Expertise in Differentiation:

A Preservice and Inservice Teacher Make Their Way

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Abstract

The literature on differentiation offers insights and recommendations on principles, models, and pedagogy. There has been minimal evidence presented, however, about how an inservice teacher learns about differentiation and virtually no research about how a preservice teacher comes to understand and practice responsive teaching. This qualitative study attempts to describe how an inservice and preservice teacher come to understand and practice differentiation and how that process affirms or refutes existing research about competence in addressing student diversity.

The study focuses on one inservice and one preservice teacher over four months in a fifth grade classroom. The key components for data collection were eight interviews with the preservice teacher and six with the inservice teacher, seven observations of the preservice teacher and three of the inservice teacher, and reflection journals from both participants that spanned the entire study. A case study in the final report presents general and particular description of each participant and their lived experience together. Evidence of rigor in the research includes triangulation through interviews, observations, reflection journals, documentation, and videotaped lessons; peer debriefing; member checking; and attestation of an audit trail.

The following four assertions emerged from the study: the practice of differentiation is dynamic, influenced by changing beliefs and knowledge; beliefs and understanding about differentiation are enacted through continuous assessment; a context that supports differentiation is critical for successful translation of beliefs and

understandings into teaching and learning; and key differences exist in the process of understanding and practicing differentiation for the preservice and inservice teacher.

By bringing together what and how a preservice and inservice teacher learn about differentiation it is possible to define specific developmental stages as the content, context, and process of their experience takes shape. While they often find themselves at the same point in development, they move through each stage at different rates of speed and levels of sophistication. Self-system processes, prior experiences, and the complexities of learning to differentiate define the distance between them. The findings show that, in contrast to existing research, the novice teacher is capable of beginning to teach by addressing diverse student needs. However, it is clear that extensive support structures are necessary to remove roadblocks and enhance the progress of the preservice teacher as well as to sustain the momentum of the inservice teacher as they refine their efforts to respond to student variance.

Leadership, Foundations, and Policy

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APPROVAL OF THE DISSERTATION

This dissertation, "Expertise in Differentiation: A Preservice and Inservice Teacher Make Their Way," has been approved by the Graduate Faculty of the Curry School of Education in partial fulfillment of the requirements for the degree of Doctor of Philosophy.

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The Problem

Consistent throughout the current reform movement in education is a concern for providing all students with a clear, focused curriculum based on student needs and designed to build enduring understandings (Darling-Hammond, Wise & Klein, 1999; Melnick & Zeichner, 1998; Wiggins & McTighe, 1998). The emphasis on standards and accountability in conjunction with inclusion, de-tracking, and increasing diversity in the student population spotlights the need for teacher expertise in appropriately differentiating curriculum and instruction (Darling-Hammond & McLaughlin, 1996; Gamoran & Weinstein, 1995; Kozol, 1991; McLaughlin & Talbert, 1993). All students deserve access to appropriate curricular materials, supportive resources, and teachers with expertise in differentiating, or modifying and adjusting curriculum and instruction, to meet their needs (Doucette, Sewell & Shapiro, 1996; McLaughlin & Talbert, 1993; Schoenfeld, 1999; Tomlinson, 1999).

How do teachers become experts in differentiating curriculum and instruction? While most teachers agree that teaching responsively is critically important (Hootstein, 1998; Paine, 1990; Tomlinson, 1995a), teacher education programs, in general, have not prepared teachers for today's diverse classrooms (Britzman, 1991; Cochran-Smith & Lytle, 1998, Levine, 1996). The path from novice to expert in differentiation is a complex, dialectical, and reflective process that can be enhanced by collegial support and action research (Brimijoin, 2000; Simpson & Ure, 1994; Tomlinson, et al., 1995; Tomlinson, 1995a). Expertise in differentiation is evolutionary and characterized by shifts in stages of understanding that require the support of teacher education programs,

cooperating teachers, and supervisors (Howey & Zimpher, 1996; Lidstone & Hollingsworth, 1992; Paine, 1990; Tomlinson, et al., 1995).

Case studies indicate that the widely varying thoughts, interests, and prior experiences of students in the classroom make student teachers doubt their ability to meet the needs of individual students effectively (Britzman, 1991). While research shows that student teachers move through specific stages toward expertise in content and pedagogy (Feiman-Nemser & Buchmann, 1986; Hollingsworth, 1989; Piland & Anglin, 1993), a review of the literature reveals that minimal attention has been given to how student teachers develop expertise in differentiation (Tomlinson, et al., 1995). The focus of research in teacher education has been primarily on the need for beginning teacher competence in designing whole class instruction rather than personalized instruction (Lidstone & Hollingsworth, 1992; Maxson, et al., 2000).

Traditionally, studies of teacher education have looked at the training teachers need and what teachers need to know rather than at the thinking of the teachers themselves (Carter, 1990). Two case studies and a pilot research study (Brimijoin, 1999; Brimijoin, 2000) have called for more analysis of how beginning teachers fare on their journey to understanding differentiation. Given that this is a complex process, case study methodology provides a means to see the journey from the inside – through the eyes of student teachers themselves (Yin, 1994). In-depth case studies of student teachers and their emergent understanding of differentiation can lead to future research on models to improve teacher education, the supervision of student teachers, and the scaffolding necessary to encourage responsive teaching.

Reconstructing Philosophy and Practice in Our Nation's Schools

At the core of school reform for the 21st century is an effort to increase responsiveness to the needs of learners (Melnick & Zeichner, 1998; Kozol, 1991; Schlechty, 1997). Guiding this effort is a mission to educate all students to achieve 'world class' performance standards (McLaughlin & Talbert, 1993). This mission requires that teachers develop the ability to discover and address the diverse needs of students as well as an understanding of multiple avenues to learning in today's schools (Darling-Hammond, Wise & Klein, 1999; Tomlinson, 2000). Developing an understanding of multiple learning paths calls for revising philosophy, while dealing with student diversity necessitates a change in practice (Darling-Hammond & McLaughlin, 1996). Reconstructing philosophy and practice is complex, challenging, and difficult (Goldenberg & Gallimore, 1990; Gamoran & Weinstein, 1995).

McLaughlin & Talbert (1993) explain how the effort to increase responsiveness to learners and a mission requiring radical changes in philosophy and practice combine to create a serious, reform-related problem.

> The changes in practice, content, and pedagogy assumed by the national education goals are extremely complex and difficult to carry out, or even to understand. At its core, the problem of systemic reform fundamentally is a problem of teachers learning how to translate enhanced curricula and higher standards into teaching and learning for all of their students (p. 5).

The task of translating enhanced curricula into learning for all students is complicated by increasing differences in ethnicity, exceptionalities, learning styles, intelligences, and languages in America's schools (Darling-Hammond, Wise & Klein, 1999; Gardner,

1999; Meier, 1995). By 2035 students of color will be a majority in our schools, rising numbers of children from immigrant and migrant families will bring diverse cultural backgrounds to classrooms, over half of all students will live in a single-parent home before they leave high school, and the number of disabled children mainstreamed in heterogeneous classrooms will continue upwards (Sapon-Shevin, 2001). While research has revealed that ability tracking may block the achievement of students who are racially, ethnically, or linguistically different, increasing heterogeneity in the classroom leads to yet another problem (Gamoran & Weinstein, 1995; Robinson, 1998). In a study of restructured schools conducted through the Center on the Organization and Restructuring of Schools (CORS), Gamoran & Weinstein (1995) found that de-tracking in order to provide the same opportunities for all students was confounded by the fact that students have varying needs and capacities requiring differentiated types and rates of instruction. The CORS study showed that because student needs differ, instruction should not be identical in all contexts.

Enhanced Curriculum and Instruction

In order for students to meet the challenge of high standards, schools must create knowledge work that engages, compels, and satisfies them. (Schlechty, 1997). Designing curriculum and instruction that result in enhanced knowledge work means that teachers must focus on teaching for understanding (Wiggins & McTighe, 1998). Creating a clear definition of what students should know, understand, and be able to do as a result of a learning experience forms the core of teaching for understanding (Dewey, 1990). We have known for some time that assessment of students' prior knowledge, performance, interests, learning styles, and misconceptions can sharpen the clarity and direction of

curriculum design (Dewey, 1910; Doyle, 1983;Wiggins & McTighe, 1998). Clarity comes from practicing what Wiggins & McTighe (1998) call "backward design": assessing students' prior knowledge, performance, interests, learning styles, and misconceptions; determining required curriculum standards; defining the intended results of a lesson or what students should know, understand and be able to do as an outcome of the learning experience; specifying the evidence required to evaluate those intended results; and then creating supporting learning experiences.

Deep understandings are built into backward designed lessons by targeting essential questions, concepts, and organizing principles, and linking them to a culminating performance (Erickson, 1998). According to Faulk (1999), a focus on concepts and enduring understandings provides "multiple entry points" for students (p. 25). Research on Cognitively Guided Instruction (Franke, et al., 1998) demonstrates the important role concept construction plays in the mathematical thinking of children. Research in developmental psychology has shown that children and adults construct and internalize personal understandings through situations that allow cognitive conflict, exploration, and individual control over learning (Cannella & Reiff, 1994).

Because many of the reform initiatives in education call for students to "think like" historians, scientists, mathematicians, or writers, instruction cannot be simply an assimilation of isolated facts and data (Banks, 1997; Schoenfeld, 1999). However, most teachers today tend to hold the following beliefs about learning: that students are receptors of information; that teachers tell and students do; that content consists of isolated bits of information; that the teacher's responsibility is coverage rather than "uncoverage" of the textbook; that intellectual discomfort is a negative experience for

students; and that a teacher delivers content gathered from outside rather than inside the discipline (Nelson & Hammerman, 1996). Current research shows, however, that enhanced curriculum and instruction should be designed to "uncover" concepts or inquire into, around and underneath content, and build in relevance by connecting the discipline being studied to the context of the student (Wiggins & McTighe, 1998).

Contextual and Developmental Learning

Neuroscience research is offering important insights into the relationship between context and the structure of nerve cells and synapses in the brain (Katz, Rubin, & Suter, 1999). The theory of "situated learning" postulates a connection between cognitive learning and social practice in the world of the student (Lave & Wenger, 1991). Bransford, Brown, and Cocking (2000) describe the results of research on the relationship between situated learning in complex environments and structural changes in the brain:

> Studies have found alterations in the weight and thickness of the cerebral cortex of rats that had direct contact with a stimulating physical environment and an interactive social group. Subsequent work has revealed underlying changes in the structure of nerve cells and of the tissues that support their function. The nerve cells have a greater number of the synapses through which they communicate with each other....These findings suggest that the brain is a dynamic organ, shaped to a great extent by experience – by what a living being does, and has done (Bransford, Brown, & Cocking, 2000, p. 126).

Other research shows that certain situated learning experiences are more influential on the brain and the mind at certain points in time, thus supporting the view that learning and development are interdependent (Piaget, 1955; Vygotsky, 1978).

Zemelman, Daniels, and Hyde (1998) describe developmentally oriented teachers as having respect for the emerging capabilities of groups as well as individual students and perceiving diversities as contributions to the richness of the student population.

In order to match learning with the appropriate developmental level, it is necessary to design curriculum and instruction which take into account the level of independent learning and the "dynamic developmental state" or zone of proximal development of the student (Vygotsky, 1978). If the delicate balance of challenge and skills is achieved, engagement is more likely and may result in "flow," or an optimal learning experience resulting from focus on clear and compatible goals (Csikszentmihalyi, 1997).

Increasing Diversity Among Students

Constructing engaging, enhanced curriculum that focuses on mastery of concepts, enduring understandings, and a delicate balance of challenge and skills for a broad range of students is a complex process (Cannella & Reiff, 1994). Demographic trends in the United States show that our nation's schools are increasingly populated by students whose culture and language are unique, students of color, students who suffer from poverty, and exceptional students who are part of inclusive instructional programs (Banks, 1997; Lesar, et al., 1997; Maheady, Malleete, & Harper, 1991). Today, nearly ten million school-age children and youth are from homes where a language other than English is spoken (McLeod, 1995). In 1998, 37% of public school students in grades 1-12 were considered to be part of a minority group, an increase of 15% since 1972. White, black, and Hispanic students accounted for the greatest increase, and students from other racial-ethnic groups also increased from 1% in 1972 to 5% in 1998 (United States

Department of Education, 1998). Statistics from the Early Childhood Longitudinal Study of Kindergartners (National Center for Educational Statistics, 2000) indicate that 18% of entering kindergartners show signs of hyperactivity, 13% have difficulty paying attention for sustained periods, and 11% have communication problems. Results of this study also show that 29% of kindergartners can associate beginning letters with sounds, 2% are able to read sight words, and 1% can read more complex words. Twenty percent can count and read single-digit numbers, read two-digit numbers, identify ordinal position, and solve simple word problems. Four percent begin kindergarten able to solve addition and subtraction problems; they are already doing basic arithmetic. On the other hand, 18% of kindergartners are not familiar with the fundamental conventions of print – they do not understand directionality in producing or interpreting printed material. Thirty-four percent cannot identify letters of the alphabet. Forty-two percent cannot count to 20, 6% cannot count to 10 or identify simple numbers and shapes and are not at the first level of math proficiency.

Those human characteristics -- biological, social, environmental, obvious or covert -- that influence an individual's capacity to learn in school are what Ducette, Sewell & Shapiro (1996) have called diversity. Proposing four orientations to diversity, Paine (1990) suggests there are individual differences that are biological and psychological, categorical differences such as gender, social class, and race, contextual differences that situate the patterns in individual and categorical differences within a larger context, and pedagogical differences that link awareness of diversity with responses in educational settings: "For educators, a *pedagogical perspective* on diversity

assumes that differences are not simply random and interesting; they are understood as having pedagogical implications – consequences for both teaching and learning" (p. 3). Teachers have a responsibility to address the fact that variations in ability, learning style, interests, and prior experiences guarantee that every student will be like no other student (Dewey, 1910; Ducette, Sewell & Shapiro, 1996; Rose, 1989).

Meeting the needs of this increasingly diverse population is not easy for America's schools because curriculum, instruction, strategies, and evaluation that work for some students will not work for others (Berliner & Biddle, 1995). According to Bruner (1963), aiming teaching at the average student to provide "something for everybody" is not an acceptable solution:

> The quest, it seems to many of us, is to devise materials that will challenge the superior student while not destroying the confidence and will-to-learn of those who are less fortunate. We have no illusions about the difficulty of such a course, yet it is the only one open to us if we are to pursue excellence and at the same time honor the diversity of talents we must educate (p. 70).

In a longitudinal study of 233 prospective teachers at five teacher education program sites, Paine (1990) found that teachers traditionally go first to teacher education programs and later to jobs located very near where they grew up. Survey results showed that teachers often envision and practice teaching that bears a striking resemblance to what they experienced as students and may assume their own students will be people like themselves. In fact, the American Association of Colleges for Teacher Education (1995) reported that 87% of public elementary and secondary school teachers were white, and 80.5% of those enrolled in teacher education programs in 1995 were white. Feiman-

Nemser & Remillard (1996) point out that over three-quarters of prospective secondary teachers and more than 90% of preservice teachers in elementary preparation programs are female. Thus, teachers tend to be a relatively homogeneous group of primarily white, middle-class women with little exposure to the diverse cultural, racial, gender, and socio-economic differences characterized by the students they teach today (Howey & Zimpher, 1996). Valuing and accepting diversity is essential for teachers whose pedagogical responsibility is to balance student differences, challenges, and skills (Ducette, Sewell, & Shapiro, 1996).

Differentiating Curriculum and Instruction

All students should have access to teachers with competence in differentiating instruction (Gamoran & Weinstein, 1995). Differentiation is not a teaching method, a kit, or a make-it-take-it formula. Differentiation, or personalized, responsive teaching, is a belief system about how to create curriculum, instructional experiences, and supportive resources that are appropriate for a wide range of learners (Tomlinson, 2000). In a study of differentiation practices in Scotland, Simpson and Ure (1994) defined three avenues for differentiation: the placement of the student in a particular task based on prior assessment, the level of difficulty of the content and materials, and "differentiation by dialogue" where the teacher adjusts support and one-on-one responses with students based on prior assessment. One of the hallmarks of a differentiated classroom is that the teacher will play multiple parts as artist, diagnostician, leader, organizer, manager, and coach (Tomlinson, 1999).

> Teachers in differentiated classes use time flexibly, call upon a range of instructional strategies, and become partners with their students to see that both

> what is learned and the learning environment are shaped to the learner. They do not force-fit learners into a standard mold. You might say these teachers are students of their students...They do not reach for standardized, mass-produced instruction assumed to be a good fit for all students because they recognize that students are individuals (Tomlinson, 1999, p. 2).

Although there are no clearly established rules or steps for how differentiation "looks" in a classroom, the following generalizations or principles about personalized learning are supported by research (Tomlinson, 1995; Tomlinson, 1999):

1. Effective differentiation depends on clear curricular goals, focused on essential ideas and questions about content. This clarity can increase depth, breadth, and personal control of knowledge (Dewey, 1910; Wiggins & McTighe, 1998).

2. An acceptance and awareness of the unique qualities and characteristics of each student is an essential component of differentiation. The importance of recognizing each student's unique set of abilities, potential, and learning preferences is supported by results of a study of Cognitively Guided Instruction (CGI) in designing mathematics instruction (Franke, et al., 1998) and by research on the analytical, creative, and practical aspects of intelligence (Sternberg, 1996).

3. The ongoing, consistent use of a range of assessment techniques to determine the unique qualities of each student is an integral part of differentiating curriculum and instruction. Both students and teachers in Scotland viewed continual identification of students' strengths and weaknesses as critically important for the quality and level of learning (Simpson & Ure, 1994).

4. The core elements of instruction - content, process, products, learning environment, and emotions - can be differentiated based on students' abilities, interests, and learning preferences (Tomlinson, 1999). Content consists of the facts, concepts, principles and skills that students should master as a result of a learning experience. Effective differentiation is built on content that is linked to essential understandings (Dewey, 1910; Erickson, 1998). Process consists of the sense-making activities that enable students to "own" the content and understand it deeply. Effective differentiation is based on processes involving explanation, interpretation, application, perspective, ethics, and metacognition that promote student construction of meaning (Phenix, 1964; Wiggins & McTighe, 1998). Products are the demonstrations of how students have made sense of the content. Effective differentiation calls for products that emphasize problem solving, making connections, synthesizing, and evaluating, which provide "multiple entry points for student involvement" (Faulk, 1996; Levy, 1996). The learning environment is the context for situating content, process, and product. Effective differentiation requires a context that is collaborative, supportive, constructivist, and student-centered (Brimijoin, 2000; Bransford, Brown & Cocking, 2000; Dewey, 1938; Schoenfeld, 1999). Ensuring emotional engagement in curriculum comes from understanding and taking into account the personal perceptions and affect of students. Effective differentiation takes into account the results of brain research and studies of creativity and motivation that show increased student involvement in personally meaningful and appropriately challenging tasks (Csikszentmihalyi, 1997; Jensen, 1998; Kozol, 1991; Zemelman, Daniels, & Hyde, 1998).

