the children were trying was welcomed knowledge. It helped the students, in Kit's word, "sympathize" and connect with the children rather than find fault. It gave the students alternative explanations for why the children were not immediately learning the skills taught, explanations that went beyond blaming the children and blaming themselves. Overall, their new way of knowing was a richer, more integrated understanding of the teaching/learning process.

Teaching Is Interactive

The third example of a change in a knowledge component that was salient for several students was a growing awareness

of the interactive nature of teaching. In this component knowledge development moved toward increased integration with the environment. The stories of Tyler and Kit illustrate this change.

Tyler described learning about two different aspects of the interactive nature of teaching. First, she learned her enthusiasm influenced the children's actions.

> They're eager, very eager. I never saw that before.... I worked with school-aged kids in a day camp situation and the only thing that I perceived out of that was that they are very lazy as a group and they don't want to do anything. And I had to be the cheerleader all the time and get them to do things. And I'm not sure now, maybe that had something to do with my activities and how I was getting them across. But they are eager to learn...I think that's the one thing I've learned....[My] enthusiasm, I think that that had a lot to do with...how the kids react. It all goes back to knowing what you're doing in the lesson and know what your focus is then you're more confident and that confidence shows in your enthusiasm and then it's reflected in how the kids act. (Tyler, interview)

Second, she learned that feedback was not simply something she gave to the children; it was also something she received. She gave the children verbal feedback but in addition her observations of the children gave her feedback about her teaching and the children's learning/development process.

> I should also relate a notion that there existed, between myself and the learners, an event of reciprocal learning which increased my intensity that much more. The children were responding to my verbal cues and attempts to refine and extend the tasks while I continuously derived information regarding feedback effectiveness, teacher behavior in relation to student motivation, and ideas concerning development. (Tyler, lesson evaluation)

Thus, Tyler learned more about the interactive web of teaching. Children react to teachers, teachers react to children. Tyler learned she could use her powers of observation to evaluate not only the children's responses but also the feedback she was giving the children. Teachers had an active role in the lesson, a think-on-the-feet role that was interactive and could not be predicted in advance.

Kit also discussed learning about the interactive nature of teaching. She learned how the precision and accuracy of her demonstrations influenced the children's performance.

> I should demonstrate exactly the way I want certain movements to be done. After viewing the tape, I saw that I explained to the children what I wanted them to do but when I demonstrated the movements, it looked nothing like the task I described. So the children copied my movements which were wrong and so they didn't do the movement the way I wanted them to do. (Kit, dialogue journal)

Kit did not realize she demonstrated inaccurately until she saw herself on video tape. She may have seen problems with the children's movements while she was teaching but she did not attribute these problems to her demonstrations.

By the end of the semester, Kit, Dr. Watson, and I all noticed and mentioned that Kit's demonstrations were better. Her knees were bent, she moved energetically, and she looked like a skillful mover. Her movements showed the children exactly what she wanted and she began to use demonstrations as an effective way to communicate.

In addition to improving her demonstrations Kit also learned demonstrations were not a single-dimensional

technique.

> I did demonstrate the side roll correctly and I also showed them several ways I saw them perform the side roll incorrectly, from observing them in previous lessons, and compared the two rolls. This helped them to see what exactly they were doing and how to improve on it. (Kit, dialogue journal)

Thus, Kit's knowledge of demonstrations became more fine-tuned and differentiated; i.e., demonstrations could be used in different ways to meet different aims. She learned that her demonstrations influenced the children and in the process she recognized more of the interactive nature of teaching.

Most, if not all, of the students had some problem with the accuracy and precision of their demonstrations. Standing upright and patting the air with a flat hand while remaining in the same location was a common demonstration of dribbling during the first field experience block. The students did not seem to take advantage of the potential of a clear demonstration to elicit skillful movement in children. At one point in the semester the teacher educator directed the class's attention to improving their demonstrations and over the semester the group as a whole became more competent demonstrators. They moved more when they demonstrated, they directed the children's attention to specific parts of their demonstrations, and their demonstrations were more active, less passive. They used demonstrations not simply to introduce a skill but as a flexible teaching tool that served a range of purposes: showing the children what was

incorrect, highlighting the actions of one body part, showing the position of the body, and showing movement quality. From a perfunctory role, demonstrations became an active part of their interactions with the children.

Giving Directions: What Matters Is Not What I Say, But What the Children Understand

The final example of knowledge restructuring was a change that Marty described in the sense she made of giving directions. Initially Marty wrote in her lesson evaluations that her directions were clear and precise. This perception changed after she met with the teacher educator and they analyzed a video tape of one of her lessons. Marty then said to me:

> The way I give directions sometimes is not real clear....When I was trying to tell them what to do I got carried away, I guess. Oh, I knew what I wanted, but I had trouble saying it to where they could understand it or saying it the way I really wanted to say it, like I wrote it down on paper. And I was like, let me see how I can say this. Laughs. I was like at a loss for words there. (Marty, interview)

Marty spoke about several problems with her directions. First, at times, she did not tell the children what she wanted them to do.

> I should have told them to use one jump at a time and then watched them and see if they used it. I wanted them to jump for height but I didn't tell them to. (Marty, dialogue journal)

Second, at other times, she told them what she wanted but did not tell them how to do the movements.

> I told them to absorb force and land softly. These students had trouble absorbing force and landing softly.

> I should have told them to bend their knees on the way down, land on two feet, spring back up and finish with arms extended high in the air. (Marty, dialogue journal)

Finally, Marty said she tended to overload the children with information.

> I give too many verbal directions and cues at one time....For example, I told these students to work on ready position, using forearms and hands to strike the ball upward, height, and move to get under the ball. I should have taken these tasks one at a time. (Marty, dialogue journal)

Once the teacher educator prompted Marty's awareness of her problems, Marty worried for the rest of the semester about giving clear, precise directions. She tried to improve her ability to give directions several ways: in lesson plans she wrote exactly what she wanted to say in class, when teaching she paid attention to her words, and after teaching she reflected on and evaluated the quality of her directions.

Toward the end of the semester after a discussion with the teacher educator Marty described a restructuring of the meaning she made of giving directions. Her thinking turned around and she came to see the problem from a different viewpoint. The problem was not whether the teacher gave clear, precise directions but whether the children understood the directions she gave. Marty changed her viewpoint for evaluating the effectiveness of her directions from the teacher to the children. The focus was now on children's understanding, not teacher behavior.

> They're always harping like--"give clear directions." Yet, I might be giving clear directions or what I have

> written out on a paper might be perfectly good to say or sound great, but the kids might not understand it. Something I've learned [is] that I might have it written out right, I might say it right, but it's too advanced for these kids because they can't understand. They just can't do it. So break it down....And, we really weren't told that. We were just told, "give clear and precise directions" instead of breaking it down to where they can understand it. (Marty, interview)

This new place from which to view giving directions brought Marty to a deeper understanding and was a stronger base for helping her communicate effectively.

CHAPTER VIII

KNOWLEDGE RESTRUCTURING: DISCUSSION

As discussed in Chapter I, knowledge restructuring is the reorganization of knowledge. New schemata are built on the structures of old schemata (Rumelhart & Norman, 1978). "A large body of previously acquired (but ill-structured) information fit[s] into place (Rumelhart & Norman, 1978, p. 38). Knowledge restructuring can occur on a large or a small scale and be domain-specific (Anderson, 1977; Vosniadou & Brewer, 1987). It can take the characteristic of a flash of insight (Rumelhart & Norman, 1978) or be more gradual and piecemeal (Strike & Posner, 1985).

Three of the clearest examples of knowledge restructuring in this study were (a) the change from going through the motions to going after learning, (b) the shift from thinking the children were "being bad," "not trying," and not "understanding," to thinking the children "were trying," "were eager," were "not being bad," and "wanted to learn," and (c) the new understanding, presented in Chapter V, that tasks have a focus and that the preservice teachers needed to ask themselves "what do I want?" and "what should I look for?" The first two examples of knowledge restructuring seemed to be distinct changes, almost reversals, in perspective. The third example was more of a consolidation

of previously ill-structured knowledge. Before the students understood tasks had a focus, things were "jumbled up;" now there was clarity and insight. Things fit. There was a purpose to tasks that took center stage and in recognizing this purpose their knowledge of tasks had a new structure.

Thus it seemed throughout the semester there were times when the preservice teachers' knowledge seemed to undergo restructuring. The place from which they were viewing aspects of teaching changed and they found new, more adequate ways of interpreting what was happening. Several students found this restructuring to be a developmental milestone in their growing understanding of teaching. Their newly organized knowledge was a "big eureka." The change in thinking felt "drastic." The "light went on."

It is inaccurate to assume the change in the students' knowledge happened solely as a result of the elementary methods course. As Strike and Posner (1985) suggested, knowledge restructuring is often gradual and thus would result from repeated experience. The preservice teachers had years of school, camp, baby-sitting, and participation experience. Moreover, the elementary methods course was at least the fourth course with embedded field experiences. The building up of experience over courses and over years along with current course experiences including instruction were all likely factors affecting restructuring.

The examples of knowledge restructuring in this study

seemed to support Strike and Posner's (1985) suggestions that knowledge restructuring is enabled by dissatisfaction with old interpretations and the fruitfulness of new perspectives. For example, students no longer seemed to need to blame the children. They became more accustomed to teaching in field experiences--they were more comfortable and less nervous. Having to be concerned with preserving their self-concepts was not as pressing. They stopped seeing the children's actions as an affront to their person. They no longer needed to blame someone else for problems because they were secure and successful enough as teachers to take responsibility for what was happening. In addition, their growing knowledge of development and learning enabled them to recognize that the children were trying but were not successful because skill development takes time and practice. Embracing a position that children were eager, trying, and wanted to learn seems more fruitful as it is in keeping with a positive image of teaching and with messages from teacher educators. Although I never asked them, it seems unlikely that the students' dreams of future careers as teachers would have been filled with children who were bad, lazy, and did not want to learn. A new vision of children as trying-and-wanting-to-learn worked, it was more adequate, there was fit. They came to view teaching from a different place--a place which seemed more satisfying and fruitful.