5. Each of the core elements of instruction may be differentiated by readiness, interest, or learning preference (Gardner, 1983; Tomlinson, 1999). Effective differentiation is a result of the careful assessment of abilities so that the learning experience can provide the appropriate challenge and support for individual growth (Britzman, 1991; Bruner, 1963; Simpson & Ure, 1994; Tomlinson, 1995a). Matching students' instruction to their creative, analytical, and practical abilities can facilitate the differentiation of curriculum and instruction and improve performance (Sternberg, 1997). Effective differentiation also acknowledges the critical role student interest plays in creating successful learning experiences. Ongoing diagnosis of student interest and offering students choices can encourage students to deeply engage in content (Brandt, 1998; Sizer, 1999). Effective differentiation responds to the learning styles and intelligence preferences of students by using learning style inventories and modifying instruction based on multiple intelligences theory (Carbo, Dunn & Dunn, 1986; Gardner, 1983).

6. The design of "respectful" tasks helps ensure differentiated instruction that will be equally important, valuable, and interesting for all students (Tomlinson, 1999). Effective differentiation incorporates moderately difficult tasks that result in adaptive learning or the ability to sustain learning in the face of uncertainty (Bransford, Brown & Cocking, 2000; Rohrkemper, 1990; Vygotsky, 1978).

7. Differentiation is characterized by flexibility in teaching and learning arrangements. Specific task assignments, the placement of students in learning groups, the use of materials, the pacing of instruction, and the social context of learning are all

modified in a variety of ways in an effectively differentiated classroom (Reis, et al., 1998; Tomlinson, 1995b).

Many of these essential principles of differentiation parallel Brandt's (1998) descriptions of powerful learning in examples from research and teaching. The principles of best practice learning outlined by Zemelman, Daniels, and Hyde (1998) also echo these key principles. While all principles revolve around the ability to modify and adapt instruction, differentiation is not creating individualized learning plans that allow every student a separate entry point into instruction for each subject every day (Tomlinson, 1995b; Tomlinson, 1999). Rather, effective differentiation recognizes that at times some students learn best alone while others thrive in groups; some learn better kinesthetically, while others may learn better through music. Some students learn best with content that is presented in a logical, sequential format, while others learn best with open-ended problems that require divergent thinking, or at times all students learn best together as a whole class. In fact, the philosophy of differentiation holds that every student is like no other student, every student is like some other students, and every student is like all other students (Ducette, Sewell & Shapiro, 1996).

When teachers tailor instruction by making minor alterations such as adjusting questions, they are practicing "micro" differentiation, and when they continually monitor the alignment of student needs and learning goals in order to design dynamically differentiated curriculum and instruction, they are practicing "macro" differentiation (Tomlinson, 1995b). Moving along the continuum from the "micro" to "macro" level of differentiation requires time, commitment, and support as educators develop expertise in responsive teaching.

Building a Learning Community to Support Differentiation

When teachers move toward macro differentiation, individual needs inform instruction. As a consequence, individuals are empowered and teachers must design learning communities that are student-centered and support the acceptance of individual differences. Educators, however, have tended to muddle their definition of community by relying on a modernist view that emphasizes sameness as the criteria for community membership when the postmodern world is increasingly heterogeneous (Furman, 1998).

A community experience is one that conveys a "sense of belonging, trust of others, and safety" to its members (Furman, 1998, p. 300). Feelings of belonging and safety come from "inclusion in the deliberative discourse of the community" and "the guarantee of acceptance despite differences" (p. 321). Trust results from an ongoing commitment to inclusive discourse and guaranteed acceptance and is enhanced by the "intimacy" of small group experiences. Furman shares an example of how these needs can be met: "Belonging and trust are promoted through participation in small groups – in other words, through intimacy. The more the individual community member knows others and consistently observes their adherence to the ethics of postmodern community, the more trust evolves" (p. 322). Small clusters of students created by the flexible grouping in a differentiated classroom can be the perfect settings to carry out the "deliberative discourse of the community." Differentiation requires and promotes discourse about individual needs, goals, and gains, and thus can guarantee acceptance by recognizing the worth of each student.

In a nested model defining community experiences, the classroom community fits in a layer where membership is representative of values and cultural differences across

the population (Furman, 1998). In the other two layers of the model, kinship community (family) and valuational community (church, civic clubs) membership are based on sameness. Schools are part of the "postmodern community of otherness" where membership is "based on the ethics of acceptance of otherness with respect, justice, and appreciation and on peaceful cooperation within difference" (p. 312). The success of differentiation depends on and demands an acceptance of otherness and a cultivation of the sense of belonging within a community of difference.

Educators, however, have frequently re-crafted Maslow's hierarchy so that belonging is seen not as an unconditional need but as a by-product of self-esteem earned from achievement and mastery (Kunc, 1992). Many educators believe that mastery of curriculum is the primary expectation for students: "Children are required, as it were, to *learn* (emphasis in the original) their right to belong" (p. 31). Kunc claims that education turned Maslow's hierarchy (1970) on its end by holding the view that "a child's sense of self-worth can be developed from a sense of personal achievement that is independent of the child's sense of belonging" (p. 29). To the contrary, a student's self-worth must be validated within a context of belonging in order for self-confidence and self-esteem to grow.

"Self-system" processes develop as individual needs for competence, autonomy, and belonging are met within specific social contexts (Connell & Wellborn, 1991, p. 51). The need for competence is defined as the capability to produce desired results, the need for autonomy as the experience of choice and its connection to goals, and relatedness as the need to feel loved, respected, worthy, and connected to the social group. Constructs of the "self-system" are assessed in a study of The Rochester Assessment Package for

Schools (RAPS), which was administered to students, parents, and teachers in a rural/suburban community, and to students in a working class suburb and an urban area. Items on the RAPS related to school competence looked at two self-system processes: students' perceived strategies for achieving outcomes as well as their perceived capacities for executing those strategies. Four sub-categories of self-regulation, or autonomy, emerged from the study: intrinsic self-regulation when students do their work because they enjoy it; external self-regulation when students do their work because they will get in trouble if they don't; introjected self-regulation when students do their work because they will feel bad about themselves if they don't; and identified self-regulation, when students are most autonomous and do their work because it will help them reach their goals. "Children and adolescents who experience themselves as regulating their *own* (emphasis in the original) behavior in school are more engaged in this domain and these engaged patterns of action are associated with higher levels of academic accomplishments" (Connell & Wellborn, 1991, p. 63). Results of the RAPS study also showed that feelings of relatedness and security with peers and teachers can predict engagement, which in turn can predict school performance. The RAPS study contains an important caveat, which should govern the current research study as well: that teachers and students as members of an educational community also belong to multiple communities outside of school, each of which may influence their autonomy, competence, and sense of belonging.

Motivation, performance, and development are maximized within social contexts that provide people the opportunity to satisfy their basic needs for competence, relatedness, and autonomy (Deci, E., Vallerand, R., Pelletier, L., & Ryan, R., 1991). "The

highest quality of conceptual learning seems to occur under the same motivational conditions that promote personal growth and adjustment" (p. 326). Optimal learning is defined as "conceptual understanding and flexible use of knowledge" and optimal adjustment as having positive feelings about oneself, being able to satisfy basic needs, and being connected to the social context (p. 327). Offering choice, reducing control, recognizing students' feelings, and providing positive feedback can help to create a caring community that supports autonomy.

The Child Development Project (CDP) has focused on creating caring communities in elementary classrooms and schools in two California school districts (Solomon, D, Schaps, E., Watson, M., & Battistich, V., 1992). CDP combines cooperative learning, literature-based reading, and developmental discipline with certain fundamental beliefs about school communities: they meet the basic needs of students by providing self-directed activities where students have an active voice in decisions and classroom governance; students must be allowed to feel and be competent by offering them purposeful tasks; and teachers must recognize student contributions by making certain that students are "told clearly" and "able to see clearly for themselves" when they have succeeded (p. 45). Students feel valued and accepted when their teachers assume they have the capacity to be responsible, sensitive to others, and intrinsically motivated. In CDP classrooms self-direction, competence, and belonging build trust, fairness, concern for the group, and a commitment to learning among members.

The most critical element for building a caring community in CDP is developmental discipline (Osterman, 2000; Solomon et al., 1992), a philosophy of shared management where students participate in governance, work together to solve discipline

problems, and meet to resolve difficulties. Teachers who practice developmental discipline promote respect and concern "by using many classroom activities that explicitly focus on these qualities (e.g., activities that help them learn about each other) while also building academic knowledge and skills" (Solomon et al., 1992, p. 48). These teachers regard their students "as capable people who can use and respond to reason" and they avoid using extrinsic rewards or punishments (p. 48). Negative behavior is seen as an occasion for teaching rather than punishing. Developmental discipline assumes that "mutual goodwill" unites all members of the community. "Developmental discipline thus aims to meet students' needs for autonomy, influence, and belonging and to give them opportunities to feel competent by making effective contributions to classroom decisions" (Solomon, D., Battistich, V., Watson, M., Schaps, E., & Lewis, C., 2000, p. 6).

The most recent study of the CDP evaluated program implementation in terms of student outcomes in six school districts across the country with broad demographic characteristics (Solomon et al., 2000). Data included observations, teacher and student questionnaires, and student achievement measures. While earlier analyses of CDP implementation showed no effect on student achievement, this most recent study suggests: "Where progress was made toward implementing the basic aspects of the program, students showed clear gains in academic motivation and engagement (the intellectual realm), personal and interpersonal concerns and skills (the social realm), and prosocial values and behavior (the ethical realm)" (p. 34). Achievement gains were limited to schools where assessment reform initiatives matched CDP goals. In those schools the gains were attributed to program implementation.

One study was designed to assess the impact the sense of school community had on disadvantaged students (Battistich, V., Solomon, D., Kim, D., Watson, M. & Schaps, E., 1995). Using a diverse sample of 24 elementary schools and a multilevel regression technique of hierarchical linear modeling, questionnaires were given to 4,515 students and teachers. Findings from the study show that the relationships between school community and student outcomes are consistent across socio-economic levels and, to some degree, "appear to be strongest among schools with the most disadvantaged student populations" (p. 649). The support provided for disadvantaged students in a caring classroom community defines values and motivates students to adhere to those values, nurturing motivation and goal setting and counteracting any lack of support outside of school.

Enacting the principles of differentiation, then, requires a special blueprint for building a caring learning community. Opportunities to ensure safety, belonging, and trust must be carefully laid out. Specifications for shared management, choice, and decision-making in order to promote engagement, competence, and autonomy must be clearly delineated. Designing and building this kind of caring community has not been a priority in American education (Solomon et al., 1992). Furthermore, as this community is constructed, respect for students' ideas and capabilities "must be made explicit and be considered, explained, and discussed" (p. 45). To be the architect and engineer of such a community is an obligation and challenge for any teacher who is moving toward "macro" differentiation.

Expertise in Differentiation

Following a period of sustained work or training in a discipline or field, an expert develops a "set of distinguishing engravings" that are not exhibited by novices in the field (Gardner, 1999, p. 123).

> Part of that training involves the elimination of habits and concepts that, however attractive to the naïve person, are actually inimical to the skilled practice of a discipline or craft. And the remaining part of that training involves the construction of habits and concepts that reflect the best contemporary thinking and practices of the domain (p. 123).

Constructing engravings of differentiation is one form of expertise in teaching (Tomlinson, 2000).

Research with both novice and expert teachers as well as postulants (individuals with expertise in subject matter but no formal teacher preparation), showed a reduction in variance among experts in their reactions to split video images of a classroom of learners (Berliner, 1988). Novices were unable to monitor all three video images simultaneously and were confused about what they saw. Postulants were more overwhelmed than the novices. Experts had no difficulty monitoring classroom performance from the three screens. In fact, Berliner's work showed that expert teachers tended to organize patterns of thinking and response in ways reminiscent of DeGroot's research findings on expert chess players who recognize meaningful patterns of information about the game and thus are able to develop and apply appropriate strategies (Bransford, Brown & Cocking, 2000).

Berliner (1988) delineated five stages in the development of expertise in teaching. For those in the novice stage, rules and routines must be context-free, clearly defined, and in place. Advanced beginners do not assume total responsibility for their actions, but they do begin to strategize as patterns in knowledge and context emerge. Competent teachers take responsibility for their actions and begin to make curricular and instructional decisions, discriminating between what demands their attention and what can be ignored. With proficient teachers, intuition guides actions, discreet knowledge and patterns are internalized, and, as a result, conceptions of broader patterns and understandings form. Expert teachers exhibit qualitatively different performance styles that are flexible, fast, and fluid, and when things are working experts tend to operate on automatic pilot. In Berliner's study experts had a firm knowledge base about how students understand content.

> In addition, the experts seemed able to think through the misalgorithms that students might apply to solve a particular problem. The experts had more experience dealing with student errors and therefore were able to predict what types of errors students might make. Novices and postulants rarely discussed the issue of misalgorithms that student might apply to solve a problem. The inability to predict the kinds of errors that students will make in particular situations is, no doubt, a major deficiency of the beginning teacher (p. 16).

In a longitudinal study of preservice teacher knowledge and beliefs about reading instruction before, during and after a five-year teacher education program, prior beliefs and experiences emerged as a filter for developing expertise in teaching (Hollingsworth,

1989). This study confirmed that general management routines had to be in place first before content and related pedagogy received the novice's attention. Only after management, content and pedagogy were mastered could beginning teachers focus on individual student learning and engagement. These findings are supported by the work of the National Research Council (Bransford, Brown & Cocking, 2000) whose study connects these principles of expert knowledge development to teaching and learning: experts notice patterns and behaviors missed by novices; experts command a deep understanding of content; experts are capable of applying their deep knowledge across many varied contexts; the ability to call up specific pieces of knowledge for application is nearly effortless with experts, although being a content expert does not necessarily mean being an expert at teaching the content; and experts exhibit high degrees of flexibility handling unfamiliar contexts and situations.

Data from the Preservice Teacher Preparation Project directed by the National Research Center on the Gifted and Talented at the University of Virginia provide additional evidence that student teachers focus on classroom management and routines before they focus on the needs of individual learners (Tomlinson, et al., 1995). In the first two years of this three-year study, preservice teachers were followed through the student teaching experience. Results of surveys, observations and interviews showed that student teachers focused on covering or "getting through" standardized curriculum rather than teaching for enduring understanding. Time was seen as directly related to "coverage," or getting through the content, and as an inhibitor of differentiation. Management was found to be essential and whole-class control was easier than establishing a multi-task or student-centered learning environment.

As early as 1969, however, Fuller recommended assessing preservice and inservice teacher concerns in order to create professional education that is relevant to needs. While Fuller's study delineated stages similar to those of Hollingsworth (1989), when the concerns articulated by student teachers were used to focus objectives for teacher preparation, preservice teachers were able to function, to some degree, at even the most advanced stages of development. For example, for the first time student teachers were able to specify tasks that would help them take into account individual student needs and capacities and evaluate their effectiveness in relation to student performance. These tasks were rarely addressed during student teaching because security, control, and "problem" students generally crowded out issues related to cognitive or affective achievement. With more course content focused on the limits of acceptance in the classroom, the creation of a positive learning environment, and the evaluation of relationships in the classroom, student teachers were able to discuss individual needs. One student teacher in the study shared her view of what the changes in teacher preparation courses meant for meeting varied needs: "Since you have a feeling of confidence now about the mechanics of teaching, start putting more time in on the planning" (p. 10).

Differences in teachers' knowledge, experiences, and perspectives influence how they design curriculum and instruction for students (Carter, 1990). In addition, research shows that much of experts' knowledge is "tacit" and "occurs through experiencing, and learning from, failure" (p. 299). In one case study of Chris, a preservice teacher, Hollingsworth (1989) explains how he moved from "inventing" tasks that did not always work to careful construction of engaging academic tasks as he developed expertise:

> Though Chris had an understanding of what students learned from vocabulary tasks, he had to invent various ways of teaching different content to students with varying backgrounds and abilities before he understood how to actually construct academic tasks to achieve meaningful student learning (p.184).

Expertise in teaching is more complex than many beginning teachers or teacher educators believe and the developmental stages of pedagogical expertise may inhibit the beginning teacher's ability to teach the diverse student population in today's classrooms (Berliner, 1988; Howey & Zimpher, 1996). Yet, at the same time, the National Board of Professional Teaching Standards (1989) states that expert teachers should base their practice on knowledge of students' abilities, interests, prior experiences, and relationships with family and friends. Responses to "The Differentiated Practices Survey" from 284 secondary teachers indicated that 90% of the teachers believed that addressing academic differences was important or very important (Hootstein, 1998). However, teacher education programs have generally been unprepared to meet the needs of a diverse student population for the past 30 years, in spite of the critical need to change knowledge, skills, attitudes and dispositions about educating all students (Feiman-Nemser & Remillard, 1996; Freiberg & Waxman, 1990; Levine, 1996; Melnick and Zeichner, 1998; Paine, 1990; Tomlinson, 1995a; Tomlinson, et al., 1995). A habit of mind, or disposition, includes what and how preservice teachers think about the "professional, technical, student, procedural, intellectual, and value concerns of their craft" (Galluzzo & Craig, 1990, p. 609). In order to focus teacher preparation programs on creating habits of mind or dispositions to address diverse learner needs, teacher educators must identify and

analyze the path beginning teachers take to expertise in teaching for understanding and personalized learning (Carter, 1990; Gardner, 1999; Lidstone & Hollingsworth, 1992; Moon, Callahan, & Tomlinson, 1999).

Developmental Phases of Student Teaching

In a study that followed the development of five student teachers through their student teaching experience and their final teacher preparation year, Piland & Anglin (1993) identified four stages of student teaching: fear and uncertainty about the unknown; socialization to foster acceptance by the cooperating teacher, pupils, and staff; autonomy through the establishment of classroom discipline, management, and lesson planning; and affirmation or the fulfillment of personal goals and experiences. The adaptability of student teachers to diversity in a school setting, or socio-readiness, appeared to require special nurturing through remediation or reinforcement in Stage Two, the socialization phase (Piland, & Anglin, 1993).

The Model of Complexity Reduction described by Lidstone & Hollingsworth (1992) outlined three levels of conceptual understandings of pedagogy: (a) At the rote level, beginning teachers talk about a pedagogical concept but don't apply it, apply it poorly, or apply the concept but aren't sure why; (b) At the routine level, beginning teachers discuss and apply a technique but only in a specific context and with much effort; (c) At the comprehensive level, teachers understand the pedagogical concept and can apply it in varied contexts. This model evolved from a study at the University of California at Berkeley that began with 28 preservice teachers and followed them through their first four years of teaching. Conflicts between beliefs and behavior occurred as beginning teachers moved from one level of understanding to the next:

> For instance, if a beginning teacher at the rote and routine levels has a belief that students learn by listening to the teacher give instructions, this belief will certainly impact their teaching and would in fact, be consistent with their teaching behavior (they may never move past this level). However, if a beginning teacher has a belief that students learn by constructing their own knowledge, but has their class structured in a teacher-directed fashion because they are still trying to work out their management system, then there is clearly a conflict between beliefs and behavior (p. 46).

The cognitive process of teaching is what teachers are thinking about when they are teaching or preparing to teach, according to Feiman-Nemser & Remillard (1996). In analyzing teachers' cognitive processes, Lidstone & Hollingsworth (1992) found that if a teaching strategy well matched to student needs was rejected because the teacher decided it took too much time to plan, a "lower level of cognitive processing" was taking place (p. 46). This was contrasted with a higher level of cognitive processing where teachers rejected a strategy because it did not effectively engage students in an academic task.

The importance of integrating beliefs and pedagogy about what, how, when, and why to teach learners with a range of needs is evident in two case studies of student teachers by Feiman-Nemser and Buchmann (1986). Both Susan and Molly, the student teachers in this study, expressed concerns about expecting all students to complete the same academic tasks at the same rate. Molly stated her belief that student interests should be tied to learning experiences to increase their relevance and meaning. Although Susan held a belief in teaching for understanding, she rarely linked students' learning experiences to concepts. This example illustrates how Susan's beliefs were at odds with

her pedagogy and demonstrates a low level of cognitive processing as described by Lidstone & Hollingsworth (1992): "Susan also acknowledged that she was relying on dittos and workbooks, even though this conflicted with her image of a good teacher. She said it would take enormous time and commitment to prepare appropriate exercises for all the children" (p. 15).

The Preservice Teacher Preparation Project (Tomlinson, et al., 1995) looked at data from preservice teachers who received no training in meeting the needs of academically diverse learners (Phase 1) and those who received either workshop training or workshop training and guided coaching (Phase 2). The Phase 1 preservice teachers held on to a belief that teachers should address student differences. However, during the actual student teaching experience, they tended to sacrifice that belief in the face of concerns with management and coverage. In fact, Phase 1 preservice teachers saw the task of differentiating curriculum and instruction as a "near impossibility" and reduced efforts to differentiate because it "appeared too risky" (p. 43 ff). This reaction to differentiation is an example of low level cognitive processing (Lidstone & Hollingsworth, 1992) and illustrates the clash between behavior and beliefs and how both can be compromised.

Teachers' Beliefs About Addressing a Range of Needs

Many teachers at the novice stage as well as those closer to the expert level agree that diversity in the classroom must be addressed (Brimijoin, 1999). Results from questionnaires and interviews in a study of beginning teachers showed that 42% believed ability, attitudes, interests, and personality were important to consider in teaching (Paine, 1990). A study of urban K-12 teachers found that 63.3% of elementary and middle and

72.4% of high school teachers needed assistance with strategies to adapt to diverse student needs (Maxson, et al., 2000). In the same study, 65% of high school teachers identified preparation for addressing learning problems as urgently needed.

Nearly 15 years ago, Giroux and McLaren (1986) pointed out the need to rethink teacher education to ease the conflict beginning teachers face in diverse classrooms:

> Usually when classroom life is discussed in teacher education programs, it is presented fundamentally as a one-dimensional set of rules and regulative practices, rather than as a cultural terrain where a variety of interests and practices collide in a constant and often chaotic struggle for dominance. Thus, prospective teachers frequently receive the impression that classroom culture is essentially free from ambiguity and contradiction (p. 227).

As a result of this one-dimensional view of classroom life, novices are rarely able to conceptualize how to meet individual needs, and they often see differences as weakness or problems. The perception of differences as problems is supported by Paine's (1990) longitudinal study at five teacher education sites where many novices also equated fairness with equity. Of the study's survey respondents, 70% agreed that teachers could accommodate students' individual interests and abilities, and only 6% voiced concerns about limitations on making those accommodations. Ironically, Paine also found that while prospective teachers linked diversity issues with fairness and equal treatment, they often denied differences and "justified unequal treatment" when beliefs were put into practice (p. 5). Different, not equal, resources are often required to design valuable learning opportunities for all students because if appropriate curriculum and instruction are unavailable, many students stagnate (Reis, et al., 1998). In his Five Towns study,

Lortie analyzed the perception expressed by some teachers that working effectively with all students is extra duty: "One can only presume that they do so in the conviction that attention to all is *not* the rule, that students can and do slip through school without close attention from some teachers" (Lortie, 1975, p. 115, emphasis in original). The struggle with equal meaning identical instruction is seen in case studies of prospective teachers whose prior beliefs conflict with the philosophy of their teacher preparation programs (Feiman-Nemser & Buchmann, 1990). In one case study, Janice resisted altering her existing belief system to embrace equality of educational opportunity. In discussing the teaching of poetry, for example, Janice claimed that, "certain things should be stressed in certain schools, depending where they're located" (p. 14). In another case, limited personal experience prevented Sarah from helping students with special needs (Feiman-Nemser & Buchmann, 1990). Sarah needed scaffolding, or guided support, to create appropriate curriculum for these students: "Her own good intentions and general advice from the program were not enough." (p. 16)

Teaching Responsively as a Process

If best practice in teaching is based on personalized and student-centered learning, then focusing the process of teacher education on acquiring content knowledge and pedagogical skills alone is not enough (Feiman-Nemser & Remillard, 1996; Zemelman, Daniels & Hyde, 1997; National Board of Professional Teaching Standards, 1989). Using the needs of students as the place to begin designing curriculum and instruction is what Giroux and McLaren (1986) have called developing a "critical pedagogy" (p. 233). A critical pedagogy allows teachers to analyze the appropriateness of dominant forms of what Schlechty (1997) calls knowledge work, or using, organizing, and applying

information to create useful products, and provides opportunities for students to self-assess their own subordinate knowledge work. According to Feiman-Nemser and Remillard (1996), "Teaching is a moral practice as well as a technical activity, and this has implications for thinking about the content of learning to teach. Besides acquiring requisite knowledge and skills, teachers must also develop values, commitments, and images of good teaching" (p. 76).

The teacher education faculty at Boston College conducted a year-long self-study of ways to integrate the values, commitments, and images of responsive teaching into their teacher preparation program (Zollers, Albert & Cochran-Smith, 2000). The faculty struggled with many of the same issues of fairness, equity, and personalized learning echoed in other studies of preservice teachers (Feiman-Nemser & Buchmann, 1986; Feiman-Nemser & Buchmann, 1990; Hollingsworth, 1989; Lampert, 1984; Paine, 1990; Tomlinson, et al., 1995). A case study of a teacher preparation course described specific goals for addressing the diverse needs of learners (Morales, 2000). In this course the instructor stressed the importance of reflection as a bridge between theory and practice and a means for strengthening the ability of novice teachers to personalize their teaching.

The Inclusive Early Childhood Education Unit at the University of Tennessee integrates the goal of working with all children throughout its teacher preparation program (Lesar, Benner, Habel & Coleman, 1997). Reflection, dialogue, and mentoring are used as strategies to help novices tailor their practice to the situated context of student learning. The intention is that prospective teachers will adopt the program's goal as a habit of mind and see that student teaching is a beginning rather than an end in learning about how to respond to the needs of all learners.

The emphasis on reflective teaching as a means of facilitating responsive teaching is evident in the work of the teacher preparation program at the University of Wisconsin (Zeichner & Liston, 1987). Here, the student teaching program goals include reflective action, or the active analysis of a belief or knowledge in terms of the support for it and the consequences from it, and routine action, or the interaction of cognition and behavior stemming from tradition and circumstance. This program focuses its student teaching seminar on reflective and routine actions that modify curriculum and instruction for specific student needs. Student teachers are expected to assume two roles: to be curriculum developers, able to use strategies appropriate for specific leaner needs; and to be inquirers, establishing habits of mind founded on reflection as a way of improving instruction for all learners.

Developing the moral practice of responsive teaching that focuses on concepts and enduring understandings is complex, challenging, and often ignored in teacher education (Freiberg & Waxman, 1990; Melnick & Zeichner, 1998; Moon, Callahan, & Tomlinson, 1999; Paine, 1990; Tomlinson, et al., 1995; Wiggins & McTighe, 1998). Student teachers often lack the scaffolding and mentoring necessary to adopt responsive teaching as a disposition because cooperating teachers and college supervisors lack expertise in differentiation themselves (Archambault, et al., 1993; Brimijoin, 2000; Lampert, 1984; Piland & Anglin, 1993; Tomlinson, et al., 1995).

> Although novice and experienced teachers report meeting needs of academically diverse students as a goal in principle, it is not perceived as a high priority for student teachers. With little encouragement and

> often discouragement from cooperating teachers or university supervisors, preservice teachers concentrate on other aspects of learning to teach such as covering and mastering content areas and pedagogical skills necessary for teaching (Tomlinson, et al., 1995, p. 64).

Even when a workshop, course, or coaching in responsive teaching is part of the preservice program, student teachers still waver in their commitment to differentiation and teaching for understanding (Brimijoin, 1999; Brimijoin, 2000; Lidstone & Hollingsworth, 1992; Tomlinson, et al., 1995). In addition, there seems to be minimal understanding of which factors hinder or enhance the development of a disposition to teach responsively (Paine, 1990; Simpson & Ure, 1994). Both novice and expert teachers often see differences among their students as "problems" and have limited strategies for addressing them (Blumenfeld, et al., 1994; Paine, 1990).

Student teaching is often perceived as an ends rather than a means, as if it is a heavy door to push open with expertise lying just beyond (Britzman, 1991). That perception, coupled with the complexity of learning to teach for understanding and academic diversity, often leaves student teachers with the uncertainties expressed by Jamie in Britzman's (1991) case study:

> One of the things I find incredibly difficult is, I may have one idea about what I want to get across, but knowing that these twenty-five people are coming from so many different places and so many thoughts in their heads. They're at different places even when they come into my classroom. And all of a sudden, how am I supposed to get them to focus on one thing? This is a tremendous challenge. Whether it can be done or not, I don't know (p. 77).

The lack of clarity here about what Jamie can do, how she can do it, and why she should do it threatens her ability to resist being "worn down and joining up" with those who have not developed a critical pedagogy centered on student needs (Tomlinson, et al., 1997, p. 56).

Limitations of Existing Research

How beginning teachers come to know what they do about teaching has been largely ignored in teacher education (Carter, 1990). The emphasis has been mainly on processes external to the novices themselves. While qualitative studies in the past have produced "richly detailed portraits" of how teachers coped with the demands of the classroom, these studies may be "impoverished" in that they reveal little about the actual learning processes or knowledge acquired by beginning teachers (Carter, p. 195).

Dispositions are a powerful means of judging the success of teacher education programs in preparing teachers for today's students, but how dispositions are related to teacher knowledge and performance is "virtually unexamined" (Galluzzo & Craig, 1990, p. 609). Little attention has been paid to the comprehension processes teachers use to interpret specific situations in the context of the classroom (Doyle, 1990). The "what" and "how" of learning to teach have not been brought together (Feiman-Nemser & Remillard, 1996): "On the one hand, we seem to know quite a lot about what teachers need to learn. On the other hand, we still have mostly general statements and fragmented research" (p. 78).

How novice teacher beliefs and practices are affected by the culture of the school and classroom has been the subject of limited research (Putnam & Borko, 2000). A research study comparing two student teachers, who had participated in a preservice

course focused on differentiation, with two student teachers who had no training in differentiation, looked for evidence of specific strategies that support responsive teaching (Brimijoin, 2000). This study concentrated on external processes -- the frequency of applying pedagogical skills of differentiation -- rather than on the student teachers' internal beliefs and dispositions about responsive teaching. Case studies of two pairs of preservice and inservice teachers involved in a differentiation study group elicited more questions than answers about the transformation of beliefs about responsive teaching into practice (Brimijoin, 1999). Teacher education must examine assumptions about the nature of teaching, where it takes place, those who educate beginning teachers, and the relationship between the practitioner and research (Levine, 1996).

Evidence exists to support the effectiveness of learning communities in developing pedagogy and skills related to differentiation. In a study conducted at Stanford University (McLaughlin & Talbert, 1993), survey results indicated that teachers saw students as the context that matters most within the classroom. In addition, teachers acknowledged increasing diversity among students and tended to adapt practice and expectations from three distinct perspectives: they viewed the difficulties in matching challenges and skills to individual needs as a student-related problem; they lowered expectations and "watered down" curriculum; or they made fundamental changes in practice that resulted in increased engagement and teaching for understanding. Those who made fundamental changes in practice all shared one characteristic -- they belonged to a supportive, professional learning community. Unfortunately, there have been limited studies on collaborative learning in teacher education (Britzman, 1991; Lave & Wenger, 1991).

Traditionally, research and program designs have ignored the need to support images of good teaching and curriculum development for beginning teachers beyond the teacher education program and into the first few years of teaching (Howey & Zimpher, 1996; Paine, 1990). Research on how teachers design curriculum and instruction for all students is only beginning and is "central to the current reform agenda" (Feiman-Nemser & Remillard, 1996, p. 85). Few longitudinal studies have focused on constructive approaches to complex questions about beginning to teach in an academically diverse classroom (Paine, 1990).

Recommendations from Research

A vision of education is emerging in which all children are held to high standards and teachers are prepared to engage them in different ways based on their needs and strengths (Levine, 1996). And yet, children from diverse cultural and linguistic backgrounds, those with learning disabilities, gifted and talented students, and others who are victims of poverty and neglect have not fared well in our schools (Gardner, 1983; Kozol, 1991; Maheady, Malleete & Harper, 1991; Reis, et al., 1998; Rose, 1989). This vision of responsive teaching and the realization of how we have fallen short of meeting it, as well as the limitations of existing research, have precipitated many recommendations for further study of the development of expertise in differentiation. These recommendations provide a framework and lens for focusing the research questions of this case study.

Defining the Context for Teacher Learning. Deepening teachers' understandings about the learning process should be emphasized from preservice education on (Darling-Hammond & McLaughlin, 1996; Franke, et al., 1998). Teacher education programs have

the potential to become centers of critical inquiry (Anderson & Herr, 1999; Richardson, 1996). In these centers, prospective teachers could become "transformative intellectuals" (Giroux & McLaren, 1986, p. 215). As such, they would learn to use inquiry and dialogue to probe how their knowledge is acquired and what makes that knowledge meaningful for student understanding (Howey & Zimpher, 1996; Giroux & McLaren, 1986; Lampert, 1984; Zeichner, 1983).

Understanding how beginning teachers learn to teach responsively may be enriched by personalized and inquiry-based analysis (Zeichner, 1983). A personalized examination of the teaching experience focuses on the "becoming" rather than the "doing" of teaching and examines, classifies, and organizes beliefs. An inquiry orientation involves the critical assessment of dispositions and pedagogy.

The value of collaboration in facilitating the development of expertise in teaching for understanding and differentiation needs further examination (Beasley, et al., 1996; Birchak et al., 1998; Levine, 1996; Meier, 1995; Wiggins & McTighe, 1998). It has been suggested that we examine the wisdom of using experts to mentor novices (Berliner, 1988; Bransford, Brown & Cocking, 2000; Gardner, 1999; Hollingsworth, 1989). Researchers have recommended making inquiry analysis a part of the mentoring process for beginning teachers from the student teaching experience into the first few years in the classroom (Walker, et al., 2000; Putnam & Borko, 2000; Zeichner & Liston, 1987). Mentoring which conflicts with a belief in differentiation can reinforce or engender beginning teacher misconceptions and this fact underscores the need for teacher education to define the appropriate context for learning to teach academically diverse

learners (Anderson, Reder & Simon, 1996; Feiman-Nemser & Buchmann, 1986; Hollingsworth, 1989; Zemelman, Daniels, & Hyde, 1997).

Reflection as a means of assessing practice is another area that researchers believe needs attention (Carter & Anders, 1996; Howey & Zimpher, 1996; National Board of Professional Teaching Standards, 1989; Schoenfeld, 1999). Reflective teaching involves the critical assessment of the ends, means, and contexts of teaching (Schon, 1991; Zeichner & Liston, 1996) in order for teachers to better replicate current best practice suggested by research.

Researchers agree that the role of the college supervisor in student teaching must be examined to ensure that supervisors are prepared to implement and evaluate the most current theories and practice that support responsive teaching (Brimijoin, 2000; Lesar, et al., 1997; Hollingsworth, 1989; Tomlinson, et al., 1995; Zeichner & Liston, 1987). Specially designed training programs have been recommended so that supervisors would be more than occasional visitors; their role would include leading student teachers to innovative research intended to broaden their perspectives on teaching (Feiman-Nemser & Buchmann, 1986; Piland & Anglin, 1993).

Some researchers have suggested multi-dimensional changes in teacher education in order to restructure schools and help teachers meet the needs of diverse learners (Freiberg & Waxman, 1990; Lesar, Benner, Habel & Coleman, 1997). Levine (1996) has defined restructured schools as places where teachers offer students a variety of constructive, contextual, and shared learning experiences based on multiple assessments of their knowledge, abilities, interests, and learning styles. Teacher education programs

must change in order to prepare teachers for this restructured environment (Darling-Hammond, Wise, & Klein, 1999):

> Because restructured schools are also redesigning classroom organizations so the "push-in" rather than "pull-out" methods are more likely to be used for children with special needs and interdisciplinary approaches to a "thinking curriculum" are more common, teachers will need to know more about both subjects and students than they have in the past (p. 7).