Common across several instances of restructuring was a

developmental change in the preservice teachers' relationship with their environment. In these changes development moved toward increased differentiation and integration (Werner, 1957). As quoted in Chapter II, development as increased differentiation and integration with the environment means that:

> the organism becomes increasingly less dominated by the immediate concrete situation...less impelled by his own affective states....[has a] clearer understanding of goals...can manipulate the environment rather than passively respond to the environment....[has a] more accurate assessment of others...[and] there is less of a tendency for the world to be interpreted solely in terms of one's own needs and an increasing appreciation of the needs of others and of group goals. (Werner, 1957, p. 127)

The preservice teachers described many such changes. For many there was a shift from a focus on teacher behavior to children's learning. They spoke of "going through the motions," "living through it," "just getting by," and "letting it slide because I wanted to get it over with," to "persisting and going after what I wanted," "feeling involved," "into it," "excited," and "engrossed." Several went from giving a task, observing, and going on to the next task to giving a task, observing, and then going after learning. Some grew from following a prepared script to adapting and improvising on their feet. One student went from concern for what she said to concern for whether the children understood.

In addition, the preservice teachers went from thinking

the children were not trying to realizing the children were, in general, trying and wanted to learn. They stopped assigning fault and seemed to begin to accept the children's struggles to learn as authentic. Several moved from not recognizing the relationships between teachers' and children's actions to seeing connections. For most, their demonstrations went from small, vague, perfunctory movements to full-blown, articulated enactments of how they wanted the children to move. Several went from minimal movement and "feeling tied down to one spot" to traveling around their teaching station. In general, the direction of knowledge development went from detached to involved, blaming to understanding, passive to active, still to traveling, separate from to interacting with, going with the flow to holding on and taking charge, concerned with self to concerned with children.

Thus, in this study knowledge development moved toward increased differentiation and integration. This meant being better able to act on rather than be controlled by or passively react to the teaching/learning environment, such as, when the preservice teachers went after learning and held onto what they wanted. It also meant being less consumed by one's own needs and being more able to care for the needs of children such as when they focused less on their nervousness and more on children's learning. Further, it meant being more able to both separate and see the

connections between children's actions and teachers' actions, and children's feelings and teachers' feelings such as when they ceased to find the children's actions an affront to their teaching and when they recognized that what they did influenced the children. The preservice teachers became more differentiated from the environment and more caring of others when they attended less to their need to live through it and more to the messages the children received and what the children learned.

Links to the teacher education literature. Other research in teacher education found similar developmental changes in the substance of preservice teachers' knowledge. The main body of literature being the research of Francis Fuller (1969, 1970), Fuller and Brown (1975), and the many studies stemming from their work.

Fuller and Brown (1975) proposed a three-stage developmental model of teachers' concerns. The first stage is concern for self, including self-protection, self-adequacy, class control, and, in general, survival. The second stage is concern for the tasks of teaching, e.g., being concerned about lack of instructional materials, lack of flexibility in teaching situations, and having too many students. The third stage is concern for the impact of teaching, including concern about helping children learn, individualizing instruction, the children's social and emotional needs, and the appropriateness of content for each

child. Hall (1985) said:

> the logic suggests that over time as a person becomes more mature in being a teacher, there will be a tendency towards less self concerns, less task concerns, and the arousal of more impact concerns. And this general pattern had been observed in the studies. (p.12)

Although she proposed a developmental sequence of teachers' concerns, Fuller's model is not a formal stage theory in which all teachers predictably, with no regression, progress through the three stages. The sequence from self to task to impact "has its ebbs and flows, certainly is idiosyncratic, and clearly is affected by the types of teacher education experiences that are offered" (Hall, 1985, p. 12).

Rather than hypothesize formal stages Fuller categorized and described the concerns common with preservice teachers. These categories are useful for understanding and interpreting preservice teachers' actions, thoughts, and feelings in field experiences. Further research suggested the categories are viable although support for their developmental sequence is inconsistent. Some research duplicated the self, task, impact sequence; other research found no changes in concerns during field experiences, and still other studies had mixed results (Bogess, McBride, & Griffey, 1985; Hall, 1985; Richards & Gipe, 1987; Schempp, 1985; Silvernail & Costello, 1983; Strawitz & Malone, 1986; Wendt, Bain, & Jackson, 1981). It is possible that differences in the extent and kinds of field experiences,

different teacher education program goals, and research methodologies may account for the inconsistent results (Reeves & Kazelskis, 1985; Strawitz & Malone, 1986).

Thus, research on teachers' concerns found preservice teachers were concerned, often in sequence, with self, task, and impact. In addition, other research found preservice teachers changed during field experiences from blaming the children for problems to being more empathetic and focusing on children's needs (Harrington & Sacks, 1984; Richards & Gipe, 1987; J. Shulman, 1987). The developmental change from a focus on self to a focus on children's learning and the change to thinking the children were trying reported in this dissertation reiterates these sequences. It appears the predominant concern of preservice teachers is not automatically with children's learning. Concerns with self, survival, and class control can be expected.

Results from another set of teacher education studies also parallel the changes in the substance of knowledge reported in this study. Although it is not longitudinal research, the literature comparing experts and novices hints of knowledge restructuring that moves toward increased differentiation and integration. The characteristics of novices and experts may describe respectively the beginning and end points of a developmental journey. Several studies found that experts more than novices were concerned with student learning and more connected rather than detached from

their environment (Dreyfus & Dreyfus, 1986; Housner & Griffey, 1985; Ropo, 1987).

Thus, the restructuring of several of the preservice teachers' knowledge components moved in a developmental direction toward increased differentiation and integration with the environment. The assertion that these changes are developmental and, hence, more of an adaptation to the environment, is made with confidence because at no time did a student describe the reverse direction. No one said, "I used to be concerned with helping the children learn; now I just worry about presenting tasks and going through the motions." Nor did they say, "I used to be involved; now I stand back and after a time present the next task," or "I used to think what mattered was the children understanding what I say; now I just worry about speaking clearly." The developmental changes seem to be logical learning sequences in the beginning phases of learning to teach. They helped the students function as teachers. The changes were adaptive and make sense for fresh, young, beginning teachers on the brink of possible careers.

This study does not suggest, however, that the preservice teachers came to, saw, and conquered issues of detachment, passivity, going through the motion, and concern for self. Descriptions of mid-career teachers attest too clearly and consistently that these issues weave in and out of teachers' lives (Locke, Griffin, Templin, 1986; Templin,

in press). Developmental change does not mean a trip down a one-way street through a one-stop town. The developmental model that informed this study conceptualized development as the revisiting across the life span of issues, themes, and modes of thinking each time with richer understanding and consequently, more choices (Kegan, 1982; Pearson, 1986). This model suggests that a worn, threadbare teacher who speaks about frayed commitment and is going through the motions is confronting this issue with a depth of understanding unknown by the preservice teachers in this study. A spiral model of development predicts teachers will revisit themes and issues throughout their careers.

In this study development is assumed to result from the interaction between an individual and the environment and thus depends on both what the individual brings and what the environment affords. Development does not equal maturation nor will stages or sequences unfold automatically as a result of experience. Developmental change is more complex. Broadly speaking, in this study students brought to their learning the sum of their past knowledge, beliefs, motivations, attitudes, and past experiences. The environment included the form and content of course experiences, other university experiences, the particular group of children each student taught, student/student interactions, the topics covered in the class and textbook, the Onondaga Lake Elementary School environment, the teacher

educator with her unique biography, and the research project complete with interviews, observations, note taking of everything said, videotapes, and so forth. The result of the interaction of all these factors is not predictable. In turn, for preservice teachers knowledge restructuring is not insured.

CHAPTER IX

INDIVIDUAL DIFFERENCES--THREE PROFILES

The third major theme was individual differences among the students. Research suggests that personal attributes and the manner in which an individual interacts with her or his environment affect developmental change (Lerner, 1986). In this chapter profiles of three of the preservice teachers: Marty, Tyler, and Robin, illustrate how different orientations toward learning to teach influenced each one's feelings about and understanding of course experiences.

Being a Received Knower in a Methods Course Emphasizing Constructed Knowledge--Marty

A major part of Marty's learning-to-teach story was that she valued received knowledge in a methods course emphasizing constructed knowledge. The primary theoretical framework for interpreting this part of her story profile was the developmental conceptualization of women's ways of knowing by Belenky, Clinchy, Goldberger, and Tarule (1986). These authors described five different ways of knowing: (a) silence (women who felt voiceless and assumed they could not learn from hearing others) (b) received knowing (women who listened to the voice of others), (c) subjective knowing (women who listened to their inner voice), (d) procedural knowing (women who listened to the voice of reason), and (e)

constructed knowing (women who integrated the voices). The authors suggested these five ways of knowing are developmental but they are not proposing a stage theory.

Received knowing. Received knowers listen to others to direct their learning and tell them what they need to know. They do not value their own "voice" nor do they rely on constructing knowledge based on their own observations.

> While received knowers can be very open to take in what others have to offer, they have little confidence in their own ability to speak. Believing that truth comes from others, they still their own voices to hear the voices of others. (Belenky et al., 1986, p. 37)

Courses that demand students to construct knowledge can cause problems for those women who rely on received knowing. "Being recipients but not sources of knowledge, the students feel confused and incapable when the teacher requires that they do original work" (Belenky et al., 1986, p. 40). Also, open-ended tasks, facing dilemmas, and solving problems that have several competing or appropriate solutions are problematic for received knowers.

> The received knowers are intolerant of ambiguity....They like predictability. They want to know what is going to happen when. They like clarity. They want to know exactly what they are expected to do--what they are responsible for. (Belenky et al., 1986, p. 42)

An analysis of Marty's patterns of teaching, knowing, and learning to teach revealed she tended to value received knowledge. She seemed to rely on and seek knowledge from an outside source to direct her learning. She wanted to be told exactly what to teach the children, in what order she should

teach it, and what she should look for when observing the children's responses.

She valued fairness--even though the equipment could not be divided equally, she thought all groups of children should have had the exact same equipment. She valued authority.