Reporting results of a research project at the National Center for Research on Teacher Learning, Melnick and Zeichner (1998) offered this challenge: "The failure to provide quality education for all students signifies a crisis that is intolerable in a democratic society....For teacher educators, the social crisis clearly means shouldering the responsibility for preparing teachers to teach diverse students in ways that we have not yet done" (p. 93). Many other researchers in the field also recommend critical changes and a new vision in teacher education programs in order to respond to all learners (McLaughlin & Talbert, 1993; Maxson, et al. 2000; Putnam & Borko, 2000; Robinson, 1998; Zeichner & Liston, 1987).

Understanding How Beginning Teachers Learn to Teach Responsively.

Researchers have suggested further study in the following areas to advance our understanding of how beginning teachers learn to teach responsively and how teacher education might facilitate that learning process:

1. Considering Prior Beliefs: The prior beliefs and experiences of prospective teachers need to be examined as part of the teacher preparation program in order to measure their influence on developing beliefs about meeting the needs of diverse learners

(Ducette, Sewell & Shapiro, 1996; Feiman-Nemser & Buchmann, 1986; Feiman-Nemser & Remillard, 1996; Hollingsworth, 1990; Paine, 1990, Putnam & Borko, 2000).

2. Assessing Novices' Understandings, Interests, and Learning Preferences: Teacher educators, as teachers themselves, must incorporate assessments of their students' knowledge, interests, and learning preferences into teacher education programs (Bransford, Brown & Cocking, 2000; Feiman-Nemser & Buchmann, 1990; Feiman-Nemser & Remillard, 1996; Howey & Zimpher, 1996; Levine, 1996).

3. Developing Definitions of Differences: Teacher education should provide opportunities for prospective teachers to develop definitions of diversity and examine their curricular and instructional implications (Ducette, Sewell & Shapiro, 1996; Melnick & Zeichner, 1998; Paine, 1990; Tomlinson, et al., 1995).

4. Building Respect for Differences: Developing respect for individual differences among learners should be an integral part of the course work in teacher education programs (Ducette, Sewell & Shapiro, 1996; Banks, 1997; Howey & Zimpher, 1996; Paine, 1990; Zeichner & Liston, 1987; Zollers, Albert & Cochran-Smith, 2000).

5. Developing Expertise: Researchers should undertake further quantitative and qualitative studies of the developmental stages of expertise in teaching in order to create the appropriate scope and sequence of teacher preparation courses aimed at teaching for understanding and meeting diverse academic needs (Anderson, Reder & Simon, 1996; Berliner, 1988; Blumenfeld, et al., 1994; Carter, 1990; Doyle, 1990; Feiman-Nemser & Buchmann, 1990; Hollingsworth, 1989; Piland & Anglin, 1993).

6. Teaching for Understanding: The curriculum of teacher education programs should be revised to focus on teaching for understanding, the importance of concepts and

essential questions, and the role of backward design for curriculum development (Blumenfeld, Krajcik, Marx & Soloway, 1994; Feiman-Nemser & Buchmann, 1990; Schoenfeld, 1999; Tomlinson et al., 1995; Tomlinson, et al., 1997; Wiggins & McTighe, 1998).

7. Developing Skills in Differentiation: Teacher education programs should model and teach instructional and management techniques and strategies that build expertise in meeting the needs of academically diverse learners (Feiman-Nemser & Remillard, 1996; Freiberg & Waxman, 1990; Lesar, Benner, Habel & Coleman, 1997; Maheady, Malleete & Harper, 1991; Melnick & Zeichner, 1998; Tomlinson, 1999; Tomlinson et al., 1995; Tomlinson, 2000).

8. Improving Practice: Prospective teachers should be provided with multiple opportunities to engage in reflection, dialogue, inquiry and action research as they consider the impact of theory and practice on their ability to teach responsively (Brimijoin, 1999; Brimijoin, 2000; Levine, 1996; Maxson, et al., 2000; Morales, 2000; National Board of Professional Teaching Standards, 1989; Zeichner, 1983; Zeichner & Liston, 1987; Zemelman, Daniels & Hyde, 1998).

9. Supporting the Development of Expertise in Differentiation: Researchers should determine which factors enhance or block the development of beginning teachers' expertise in differentiating curriculum and instruction and use that information to provide scaffolding from preservice education into the first few years of teaching (Feiman-Nemser & Buchmann, 1986; Lidstone & Hollingsworth, 1992; Moon, Callahan & Tomlinson, 1999; Paine, 1990; Simpson & Ure, 1994; Tomlinson, et al., 1995; Tomlinson, 1999; Zeichner & Liston, 1987).

Examining Environments that Promote Responsive Teaching. Many researchers agree that interventions and programs designed to build beliefs and skills for responsive teaching should be evaluated in terms of their impact on teacher education (Brimijoin, 1999; Brimijoin, 2000; Howey & Zimpher, 1996; Melnick & Zeichner, 1998; Tomlinson, et al., 1995). Research has shown that novices lack support for changing one-size-fits-all practices (Tomlinson, et al., 1995).

> Interventions such as a workshop can serve as a starting point for focusing novices' attentions on the varied needs of academically diverse learners and shape their thinking about the learning environment. As they venture into the classroom, novices need support and guidance from key players in the system to model strategies and develop a repertoire of teaching skills that can facilitate meeting varied needs. The academic diversity of today's classrooms calls for change in practice that should be recognized as a priority from preservice training through professional development (p. 74).

In particular, recommendations have been made for research into the power of study groups to effect change in teacher education (Birchak et al., 1998; Brimijoin, 2000; Britzman, 1991; Levine, 1996). Howey & Zimpher (1994) have stressed the importance of long-term instruction in preparing novices to teach conceptual understanding for all learners. Other researchers suggest that teacher education programs should help prospective teachers see themselves as continuous learners across a lifespan of teaching and view their preparation programs as a means rather than an end (Britzman, 1991,

Cochran-Smith & Lytle, 1998; Darling-Hammond & McLaughlin, 1996; Lesar, et al., 1997).

Reflective analysis of videotaped lessons during teacher preparation has been recommended as a method of increasing responsive classroom practice (Brimijoin, 1999; Darling-Hammond, Wise & Klein, 1999; Lesar, et al., 1997; McNergney, Hallahan, & Herbert, 1999). Results of studies by Howey & Zimpher (1996) have led to suggestions for the creation of "pedagogical laboratories and teaching and diagnostic clinics" where beginning teachers work with inservice teachers to reflect on videotaped lessons (p. 483). Similar partnerships in learning have been suggested that would focus specifically on building beliefs and skills in differentiation and providing extended support for beginning teachers through the first years in the classroom (Birchak et al., 1998; Brimijoin, 2000; Maxson, et al., 2000; Melnick & Zeichner, 1998; Miller & O'Shea, 1996; Walker, et al., 2000)

Considering Rival Theories

In terms of the methodology for this case study, it is important to consider conflicts or rival theories raised by earlier research. In a review of the literature, two potential conflicts seem significant. While best practice standards for teaching emphasize the need to teach for understanding for all learners, beginning teachers may be discouraged from this best practice because of a national emphasis on standardized testing that pushes novice and expert teachers to standardized instruction for all learners (Ducette, Sewell & Shapiro, 1996; McLaughlin & Talbert, 1993; Ohanian, 1999; Schlechty, 1997; Tomlinson, 1999; Tomlinson, 2000; Zemelman, Daniels & Hyde,

1998). Maintaining that this conflict should take a front seat in teacher education research, Ducette, Sewell & Shapiro (1996) identify a widening gap:

> We live in a society that is becoming increasingly diverse...and in which the needs of individual students can no longer be submerged by uniform teaching practices....Yet inclusive schools are rare, teachers tend to be homogeneous, and the curriculum is increasingly being driven by standardized tests that focus on uniformity justified on the basis of national educational goals. The gap between our needs and our resources is widening, and we are left, as we so often seem to be in the complex arena of teacher education, with more questions than solutions (p. 369).

Other researchers have theorized that instructing beginning teachers in differentiation may be non-productive because the stages of development in teaching expertise may inhibit the novice's ability to teach diverse students (Berliner, 1988; Howey & Zimpher, 1996). Both of these potentially conflicting theories will be considered as data are collected and findings of the proposed case study are interpreted.

Pilot Studies

A longitudinal study is underway to collect research on a local school-college partnership that has created a study group of preservice and inservice teachers learning to differentiate curriculum and instruction. As a result of this partnership, the college has restructured courses in its teacher preparation program to incorporate teaching for understanding and meeting the needs of academically diverse learners in its curriculum. Since 1999, program researchers have been collecting data from pre- and post-surveys, written reflections, videotaped lessons, and written lesson plans completed by preservice

and inservice teachers. As one of the researchers in 1999, I completed case studies of two pairs of preservice and inservice teachers and their developing understandings of differentiation. An excerpt from the study summarizes the beliefs of each pair; Frances and Sara are the inservice teachers paired with Skye and Chloe, the preservice teachers:

> I expected that the inservice teachers in the project would develop an understanding of differentiation more easily than the preservice teachers because of their experience in the classroom with an ever-widening range of student abilities, interests, and learning styles. What emerged from the interviews was that the study group pairs differ on what they believe differentiation is and they differ in their acceptance of it as a philosophy. Frances is clear on her definition while Skye confuses whole-group teaching with differentiating. Frances embraces differentiation as a practical mindset while Skye sees the differentiated classroom as an ideal. Both Sara and Chloe are clear on their definitions and both say they will use it in the classroom, though Chloe isn't sure she is ready (Brimijoin, 1999, p. 2 of cross-case analysis).

This research led to the following questions for future study: (a) What do the results of this research tell us about teacher education programs? (b) Is the traditional student teaching experience the best way to prepare novice teachers for today's diverse students? (c) What do the experiences shared in this study tell us about the preparedness of teacher education faculty? and (d) What influences support or thwart a beginning teacher's attempts to differentiate curriculum and instruction?

In an extension of the 1999 study, I looked at the student teaching experience of two preservice students who had participated in the differentiation study group and two

student teachers from another college who had not had the study group experience (Brimijoin, 2000). Findings from this research generated recommendations for future consideration of how preservice teachers transfer learning about differentiation into their own classrooms and school cultures. In addition, results indicated that the supporting role of student teaching supervisors in differentiation and teaching for understanding should be investigated.

In looking at the problems and possibilities of accommodating the diversity of today's students, Ducette, Sewell and Shapiro (1996) raised questions similar to those generated in my pilot studies and they discussed these implications:

> How should teachers approach this diversity? How complex and differentiated can instruction be without losing coherence? What aspects of diversity make a difference in a specific situation and which ones are relatively unimportant...Questions like these, while having a long history in educational practice, have traditionally been considered less important than questions that focus on general issues about the curriculum or about learning. In the present environment, where diversity of all types is becoming more recognized, and where more and more groups are demanding that their specific aspect of diversity must be explicitly acknowledged, these types of questions can no longer be ignored or placed in a secondary position in the educational literature (pp. 323-324).

Research Questions

In response to recommendations that researchers focus on both the cognitive and contextual processes for learning to teach responsively, I framed the following research

questions to guide this study: (a) How do an inservice and preservice teacher each come to understand and practice differentiation? (b) How does their understanding and practice of differentiation affirm or refute existing research about building teacher competence in addressing student diversity?

This study answers these and other questions that have emerged and should provide a rich description of what is taught and learned in teacher education about meeting the needs of diverse learners. Specifically, this case study may offer a clear picture to educators about how to construct dynamic rather than static conceptions of individuals and groups in the classroom from the inservice as well as preservice teacher perspective.

Chapter 2

The Research Design and Methodology

Researchers have suggested longitudinal studies and case methodology to examine the developmental stages of expertise in responsive teaching (Hollingsworth, 1989; Morales, 2000; Paine, 1990; Piland & Anglin, 1993). Teacher education would benefit from a deeper understanding about cognitive changes that take place in the preservice and beginning teacher years and how preservice teachers learn pedagogical skills (Hollingsworth, 1989).

Qualitative case studies can define "pedagogical thinking" and describe major influences on prospective teachers and how they help or hinder the development of expertise (Feiman-Nemser & Buchmann, 1990).

> Without systematic descriptions of what is taught and learned in formal preparation and field experiences, we cannot understand what professional education contributes to teachers' learning or the ways that learning can best be fostered. That means we need to understand the following: (1) What teacher educators teach; (2) How opportunities for learning in the preservice curriculum are structured; (3) What prospective teachers make of these opportunities to learn over time; (4) What happens when student teachers take their learning from the university setting into the classroom; and (5) How these different experiences do or do not measure up as a preparation for teaching (pp. 1-2).

Answers to these questions call for the thick description and analysis that characterizes case study research. Evaluation of the importance of the findings from case research and the implications for teacher education is a critical addition to description and analysis, as

it will provide frameworks for helping novices to develop the "gross motor skills" that will become the "fine motor skills" of expertise in responsive teaching (Tomlinson, 1999, p. 115).

Understanding how prospective teachers are transformed from students into responsive practitioners who are able to meet the needs of nonstandardized learners is a complex task that requires probing and in-depth study (Blumenfeld, et al., 1994; Carter, 1990; Darling-Hammond, Wise & Klein, 1999; Doyle, 1990; Paine, 1990). Paine (1990) recommended longitudinal studies in teacher education directed at issues related to the growing diversity in classrooms: "Both researchers and teacher educators have much to learn about the orientations to diversity that prospective teachers bring to their professional education. We have even more to learn by seeing over time what these teachers make of what they bring" (p. 20). Attention to the internal processing of beginning teachers about specific classroom situations and the appropriate response to them will allow for the construction of a theory of teacher education that defines how teachers learn to teach and how that knowledge is used to solve teaching dilemmas (Carter, 1990; Doyle, 1990).

> The emphasis, in other words, is not simply on what particular teachers think or believe or even on how experts differ from novices. Rather, the purpose is to understand how meanings are constructed in classroom settings. To do this kind of analysis, one must have a powerful language to describe both *events* and the *interpretations* made of these events....Research along these lines generates not indicators but frameworks about what teachers know, how they act, and what judgments they make in solving teaching dilemmas. (p. 20)

This case study has the potential to create a powerful language of the "event" of differentiation in the classroom and the teacher's "interpretation" of the event. Analyzing the information collected promises to improve both events and interpretation and, as a result, to spotlight factors that enhance or hinder developing competence in differentiation.

Emergent Design

Qualitative inquiry is naturalistic in that the researcher does not manipulate the research setting (Patton, 1990). Because theory emerges from the conceptualization and interpretation of categories and characteristics derived from the data, it is not proposed at the beginning of the study (Merriam, 1998). Whatever theory emerges from analysis of the proposed case studies should be "substantive" rather than formal in that it should be specifically helpful for practice and for reforming teacher education curriculum (Merriam, 1998).

Case study inquiry is a comprehensive research strategy that rests on prior research and theory to guide data collection and analysis (Yin, 1994). In naturalistic inquiry, the research design unfolds rather than being preconceived, because emerging interactions between researcher and design are unpredictable and may influence the outcomes in unpredictable ways (Lincoln & Guba, 1985).

A case study is described by Yin (1994) as an empirical inquiry based on "how" or "why" questions about a phenomenon over which the researcher has little control. Case study methodology, therefore, seemed appropriate to examine the evolving understanding and practice of differentiation for an inservice and preservice teacher. The case study focused on an inservice teacher, Katherine, a preservice teacher, Mattie, and

Mattie's student teaching placement that brought them together for 12 weeks. I produced a written case report based on the advantages listed by Yin (1998) as written reports are more precise than non-written and the format of written reports is familiar across audiences. Chapter Three contains three case reports: one on Katherine and her class, one on Mattie, and one on Katherine and Mattie in their 12 weeks together. Chapter Four contains assertions generated from the data in the case reports, analysis, and findings (Erickson, 1986). Chapter Five shares conclusions and recommendations for further study.

Purposive Sampling

In making sampling decisions Yin (1994) suggests the use of sampling logic to ground multiple case studies and careful selection of each case in order to produce comparative results for potential theoretical replication. For this case study, purposive sampling was chosen because of the power possible from information-rich cases that answered the guiding questions (Patton, 1990). I have employed the strategy of extreme case sampling based on Patton's (1990) explanation that extreme cases are unusual in some way and consequently the source of rich information. Both participants have completed a one-credit graduate course in differentiation that focused on action research as a means of applying theory. In addition, both participants shared the experience of a differentiation study group, a unique collaborative program between the preservice teacher's college and a local school division that won the 2000 Innovation in Teacher Education Award from the Southeastern Regional Association of Teacher Educators. Preservice teachers participate in the study group as part of their Teaching Methods class in the fall semester preceding their student teaching placement. In the study group

preservice teachers are paired with inservice pairs to translate core knowledge about differentiation into best practice lesson plans they teach, videotape, and analyze. As a whole the study group then reflects on instruction and student response to improve practice. The participants in the study were not paired with each other in the study group.

The selection of the inservice teacher, Katherine, was based on her participation in the differentiation study group, on her completion of a graduate course in differentiation, and on her willingness to serve as clinical faculty for the student teaching placement being studied. Responding to a request from the preservice teacher, Katherine offered to lengthen the student teaching placement to twelve weeks, a deviation from the usual two-placement rotation of six weeks each. Katherine's commitment to differentiation also contributed to her selection. The researcher, local inservice teachers, and two school principals had verified that Katherine differentiated curriculum and instruction almost continually. Her consistent application of differentiation made her an extreme sample.

The selection of the preservice teacher, Mattie, was based on her participation in the differentiation study group, completion of the methods course that focused on differentiation, her interest in participating in the study, and her outstanding performance in her coursework at Blue Mountain. The lessons she designed, taught, and videotaped during her methods class were carefully articulated and differentiated based on readiness, interest, and learning profile, offering students choices that connected directly to their prior experiences. Mattie's reflections from the methods class professed a commitment to differentiation. The differentiated lessons she had designed and taught as well as her stated commitment to responsive teaching were not typical of preservice teachers about to

enter their student teaching placement and they provided evidence that Mattie also was an extreme sample.

In making the selection of participants for this study, a universe of possibilities existed, based on the degree of experience and interest in differentiation. I narrowed that universe down to two levels – interest and experience in differentiation and no interest or experience in differentiation – for the preservice teacher and clinical faculty mentor in the student teaching placement (see Figure 1). I chose to study participants in the cell where preservice interest and experience in differentiation matched clinical faculty interest and experience in differentiation because this match presented a unique and exemplary condition. Given this unique sample, I wanted to look at the potential difficulties and problems that arose even under these exemplary conditions.

Sampling Matrix

	Clinical faculty with no interest and experience in differentiation	Clinical faculty with interest and experience in differentiation
Preservice teacher with no interest or experience in differentiation		
Preservice teacher with interest and experience in differentiation		X

Figure 1. Sampling matrix for selecting participants in the study.

Person As Instrument Statement

For case study research, the investigator is the primary data-gathering instrument and as such is able to adjust to a variety of circumstances, to assess interactions with respondents and phenomena, to evaluate the shaping of events by the instrument, and to

identify and take into account biases (Lincoln & Guba, 1985). The person as instrument is in an advantageous position to respond flexibly to multiple situations and increase the probability of gleaning productive information as a result (Meloy, 1994; Merriam, 1998). Any instrument is subject to error and bias and should be measured against specific criteria to assess degree of trustworthiness (Lincoln & Guba, 1985). By describing my unique qualifications to have been the primary data-gathering instrument in this study, I hope to confirm my trustworthiness to assume this complex role.

From the Perspective of a Student. As a student, from kindergarten through the third year of my doctoral program, I have been keenly aware of the relationship between personal engagement and learning. When asked to remember the most effective learning experiences in my schooling experience, I always call up those teaching and learning events that were designed to challenge my thinking, tap into my interests, and/or fit with my learning preferences. The teachers that I remember as being the most successful in helping me to grow at maximum capacity are those who were "responsive teachers."

From the Perspective of a Teacher. Teaching students from kindergarten to adulthood over the past 24 years, I have developed a personal philosophy that emphasizes the individual in the learning process. I believe that my charge as an educator is to create life-long learners who see that the question is more important than the answer. In order to achieve this goal, I believe that I must truly know each of my students so that appropriate curriculum can be designed based on their individual talents, skills, interests, and learning preferences. Another underlying principle for me as an educator is that I must model what I teach. In terms of my vision to create life-long learners, I believe that as a teacher I

must continue to learn and grow. I believe that the description of my own experience in differentiation is evidence of continued learning and growth.

From the Perspective of an Administrator. As Enrichment Program Coordinator in a local school district from 1989 until 2000, I assisted gifted students and their teachers with curriculum and instruction. Over those eleven years I worked with many students who were severely under-challenged and who spent the majority of their time in classrooms "hurrying up to wait." I often observed and assisted teachers in classrooms where gifted students were bored or misunderstood and realized many other students were struggling or stressed from inappropriate learning experiences. The teachers I worked with were not ignorant of these problems; in fact, they expressed anxiety and frustration about their inability to address a continually expanding range of diversity in the classroom and asked for help in responding to varied student needs.

In 1997 I conceptualized a professional development model designed to provide education and support to teachers in my disctrict who were interested in studying differentiation. With school board approval, in the summer of 1997 I began working with a volunteer study group of nine teachers, who met in a 3-day summer retreat and monthly during the school year, observed each other, were observed by me, and worked together to write and implement differentiated lesson plans. The study group would incorporate action research in that each participant would use his or her classroom as a laboratory to test theories and research, reflecting on application to improve practice. The entire project was non-evaluative in nature.

In addition, the school board underwrote the cost of one-credit, graduate classes in differentiation through a local university. I taught those classes from 1997-2000. They

were designed to parallel the work of the study group in that teachers applied theory in the classroom throughout the course to evaluate their attempts to teach responsively.

By the spring of 1999 the study group had grown to fourteen new teachers. Encouraged by the increasing interest from faculty, I was at the same time dismayed by a lack of understanding and experience in differentiation among new teacher hires. Interview panels were finding that, when asked about how they differentiated instruction, only one out of ten candidates could define differentiation with any confidence. Research and reading on teacher preparation helped me see the importance of introducing preservice teachers to the concept of differentiation *before* they assumed the role of student teachers.

Meetings during the spring of 1999 with a local college faculty resulted in a formal commitment to collaborate on instruction in differentiation during the following year. The inservice teachers' study group was expanded to include the preservice teachers in Teaching Methods class during the first semester. Inservice and preservice teachers would read, study, and learn as "study buddies" about differentiation, design differentiated lessons, and implement them based on the action research model. Videotaping and observations would be used for reflection and analysis.

From the Perspective of a Researcher. As the study group design expanded, I became interested in how effective the professional development model had been in producing a clear understanding of differentiation. I designed a study of this staff development program as part of research requirements for Qualitative Methods in the fall of 1999.

As part of my doctoral studies in the fall of 1999, I embarked on an independent study to create a film featuring action research from the differentiation study group. I created a master digital tape of approximately forty-five minutes of rough-edited video examples of differentiated lessons taught by preservice teachers. Although the project remains unfinished at the moment, it is possible to use segments for teaching. I continue to search for funding opportunities to carry forward completion of the project.

In the spring of 2000, I designed a research study to follow two students from the differentiation study group through their student teaching experience with two teachers who had training in differentiation. I also studied two students who had no experience in differentiation who were placed with teachers who were also untrained. I designed an observation instrument, lesson plan analysis form, and surveys and copies of all lesson plans. Observations were completed over a three-month period. Data analysis included documentation of frequencies from observations and lesson plans, inter-rater reliability summaries, and qualitative analysis of survey results. A paper summarizing the study and its findings constituted my comprehensive exam. In addition, the paper received a Research Award from the Research and Evaluation Division of the National Association for Gifted Children (NAGC) and an abstract was published in the 2001 issue of Research Abstracts, one of the association's refereed journals.

I have completed six credit hours in Qualitative Research Methods at the University of Virginia. I passed the qualitative research exam in April 2001. Starting in 1993, I participated in a three-year study with the National Research Center for Gifted and Talented at the University of Virginia, and received training in the use of qualitative methods in field research. In addition, my administrative position with the school division

included many responsibilities for interviewing students, parents, and prospective teachers.

From the Perspective of a Teacher Educator. Over the past decade I have taught graduate courses on differentiation, served as a consultant to many school divisions and presented papers and sessions on differentiating curriculum and instruction at local, state, and national conferences. I am part of a Differentiation Cadre created by the Association for Supervision and Curriculum Development and consult on differentiation with schools across the country.

As creator and director of the differentiation study group, I have been collecting a rich array of data in the form of reflections, lesson plans, and videotaped field experiences from inservice and preservice teachers who are learning to differentiate. For me, the following questions echo throughout these sources of data: How well do teachers understand differentiation? What is missing from their understanding? How does their understanding influence their practice? What happens when a student teacher is placed in a classroom where the teacher consistently differentiates and the students expect differentiated curriculum and instruction? Do the cooperating teacher's beliefs about differentiation affect the student teacher's beliefs? If so, how? Can the cooperating teacher provide the scaffolding necessary to support a student teacher's efforts to differentiate? What does that scaffolding look like? Do cooperating teachers have the support they need to do this? By examining these and other research questions that may emerge, adjustments might be made in inservice and preservice teacher education that will ultimately benefit students.

From the Perspective of a Parent. Both of my children were identified as gifted early in elementary school. In addition to being gifted intellectually, both have special talents and learning styles. My daughter is a very creative thinker: her strengths in analysis are inductive rather than deductive; and she tends to view the world from unusual perspectives while exhibiting an extreme emotional sensitivity. Because of her unique perspective, multiple-choice tests have been her nemesis, but when provided with creative challenges she produces astounding work. My son is gifted in art and has a near photographic memory. He also exhibits extreme emotional sensitivity and spent many years in school sitting in "punishment chairs" because his way of dealing with boredom usually disrupted the class. However, when appropriately challenged he always excels. The learning experiences of my children have served to strengthen my commitment to the importance of responsive teaching.

These experiences form the values and principles I bring to this research study. My expectation is that the guiding research questions of this dissertation will lead to an understanding of how teachers develop a critical awareness of students as individuals and how that awareness can be translated into best practice design of curriculum and instruction. At the same time I believe that the data gathered through this dissertation will provide evidence for making revisions in the curriculum of teacher education.

Biases

Because of the serious commitment I have made to responsive teaching, I am no doubt susceptible to bias regarding differentiation, curriculum design, and innovations in teacher education I have helped bring about at Blue Mountain College. I believe it is my responsibility to acknowledge the following potential biases.

About Responsive Teaching. I believe that teachers who respect and acknowledge the differences of individual students can design academic tasks that appropriately engage and challenge students. Responsive teachers can create classrooms where students have choice, are involved, construct their own meaning, and develop enduring understandings. I believe that responsive teachers and the environment they create are key ingredients for success in this reform-driven era of education.

About Curriculum Design. I also believe that teachers should be curriculum developers and that most teachers have had little or no training in curriculum design. I believe that curriculum should be clear, concept-based, and mapped out by identifying results first and that educators, from the novice to the expert, should expand their understanding of how to design this kind of curriculum.

In summary, I have attempted to minimize the potential bias in this study by peer debriefing, consistently reflecting on the process of data collection and analysis, member checking, and establishing an audit trail. I took part in debriefing sessions (explained in the next section) with my peer reviewer, with a professor of qualitative research, and with members of my doctoral committee. These meetings helped early on to direct the study when Mattie was struggling and later to advance the evolution of major assertions. An audit trail (Lincoln & Guba, 1985) is available and includes samples of raw data, coded data at various stages of the investigation, excerpts from the methodological log, and analytic memos.

Data Collection

Data collection forms the centerpiece of the qualitative or quantitative research design (Grady, 1998). Comprehensive data collection is critically important for building

trustworthiness, or credibility, within the design. This approach to collecting data, known as "triangulation," requires gathering information from multiple sources and through multiple means, and crosschecking results (Lincoln & Guba, 1985). Corroborating multiple data sources increases the trustworthiness and, thus, the accuracy of the information (Grady, 1998). I used multiple sources and venues for data collection in this case study. Yin (1998) cites three principles of data collection: to use multiple sources of evidence, to create a case study database, and to maintain a chain of evidence for reliability. I used interviews, documents, and observations as sources of evidence; all narratives, reports, notes, and a research journal are stored in a computerized database. All documents, research, transcriptions, records of interviews and observations, and research journal entries are available for inspection.

Interviews. While the research proposal projected three one to one-and-a-half hour interviews, participants were generally unable to spare more than 35-40 minutes maximum during the school day. Consequently, I conducted eight interviews with Mattie and six with Katherine over the data collection period. All interviews were tape-recorded for later transcription and analysis. Interviews were usually held in a conference room off the school library during teacher planning time. Because this was not always possible, several interviews were conducted after school in my office at the college. These after-school times worked better for Mattie at the end of the semester because of her extracurricular schedule and the demands of lesson planning. My first interview with both participants began with a question about their understanding of differentiation at that point in time. Subsequent interviews began with questions generated from analysis of preceding interviews and observation field notes or comments made by participants

during observations. While I generated a list of questions for each interview, I allowed the respondent to join in establishing the direction each interview took. This was especially true in the first half of the semester when I asked these questions: "How did you come to know what differentiation is?" and "On what beliefs about students and learning is your understanding of differentiation based?"

Toward the end of the study my questions became more specific as I searched for evidence to confirm and disconfirm the shaping of assertions. For example, in one of the last interviews with Mattie I asked her this: "Talk a little bit about how it made you feel to move from group to group and student to student when you were actually in charge of differentiated activities." With Katherine, pursuing a line of investigation about professional isolation, I asked her: "When you were talking about 'waving the differentiation flag' what implications did that have on your role in your school?" Numerous informal interviews were conducted with both Katherine and Mattie upon their request for coaching or intervention. As agreed with both participants, these interviews were not taped but were documented with notes. Several of these sessions were in my office at the college and provided an opportunity for Mattie to ask questions, get positive feedback, and reduce anxieties that resulted from confidence issues. I also conducted one on-site interview lasting approximately 1 hour with the school principal, Laura Hooper, after she had observed Mattie teaching. Mrs. Hooper's observation was routine for student teachers and Mattie knew about my interview with her. I conducted one subsequent telephone interview with Mrs. Hooper, which lasted about 30 minutes in order to clarify school related data.

Because of my full-time work schedule I hired a typist to transcribe the tape-recorded interviews. These were done within a week after each interview. While the interview was in progress I took brief hand-written notes to help me clarify any questions the typist might have. As soon as transcriptions were available I reviewed them thoroughly, making notes in the margin and listing questions for subsequent interviews. I wrote analytic memos over the entire span of the study. These memos helped bring definition to the ideas and meanings that evolved from interview responses.

Reflections. Participants voluntarily maintained electronic reflective journals, which they emailed to me every few days. They agreed to record their thoughts, feelings, actions, and reactions in their journal entries, but were not required to do so. All reflections were unprompted and unscheduled. Both participants were consistent in the maintenance of these journals over the data collection period. Katherine also emailed me portions of her personal electronic journal from the beginning of the school year to help uncover particularities about the construction of the learning community.

Observations. Observations provide a holistic view of the cases being studied in qualitative research (Grady, 1998). While I proposed only three observations of Mattie, I ultimately completed seven during her student teaching placement. Originally I had planned to remain in the classroom for three full days to observe, but this did not work because of conflicts in my schedule. Consequently, in order to observe Mattie teaching all content areas, it was necessary to conduct more observations, each for shorter time segments. Mattie agreed to this change in plans. In addition, I observed Katherine three times. I described observations in detail through field notes in order to provide the "emic"

perspectives, or the insiders' views (Merriam, 1998). I gathered field notes in written form.

As observer I usually sat in the back of the classroom during any whole group instruction and moved from group to group during differentiated learning experiences. I participated minimally in the class. Katherine's students were prepared for my role and from the very beginning seemed to accept me as if I had always been there. I explained to them that I was writing a kind of book about how teachers work with their students and several of them said Katherine was a good teacher to study. Many students greeted me on my arrival each time and occasionally some asked me questions or shared information with me.

The evening after each observation I re-read my field notes and made notes in the margins. I kept a notepad of concepts or themes that I sensed were emerging from the data and reflected on the observation in my methodological log. I also wrote analytic memos to respond to the observation data I was collecting. These memos helped to narrow and focus concepts and themes and generate assertions.

Documentation. I collected a variety of documents or archives during the study in order to confirm and refine the development of generalizations and assertions. I reviewed non-confidential data required for the student teaching assignment. These data included checklists, observation notes, and evaluations from the cooperating teacher and the college supervisor as well as checklists, lesson plans, and self-assessments from Mattie during her student teaching placement. The copies of lesson plans included those I had observed. I also saw examples of student products that were the outcome of lessons I had observed. Additionally, Mattie provided me copies of her lesson plans, reflections, and

analysis papers from the Teaching Methods class first semester. Such documents are useful for creating a context for the study and for increasing accuracy by creating a tangible record of events and circumstances (Grady, 1998).

Time and Motion Studies. In order to quantify the number of contacts Mattie and Katherine had with each other when they attempted to co-plan and co-teach and the number of contacts they each had with students when they were differentiating instruction, I used a "time and motion study" technique described by Wolcott (1994). Although the quantification of the time and motion study approach may seem to contradict the principles of qualitative research, Wolcott explains that this type of study has been characteristic of anthropological fieldwork for over fifty years. The systematic observation of specific time distributions allowed me to document minute-by-minute interactions between Katherine and Mattie, Katherine and students, and Mattie and students. By coding these interactions in much the same way as Herbert (1999) I was able to pinpoint exactly what transpired during segments of instruction that were differentiated and between Katherine and Mattie when they were co-teaching.

Videotaped Observations. I videotaped four observations of Mattie and three of Katherine. At the beginning of the study I used the videotapes to prompt reflective interview responses as recommended by McNergney, Hallahan, and Herbert (1999). However, participants did not like watching themselves on the videotapes and this seemed to thwart rather than promote dialogue. After the second interview I abandoned this approach and used the videotapes for study to generate additional interview questions and triangulate other data by confirming or disconfirming evidence from interviews and observations.

Informants. Mattie's college supervisor observed her teaching in Katherine's class as part of the evaluation process for student teaching. Her supervisor provided me with copies of formal observation notes and checklists, which I used for triangulation. When she and I spoke informally, I took notes and have them on file. Notes from those informal conversations were used to confirm evidence collected from other sources.

All written field notes are on file with all copies of archives and documents. Interview transcripts, my methodological log, observation field notes, and journal reflections from both participants are stored in a database, on my personal website at the college, and on two external zip disks. Hard copies of all this material are also on file. The data has been stored carefully in order to create an audit trail.

Audit Trail. In order to establish an audit trail (see Appendix G), I created a system for organizing transcripts, documentation, notes, methodological logs, analytic memos, and data analysis. I met with my peer auditor four times and communicated consistently by email over the course of the study. In addition, I met on four occasions with my committee chair, and several times with other committee members and professors. These meetings helped to refine questions for interviews and advanced the study's assertions.

Data Analysis

The conceptual framework of this study seemed to fit best within the paradigm of Erickson's (1986) methodological approach to qualitative research. Erickson points out that "the specifics of action and of meaning-perspectives of actors in interpretive research are often those that are overlooked in other approaches to research" (p. 124). According to Erickson, assumptions about the nature of cause in human social relations form the most fundamental ontological approaches to "reality" in interpretive research.

Interpretive inquirers assume that peoples' actions are based on the actions of others around them and the resulting perspectives of the actors are of critical importance in legitimating research. Defining Katherine and Mattie's journey toward differentiation required careful scrutiny of their actions in response to the students they taught and their resulting perspectives on what this meant for their personal theories and pedagogy. Erickson's epistemological assumption is that there are multiple and complex realities and our understandings of those realities are causal and complex in and of themselves. In trying to discover the path both Katherine and Mattie take toward differentiation in this study, the complexity of multiple realities had to be addressed. Katherine's understandings of differentiation, Mattie's understandings, their shared understandings, the students' understandings of differentiation and how their understandings related to Katherine's and Mattie's created a complex, multi-tiered set of phenomena to interpret.

Erickson also assumes that, for the interpretive inquirer, patterns of status and role identity and local meaning interpretations are distinctive to a microculture or natural group. Erickson suggests that distinctly local interpretations such as students' views of classroom life may be worthy of study. The role that the learning community played in Katherine and Mattie's understanding of differentiation called for distinct microcultural meaning interpretations and fit well with Erickson's assumptions. Local meaning interpretations are also seen by Erickson to be critical because the minute-to-minute actions and reactions, or "lived experience" of participants, are unpredictable, elusive, and unique (Lecompte & Preissle, 1993). The unique lived experience of Katherine and Mattie as they acted and reacted to Katherine's students and each other reinforced the application of Erickson's approach to this study.