> I think of myself as an authority figure. One reason is because I am older than these kids. Another reason is that these kids look up to me. A third reason is because these kids really work hard and follow my directions. (Marty, lesson evaluation)

When asked to justify teaching decisions she tended to either do so arbitrarily saying "I was just curious," "because that's the way I wanted them to do it," or "that's just the way I teach," or by abdicating responsibility to a high authority, "that's what [Dr. Watson] said to do so that's what I did." Sometimes she did not know why she chose the course of action she chose. "I'm not really sure why I did that." "I don't know why I did this--just habit I guess." Decisions about teaching not handed down by authority would by default be made arbitrarily. Teachers are seen as authority figures. Marty was the authority for the children. Dr. Watson was the authority for Marty. Marty did not seem to weigh alternatives, recognize trade offs, or enjoy delving into the ambiguity of teaching decisions. She tended to value the predictable and the unambiguous.

In addition to valuing received knowledge, it was evident during the methods course that Marty wanted to learn. She paid careful attention to feedback from the teacher

educator and used this feedback for guidance. She wrote lengthy lesson plans and evaluations. When she did not understand what the teacher educator wanted, Marty made efforts to find out. She asked the teacher educator and on several occasions she asked me to tell her or help her figure out exactly what she was supposed to do. To better understand her own thoughts and feelings she borrowed every audio tape of her formal interviews with me. After she had a conference with the teacher educator, Marty took my field notes of the conference in order to study what was said. She wanted to do a good job in the course and was persistent in her efforts to do so.

Marty, however, was in a methods course in which the primary modes of learning were based on constructing knowledge. The course focused on teacher decision-making and reflecting on teaching. Forced to construct knowledge and rely on her own authority Marty's desire to receive knowledge was at odds with the methods course learning experiences.

Marty's persistence and dedication to learning coupled with the value she placed on received knowledge in a methods course demanding she construct knowledge often left Marty frustrated. For example, she recognized the importance of the questions, "what do I want?" and "what should I look for?" but she was frustrated because she did not know the answers. She read books, she listened to the teacher educator, and she listened to class discussions in a struggle

to hear the answers. What she heard was, to her, inadequate--she wanted someone to tell her all that she knew she needed to know about what content to teach and what to look for. The act of teaching in field experiences, however, frequently demanded that she construct the knowledge herself.

> I don't know what to say in my evaluation because I don't really know what I'm looking for. I mean I see things, I don't know if that's exactly what I'm looking for, so I'm still kind of lost like that--I don't know exactly what I want I guess. I still have that problem with figuring out what it is, what I actually want....
>
> I was trying to walk around and make sure everyone's working and doing it right, what I was wanting. I mean it's hard when you don't exactly know what you're looking for. I mean I got part of an idea. I really don't know what's she's talking about, all the steps and stuff like that. I don't really know one right after the other what I'm actually looking for. (Marty, interview)

The questions "what do I want?" and "what should I look for?" plagued Marty. They seem to be reasonable questions for someone who sees coming to know as constructing knowledge, but to someone whose primary mode is receiving knowledge they seem, in Marty's word, "ridiculous." When asked in the final interview if she felt anything should be changed in the course Marty replied,

> Yeah. If they were to give you a [pause], if we do striking again to do a step-by-step procedure of what's supposed to take place, in what order, so that you'd know. I mean you'd have it down on paper so you'd know what you're looking for before you even teach the thing. I mean that was ridiculous. It still is ridiculous. It's like she says, "did you take notes on what you saw?" I'm like--didn't know what to take notes on. I mean I don't know what it is I'm looking for. (Marty, interview)

Marty wanted to have the content clearly ordered and delineated.

Marty's frustration went beyond learning what content she should teach. She also wanted to be told step-by-step how to teach.

> Marty: I would have liked to have had more or less a step-by-step thing like the kids get, but it doesn't work like that.
>
> Inez: Yeah, that would be helpful. What's your opinion of the method that you're taught here.
>
> Marty: Oh. Overall I guess it's a pretty good [method] I guess, but I mean there's a lot of work you've got to do on your own. If you don't, I mean in my case I think I'm pretty dedicated to doing a good job and making sure the kids learn and so that, I guess, kind of motivates me to do a better job or work harder at it. But, it just seems like we had to do everything myself. And I don't know. That's the way it is. (Marty, interview)

Thus, in learning to teach Marty wanted to receive the knowledge of experts.

Marty's perspective on knowing seemed to limit her ability to grow in several ways. First, although she worked hard and persistently to improve her teaching, as might be expected she relied on the teacher educator to identify what to work on and how to improve. Changes in Marty's written work occurred after meetings with or written feedback from the teacher educator. She changed precisely what and often no more than what the teacher educator said to change. She had difficulty expanding on the teacher educator's comments or adding her own interpretations of what happened during the field experiences. She did what she was told.

Second, as she looked for received knowledge what she learned from the processes of observing and reflecting was limited. For example, Marty said observing other teachers and writing journals about field experiences were "busy work." She wanted to be told exactly what to look for when watching her classmates teach.

> My observations, that's a joke....When she was telling you to get with your partner and figure out what it is that you want them to watch, that was a waste of time...you're watching something and then you got to worry about what you're writing down and then you write something down and you miss something....I don't know, it's good but it's bad....It's good that you've really got something down on paper, but is that actually helping that person or is it helping you, the person writing it down. I mean I'm still not sure it helped. I mean I tried to write things down on [my partners] and it was like I'm not real sure what it is I'm looking for here. I still, I don't really know what she wants. (Marty, interview)

The lack of precision in what to look for and record and the dual goals of helping her partner and learning about teaching herself left Marty lost in ambiguity and feeling the assignment was a waste of time. In general, Marty did not seem to value reflection as a means for learning to teach. Probing the depths of her feelings and thoughts was difficult for her. During a lengthy informal interview I had repeatedly asked Marty how she was feeling about teaching and why. It was difficult for her to answer my questions. Finally she looked at me, smiled, and said, "`why' questions are hard for me...put words in my mouth."

Finally, valuing received knowledge also limited the

growth of Marty's content knowledge. For example, she found it difficult to create knowledge of content by applying a procedure learned in one situation to another. Class discussions had to be exactly on the content she was teaching or the discussions were not valued. One Friday the class focused on the procedure of hypothesizing the developmental steps of motor skills (Roberton & Halverson, 1984). To demonstrate the application of the procedure the class imitated and discussed the various movement patterns they saw the children using to strike the ball with their heads. They then put these patterns into a hypothesized developmental order.

Marty did not value the class. Although she acknowledged learning more about striking with the head, she had not emphasized the head in her teaching. She did not seem to appreciate that the procedure for hypothesizing developmental steps of motor skills could be a valuable tool for helping her answer the very questions that she was having trouble answering, i.e., what do I want? and what should I look for?

> I just think like, at times, [the class has] done things that didn't relate to what I was doing. Well, you know striking--it would have helped if we had talked about something other than just the head....I had <u>one</u> kid that really used his head and they can only do it one time and it went every where so you couldn't keep it going. I was like, well, why didn't we go into it and write on the board or something, sit down and do the the arms, thighs, legs...so that we'd know what to look for. I mean like it is now we don't really know when (like she said) there's not a whole lot written down....I don't know what to say in my evaluation because I don't really

> know what I'm looking for....See we know [the steps for the head], but what good's that going to do? They're not going to use the head that much. I mean the ones I was thinking about would be their arms. (Marty, interview)

Marty learned about striking with the head. This, however, was only a portion of what could have been a bigger lesson, i.e., how to construct knowledge about the development of motor skills from her own experience. The class left her frustrated. Creating knowledge by applying a procedure to a new situation may be a valuable tool, but its meaning and use are not easily accessed by a student who listens for received knowledge.

Belenky et al. (1986) suggested that wanting to be told exactly what to do, listening to authority to direct learning, shunning ambiguity, and needing clarity are common patterns of received knowers. Because they have not learned to value or trust their own voice, it is the voice of authority that carries the greatest weight. Marty wanted to do a good job and believing she was unable to generate her own guidance, she looked for and followed the directions of authority. This means that in wanting to do exactly what the teacher educator said, Marty was not trying to get by with the least amount of work, nor was she simply attempting to get a good grade. Rather, she was trying to come to know in the best way she presently knew how, that is, by receiving the knowledge of experts.

It seems, however, that relying on received knowing is

less than optimal. For Marty it limited the growth of her knowledge. Further, to continue to grow in the isolation of her future classroom she will need to rely on constructing knowledge and learning by reflecting on her own experience.

Charting her Own Course: Developmental Tasks and Active Agency--Tyler

Background. Tyler swam competitively until approximately third grade when she quit because she was "out there for fun" and the adults were "out for brutal competition." Tyler said she was more "sand-lot oriented," and enjoyed playing baseball and pick-up basketball with the other children in her neighborhood.

In school Tyler had limited experience with physical education. Her elementary physical education "was recess." Junior High physical education met five days a week, but with the exception of one teacher, who Tyler thought was a good instructor, physical education was a lot of "ball rolling." Tyler took one semester of tennis in high school, was not a high school athlete, and did not remember whether she took any physical education in college.

Tyler earned a bachelor's degree in another subject area and after one year of teaching kindergarten in a private preschool, she came to Alexandria University to become certified to teach physical education. She was 25 years old.

Tyler chose physical education because she thought it could be an avenue for helping children develop positive

self-concepts. She said she had a poor self-concept as a child and she wanted to prevent the same thing from happening to other children. "It's such a waste to have such a poor self-concept coming up....I don't want people wasting their feelings on anything--on the bad. I want it to be good from the beginning" (Tyler, interview).

Tyler thought she could make a difference in children's lives. She knew that physical education teachers could have both a negative and positive affect on a child's self-concept. Because of her seventh grade physical education teacher Tyler was "turned off completely" to physical education. In ninth grade, however, she had a teacher who was "excellent." "She was very sympathetic to me," "not only when physical skills were concerned but [when] things affective were concerned. Ms. Abbott you could go to" (Tyler, interview). When Tyler was considering career options, she remembered "how Ms. Abbott was as a teacher and how my other teacher was and what a negative affect [my other teacher] had on me" (Tyler, interview). Tyler chose physical education because, based on her own experiences, she knew how important a positive self-concept could be to a child and that as a physical education teacher she could help others have what she did not have.

Following her own agenda. As a learner in the methods course Tyler tended to be self-directed. She identified problems in her teaching she wanted to solve and set her own

goals. When asked what she learned recently, Tyler said,

> Well, I know what we've been taught, and then I know what I've learned....I've been more concerned with what kind of approach as a teacher I'm going to have and working on that than I have been little things that she's been working on with us. (Tyler, interview)

Tyler was drawn to her own agenda. This does not mean she did not have the teacher educator's guidance or support. She did. She mentioned helpful, private conversations with the teacher educator and she and the teacher educator modified the lesson plan format to better meet Tyler's needs. Further, Tyler participated fully in the activities of the class.