Because of the ontological and epistemological assumptions he makes, Erickson maintains that the interpretive inquirer must adopt a holistic perspective for methodology. Assuming that uniformity is an illusion, as researcher I recognized that interactions among Katherine, Mattie, and the students created context and I attempted to identify that context by discovering the connections between choices and actions. The analysis of data in this study focused on uncovering layers of particularity, as recommended by Erickson. In order to define the social ecology of Katherine's classroom, as researcher I documented the social and cultural organization of the environment. Erickson stipulates that the researcher must frame the investigation with these key questions: (1) What is happening and what does that mean to the participants? (2) What are the differences and conditions of meaning perspectives for participants? (3) How is meaning constructed and sustained? (4) What is sense making for participants in specific situations? These fundamental questions framed the research questions that drove this investigation and helped me to focus on the preservice and inservice teachers' own models for translating their understanding into practice.

As an interpretive researcher I knew that the methods are not separate from the researcher as instrument and that, because all research methods are fallible, it is important to use multiple methods. Therefore I constructed plausible, coherent accounts and established the evidentiary warrant of those accounts through thick description, different accounts from different people, quotes, disconfirming evidence, and causal links in effective storytelling (see Appendix B). Throughout the case report evidence was presented from reflections, documents, narrative vignettes, time and motion studies, and videotaped observations. As I reviewed observation field notes and interview transcripts

and wrote analytic memos, I began to see specific concepts and themes emerge. I narrowed these to four broad areas: beliefs and understandings about differentiation; instructional methods and strategies for differentiation, management, and assessment philosophy and practice; the design and creation of the learning community; and support for differentiation from self, others, and instruction (see Appendix C). I assigned each theme a color and used color-keyed post-it notes to mark evidence in reflections, interview transcripts, and observation notes. I also used color-keyed highlighters to frame or underline specific quotes or sections in those notes for future reference. As the study progressed, an increasing number of sub-themes began to emerge. For example, under assessment and differentiation the sub-theme of management took on huge significance. However, I decided to stay with the existing color codes rather than re-marking all data. I made notes as I went along to indicate more specific sub-topics (Appendix B).

In keeping with Erickson's approach, I inductively generated assertions by reviewing the data corpus multiple times to test my assertions for validity. Finding disconfirming evidence, some assertions were modified, collapsed, or eliminated. I have documented the evolution of these assertions over the course of data analysis in analytic memos that were written throughout the data collection and analysis period (see Appendix C). These memos serve as documentation of the emergence and testing of assertions. In addition, I maintained a methodological log in order to document the day-to-day specifics of data collection and analysis for purposes of dependability (see Appendix D).

Establishing Trustworthiness

The naturalistic inquirer establishes trustworthiness, or confidence in the conduct and results of the investigation, through the processes of credibility or truth value, transferability or applicability, dependability or consistency, and confirmability or neutrality (Lincoln & Guba, 1985). These processes conform to the scientific processes of internal validity, external validity, reliability, and objectivity and help to ensure the kind of rigorous investigation and ethical outcomes that may have significant influence on the practice or theory of education (Merriam, 1998).

Credibility. I attempted to establish credibility in this study through the following processes, as suggested by Lincoln & Guba (1985): prolonged engagement, persistent observation, triangulation, peer examination or debriefing, and member checking. My efforts to triangulate the data are discussed in detail under the "Data Collection" section.

Prolonged Engagement. Lincoln & Guba (1985) have defined prolonged engagement as the sufficient time required to learn the culture under study, test misinformation or distortions produced by the investigation, and build trust. My roles as staff developer, graduate course instructor, teacher-coach at the K-12 and college levels, and gifted coordinator have provided a foundation of trust with the two participants in this research design. Although I joined the local college faculty in July of 2000, I had been working with the Education Department for the previous three years as a visiting consultant and adjunct and I helped to restructure the Teaching Methods syllabus in the spring of 1999. I knew the preservice teacher through previous work at the college and had worked with the inservice teacher for two years. The study was conducted between the last week of January and the second week of June. The twelve-week student teaching

placement was an intensive experience for both participants and provided rich and varied data.

In order to build trust I enforced pledges of anonymity, avoided using confidences against either participant, honored the interests of the participants, allowed them opportunities for input, and disallowed hidden agendas (Lincoln & Guba, 1985). To avoid "going native," I adopted a degree of participation that produced the most meaningful data given the participants, the context, and the interactions (Patton, 1990). Involving participants in all phases of the research, triangulating the data, and engaging a peer examiner assisted me in resisting the tendency to become excessively involved.

Persistent Observation. The purpose of persistent observation is to identify the salient characteristics most closely applying to the research question under study and to focus on them in considerable detail (Lincoln & Guba, 1985). Repeated observations over a period of time can increase the validity of research findings (Merriam, 1998). I resisted the tendency to premature closure, or coming to a focus too soon, by entering the investigation with no preconceived theories or a priori hypotheses. The interviews and observations took place over the entire student teaching placement, from January 15 until May 4, 2001. Subsequent observations and interviews with Katherine continued until June 18, 2001.

Peer Examination or Debriefing. Another technique for establishing credibility is finding a peer examiner who is willing to explore aspects of the investigation that may escape the researcher (Lincoln & Guba, 1985). The role of a peer examiner is to keep the investigator honest, to test working hypotheses, to further the emergence of design, and to allow the investigator an opportunity to "clear the mind" (Lincoln & Guba, 1985). Dr.

Catherine Brighton, who completed her Ph.D. in Educational Psychology at the University of Virginia in May of 2001, has served as my peer examiner. Dr. Brighton and I have met five times in person and have communicated consistently by electronic mail over the course of the study.

In addition I participated in a peer debriefing session related to my research study during my qualitative research class in the spring semester of 2001. My qualitative research professor permitted me to use my dissertation research as the basis for our class project. Consequently, I produced a research paper using the Erickson paradigm that served as a first draft of data analysis for my dissertation. That paper offers further evidence of evolving assertions in this study. I met with my professor in an advising session after he had evaluated my paper to discuss methods and analysis. I also participated in four advising sessions with the chair of my committee and one with another member of my committee during the study. The sessions with my debriefers and committee members helped me to clarify the direction of data collection and analysis. In addition, on three occasions my committee chair assisted me when the preservice teacher was struggling and asking for intervention; the help she provided allowed me to maintain objectivity but to be sensitive to the needs of the student.

Member Checking. Giving stakeholders, or the members of the research cases, the opportunity to react to representations of the study, is the "most crucial technique for establishing credibility" (Lincoln & Guba, 1985). I gave both participants opportunities for formal and informal feedback about the data being collected. These opportunities for feedback allowed for clarification of intent, correction of errors, elaboration, summarization, and confirmation of credibility and accuracy (Lincoln & Guba, 1985). I

asked respondents to read over transcripts of interviews and offer suggestions for revision. I also gave both participants copies of the qualitative research paper I had written. Mattie had no suggestions. Katherine's suggestions helped to frame new interview questions during the last few weeks of the study. Katherine collaborated on the design for numerous diagrams and figures and reviewed all of them, giving helpful feedback. After completion of the case report Katherine reviewed all sections and gave helpful feedback and clarification. By the time I had finished the first draft of the case report, Mattie had departed for her work abroad for the year. Because of her location, it is impossible for me to send it to her at this time.

Transferability

Generalizing from a particular instance in order to extract the "universal" idea or theme helps the researcher develop working hypotheses that can guide the investigation (Merriam, 1998). Generalizability, or transferability, in the positivist sense cannot be achieved through naturalistic inquiry, but can be suggested by "proper" thick description that provides a sufficient knowledge base to permit another person in another setting to make comparisons or replications (Lincoln & Guba, 1985). In Chapter One, I provided a thorough description of the problem and the theoretical rationale for the guiding research questions. In this chapter, I have provided a thorough description of my credentials to be the data collection instrument, the methods I have employed, and the analysis I used. In the next chapters, I believe I have provided a thorough description of the contexts for the case report and the processes and transactions observed in those contexts, which are the two most critical components of Lincoln & Guba's (1985) definition of "thick description." In addition, I believe I have identified important elements in each context

that were investigated in depth and discussed the findings of the study in terms of working hypotheses.

Dependability and Confirmability

The "audit trail," or stream of records issuing from the investigation, is the major technique for establishing dependability and confirmability (Lincoln & Guba, 1985). Dependability is achieved by thorough examination of the processes of the investigation to ensure that it is acceptable. Confirmability is achieved by thorough examination of the products of the investigation to attest that they support the data and findings. The inquiry audit includes the assessment of both processes and products and should be conducted by an independent auditor (Lincoln & Guba, 1985). Dr. Catherine Brighton, my peer debriefer, has performed an independent dependability and confirmability audit (see Appendix G). Examples of raw data, analytic memos, and methodological log excerpts are available for examination.

Ethics

The investigator's role in naturalistic inquiry is not to change the respondent. Consequently, ethical issues are extremely important to this researcher. The researcher-participant relationship is central to potential ethical dilemmas in qualitative research. That relationship and the research problem together determine how well the participants are protected from harm and to what degree consent will be informed (Merriam, 1998). Although confidentiality and anonymity cannot be guaranteed, there are many factors that must be acknowledged and balanced by this researcher to protect participants and exercise all reasonable precautions in that regard (Lincoln & Guba, 1985).

Confidentiality

I guaranteed confidentiality to both participants. All respondents and locations were given pseudonyms. Participants provided written consent to participate in the study. In this study, I have conformed to the ethical considerations and principles of the American Psychological Association for research with human subjects. I received approval to complete the study from the Institutional Review Board of the University of Virginia.

Promises and Reciprocity

The researcher can honor promises made about the member-checking process by negotiating outcomes (Lincoln & Guba, 1985). This negotiation is an interactive process where the participants and the investigator define the meaning of the data. The resulting definition is reciprocal and takes into account the stake the participants have in the study. Throughout this study I encouraged reciprocity and attempted to establish an open dialogue with both participants for the purpose of including their revisions and extensions.

Chapter 3

Teaching and Learning: A Journey Taken

Katherine and Her Class

The Context. Redlands Elementary School is located in Jefferson County, a rural school division in the mid-Atlantic region with one high school, two middle schools, and seven elementary schools. Redlands is ten years old and the newest school in the county. Of all the schools it is situated nearest to the only urban area in a radius of fifty miles and is bordered on the north, east, and south by sprawling strip malls, fast-food restaurants, and small businesses. On the edge of the main route in this area zoning is continually being converted from residential to commercial. There are a few new housing developments, scattered apartment complexes, many neighborhoods of small, older homes, and several mobile home parks. The school is set well back from the main highway in a wooded area that is more characteristic of this rural county than the encroaching development just beyond the trees.

When asked about parent involvement and support at Redlands Elementary, the principal said there are "a few parents who are there for everything but most do not get involved." She explained that this is primarily because more than 50% are single parents and many work more than one job. She also said that many of the children in the school come from "problem homes" and are academically, emotionally, or physically at risk.

Currently Redlands Elementary has 467 students enrolled in kindergarten through fifth grades and 50 faculty and staff members. For the first time last year Redlands had an assistant principal but this year that position was eliminated due to budget cuts. Laura Hooper, who was the assistant principal, was promoted to principal at Redlands this year.

In an interview she described the school as "basically low socio-economic with some average to middle income families." Forty-five percent of the students receive free or reduced lunch. Approximately 25% of students are African-American and less than 1% are Native American or Hispanic. Of the 50 faculty and staff, 20% are African-American and the rest are Caucasian. Nearly 75% of the faculty members are new to the school and new to the profession with less than 5 years teaching experience. The principal described the faculty as having a "high turnover rate for the past few years" and attributed this to high-stakes testing and to attrition from retirement. Most teachers live in Jefferson County or the nearby city but only two live in the section of the county closest to Redlands Elementary.

Being in a high-stakes testing state, Redlands Elementary is evaluated each year in terms of student performance in English, math, science, social studies, and technology. Redlands has yet to report a passing percentile for any grade level on any content area test. Their average reading scores are 20 points below the state's minimum passing level. Math scores are a little higher, but still more than 10 points below the cut-off scores. The school is considered "at risk" and has received the ranking of "Needs Improvement" by the state.

When asked about strengths of the school, the principal pointed to the new faculty as "risk takers" who she thinks may help to increase student achievement through innovative teaching practices. She is very proud of the fact that the school will implement parallel block scheduling next year on every grade level, after a pilot program for the past two years in fifth grade. An emphasis on the fine arts is another strength of the school highlighted by the principal. She pointed out that Redlands was the first elementary

school in the county to establish a drum corps, flag corps, show choir, and dance troupe. In spite of the generally low level of parent involvement in school activities, these after-school fine arts activities boast a high participation rate by a diverse group of students. This is one area where Redlands has been a trendsetter; several other elementary schools in Jefferson County are now starting their own choirs and flag corps.

Laura Hooper is unique among principals in Jefferson County in that she is the only administrator who has an extensive background in differentiating curriculum and instruction. As a former teacher in the county, Laura was part of Jefferson County's innovative study group focused on action research in differentiation. By the time she became a building administrator, Laura had designed and taught many lessons and units differentiating content, process, and product in all content areas. Several of her units were considered exemplary by the central school administration. In the school where she taught fifth grade, Laura differentiated her math instruction on a daily basis and frequently differentiated instruction in language arts, social studies, and science. In an interview Laura shared her hope that eventually "all teachers will understand and practice differentiation" and she continually looks and asks for evidence of the principles of differentiation when she observes and evaluates instruction at Redlands. She recognizes the importance of administrative support for differentiation and acknowledged that for both preservice and inservice teachers differentiating curriculum and instruction is complex, challenging and, at times, overwhelming.

The Grade Level. The classroom studied was one of four fifth grade classes at Redlands Elementary School. The teacher studied has been teaching for two years, both at Redlands, although she is thirty-eight years old. The other three fifth grade teachers

have been teaching for an average of 20 years each and all three have been at Redlands since it opened. Before coming to Redlands they had all worked together for at least ten years at one of the schools Redlands replaced.

According to Redlands' principal, all four classrooms in fifth grade have "varying levels of abilities from very high to very low and are pretty typical of the school." In the classroom under study there are more students receiving special education services than in the other three classrooms because, the principal explained, they were "clustered" for services this year.

The principal also pointed out that the classroom being studied was the only one in fifth grade that did not participate in the pilot program for parallel block scheduling, started two years ago. The parallel block requires strict adherence to scheduled class change times. Katherine, the teacher studied, felt that the parallel block schedule would limit her ability to implement interdisciplinary, concept-based instruction and differentiated learning experiences. She also believed that increasing the number of times groups of students were split apart in her class would undermine her goal to build an interdependent learning community. She argued her case effectively and was exempted from the pilot program.

Fifth grade is a testing level for the high-stakes state assessment program and, as in most districts across the state, Jefferson County is no exception in placing heavy emphasis on teaching the tested curriculum standards for fifth grade. All teachers at this grade level are currently under immense pressure to guarantee test results that meet or exceed the state's passing score. Considering the "at risk" ranking of Redlands, the fifth grade teachers are looked to by school administration and parents to whittle down the 20

point difference between existing scores and cut-off scores to help lift Redlands out of the "Needs Improvement" category.

The Classroom. To accommodate the rising population at Redlands Elementary, the county just completed the addition of a new wing to the ten-year old facility. Katherine's class moved into their bright and spacious classroom after school started in the fall. The room faces south with large windows across the south wall. Storage closets and cabinets, a sink, and counters line the north wall next to the door. There is a small rug between the counter and student desks. On the east wall shelves and hooks provide space for student belongings and most of the west wall is covered with a dry erase board and bulletin boards covered with job assignments, classroom rules, and housekeeping items. Student desks are clustered in pods, four to five desks per pod. Each pod has a "common table," or extra desk that serves as an extra supply space for each pod. In the southeast corner bookcases, freestanding crates with books, a rug, and large beanbag pillows form a reading area. Albert Einstein looks down on this area from a large poster above the bookcases. In the southwest corner four computers and a printer form a technology ell next to the overhead projector cart. The school supplies one of the computers and the other three belong to Katherine, whose husband works for an electronics corporation. Near the windows is a round table with chairs. A half-table with chairs has appeared in various spots in the room during the spring semester, sometimes in the back near the student shelves, sometimes in the front near the bulletin board. This table usually looks very much "in use" with papers, books, plastic cups of pencils and pens, files, teaching materials, and student work. The piece of furniture that looks least used or lived in is the standard teacher's desk in the northeast corner of the room. Materials are neatly stacked

next to family photographs but one has the sense that this space is used more for storage than for occupancy.

The classroom is clean with materials and supplies organized in specific spaces, but there is a general level of clutter typical of groups working on more than one task at a time. There are several signs hanging from the ceiling that say, "There is NO time to waste." There are two signs on the wall behind Katherine's desk. One is a quote from Ralph Waldo Emerson: "Our greatest glory is not in never failing but in rising up every time we fail." The other is from Dr. Seuss: "I like nonsense, it wakes up brain cells. Fantasy is a necessary ingredient in living." If the quotes Katherine displayed tell us something about her, we might guess that Katherine believes in perseverance as well as a certain amount of playfulness.

The Students. Students at Redlands Elementary are grouped heterogeneously in all grade levels. Those identified for special education services are mainstreamed in the regular classroom, but pulled out for specialized instruction based on their individual education plan (IEP). In Katherine's classroom students receiving special education services left from approximately 9:15 to 11:30 each day with the exception of one who left at 10:30. Students identified as gifted were pulled out from 1:30 until 2:00 one day a week, participated in several after-school programs, and had an individual gifted plan (IGP) for compacted instruction in the classroom.

Of the 19 students in Katherine's fifth grade class 11 were females. Four females and one male were African-American; all others were Caucasian. Six students received special services; one for a learning disability, one for a learning disability with other health impairment (attention deficit, hyperactivity disorder), one physical disability,

another for side effects of lead poisoning, one for traumatic brain injury, and one for speech, language, and occupational therapy. Another student received Title I reading assistance. Two students were identified as intellectually gifted.

The typical daily class schedule began at 9:00 with "morning work" followed by the Pledge of Allegiance and a moment of silence. At 9:30 five special services students left and math instruction began. At approximately 10:30 a transition was made to a reading block and another student left for special services. At 11:30 students receiving special education services returned and the class went to art, music, physical education or computers. Students returned to special education services and the rest of the class worked on basal skills and writing from 12:15 to 1:00. All students reassembled for lunch from 1:00 to 1:40, followed by recess until 2:00. Then the entire class was together for a social studies and science block from 2:00-3:30.