As might be expected of a self-directed learner, the process of reflecting in journals and lesson evaluations served Tyler well. It was her chance to find her own way, explore her own themes, and set new goals. Class discussions were also valuable learning-to-teach experiences. When asked how she felt during Friday's classes, she answered immediately:

> I feel like it's real useful because [Dr. Watson's] picking things out that she sees need to be looked at....It's a time to discuss and that kind of thing....I feel like that is a time to say, "OK, this is where we've been with this lesson," and talk about some of the things that we saw in this lesson that maybe need to be dealt with in the next lesson. (Tyler, interview)

Although Tyler was guided by her own agenda, she did not do so consistently or with steady confidence. For example, although she held firmly to her own beliefs even when she thought there was a discrepancy between her beliefs and the

teacher educator's, Tyler did not always act on those beliefs.

> It's really hard to react to the children the way you really want to with Dr. Watson because (my natural reaction...when working with kids is to be very warm...and joke around with them...and make a kind of a good rapport with them because I think it builds a relationship) I think it's so staunch and cut and dried, it's almost militaristic...very rushed and hectic....And you're trying to elicit these things that you want and it's not like there's a relationship between you and the children....Dr. Watson knows exactly what she wants....You've got to get this done and this done and it's very intense and formal. And I don't know how she'd react. Maybe I've just never tried it--to all of a sudden break out with kidding around for a second with your kids....It could very possibly boil down to the fact that everything is rushed. You literally do not have time...to do anything but...stay on task. And the kids are expected [to] stay on task. (Tyler, interview)

There were times Tyler was afraid she was not doing what the teacher educator wanted. As the semester progressed and she gained knowledge and experience, she became less anxious and less concerned about doing the right thing. She said:

> My anxiety is less now than it used to be.
>
> Now if it looks like number one, I don't know what I'm doing (to other people) or if I'm not doing what I think she necessarily wants to see us doing in a lesson, that doesn't bother me as much. (Tyler, interview)

As a self-directed learner, Tyler was sensitive to her own learning and her self-knowledge as a teacher seemed finely tuned. She knew where she had been and where she wanted to go. There was logic, order, and coherence in her learning-to-teach journey. As discussed in Chapter II, Oerter's (1986) description of development seemed apt for Tyler:

> The developing individual, as an agent of his or her own development, takes a future perspective by both perceiving cultural demands and setting developmental goals of his or her own. (Oerter, 1986, p. 243)

Tyler was an active agent in her own teacher development. This agency was evident in two processes. First, she seemed to learn to teach by recognizing changes in her knowledge and feelings and by building on her insights, and second, perceiving problems and setting a progressive series of developmental tasks.

Recognizing and building on insights. During the semester Tyler tended to recognize and acknowledge what she learned and she built on her new understandings. The two most prominent examples follow. First, she learned that tasks have a content focus and she needed to know exactly what she wanted the children to learn and what to look for.

> I guess I've had a big eureka since then and it's like I figured out part of how to teach....I was just sitting there doing some homework out in the hall in Stillwell Building and Dr. Watson starts talking to me about my lesson plan...and she said, "don't you realize that for each of these tasks you've got to find something that you're working on in each one?" And I thought--a focal point--you know, my focus. And that was it. I thought, that is the key right there. That's the thing that I've been missing....I need a focus for everything I do. (Tyler, interview)

Her new way of understanding tasks gave her a new structure for framing and directing teaching actions--a new, more clear, goal-oriented way of understanding. The change seemed to be a developmental milestone. Where before she was "jumbled up" and "disgusted," now she had direction, focus,

she knew what she was doing, and was "excited," "confident," and enthusiastic. Tyler spoke of her new understanding as being a "big eureka" thus characterizing the change as a moment of insight. Tyler built on her understanding and worked to make it part of her teaching repertoire.

> So that's what I'm working on now. It's like before the lesson begins I have my focus for each task and I know what I'm looking for...which is more difficult than trying to discover what it was that was missing to begin with....I'm just looking for how to put the focus of the lesson into action, into practice and how to find different ways of putting it across to the kids. (Tyler, interview)

The second important insight was the change in her understanding of teaching.

> The light went on for me on Wednesday. I realized I had just been going through the motions and that [from now on] no matter what, I was going to persist and go after what I wanted--and I did.

Where before Tyler felt "if I got through the task, it was more a matter of pleasure principle...getting through it and making my self feel better," now she focused on helping children learn. This shift in perspective was an important gain in understanding and her sense that "the light went on" suggested an insight. She further expanded on her understanding of going after learning by trying to improve on her ability to "observe what's wrong....really zeroing in on what is wrong and working on it."

Recognizing problems and setting developmental goals. In addition to recognizing and building on changes in her knowledge and feelings, Tyler, as an agent in her own

development, set a series of developmental tasks. These tasks included working to overcome her nervousness, trying to put her thoughts into action, learning how to give appropriate feedback with ease, and being able to verbalize more clearly. One task, however, was broader and central to Tyler's perceptions of herself as a teacher. This task was to find ways to individualize instruction and live by her beliefs in the face of reality.

The formation of this task began years before the methods course. As previously mentioned, one reason Tyler chose to major in physical education was because she lacked a positive self-concept as a child and she thought as a physical education teacher she could help children develop positive self-concepts. Her beliefs about physical education reflected this goal. Tyler said:

> Fostering a positive atmosphere and positive self-concept is probably number one on my list. If you have to, in order to get that, sacrifice in some way skill development...then that's just that. (Tyler, interview)

> Whatever content you use should cater to their level of...development and try to accommodate for individual differences. (Tyler, interview)

Tyler's beliefs about elementary physical education had deep personal meaning because she connected them to her childhood experiences with a poor self-concept. She saw them as a guidepost for everyday teaching--a goal to aim for and stand for. Not a carbon-copy of the teacher educator's, Tyler's goals were her own agenda for her future classes.

All this, as far as physical skill development and that

> kind of thing, is great and I'm really excited about learning it all and the Laban framework and all that. What I'm really after, though, is helping mold those positive self-concepts and bringing people up who are more confident in themselves as movers and overall it just kind of permeates their whole life. (Tyler, interview)

No matter what the teacher educator said, no matter what her classmates said, Tyler's priorities were clear.

The task for Tyler was to learn how to make her beliefs work in the gym. "I've got that philosophy, but I don't know if I'm going to be able to put it into practice." Tyler wanted to be able to explain and justify in terms of her philosophy what she did as a teacher. "When somebody comes out to me and observes and comes up to me and asks me something about what I'm teaching and why I'm teaching it, I want to be able to answer them on the spot." She wanted to know her philosophy and be "consistent with it" in practice.

Tyler recognized her beliefs were not going to be easy to actualize and she discussed this issue in a dialogue journal.

> I have observed that, on both the practical and administrative levels, forming a philosophy about teaching P.E. and forming a <u>working</u> philosophy can be two separate ideas. It seems easy to propose a viewpoint in which children learn on an individual basis; all have equal time on or with equipment; every child remains active the duration (maximum participation), etc. But when practical problems such as oversized classes, behavior difficulties, limited facilities, and pressures involving boredom and other negative reactions to content begin to occur....Also, obviously, when administrative problems such as dealing with tenured staff members or curricular guidelines begins to get in the way of "successful" teaching according to a philosophy, inconsistency would most likely take place. (Tyler, dialogue journal)

Tyler knew that she would have to manage problems with children, facilities, other teachers, and administrators. The realities of teaching lay ahead. Being the kind of teacher she wanted to be would be a challenge.

Although Tyler initially described her philosophy in the first interview, it was not until after she had grappled with the importance of knowing what she wanted the children to learn and going after learning that she set in the forefront the task of putting her philosophy into practice.

> I've got that philosophy...and that is just knowing every single one of them and knowing where they are cognitively, emotionally, physically and being able to work on their level....I don't know how I'm going to get to every single one of them, but I guess that's the next thing, is learning how to really deal with the individual differences in a big group. (Tyler, interview)

For Tyler, one particular teaching technique was associated with individual differences and getting to each child. That technique was planning and using alternative strategies. Alternative strategies are possible plans of action to be used if the present strategy was not working. Although it was not required, Tyler added alternative strategies to her lesson plans. Two examples from her lesson plans follow. The first is a task and alternative strategy from a gymnastics lesson:

> Task:
> As you move about the area try an easy jump over the corners of the mats.
>
> M.E.: [major emphasis]
> speed: move swiftly, but do not run

soft landings: be sure to bend your knees as you land. Make no noise in landing.

Alternative Strategy:
(If extension is evident in some, suggest directions)

The second task and alternative strategy is from a games lesson.

Task:
Strike the ball in an upward direction using any part of your arms and catch it as it comes down.

M.E.: [major emphasis]
Point of application: Think at what point the ball should be contacted to make it go straight up.

Body Position: Keep your knees bent (flexed) stay light on your feet instead of being "stuck" in one spot.

Alternative Strategy:
(If balls are hit "wild," tell them to use less force in the strikes, i.e., strike it lower)

Although Tyler planned alternative strategies as a way to help her individualize instruction in her fourth day of field experiences, it was not until her sixth field experience that she said she was able to do so in practice. She knew "that" before she knew "how."

> I saw that one child's skill level was far beyond another one. So I actually, and this is the first time I've done this, worked with them on two different levels. OK. And I never did that before. It was like, let it slide because I want to get this over with....I might have noticed it but I didn't put anything into practice. (Tyler, interview)

Consciously and intentionally, Tyler began to draw on alternative strategies in teaching. She began the task of individualizing instruction and putting her philosophy in practice.

For me the climax of the alternative strategy story came during one lesson when, due to a lack of class time, the lesson plan was done by the teacher educator and seen for the first time by the preservice teachers in the hour prior to teaching the lesson to the children. Thus, Tyler had not been able to develop major emphases or alternative strategies before teaching. She described her lesson in a way different from earlier lessons--her tone was more positive and confident. Her learning-to-teach journey seemed, to me, to be going in the direction she wanted.