The poverty, parental neglect, and minimal educational levels among parents at Redlands were the antithesis of Katherine's own fifth grade experience. "You know, students couldn't afford to bring in the loose leafs I needed them to bring in. That was a real shock. I think that was probably the biggest surprise to me. It wasn't so much the ethnic diversity or the learning styles and needing to be entertained, but it was poverty." Katherine's students looked like typical 10-year olds. Some of the girls sported platform sandals and bright colored T-shirts with colorful, glittery designs. Others wore more subdued jeans and sneakers. Many of the girls seemed fascinated with a range of non-traditional colors in nail polish; some had different colors on each nail. The boys were more uniform in dress; all of them wore jeans or shorts and T-shirts with pictures or logos of sports teams, car racing, and vacation spots. They were a friendly group, at ease with

strangers or visitors in the classroom and seemingly oblivious to videotaping by observers. They appeared to be comfortable with themselves, each other, and Katherine.

When they arrived in the fall Katherine knew that a few of her students brought the label of "discipline problem" stamped on them by former teachers. She enjoyed telling the story of her first meeting with Bethany during the opening of school when Bethany looked straight in Katherine's eyes and said, "You'll be sending me to the office a lot this year. I'm bad to the bone." A number of her students had a history of office referrals stretching back to primary years. At the end of this year Katherine reported a total of 13 office referrals, nine of them occurring while her student teacher was on duty, and Bethany was not among them.

The Teacher. Katherine is of average height, with dark, short hair and blue eyes that look intensely and directly through small glasses. She often knits her brows in what might be called a "ponder." She has a get-down-to-business air, but humor is important to her and the "ponder" often dissolves into twinkling eyes and bright laughter. Katherine has a confidence in her voice and carriage that makes her a magnetic presence. In the classroom she is rarely separated physically from her students – she moves among them, between them, in the center of them, along with them. It is easy to mistake her for a large fifth grader, her teacher role not immediately obvious to the casual observer.

It is quite common for Katherine to be multi-tasking. She is a powerhouse of energy, usually arriving at school about two hours before teachers are required to report. She emanates competence and caring while carefully analyzing, reflecting, and conceptualizing. Observing, questioning, sharing, guiding, and encouraging, she sits, stands, kneels, gestures, and dashes about the classroom, but it also is not unusual to see

Katherine seated, cross-legged between crates of books on the rug in the corner, "advertising" reading selections or research sources for assigned tasks. She is constantly collecting valuable information that will help everyone in the classroom grow – students and teacher alike.

Katherine grew up in a suburb of a northern city in a community that was almost purely white and middle class. "I didn't have a lot of ethnic diversity at all when I grew up." Both Katherine's parents were educators, moving from elementary to high school teaching and finally to teaching at the college level and she reported, "Teaching was kind of the family business." She said she wanted to be a teacher all through grade school, but that her parents encouraged her to think about a profession like engineering. In college, she majored in physics and engineering for two and a half years and "loved the math and science and excelled in my course work." However, she tired of the individual competition and the hours of working alone. After dropping out of college to get married she said, "I spent the next ten to twelve years doing a lot of daycare work. I did elder care (Alzheimer's patients) but everything I gravitated to had to do with people. People contact, people working, caring and nurturing." After her two children reached school age, she volunteered in their schools for nine hours a day and served as PTA President. "And then I finally hit the point where I realized I couldn't do anything but teach. That was all I wanted to do." When her children established a solid footing in school, Katherine decided to go back to college. With her background in math and science, she was advised to finish her degree with a high school teaching license. She struggled with that because "I felt like the biggest change you could make in education and with children is in the elementary school setting...My personal thing is math. Start them out

loving math, not being afraid of math. A lot of times by high school I think it's over, they've given up, they've had too much frustration." In spite of her advisor's lobbying, Katherine followed her heart and completed a B.S. in elementary education with eleven hours towards a master's degree.

Believing and Understanding. Katherine entered her student teaching placement, atypically, at the age of thirty-four, with a great deal of firsthand experience in dealing with and doing school. "It wasn't that I needed a degree because I needed to teach or I needed an income. I went into education back in college with a kind of mission in mind." That mission was to create a classroom where individual student needs would be met as well as valued. Her mission grew out of, "having been a student and having had difficulties in school with content not meeting my needs. And then being a mother and having children in school." Katherine first recognized the importance of individual needs in kindergarten, "where I spent most of the day in the corner. I was very talkative and I had a really high need to communicate as I was learning which was not understood back then." She entered kindergarten reading, "and that was a problem and I was different and that was a problem. So, I think that this whole idea of children being different is something I've dealt with my whole life. It is very critical to me."

Another early influence on Katherine's philosophy was a friend who had a learning disability, although at that time the label didn't exist. "She was put in a dummy class and I saw a lot of that, injustices. I think I was born with this fairness thing and meeting everybody's needs and trying to be everything for every body." Her friend was in the slow reading group, while Katherine worked hard, finished early, and sat. "There was no challenging past that point and my girlfriend, who like I said had learning disabilities -

I remember her crying on the playground. She was crying and I was crying and we were crying for two totally different reasons. But, nobody was doing anything to meet our needs." When Katherine got to high school things improved because she was accelerated one grade level and took Advanced Placement courses to finish high school in three years. And while the advanced classes helped to challenge her more, "There was definitely not a focus on what I was interested in. No differentiating by interest at all and on learning styles, unheard of. Luckily I'm very visual and auditory and logical/sequential and I did very well, but the kids that were kinesthetic, I mean back then they were just called bad."

Katherine's experiences in school were forming the bedrock of her teaching philosophy: that individual students differed but that this did not mean they were "problems." Instead, for Katherine, it meant that the teacher was presented with problems, but problems that had solutions. To Katherine the challenge of solving these problems seemed stimulating and enriching. About her mission to address student differences she said, "I think the reason that I bought into the philosophy so strongly was that it spoke to something that I had already believed, intuitively, I think." Katherine's "mission" therefore became a journey, driven by her beliefs, to turn the problems of meeting individual needs into effective solutions.

Knowledge: The Foundation. Although there was some focus on meeting individual needs in her education courses, Katherine never encountered the term "differentiation" until her student teaching placement in Jefferson County with Laura Hooper, who is now principal at Redlands. "Laura had a cubing activity going on where she had cubes with different levels of questions, but all dealing with explorers." This

interested Katherine "because some things went well and some things didn't and I got to see what was working for her." She called her first encounter with a differentiated classroom and Laura Hooper's modeling a "eureka moment" and said, "It's like I've found it, there is a name for this. You know, it is not just something creative teachers do and regular teachers don't. It's not just a personality thing; this is a real philosophy with steps and order and a purpose." For Katherine, seeing a teacher modeling differentiation not only triggered a revelation, it also synthesized belief and practice. Something she held as a personal theory now had come alive in application. She had discovered a process for differentiation, and having seen a model in practice, Katherine dove into books, articles, and information on the web to learn more.

Katherine's study pointed to a fact she understood implicitly -- that content knowledge was a fundamental requirement for effective differentiation. In a journal reflection she wrote, "To integrate and differentiate you have to really know what you are teaching and the outcomes you need to have." If the content and outcomes were clear, but accommodations were not made for individual needs, then Katherine saw that some students would grow while others would struggle or wait. Just as importantly she also saw that if individual accommodations were built into the lesson, but the content and outcomes were fuzzy, student learning would be "muddled and confused." Effective differentiation would unite individual accommodations with clear content and outcomes.

Katherine began to sense that the learning environment with its embedded management system might be as critical a component of effective differentiation as content and outcomes. Katherine recognized the importance of learning specific techniques and strategies for "moving, working, and juggling" in the differentiated

classroom. She reflected on the importance of consistency, recognition of individual worth, and the building of trust in managing a differentiated classroom.

Finding key resources helped Katherine define the differentiation process. She noted in a reflection: "You really can't diff (sic) until you have a handle on all the resources available to you! What's out there? What can we access? Videos, tapes, sites, books, speakers?" She was not only referring to resources for students, but for teachers as well. To assess spelling development as well as instructional and independent reading levels, for example, Katherine needed access to specific spelling and reading inventories. Struggling readers in her class needed novels and content texts that were on their readiness levels. As a teacher, she needed to know how to provide these materials for her students.

Katherine's first placement in Jefferson County was instrumental in confirming the role of assessment as the heart of differentiation. She worked with emotionally disturbed students from four different grade levels in a multi-age classroom setting and shared this description:

> You know, multiple learning styles, multiple emotional kinds of things going on. For half a year I had to differentiate because I had to differentiate...I mean there was no choice. Everybody had different content, everybody had different learning styles, and everyone had different personal interests.

Katherine's definition of differentiation was being refined by the context in which she worked. The multi-age classroom setting demanded that she determine and address student differences. Katherine saw the critical role personal interests and learning styles

played in student engagement saying, "To do 'good' differentiating you have to really KNOW (emphasis in the original) your students."

During her first year of teaching at Redlands, Katherine enrolled in a graduate class on differentiating curriculum and instruction. The course reinforced the connection between clearly focused curriculum design and differentiation and included an action research component. Katherine was required to apply the principles of differentiation in her classroom, to analyze and reflect on what worked and what needed more work, and to share her analysis with colleagues in class. She designed and taught a concept-based, differentiated math unit that her instructor considered exemplary. Her experience in the course confirmed her hunches, reinforced her beliefs, expanded her knowledge base, and provided valuable resources and support.

Practice: Refining, Reflecting. During the past year Katherine participated in Jefferson County's differentiation study group where she was paired with a Blue Mountain college student during the first semester. There were 12 pairs of inservice and preservice teachers in the study group. Separately they were all reading and learning about differentiation in classes or workshops. Each month they came together to share what they were learning and discuss attempts they had made to apply new knowledge. The study group, like Katherine's graduate class, had an action research component requiring the "study buddies" to design differentiated lessons, teach and videotape them, reflect on what worked and what needed more work, and to refine and rework their theories and practice for responding to student needs. Katherine enjoyed working with her preservice "buddy," felt affirmation from the support of school administrators and other colleagues, and felt the study group experience deepened her beliefs and improved

her practice of differentiation. Katherine reads constantly about teaching and learning and keeps a reflective journal about her work.

In her first year of teaching Katherine began differentiating in word study and reading. But while she felt good about her efforts to design personalized instruction in these areas, she ran headlong into two formidable lines of defense – parents and teachers. "We weren't two weeks into the school year when a parent was demanding their child be moved from my class because I was different and I was expecting different kinds of things." Having different word study lists for different students and no spelling book to send home, and different novels for reading raised a raft of questions from parents. In addition, Katherine said, "I had a lot of resistance from teachers about that, so last year was rocky."

Katherine invited parents to a special meeting. "And I had a good number show up and say you know my kid loves you, but I don't get what you are doing and they are happy but this is strange, so I really had a good time explaining to them how everything worked." The meeting helped, but didn't eliminate all the problems. Katherine decided to send home weekly newsletters, improving communication with parents about differentiation. She crafted them, "from the devil's advocate point of view. You know, like a letter to the editor. Why in the world do you do this? Your room seems so bizarre! And then I put the answer."

Now, by the end of her second year, Katherine is making a conscious effort to differentiate all instruction. "This year, I think the parents have been warned by other parents who had me last year." She explains further: "You know, the grapevine. I think I've gotten a reputation now of being okay. I do things a little differently. But, parents

talk and I think that they are comfortable." In fact, now parents often ask the principal to place their students with her, letting Katherine know that what she is doing is working.

While parents generally have shifted from questioning Katherine to supporting her, her fellow teachers have remained somewhat critical of her efforts. The graduate course she took made her very "passionate" about translating the philosophy of differentiation into practice. She immediately began sharing her passion with teachers around her and reported that, "It bred a lot of antagonism" because other teachers felt like she thought she "was a better teacher than they were." Her fellow teachers often said this about differentiation: "Well, that's individualized instruction and we tried that twenty years ago and that's out of vogue. The standards are one-size-fits-all, so we have to teach the text one way, with one curriculum and that's what they have to get." Katherine's candor in response to these reactions, already existing antagonism, and increasing requests from parents for Katherine to teach their children resulted in a growing sense of professional isolation for Katherine. Rather than feeling more and more a part of the Redlands faculty, she felt more and more like an outsider. In her reflections she shared her feelings:

> I don't join in the "how stupid kids are, standards are, administrators are" discussions. When folks ask my opinion on duty-free lunch, I generally say that there are things higher on my gripe list like supplies for science, collegial support, etc. I find I am almost always a minority opinion when teachers are talking. So, I either disagree, which makes me look like I "know it all" or I keep quiet, which makes me look like I am aloof and don't want to play. I seem to be in a "lose-lose" situation here....This is a hard time to be a teacher!...There is so much

> negativity....Its hard not to be sucked into it all and if you're not unhappy, you're seen as odd.

When asked in an interview why she thought fellow faculty members viewed her teaching as so very "different," Katherine replied that informal observations of others on her grade level and in the school have shown an approach that is generally much less student-centered: "You know, the traditional 'I give them their seat work and they sit down and do it'...That kind of thing." She has seen major differences simply in the physical set up of colleagues' classrooms, where the teacher's desk is in front and student desks are all in rows. A lack of books and excessive use of videos are other clues that reveal differences to Katherine.

One teacher, Bev, who took the graduate class on differentiation with Katherine, was interested in collaborating. "She and I would try things and bounce them off each other." Katherine saw Bev as someone who "really tries to differentiate" and who tried to be "one of the leaders" in this at Redlands. Katherine truly enjoyed having a colleague to work with as she wrote differentiated curriculum and struggled with how to create a learning environment that was responsive and well managed. She and Bev shared instructional and management strategies that supported differentiation.

Interestingly, many teachers often misinterpret Katherine's management system as laissez-faire because she has so few office referrals. In an interview she related this incident:

> I've had a fourth grade teacher say, "Well, my kids are sure going to be shocked if they are in your class because they are used to having to do their work, and they're used to having to listen." I don't know where she got the idea that I didn't

have any control in my class. It's just a different kind of setup. It's not authoritarian control; it's more authoritative control.

According to Katherine, that fourth grade teacher realized Katherine "was getting results somehow" when her students' test scores came in at the end of her first year. The huge gains her students made in achievement reinforced Katherine's resolve to differentiate and reinforced her colleagues' suspicions. She said, "They decided that I must have the smarter kids." Rather than give Katherine and her philosophy credit for being successful, most of her colleagues withdrew from her even more.

Katherine admitted that she has often had difficulties getting along with people in work situations: "All of this is a bad re-run for me." Her candor, impatience, intolerance for ineptitude, her bluntness, and her nonconformity make it hard for her to be accepted. She explained that another characteristic also works against her: "I am cursed with having a way too expressive face! I am an open book with my emotions. When I am on a mission I am so task driven. People have said that I ignore them and don't say hello. It isn't a purposeful thing. Usually I am thinking about something."

In spite of the isolation she has felt, Katherine stated emphatically that, as far as differentiation goes, the attitudes and feelings of her fellow teachers "wouldn't make me stop doing it." She admitted to being insecure, self-doubting and wanting to "belong" even though her colleagues see her as a "know-it-all." She has devoted much time to self-reflection: "I can look at myself and see warts and flaws. I think I often am too hard on myself, but I feel that is better than thinking I'm just 'the bomb' with no imperfections." She continued to self-analyze: "People think I am super confident and I am truly

insecure. I want them to like me. But, if it comes down to them liking me or doing the best I can do for my kids...there is no contest."

Summarizing her feelings of professional isolation at Redlands, Katherine said she would like to believe that her experience was "an isolated kind of incident" and that "there's a Camelot out there where teachers are more interested in students' welfare." She went on to share her reflection that the past two years have made her "think about how long a person can continue to hit her head against the wall and not be a masochist as far as putting in the kind of effort and time it takes to differentiate." It appeared that in spite of her commitment to "doing the best" for her kids, being painted into a corner as an outlier might be a potential stumbling block in her efforts to differentiate.

Collecting and Studying: Profiles of Learners. The foundation for differentiation, according to Katherine, is built on caring about your students. "It's just that everyone is an individual and the whole invisible kid thing, you know every class has three or four invisible kids that no one ever really knows. When I started teaching I tried to find them." Katherine's mission expanded from believing and understanding about meeting individual differences to hunting for those who are often hidden from view because they are good and quiet, or held back because they are not.

For this school year the former principal had selected many "invisible" students for Katherine's class. She had told Katherine that she, "gave me those kids who might tantrum, the kids who might cry still because the other teachers wouldn't tolerate it or just didn't really have a feel for that kind of behavior." She described the former principal as perceptive in assessing teaching styles and matching them with the needs of students. "She said she put everybody in my room who needed a lot of love."

As an artist collects materials and studies her subject to translate a vision onto canvas, Katherine began to search for the details that would help her create more than a thumbnail sketch of each of these students who needed a lot of love. She began with formal data in student record cards and graphed state and national test results in an Excel database. After reviewing the math scores and seeing weaknesses in geometry, graphing, and number sense, she pushed for a change in the pacing guides for instruction in her first grade-level meeting of the year. "I felt it would be better to start with measurement and integrate it with the science standards that deal with scientific method." Her sense was that she had "bullied" the changes through; another teacher wanted to start on the first page and march through the book, while another had no opinion either way.

Her students' reading scores showed instructional levels from second grade to high fifth. There were some puzzles, however; one student was receiving Title I services but had high standardized test scores in reading while an identified gifted student's instructional level in reading seemed much too low. In an effort to make sense of the puzzle before her, Katherine resolved to test them immediately with an informal reading inventory. Spelling assessment scores represented the entire gamut of orthographic development. Looking through writing portfolios, Katherine found "a pretty normal distribution, slightly skewed towards the more struggling learners."

The following narrative vignette illustrates how collecting and studying formal and informal data helped Katherine make each student in her class visible.

The Class That Needed a Lot of Love

In an interview one day I asked Katherine about the special needs in her classroom. Getting that "ponder" expression on her face and nodding slowly, she stared off into the distance, seeming to bring each child into focus, and shared some of the details of the individual portraits she was creating:

> I've got, let's see, six kids in special ed. Three of them, across the board, have learning disabilities. Two of them are visual perceptual kinds of things; one of them is processing, auditory especially. Eric has hyperactive attention deficit disorder...terrible emotional problems, tantrum behaviors and very, very bright, but he goes to special ed for reading and writing...an interesting boy.

Katherine's expression became somber as she focused on other portraits in her mind:

> Katina has multiple sclerosis. She is a very, very slow learner and physically slow because of the muscular problems...Then Kurt, he is also a special ed student. He is a victim of lead poisoning so he has all kinds of learning difficulties. And Shawn had a traumatic brain injury last spring. He rode his bicycle out into the street and was hit by a van. They had to remove portions of his brain up at the university. He has problems that we don't even understand yet. The brain is still recovering - behavior, very large behavior issues. Gaps, you know, one day subtracting left to right, one time right to left, and sometimes up and down, and the next day doing it perfectly. So, those three present my really unique kind of challenges.