> Not unlike I had anticipated, this experience turned out to be one of the most educational, actually for both my students and for myself, of any taught to date. It was a challenge to take a list of tasks and turn it into an educational experience wherein major points of emphasis (or `focuses', as I prefer to refer to them), and related alternative strategies were derived, sort of `on the spot'....For each task, I proceeded to determine the one point of focus that needed the most consideration (above and beyond other, `smaller' problems), and worked with the group, both as individuals and as a whole, to attempt some sort of change toward my (the) ideal. (Tyler, lesson evaluation)

The concept of alternative strategies was part of the content of the methods course. One Friday was devoted to discussing alternative strategies as a technique for eliciting quality, variety, and individualizing instruction. In addition, class discussions both before and after field experiences frequently centered on alternative ways to deal with what could or did happened with the children. Several students were captured by the idea of generating alternative strategies. They discussed the idea in interviews and

incorporated alternative strategies into their lesson plans. Other students did not. That Tyler did suggested the concept was meaningful to her, she was ready to use it, and it satisfied her need to begin to learn how to individualize instruction (Strike & Posner, 1985). It was the right concept at the right time.

Individualizing instruction was only part of Tyler's philosophy. She did not discuss with me the connections between her practice and her goal to help the children develop positive self-concepts. Even though I wondered about her views on these connections I did not ask her about it in interviews. I do not know if Tyler did not see the connections or that the topic simply did not come up. What Tyler and the other students said was important was without question considered to be important; however, to them, this does not mean that I was aware of everything they found salient.

Tyler tended to chart her own course. She was attuned to the development of her skills and knowledge. She actively and progressively built on her knowledge and set goals. One central task she set for herself was to learn how to put her philosophy into practice. Like the developmental tasks described by Havinghurst (1952) and Oerter (1986) this task was a significant challenge that came to the forefront after she had dealt with other, maybe more basic teaching skills.

Achievement and Complexity: A Sense of Heat--Robin

Background. Robin transferred into Alexandria University after taking two years of general college courses at another university. Although initially in a different major, she decided to change to physical education after her aunt suggested physical education because Robin liked sports and worked so "well" with her younger cousins.

Robin did not remember having structured physical education in elementary school--just free time to play. She had physical education in middle school and she thought she might have taken one year of high school physical education. Robin said she swam competitively when she was seven or eight years old for about four or five years and stopped when she was no longer successful. She participated in several interscholastic sports in high school. At the first university she attended she ran cross country for one season giving it up because "it was painful and I wasn't very successful....[It was] not enough fun." A one-semester coaching practicum and a few months with a preschool physical education class were the extent of her previous teaching experiences.

Success/achievement orientation. A primary thread running through Robin's story was her concern about being successful--being a good teacher. She was driven to be a skillful teacher, frustrated when she could not make things work in field experiences, and scared that she would not

achieve the level of success she desired. She wanted success now. In the following quote Robin discussed her feelings when she observed three experienced elementary physical education teachers.

> When I was watching Emma, she was just so quick with things to think of...she was really good with them....All three of the teachers I watched [were]. I was like, "what am I going to look like?" It's so easy for me to be critical in here and cut them down for things that they've done but what am I going to look like? I want to look better than all of them and it's a scary thought that they may have been in there ten or so years and I'm going in as a first year teacher and I've got a lot to take on and it's a scary thing going in thinking this is your first year and you haven't had really any experience and it's from experience that you get better. I don't like thinking that I'm not going to be good. And (being that I was so critical of them, of things that they were doing) what am I going to look like? I have this ideal picture and it's just scary thinking that it's probably not going to be like that. (Robin, interview)

Robin wanted to be a good teacher. She acknowledged teaching was difficult and that she was a beginner, but teaching like a beginner was not adequate. She wanted to be better than experienced teachers she knew. Robin, however, knew learning to teach took time and experience, experience she might only get once she graduated.

> Robin: So is there some set time when you're going to have the experience, enough experience that you're a good teacher?
>
> Inez: I don't know. You were talking about that, like ten years from now?
>
> Robin: Yeah. Right.
>
> Inez: It seems a long time to you.
>
> Robin: Right. So what do you do for ten years, just gain the experience and be a half way

(pause)?...Yet, you still have to have the experience of doing it. So you're still not finished with your education and you're not really the teacher you want to be. You know people go to school to become something. I don't know when I'm going to become that. I guess it's just a continual process isn't it?

Inez: Yeah. But, you're right you go to school to become it. It sounds like you had a sense that when you got done you were going to be a teacher.

Robin: Yeah. But you're not. You're going to have some basis for becoming a teacher.

Inez: How does that feel?

Robin: It's scary.

Robin held high standards for herself and was her own most exacting critic. Her lesson evaluations and journals were often detailed critiques of what she should have done better and how and why.

As a learner Robin valued hearing over reading, doing over writing, and experience over studying. She seemed to learn best by trying her ideas and evaluating them in action. While other students visually reviewed their lesson plans before teaching, Robin would grab a ball and try out her tasks. When I asked if I could photocopy her class notes for this study, she agreed but warned me she had taken so few notes they would be valueless.

Robin seemed to learn to teach primarily by reflecting on field experiences and integrating what she learned into what she already knew. She learned by building. When speaking about Friday class discussions she said:

Usually if you're not there you won't get it. And it's

> stuff that you go through and it's like a building block. You keep adding different situations [inaudible word] or thoughts, or what-should-I-have-done. And it's just a building process and it's usually pretty good. It's a long time (two or three hours is a long time to be there) but just getting up and working with those balls, that was great. (Robin, interview)

Practicum as a method of teacher education suited Robin. She valued experience and learning by doing. She did not value written assignments. Although she was driven to achieve as a teacher on the floor, this drive did not extend to her written work. In the first part of the course Robin did not turn in lesson plans and she came to class unprepared.

Part of Robin's problem with written work was that she did not know exactly what the teacher educator wanted her to write. "I'm not really clear what exactly it is that I'm supposed to write down. All the writing stuff, I'm off track on that." Another problem was that she did not want to spend the time needed to do all that was expected.

> Robin: One thing that's really hard for me to do is...to write what I see the kids doing. I can't find myself doing that because I could spend a page on each thing I see and you're spending thirty minutes with six different kids trying to explain what each one's doing or what you see them doing and I just find that really difficult.
>
> Inez: The amount of time it would take you or just doing it?
>
> Robin: Yeah. I mean you can go on for days....
>
> Inez: I don't get the sense that you really want to spend 45 minutes on
>
> Robin: No I don't. And usually I'll put it off until the following week. I'd like to sit down right

> after my lesson and write down exactly what happened....That's what I'd like to hand in right there, just the sentences, you know, this happened, da da da da da. It covers a lot of information and that's what I would probably take and put in paragraph form, and I guess make it more wordy. I don't know. But the way my schedule goes on Wednesday, (I should be doing it Wednesday night) I go Wednesday morning to Onondaga Lake Elementary School. Then we have our kinesiology Wednesday afternoon. So by 4:00 I don't feel like doing any more work. And then usually I either work Wednesday or Thursday night, then it's the weekend. (Robin, interview)

Even though her grade was based on her written work, Robin did not want to spend much time doing it.

Writing was difficult for Robin and she did not value what she learned from doing it. "I just don't take her paperwork as important as the teaching and what I'm getting out of it....I've just kind of blown it off." In addition, despite her critiques of her own teaching, Robin sensed she was doing a good job teaching the children without needing to do a thorough job with the written work. Furthermore, Robin sensed Dr. Watson thought Robin was doing fine.

> Robin: I get the impression Dr. Watson thinks that I know what's going on. She tells me....So I've got this--I don't know--this new impression that I can get away with something which isn't really good to have.
>
> Inez: Like you can get away with not doing the work?
>
> Robin: Exactly. The written.
>
> Inez: Wouldn't you like to?
>
> Robin: What?
>
> Inez: Get away with not doing the work?
>
> Robin: Yeah....It's like she gives me this impression

> that what I'm doing is good and doesn't really get on me about not doing the things right. It's like, "you made a `C' on this paper; don't worry about it." I mean that's what she says, it's like, you know, don't worry.

Inez: What would you want her to do?

Robin: Well. if she wants me to have something different then I think she needs to tell me that.

Thus, Robin was waiting for the teacher educator to make her do the written work or make her do it better.

As a teacher Robin was quick and flexible in thought and action. She seemed to me to be at home in the midst of a group of children moving. The complexity and pace of teaching, while a concern, did not unnerve her. She was able to quickly generate several possible action plans for a teaching situation and could easily handle several things at once. For example, Robin was teaching her group of six children when the teacher educator interrupted her to make a comment about Robin's teaching. Without stopping the children or her teaching, Robin listened and then used the teacher educator's idea in the ongoing lesson.

Robin taught with a sense of command. She traversed quickly among the children frequently demonstrating, complimenting, and questioning. She was lively, animated, and focused. The rest of the children would be lined up ready to leave the gym and Robin's group would be getting one last try, one last explanation, one last compliment. Robin went after action and learning--hers and the children's.

Robin's achievement orientation fit with the approach to

elementary physical education taught in the course. She said she liked the approach because

> It works....What I think that I've learned is a base of knowledge and I can pull or put it anywhere I want....These children are young, they're ready to work, they're ready to develop skill and it's not important that they play a regulation volleyball game. They'd rather be playing something that's fun and works....I've just been so impressed with what I've been able to do with my fourth graders. I'm convinced that if I were in a situation that was ideal like that, that it'll work. That with my style, with the way I am that I can be creative enough and motivate them enough that they're going to become more skilled. (Robin, interview)

The approach with movement as its framework and an emphasis on skill development and children's decision making fit with Robin's flexible, action-oriented, achievement-driven, way of thinking. She thought it matched her personality. She could freely manipulate the movement content to align it with the children and context. I thought she had a psychological affinity toward the approach specifically and the complexities of teaching in general. She may have been frustrated with a lack of instant mastery, but she was challenged.

Robin valued success and achievement not only for herself but also for the children--she aimed straight for skillful movement. Robin liked teaching in the elementary school where children want to learn as opposed to junior and senior high where students "don't want to get sweaty" and are "blaah."

> I believe that it's important for children to become skillful; and that they realize that they can gain a

> good feeling from it; and that from my positive approach and my pushing them and expecting a lot from them that I can help them build their self-esteem. (Robin, interview)

Throughout the methods course Robin approached teaching from this focus on children's learning and development. Although she often spoke and wrote about her teacher behavior, her behavior was considered in light of its relationship to how the children learned.

The focus on children's learning served Robin's knowledge development well. It was a focus that guided her observations and reflections on her lessons and consequent insights into teaching. As Feiman-Nemser et al. (1986) suggested, a central task of teaching is helping children learn. Knowledge built from this stance would be valuable for teachers-to-be. Examples of two such insights follow. The first brought Robin to a more sophisticated understanding of how to evaluate the progress of children's learning.

> Another thing that I've realized is that I must take intentional time to find out verbally how the students feel and think. I must ask more questions and even more important give them the opportunity to answer....I'm really seeing more and more why I should make it a point to use more divergent questioning. Not only does it give the students a chance to synthesize what they're doing or striving for, but it gives me a chance to see what they know, what they're taking in, what they aren't grasping, etc. Once again, something else to think about and commit to practice. (Robin, dialogue journal)

That Robin said she will "see" what the children know when what she is asking for is a verbal response is natural. A physical educator's primary mode of gaining information about children's learning is visual. Many responses, particularly

motor ones, are plainly seen, but the complete picture is not observable. Children's thoughts and feelings are often hidden from view. Teachers need more than vision to find out how children are understanding the content being taught. Asking questions can help.

Learning how to refine skill by varying tasks was another example of an insight that was guided by Robin's focus on children's learning.

> One thing I'm always concerned with is challenging the students so they will be interested and willing to do the lesson. I've got an image in my head of children being self-directed, on task, working hard (sweating), eager, motivated, and well-behaved. That's a pretty ideal setting for skill development, but as I have found, that is quite difficult to acquire especially for any length of time. With basic tasks, it's hard to always come up with creative interesting ways to keep the children focused. I have found that alternating tasks frequently yet still getting at the same goal (skill) is one good way to keep motivation levels up. Staying on one task (with no varying) too long gets boring to children, as well as they tire if asked to keep going for any length of time. The idea here is to use a variety of tasks to keep the children motivated and interested. The more creative you are in your task design, the better. But being able to create a lot of interesting tasks is quite a tough job....I think one of the hardest things to get students to do is refine a skill. Since this takes practice, and quite often repetition is the key, they will stop before enough time has elapsed. (Robin, dialogue journal)

Robin understood how complex the teaching/learning process could be. She learned she could not simply present a task and have the children practice until they got it. Tired, bored children are not likely to work on learning. She learned she had to be mindful of the children's feelings and creatively design a variety of tasks.

Robin's goal for herself and the children was achievement and competence and this goal drove her in her efforts to go after learning. Robin thought, however, her achievement orientation could be a problem at times. She was impatient with the pace of learning and sometimes it seemed she was working against herself. Two examples follow.

First, Robin thought she had overloaded the children with too much information.

> I feel like I use too many words as it is because my first drive is like [spoken very quickly] "I want to see perfection right now, here's exactly what I want you to do, I want to see your knees bent, your going under the ball, your hitting here and there, and there [demonstrates a movement] that's exactly how it should look. GO." And I want them to do it. So it's really hard for me to--you know--[spoken slowly] "OK we've got to do this one at a time, one step at a time." And I'm trying to realize that overload, overload doesn't do it. (Robin, interview)

> I need to realize I should focus them on one or two things at a time and then gradually give them more information. That's a tough one for me. I want success so soon. It's hard to pace myself to acquire a desired outcome way down the road. Impatience is my problem. (Robin, dialogue journal)

Second, Robin's orientation coupled with her knowledge that children must practice to learn pushed her to keep the children as active as possible. Active children is, of course, an important goal. Robin felt, however, that her desires to keep the children "active and practicing" sometimes got in the way of learning.

> I need to plan more cognitive and affective objectives and strive to find out if they are met. That's got to be intentional. I'm always so wrapped up in skill work

> that I forget the obvious--to ask students about their thoughts. I'm more than willing to make changes through student's suggestions and am eager to give them chances to make decisions about which piece of equipment is the best (i.e., the plastic ball vs the moon ball) to use or why some rule should/shouldn't be used, etc., but sometimes I forget to ask. I have taken the opportunity to try that when we used the nets the first day, I asked them what we should change etc., but I never really asked them to explain why something was too difficult or better if done another way. That seems like common sense, but once again my impatience and panic for the task to work out, didn't allow for me to stop and get the kids to talk it out. (Robin, dialogue journal)

The very same orientation that helped Robin go after learning in the first place was also, at times, a detriment. She had to learn how and when to balance her desires to see active, "sweaty" children instantly learn the content she was teaching with her growing knowledge about the time-taking, multi-dimensional process of learning.

To interpret Robin's story the reader needs to remember the context. The methods course content focused on children's learning. In addition, the preservice teachers were not graded on their teacher behavior but on their written reflections on the children's progress toward meeting the lesson or unit objectives. Thus, the teacher education context encouraged, supported, and prodded the preservice teachers to focus on children's learning. Nevertheless, several students did not show the clear focus on children's learning that Robin did. It was a focus Robin embraced that fit naturally with her achievement orientation.

Teaching is complex: A sense of heat. A second prominent theme for Robin during the methods course was her

knowledge that teaching is complex. Robin talked about the overwhelming amount of information she had to remember and act on during teaching. Although many students said teaching was difficult and that there was a lot to think about, Robin, more than any other student, listed why and how teaching was hard. She saw the task of teaching in details and learning to manage these details was difficult.

Robin: You think about safety...organization. You think about which task you're supposed to do next. You think about how you're going to give this child feedback, how you're going to scan over everybody....How you can challenge each individual, how you can help their individual needs, how you can keep them motivated, on task, self-directed....[And asking:] "were they getting at what I wanted?" and "what was it that I wanted?" I mean I had it laid out on paper, but I'd never seen it before. And, I'm trying to see it and I'm trying to deal with the tambourine at the same time and spacing and keeping them attentive to me and not everybody else. Wondering, "am I doing this right?"

And everybody else is looking, I mean I sweat, panic sweat for the first five minutes because we were trying to travel and they weren't actually traveling. They kind of kept looking at other groups....I was like you shouldn't have sweated that. You should have expected that these kids were going to look around and were going to hear other tambourines and be wondering what everybody else was doing. And you know you've got Dr. Watson sitting there, right there. I mean I knew she was there watching me, And as much as I want her to, it's still--I was panic stricken....

Inez: When you feel yourself panic, what do you remember feeling or thinking about? What's going through your mind?

Robin: Rush. I was just like quick, do something--make them. You know I think I said this, I think I said to them you guys are making me crazy here. You're not doing what I'm asking you. Please. Pleeease.

It was just a sense of heat. (Robin, interview)

Thus, Robin felt that there was much to do and many decisions to make. Furthermore, she realized many decisions were not simple nor straightforward. The problems she faced often had many possible solutions and within these solutions lurked contradictions, ambiguities, and dilemmas. At times, teaching demanded that she give up one objective to accomplish another. For example, she discussed putting children in pairs, a teaching task that appears on the surface to be a simple matter. Yet, her discussion revealed dilemmas. She noted children tended to choose their friends and segregate by sex resulting in both positive and negative outcomes. She outlined the benefits and limitations to both children when two children of different ability levels are paired and the demands this type of pairing puts on the teacher. She described the "trade offs" she needed to consider when she paired children of different abilities. Finally, she discussed how difficult it was to remember on her feet all that she needed to consider when she put children in pairs.

Adding to Robin's sense of the complexity of teaching was Robin's tendency to considered several possible explanations for why children responded as they did. She did not try to account for children's responses in simple, single-dimensional ways. Over the semester Robin gave developmental, biomechanical, perceptual, kinesthetic,

emotional, motivational, cognitive, physiological, and social explanations for children's responses. She drew connections among the different explanations and connected what the children did to what she did as a teacher. The following example is her explanation of one child's attempts to learn to continuously strike a peteka bird. (A peteka bird is a soft, palm-sized, padded object with three, eight inch "tail" feathers used for striking with the hand. It resembles a giant's shuttlecock.)

> One thing I noticed though is that when he switched to the peteka bird, he had a real hard time sticking with the underhand hit. He kept doing an upward thrust trying to jab the bird when it was close to face level. The thing is, is that he realized what he was doing and found it difficult to try to let it drop when he was so excited and challenged by just trying to hit the small target. It may be that it's right there at eye level and it may seem easier to concentrate on. It's hard to watch the bird come all the way down and then try to get it. Maybe it's easier to miss (or seems to be) once it's near the waist. Just a thing to consider and continue to watch. It's that above head swat I need to look at. It might be a more powerful move and that's what the children are trying for. More thought and observation to do. (Robin, dialogue journal)

Robin was attuned to the many-faceted nature of how children learn at school.

Recognizing the complexity, dilemmas, and trade offs of teaching and being able to generate viable solutions did not bring her peace and comfort. Rather, wanting to be successful, she wondered how she would manage.

For Robin, the central issue in learning to manage the complexity seemed to be how she could give each child in a class individual attention.

> Something I've yet to experience and understand, is how a teacher is capable of seeing 25 or so kids, scanning for safety, observing for skill, etc. and being able to meet individual needs. How can we get to individuals that need to be directly related to? I just feel so certain that if I could work with someone for some length of time that I could persuade them to try harder and improve skill. I guess we have to make some sacrifices, and find adequate teaching methods to get to everyone in a more general (less individualized) way. I'm still dealing with that less than maximal attention/help I'm restricted to. It bugs me to know if we had less students (or more teachers) we could gain so much more. (Robin, interview)

In teaching large groups, Robin was concerned about helping each child learn and she was concerned about insuring safety, in particular, when teaching gymnastics.

> Dr. Watson says you can say, "now if you'd like to try a forward roll you may if you feel comfortable. Just do it slowly." And she says that while you're scanning that you'll be able to pick up that wrong movement right away. And, I don't see that. I mean if you've got 26 kids, 15 or 20 of them might be trying it. It just takes a minute to land on your head like Landon did and land on your neck and all that weight's coming straight down....I would almost like to line them up. Maybe. See, it's just I don't understand how I'm supposed to [help individuals] and then watch everybody for safety. (Robin, interview)

Teaching forward rolls to a group of children meant fear for safety. Robin wanted control; she was not sure she could see the discrepant movement; she wanted to be right there when each child tried to learn to roll. Going one at a time meant safety and security. About peer teaching the past semester Robin said:

> [I was] trying to work with Marty or B.J. or Frazier and getting them to roll and it's quite easy for me to be able to stand there and help them. No problem. And we did it one at a time. That was great. I felt very comfortable with that because I felt secure. (Robin,

interview)

Robin's concern about how to deal with each child in the mass of faces in a class was reinforced by several views Robin had about teaching. First, Robin felt restricted by what she thought was less effective group teaching methods such as scanning and group feedback, and she was sure one-on-one attention was necessary for learning.

> Robin: He [a boy she was tutoring] eventually started moving in that one-on-one situation....But, how am I going to do that with 28 kids? How am I going to get to that one person and do that? That's something I don't understand.
>
> Inez: You think you have to get to that one person.
>
> Robin: Yeah....It's going to wear off if I'm in the middle of the class demonstrating it or coming around just for 30 seconds and saying, "really move your feet now." And check and he doesn't do it, [and say to him] "come on, really try." And then walk away. It's not going to do it. I think you've got to give them that time. (Robin, interview)

In addition, Robin was concerned about her ability to help each child because she was aware of how easy it is to lose children in the vast, unseen corners within a group of active children.

> I did have a little trouble with one of my children and that was keeping him going. He seemed to try one thing and then just stop and watch or mentally wander off. It took my continual prompting to get him to stay on task, and that's difficult when trying to work with the other students as well. I'm not sure what I'd do with him if I had 20 other kids. I guess, often times, kids like him just get left by the wayside. They're not disruptive, but they just try to disappear in silence. Scary. How do we get children to be self-directed or even care about being there? (Robin, lesson evaluation)

Robin knew children hid in a class. She knew how hard it was

to find them and when found that she could not be there for every one of them all of the time. One solution was self-directed learners, yet helping children learn to be self-directed is not an easy task of teaching.

Robin was attracted to one-on-one teaching as a better way to help children learn. She thought individual attention was necessary for learning, she thought it gave her control over safety. The context and content of teacher education may have fed Robin's attraction to one-on-one instruction and her frustration and concern with large-group teaching techniques. In both the elementary methods course and the secondary methods course the previous semester the field experiences were primarily small-group teaching experiences. In addition, a component of the secondary methods course was giving individual, specific feedback. A component of both the elementary content and elementary methods courses was analyzing the movement of individual children. The message implicitly and explicitly is that teaching is a one-on-one activity. This is, in part, true, but individual and small-group teaching skills are not a complete teaching repertoire. Children arrive at the gym in large groups and it within this structure that teachers have to manage to teach. Large-group teaching techniques are necessary. Small-group teaching experiences are one way to reduce the complexity of teaching for teachers-to-be, but it seems the teaching techniques used in small-group instruction do not mirror the teaching skills

demanded by large groups. For example, the need to scan, have equipment well-spaced, rely on group feedback, and help children be self-directed, self-managed learners are all less pressing with small-group instruction.

Although Robin valued one-on-one teaching and said she would have preferred using teaching techniques enabling her to do this, e.g., having the children stand in line, she avoided these techniques because she felt she had to--she was intimidated.

> I get really scared about putting them in lines for some reason....I didn't feel like I could spend time with one person. I felt like everybody's supposed to be doing--I don't know. I just felt really intimidated by some set rules, if there are even set rules because when I put my kids in the line for the tossing [drill] I just got really scared when Dr. Watson came. I was making all these excuses....And she was like "great, this is good, this is a good drill." So sometimes you're just intimidated by what might not be right, what might not be acceptable. (Robin, interview)

Despite her reluctance, Robin seemed to accept the inevitability of needing to learn large-group teaching techniques, and she worked on these skills within the small-group field experiences. She reflected in journals and lesson evaluations on her problems teaching, often generating solutions with her eye on the large-group context. For example:

> One thing I'd like to try to accomplish better is the way I give feedback. I'd like to try to give informative or critical (for improvement) feedback to the group as a whole....With positive reinforcement I'd like to try and do that more individually. The key here is to limit the amount of time spent talking. I seem to keep forgetting I can stop the whole group, have them

> look, and then focus them to a certain aspect of a skill and then let them go back to work, emphasizing what was discussed. Also I keep forgetting I can bring them in for a demonstration. Since I've gained this awareness, I'll try to focus on this in my next lessons, by delivering important cues to the class as a whole. (Robin, lesson evaluation)

During the methods course Robin was oriented toward achievement. She focused on children's learning and was driven to become a skillful teacher. She also recognized the complexity of teaching--the demands and dilemmas. Her orientation coupled with her sense of the complexity left her, at times, feeling frustrated and impatient.

Discussion

Marty, Tyler, and Robin approached the methods course from different orientations toward learning to teach. Marty valued and sought received knowledge and step-by-step learning to teach. Tyler set developmental tasks and charted her own course. Robin focused on her own and the children's achievement. Their orientations served as powerful perspectives influencing what and how they learned to teach. Content does not move from textbook to student intact and unaltered. It is not student-proof. Individuals construct their understandings based on prior knowledge (Anderson, 1977). With different orientations toward learning to teach arising out of different physical, cognitive, and affective biographies, Marty, Tyler, and Robin made sense of the methods course in different ways.

First, although similar at times, their most salient

issues, insights, and problems differed. For example, Marty was concerned she did not know what she wanted and what to look for, she wanted to know what the teacher educator wanted, she wanted to do things right. For the children she valued safety, order, fun, success, and fairness. Tyler worried about being watched, eliciting skill, giving feedback with ease, dealing with individual differences, and putting her beliefs into action. First and foremost she valued positive self-concepts for the children. Robin wanted to be competent. She delved into dilemmas, analyzed complexity, and wondered how she could challenge, motivate, and help each child in her class. For the children she valued skillfullness.

Second, even with similar knowledge components, there were differences in the meanings each made. Recognizing she needed to know what she wanted and what to look for was a "big eureka" for Tyler--a developmental milestone she viewed positively. For Marty these same questions were a source of distress, while Robin seemed neither distressed nor elated by this knowledge.

Thus, Marty's, Tyler's, and Robin's orientations seemed to influence what they learned, what they valued, and the ways they approached learning to teach. Although members of the same class, they had very different stories to tell.

CHAPTER X

SUMMARY

Purpose of the Study

The purpose of this study was to describe and analyze what and how seven preservice teachers learned during a field-based methods course. Two questions guided the research: (a) what was the substance of salient knowledge components of preservice teachers during a field-based elementary physical education methods course? and (b) how did these knowledge components develop?

Theoretical Backdrop

Theories, frameworks, premises, arguments, and research findings from developmental psychology, cognitive psychology, and education informed this study. Research in developmental psychology seeks to describe not only patterns of development but also individual differences. Development is assumed to result from the interaction between an individual and the environment; therefore, personal history, context, and current experiences become factors that can account for similarities and differences (Baltes & Reese, 1984; Lerner, 1986; Salkind, 1985; Schaie, 1965). Change need not be steady, but may be punctuated by developmental milestones (Shirley, 1933; Roberton, 1984). The mastery of certain tasks may be more significant at one point in time than at

another (Havinghurst, 1952; Oerter, 1986).

This study viewed knowledge development as a constructive process. The preservice teachers made sense of course content and experiences based on prior knowledge (Anderson, 1977; Strike & Posner, 1985). Growth was assumed to move toward increased differentiation and integration (Werner, 1957) with changes in knowledge structures involving accretion, tuning, or restructuring (Rumelhart & Norman, 1978).

Cognitive psychology research suggests that the quality and amount of context-specific knowledge play an important role in expert performance (Glaser, 1985, 1987). Compared to novices the knowledge structures of experts are inferential, deep, highly organized, connected to practice, and holistic, enabling quick, flexible use (Dreyfus & Dreyfus, 1986; Glaser, 1985, 1987; Lesgold, 1984). Researchers in education are beginning to study the context-specific knowledge that teachers use. Early results suggest the knowledge of expert teachers shares characteristics of the knowledge of experts in other domains (Berliner, 1987; Calderhead, 1983; Carter et al., 1987; Clark & Peterson, 1986; Housner & Griffey, 1985; Leinhardt & Smith, 1985; Ropo, 1987).

One form of context-specific knowledge important to this study is pedagogical content knowledge defined as:

> the understanding of how particular topics, principles, strategies, and the like in specific subject areas are comprehended or typically misconstrued, are learned and

> likely to be forgotten, (L. S. Shulman, 1986a, p. 26)

and

> the ways of representing and formulating the subject that make it comprehensible to others. (L. S. Shulman, 1986b, p. 9)

Stronger pedagogical content knowledge has been found to enable while weaker knowledge limits a range of teaching actions (Carlson, 1987; Gudmundsdottir, 1987a; Peterson et al., 1987; Roehler et al., 1987; Roth, 1987; Smith & Neale, 1987; Wilson & Weinberg, 1988).

Because this study focused on knowledge development in a field-based methods course, the research on learning in field settings was particularly informative. Teacher education is based on a hoped-for transformation of knowing "that" learned in university courses into knowing "how" to teach in the field. Several studies, however, found that despite efforts, expectations, and intentions, transforming knowledge "that" into knowledge "how" is not automatic or easy for teachers (Calderhead & Miller, 1986; Feiman-Nemser & Buchman, 1987; Feiman-Nemser et al., 1986; Grossman & Richert, 1988; Russell, 1986; Smith & Neale, 1987; Yinger, 1987). Some research found learning by doing in the field provides opportunities for preservice teachers to develop knowledge that is more holistic, integrated, and linked to what happens in classrooms (Yinger, 1987). Other research suggests that in field experiences preservice teachers develop conservative perspectives, react to social forces, and make decisions

based on personal experience rather than reflect on theory and knowledge learned at the university (Evans, 1986; Feiman-Nemser et al., 1986; Fuller & Brown, 1975; Lanier & Little, 1986; Zeichner & Tabachnick, 1981). This study adds to efforts to document the substance and development of preservice teachers' knowledge in field and university settings.

Research Methods

Research methodology followed guidelines of the interpretive research paradigm (Bogdan & Biklen, 1982; Erickson, 1986; Geertz, 1973; Goetz & LeCompte, 1984; Lofland & Lofland, 1984; Whyte & Whyte, 1984). A semester-long, field-based elementary physical education methods course that used Physical education for children: A focus on the teaching process (Logsdon et al., 1984) as a textbook was selected for the setting. All class meetings and field experiences were observed. Informal and three formal, one-hour interviews with each preservice teacher were conducted. The preservice teachers' class notes, lesson plans, lesson evaluations, dialogue journals, and examinations were collected. Data analysis was inductive with themes derived from the data. The themes were interpreted in relation to the literature. A purposeful search for disconfirming evidence was made.

The Context of the Study

Guided learning-by-doing supported by the study of

theory was an important mode of learning in the methods course. A planning, teaching, reflecting-on-teaching cycle served as course structure and primary content. Most class time was spent planning and learning how to plan a series of weekly lessons, teaching and learning how to teach these lessons to children in a local elementary school, and then reflecting and learning how to reflect on what happened. Reflecting on teaching occurred in class discussions, lesson evaluations, dialogue journals, and individual conferences with the teacher educator. The idea of a teacher as an observer, interpreter, and decision-maker was a framework for the course and was integrated into course experiences.

Findings

The growth toward a fine-grained, integrated, contextual way of knowing. The first of three major themes was the growth toward or a need for a fine-grained, integrated, contextual way of knowing. Four examples were given. First, several preservice teachers learned that the tasks or activities they presented to the children had a content focus and that they needed to ask themselves "what specific content do I want the children to learn in this task?" and "what movement responses should I look for to assess children's learning?" The answers to these questions appeared to be based on their pedagogical content knowledge. When their pedagogical content knowledge was weak they reported lacking a clear focus for their teaching actions, having problems

knowing what to look for, and having difficulty generating appropriate feedback. When their pedagogical content knowledge was stronger, they said they were better able to observe and analyze movement, they knew exactly what they wanted the children to learn, and they felt "confident," "secure," "excited," "totally engrossed," "enjoyment," and "vigor."

Second, one student reported learning that she was presenting the content too quickly and that it was important to analyze and break down the content into a smaller-stepped progression. The more fine-grained understanding of content and progression for this student and the recognition that tasks have a content focus for two other students were critical changes in pedagogical content knowledge. These changes were so important that they seemed to take on the status of developmental milestones, i.e., important changes in their thinking and actions that enabled them to better manage their environment (Roberton, 1984).

Third, early in the semester all seven preservice teachers expressed concern that they did not know what to expect when they taught the children. They did not know what the children's movement responses would look like. The preservice teachers did not raise this concern at the end of the semester, and several described the importance of their growing sense of what to expect and how children learn and how to teach specific content.

Fourth, in a finding similar to other research (Calderhead, 1986; Feiman-Nemser & Buchman, 1987; Feiman-Nemser et al., 1986; Grossman & Richert, 1988; Russell, 1986) six of the students discussed the difficulty in transforming their knowing "that" into knowing "how." They described problems thinking quickly on their feet, reacting to what they were seeing, saying what they planned to say, doing what they planned to do, and applying their content knowledge.

Over the semester the preservice teachers' knowledge became more differentiated and integrated (Werner, 1957). Components of pedagogical content knowledge grew to be more detailed, fine-grained, contextual, and action-oriented. The preservice teachers began to make sense of content, children, learning, development, and teaching in more integrated ways. Their knowledge acquired more of the characteristics of practical knowledge (Clandinin, 1986; Elbaz, 1983). Knowledge growth moved in the direction predicted by research on expertise, i.e., deeper, more connected, more important to practice, and linked to specific outcomes (Berliner, 1987; Glaser, 1985, 1987; Leinhardt & Smith, 1985, Yinger, 1987).

The preservice teachers made some progress in transforming knowing "that" into knowing "how;" however, this transformation was difficult. Difficulty existed despite a setting that combined learning by doing with the study of theory and encouraged reflection on teaching. Although their knowledge was becoming integrated, differentiated, and

oriented toward practice, the journey toward expertise was just beginning and their knowledge still had the characteristics of novices. It lacked the strength and amount of connections that would give them ready access, ease of use, flexibility, and connections to a wide range of practice conditions (Glaser, 1985, 1986, 1987).

Knowledge restructuring. The second major theme was knowledge restructuring. Knowledge restructuring is a clear change in perspective and a reorganization of the sense made of one aspect of teaching (Anderson, 1977; Rumelhart & Norman, 1978; Strike & Posner, 1985; Vosniadou & Brewer, 1987). Cases of knowledge restructuring were found to move toward increased differentiation and integration with the teaching/learning environment (Kegan, 1982; Werner, 1957). Four examples were given.

First, six of the seven students discussed a change from going through the motions to going after learning. They learned that to teach they had to do more than tell the children the tasks and elaborate with a bit of individual feedback. They had to become more involved with the teaching/learning process and go after what they wanted. Factors contributing to going through the motions were concern that the children would be bored, belief that teachers were supposed to follow a lesson plan exactly, nervousness, and lack of content knowledge. On the other hand, confidence, an easing of tension, and strong content

knowledge seemed to facilitate going after learning. Knowing that they needed to focus on learning did not mean they were able to do so consistently in practice.

Second, the preservice teachers learned that the children were not misbehaving on purpose, but rather were, overall, eager, trying, and wanted to learn. This new way of knowing helped the preservice teachers "sympathize" with the children and find alternative explanations for why the children were not immediately learning the skills taught.

Third, several students' awareness of the interactive nature of teaching grew. Teachers' actions affected children's actions; children's actions affected teachers' actions. For example, preservice teachers learned that the accuracy of the teacher's demonstration influenced the children's movement responses and the teacher's enthusiasm influenced the children's enthusiasm. Observing children's responses to teaching cues and feedback, in turn, gave the teacher information on the effectiveness of the teaching cues and feedback.

Fourth, one student described a restructuring of the meaning she made of giving directions. The question was not whether the teacher gave clear, precise directions but whether the children understood the directions she gave. Her viewpoint for evaluating her directions changed from the teacher's behavior to the children's understanding.

Thus, there were times when the preservice teachers'

knowledge seemed to undergo restructuring. The place from which they viewed aspects of teaching changed and they found new, more adequate ways of interpreting what was happening. Some cases of restructuring seemed to be distinct changes, almost reversals, in perspective; others were more of a consolidation of previously ""ill-structured" (Rumelhart & Norman, 1978) knowledge. Several students found restructuring to be a developmental milestone in learning to teach. These findings seemed to support Strike and Posner's (1985) suggestions that knowledge restructuring is enabled by dissatisfaction with old interpretations and tasting the fruitfulness of new perspectives.

Common across several instances of restructuring was developmental change that moved toward increased differentiation and integration with the environment. The direction of development went from self to child, passive to active, detached to involved, and separate to interactive. Increased differentiation and integration meant being better able to act on rather than be controlled by or simply react to the environment, being less consumed by one's needs and more able to care for the needs of children, and being more able to both separate and see the connections between children's actions and teachers' action, and children's feelings and teachers' feelings (Werner, 1957).

Other research found similar developmental changes. Research based on Fuller's three-stage sequence of concerns

found a change in concern from self, to task, to impact (Bogess et al., 1985; Fuller, 1969, 1970; Fuller & Brown, 1975; Hall, 1985; Richards & Gipe, 1987; Schempp, 1985; Silvernail & Costello, 1983; Strawitz & Malone, 1986; Wendt, Bain, & Jackson, 1981). Further, a change from blaming children to being more empathetic and focusing on children's needs was found by Harrington and Sacks (1984), Richards and Gipe (1987) and J. Shulman (1987).

The developmental model that informed this study conceptualized development as the revisiting across the life span of issues, themes, and modes of thinking each time with richer understanding and consequently, more choices (Kegan, 1982; Pearson, 1986). Thus, developmental change does not mean the preservice teachers will never revisit issues such as going through the motions. Nor does it imply that knowledge restructuring is predictable or will occur naturally with experience. Developmental change is more complex resulting from the interaction between an individual and the environment and depending on both what the individual brings and what the environment affords.

Individual differences. The third major theme was individual differences among the students. Profiles of three students, Marty, Tyler, and Robin, illustrated how different orientations toward learning to teach influenced each one's feelings about and understanding of course experiences.

Marty seemed to rely on and seek received knowledge from

an outside source to direct her learning (Belenky et al., 1986). She wanted to be told exactly what to teach the children, in what order she should teach it, and what she should look for when observing the children's responses. In addition, she wanted to learn and was persistent in her efforts to do so. The primary modes of learning in the methods course, however, were based on constructing knowledge. Forced to construct knowledge and rely on her own authority, Marty's desire to receive knowledge was at odds with the methods course learning experiences. Marty's persistence and dedication to learning coupled with the value she placed on received knowledge in a methods course demanding she construct knowledge often left Marty frustrated and unsatisfied. She referred to course work as "ridiculous" and "busy work." Relying on received knowing seemed less than optimal as it limited the growth of her knowledge of content and teaching.

Tyler tended to be a self-directed learner. She identified problems with her teaching, recognized and acknowledged what she learned, and built on her new understandings. Charting her own course, she set a series of developmental tasks (Havinghurst, 1952; Oerter, 1986) including overcoming nervousness, trying to put thoughts into action, learning how to give appropriate feedback with ease, and being able to verbalize more clearly. One central task she set was to learn how to individualize instruction

and put her philosophy into practice. Like the developmental tasks described by Havinghurst (1952) and Oerter (1986), this task was a significant challenge that came to the forefront after she had dealt with other, maybe more basic, teaching skills.

Robin was oriented toward achievement. She focused on children's learning and was driven to become a skillful teacher. She recognized the complexity of teaching--the demands and dilemmas. Her orientation coupled with her sense of the complexity left her, at times, feeling frustrated and impatient. Robin seemed to learn to teach primarily by reflecting on field experiences and integrating what she learned into what she already knew. As a learner she valued hearing over reading, doing over writing, and experience over studying.

Marty, Tyler, and Robin approached the methods course from different orientations toward learning to teach. Their orientations served as powerful perspectives influencing what and how they learned. Although similar at times, their salient issues, insights, and problems differed. Even with similar knowledge components, there were differences in the meanings each made. Although members of the same class they had very different stories to tell.

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