Together with Katina and Kurt, Shawn presented "unique challenges" for Katherine. When asked about these challenges, Katherine said she "thrived" on them. Her gaze wandered off again, this time focusing on the quilt hung on the wall behind me:

> Maggie and Max are both classified as gifted. But even as sharp as they are Max is behind. He's very strong in math and logical sequential reasoning. But his reading was below grade level when he started the year, as was his spelling. I talked a lot about reading with his mom and his attitudes about reading. I did attitude surveys at the beginning of the year and found out he just never met a book that he liked. He just had never been given the chance to pick something he was interested in. So, Max was sort of a challenge because he is smart and knows when you are playing games with him and you try to push books on him so it took a while to get Max.

Katherine set out to "get" Max by linking his interests to his reading experiences. Shaking her head slowly, Katherine shared a picture of Trevor:

> Then Trevor -- he is just that low, low kid. He does not process things well. He really struggles. He gets speech services because it is not articulation, it's processing language. He doesn't get instructions: up, down, under, and all that. This year they have added occupational because his handwriting is so immature, very kindergarten like. He is very good at spatial tasks. I make him a game with cards almost always for everything because he is very good where he matches things up together. I put him on math blaster a lot on the computer because of that visual perceptual ability.

Discovering a well of strength she could tap with Trevor helped Katherine make him visible. Her eyes scanning the room, she described the rest of the class: "And then in between that I've got mostly just really emotive kids. They are an emotional group as a general rule." Katherine saw that the students in her class had problems but she emphatically stated, "They are not problems themselves."

Revealing the depth and dimension of the student portraits she was developing, this vignette shows Katherine's positive reactions to the challenges presented by this class. In fact, Katherine compared the strategizing called for to trying to win a tough chess game. She believes strongly that "somehow we have to train ourselves to look for causes of problems rather than labeling the child a problem." Katherine's view of her students is based on an understanding that many fifth graders' "peculiarities" are developmental; she seems unruffled when she comments, "You won't find a lot of commonality in my room." The challenge of meeting the needs of these students offers Katherine an opportunity for hypothesizing and testing solutions.

One of Katherine's goals is to get a good feel for student likes, key behavioral traits, and possibilities for personal connections before school starts. In her reflections she noted, "Teachers from fourth grade come in and out telling tales about students. Some I listen to and others I discount." What other teachers regard as negative characteristics, Katherine commonly sees as strengths or positive challenges. She shared these atypical generalizations: "If the kid is 'hyper' that is usually a good thing for me. Talkative is not a problem." Katherine's reflections from the week before school show her sifting through information to find the best materials to design a supportive environment:

> Bev said Cassie is ditsy? Barbara said she is not all there? None of this really helps me. A kid is dingy and not all there but does very well on standardized tests? Ok, this question will have to wait until I meet the kiddo. Pattie was Bev's. She said Pattie is odd. She hates using capitals or punctuation. e.e. cummings?? She seems fascinating. ...Allison said that Nadine receives counseling for depression. She had a personality conflict with her teacher last year and did indeed steal her grade book. Allison feels it was a bid for attention. I am going to make a point of trying to get her to make eye contact and open up...I got all the IEPs on kids and Jessica has an interesting scatter. Higher nonverbal...puzzles...I need to capitalize on this.

Before school had even started Katherine was gaining a sense of who liked puzzles, who would be a computer nut, who might be a budding poet, and basic information about the children's lives outside of school. Her careful reflecting allowed her to separate wheat from chaff; she looked for plusses and de-emphasized minuses. She was already plotting how the information she was collecting and studying could help construct personal connections within this class that needed a lot of love.

Designing and Building: Basic Needs. Having invested much time in becoming acquainted with students from formal and informal data, on "Meet the Teacher" day Katherine heard from the kids themselves and put a real face on each picture she was forming:

> Nadine was so withdrawn. She doesn't make any eye contact at all. I need to find a connection with her. Bethany walked in and filled up my room. What a HUGE personality. She swaggers with a confidence I'm going to need to harness or fight

> all year! Doug seems polite and shy. Dad told me mom passed away a few years ago. Dad has a kind face and grandma came along. She must play a huge role in Doug's life. I'll have to remember to bring in books from home that deal with dads and grandmas. I am trying to remember the order they came in....I hope I can remember their names without having to look!

When laying out the preliminary design for this community of learners who needed a lot of love, Katherine knew she needed to address the basic needs on Maslow's (1970) hierarchy: love, safety, and a sense of belonging. As she wrote her reflections that evening she checked to see if she recognized the importance of each individual. Her reflections showed her efforts to locate points of connection with these kids:

> Katina has a labored gait and appears to wear leg braces. Note: talk to spec. ed about her needs. Kurt is polite, shy, loves football! It seems that all my new students are in special ed. That should make it easy to integrate curriculum. Maybe we could look at an inclusion model? That would be cool! Ned is a funny kid. Lots of problems last year...watch out. Look at differentiation seriously for this one especially in writing – abysmal handwriting and spelling but ideas that are WOW. Corrie is shy. She came in without mom or dad, picked up her packet of papers and was out the door before I could say anything to her! I feel so bad!! I will call her home tomorrow.

Katherine's immediate reaction was to embrace students' disabilities and differences and to find as many ways as she could to make them feel safe and wanted. In fact she collected information directly from students on "Meet the Teacher" day by having them design "Wanted" posters to share information about themselves. She took digital photos

of the kids when they arrived and had them finish wanted poster prompts on the computer like "Last seen doing..." and "Could be found reading..." Katherine said, "I try to target some content toward these interests in the few weeks of school and make connections with students based on what they've put on their posters."

Once school started, she gave students interest inventories and multiple intelligence inventories. She also had them complete "I" graphs, showing their view of what subjects they excelled in, and what they wanted to improve upon. Using direct instruction, Katherine demonstrated how to do a "five finger test" (see Appendix A), counting the number of unfamiliar words in a paragraph of text to help students decide whether or not a book was on their instructional reading level. She asked them to design jackets for two of their favorite books with details about why they liked them. She called individual conferences after a writing prompt on the first day and had students set personal writing goals. She was beginning to take note of who needed less choice and more structure and who was ready for more open-ended tasks with abstract thinking. Each student began to develop a sense of self-worth, importance, and responsibility for learning in this classroom.

Katherine's Management Philosophy. Deftly, Katherine worked together the elements of basic needs with those of a management system that she would share with the students. She reinforced the basic needs of love, safety, and a sense of belonging with "a very few rules that cover a lot of things: (a) Respect everyone and everything; (b) There's always something to do, so make wise choices; and (c) Always try, be persistent." Mutual respect for people and property ensured safety and placed a high value on care and love for one another. Becoming wise decision-makers and persevering to reach goals built a

sense of autonomy and belonging as everyone worked toward independent, self-guided learning. For Katherine, these rules were to be lived rather than memorized. "Everything in my room is about choices. You have a choice to do or a choice not to do, and then consequences. They do a lot with choice/consequences and direct responsibility. Everyone in the room is responsible for their learning. It keeps me from having to be a policeman too much."

Katherine's management system looks logical and almost simple from a distance, but on closer scrutiny it becomes a complex system of many elements working in concert. Her big picture of management is based on a system she shares with the students and described as "control-with-a-little-c." She said, "I think the basis of my management is that there is no time to get into trouble." For Katherine, pacing and engagement are directly linked: "My firm belief is that anyone who is doing a respectful, interesting task will be easier to engage than a worksheet drone." She believes that designing purposeful tasks will reduce management problems.

Katherine's collecting and studying to prepare student portraits allowed her to know her students so well that she could create multiple environments within the classroom to bring them success. Her insights into their learning profiles and behavior traits produced this line of thinking:

> I know that some of my kids can't sit for long periods, so I don't make them. I vary tasks, send them on errands, give them kush balls to fidget with, dispense gum to chew. Bethany, Katie, Eric and a few others can't stay quiet for more than four minutes or so. I try to tailor their days around pair/share, discussion groups,

and singing content songs. They learn by vocalizing and I have to give them time to talk.

Observations in the classroom support this philosophy. On numerous occasions Katherine offered fidgeting students gum or a stress ball to squeeze, and during several reading blocks Doug could be seen reading while walking around a section of desk pods. He was totally absorbed in his book and seemed to be on "automatic pilot" knowing just where to walk to avoid physical contact with people or furniture.

Constantly on the move, Katherine was everywhere among the students, listening to everything. "My students joke about me being able to hear an off task comment a mile away." She was rarely in one spot for very long, except when conferencing, and believes that her physical presence among students rather than in front of them helps to establish the "control-with-a-little-c" system.

Another key component of her management philosophy is Katherine's belief that potentially negative behavior can be re-routed into constructive action. Using the information she has gathered, Katherine identified weaknesses and temptations and designed opportunities that allow re-focusing. "If Trevor plays a game with someone, he is likely to start the 'he cheated, he isn't playing fair' nonsense that escalates into a fight. Consequently, I put him in a lot of team building/everyone wins kind of scenarios." Her strategy here was to build Trevor's skills in cooperating through high success/low frustration experiences. This provided a form of scaffolding for Trevor as he gained strength in an area of weakness. In the same way, Katherine provided a safety net for Eric who "needs to be in charge and feel like he is in control. If I put him with a strong-willed bright kid he will end up in a fistfight. So, I only group him in this way when I can be

with the group the whole time and help him with group skills and problem solving." Katherine shared the responsibility for managing Eric's control issues with him. She didn't blame him for needing to be in charge; instead she found opportunities for him to share control and, just as importantly, she modeled sharing control while doing so. Katherine described everything else in her management philosophy as "falling into the stop-it-before-it-happens category."

In even the best-managed classrooms good behavior will unravel and when this happens Katherine relies on a hierarchy of strategies to mend the situation. She often starts with what she calls a "Katherine look of disapproval or perhaps confusion." She may position herself next to the offender or simply remove the object or person causing the problem. She tries to employ humor or occasionally review the class rules on the spot. She uses alternative means to communicate: "I have some nonverbal cues for Eric to let him know he is spiraling and to offer him an escape. I use hand signals with Ned and Katie as well." Hall talks have proven very effective for Katherine, "no giving them punishments that are disrespectful to their persons...standing in the hall...writing one hundred times...making kids apologize when they don't mean it and aren't ready to say it."

One of Katherine's fundamental management strategies is active listening. "We have 'Off the Records' and I honor their honesty by not using what they say against them." The "Off the Records" are like class meetings; everyone puts their feet up on their desks, leans back in their chairs, and shares whatever is bothering them. Katherine, the whole class, or a group of students can initiate "Off the Records." She explained, "If it (a need to talk) is pressing, we drop everything and go to it. If it isn't or is about personality

things, tattling things, I schedule it during recess time. That seems to keep the frivolous cases down." In addition to the three basic classroom rules, Katherine shared specific rules for "Off the Records": (a) No attacks or insults; all sentences must be stated in first person (I feel, I think); (b) Honesty is expected and required; (c) The goal is solutions, not just a chance to complain; (d) People in conflict need to work on solutions together; (e) People can agree to disagree; different ideas don't end friendships, attitudes do; (f) What is said in the "Off the Record" doesn't go out of the classroom and there are no consequences for what is said if the rules are followed. This class started "Off the Records" in December and, looking back, Katherine said at first there were lots of them:

> The kids were enamored with taking class time to discuss or waste. When I instituted the recess rule for frivolous cases it decreased a ton. We went to having them about once a week and mainly instigated by me. I noticed the kids doing more problem solving on their own and using our methods without involving the whole class.

A key element in Katherine's management system is her acknowledgement that student and teacher moods and behavior are interwoven; the one reflects the other. "If I am down or lethargic, they are too. If I am spunky, they are too." Katherine consistently modeled her own conflict resolution, frequently discussed choices and consequences with the class, and modeled self-talk. Summarizing her efforts to manage this class who needed a lot of love, Katherine noted, "I don't believe that one set of rules and consequences fits everyone any more than one size curriculum does. I guess I differentiate management! The kids don't see me as inconsistent, they see me as fair, which is high praise from fifth graders." Differentiated management aligned well with the

assessment Katherine had been collecting and studying and supported the student-centered community she was building.

Modeling Routines and Procedures. Through direct instruction, rehearsal, and by modeling routines, procedures, transitions, and methods for time management, Katherine demonstrated for her students the logical choices for constructive, productive action. Teambuilding activities helped define parameters for group and buddy work. Movement from seatwork to group work was acted out, practiced, reinforced, and cemented. Individual roles for group work were defined and rehearsed; the duties for group leaders were listed and practiced. Katherine continually asked students to self-assess their roles and the task commitment of their group. As students worked in groups she used the results of these evaluations to refine task assignments, to assign status, and to discuss community values with the whole class. She used countdowns to encourage speedy transitions and often minutes saved on transitions were added to recess, encouraging the class to better transition times. Nonverbal signals were introduced and memorized. Attention-getters like clapping rhythms were rehearsed and reinforced in context. Students practiced using stacked green, yellow, and red cups as signals for individual or group work that was moving, halting, or stuck. Eventually they automatically grabbed a set of cups whenever group activities began.

Students learned that Katherine had specific support structures available that helped them with two basic classroom rules – making wise choices about time usage and persevering. They saw that task cards, recorded directions, graphic organizers, peer checking, labeled materials, and special buckets of resources could assist them as they worked individually or in groups. She created special activities for anchoring whenever a

student completed a task before others. These anchoring activities kept students from floating aimlessly or disturbing others. Sometimes they were tasks from other assignments that needed finishing, drills on specific standards-based skills, work on Accelerated Reader, research on book-marked websites, or independent contract work. Katherine also introduced the concept of mini-lessons through direct instruction by showing how a small group might work with her one-on-eight, for example, on a writing skill that might need sharpening. Setting up a mock instructional activity when students were frustrated and stuck, she demonstrated the calling of "clinic" and invited strugglers to the half-table in the back of the room for triage. During all of this, Katherine modeled her fundamental management philosophy of "shared control-with-a-little-c," calling on students to make wise choices, hearing and seeing as much as possible, and making adjustments based on their individual traits and needs.

Seeing Bright Spots in Each Portrait. Talking in an interview about how everyone had a "Mary" in their class who everyone knew was the smartest and brightest, Katherine said, "I want every kid to feel as good as 'Mary' felt when the teacher always recognized how wonderful she was." She explained that she set out this year to find something valuable in each student academically, "Not, well you're a zero in school, but boy can you kick the ball. Trying to find a strength and from that strength build up their weaknesses." Having been informed by Bethany that she would spend a great deal of her time in the office this year, Katherine searched for the positives that could redirect negatives in Bethany's behavior and attitude:

> Bethany is at a crossroads. She wants to be known as a brawler and a "tough guy." It comes from her wanting respect. If she has to fight to get it she fights. I

have convinced her she thinks like a "scientist" and her peers go to her for science help. She is getting respect and she isn't fighting nearly as much.

Bethany the brawler was being reshaped into Bethany the scientist and gaining respect as she gained status among classmates. Katherine pointed out that Bethany was a global thinker. During one observation I saw Katherine pause in working with a small group of students, and call to her, "Bethany, come over here, I need your 'big picture' mind."

Corrie could easily get into trouble for moodiness and pouting. At the same time, Katherine knew that Corrie had a blossoming talent as a leader. And so Katherine said, "I work around this by making her a team leader and expert for the day. She wants attention and I shower it on her when she is acting appropriately... She is regulating this behavior herself more now."

Katherine feels that gaining status is particularly important for special education students. Observations during her first two years of teaching convinced Katherine that most teachers see these students as, "the kids that kind of bop in and out and are not really a part of the community." Katherine looked for every opportunity to award status to students receiving special services, differentiating instruction as much as possible by learning profile or interest to take into account their special needs.

Katherine has created two forms of positive feedback that contribute to status building. In an observation of a math lesson where she was teaching algebra concepts and linking them to the larger concept of patterns, Katherine asked students where they had seen patterns in math before. Corrie said, "Powers of 10" and Katherine said, "Kiss your brain!" This was a signal for Corrie to kiss her fingertips and touch her brain. Then, offering another example of patterns in math, Ann said, "1, 55, 1, 555, 1, 5555" and

Katherine said "Fireworks!" and gestured an explosion with her hands accompanied by a bursting noise. "Kiss your brain!" and "Fireworks!" are both status builders that serve to dramatize personal and public recognition of insight, understanding, and participation.

According to Katherine, because she conferred status on Eric for being a "math whiz," his behavior improved in other areas because he knew he was making valuable contributions. In dialogues with Corrie, Katherine focused on her strengths to help her feel safe enough to admit she needed help in areas of weakness. Katherine commented on this: "Part of the bigger community is responsibility. I think that giving everyone status in some respect builds the community to the point where we can admit we can't do something because we know we can do other things really, really well." Building a level of comfort that made students able and willing to self-assess candidly was critical for creating a learning environment that supported differentiation. Katherine encouraged students to view differences in levels of understanding as a part of goal setting for personal progress rather than as wins or losses.

Developing a Student Understanding of Differentiation. After modeling routines, procedures, and teambuilding throughout the first six weeks, Katherine introduced her students to the concept of differentiation. This was something her students hadn't ever been taught in school. She defined "differentiation" and described how it worked; sharing materials she had collected from class, the study group, and her reading. Her reflections from the beginning of the year describe this experience:

> I showed them the "one-size-fits-all" cartoon. They were amazed! We spent days talking about our strengths and areas of potential growth. The students reflected on their graphs. They set learning goals for the year. They couldn't just say, "I

> want to get better at math." They had to really think about what they meant by that... We spent the next hunk of time looking at diffing (sic) for readiness and interest. The students asked a lot if they could "differentiate" today.

Students could actually assist in differentiation according to Katherine because "they know what we're doing" and because they "are really buying into it." She related instances when Bethany said, "I need this differentiated more, this is too easy," and when Maggie said, "I think you did too good at that differentiation stuff, this is too hard." During one observation I saw Sally ask Katherine to differentiate for her because she had completed the assignment and needed extension. Asked about this in an interview, Katherine said she believes that, by developing an understanding of differentiation, her students: (a) Appreciate that the teacher cares about whether they understand, are bored, frustrated, or under-challenged; (b) Are clearer about instructional goals; and (c) Can learn to evaluate the differentiation and provide valuable feedback to the teacher. She said, "They will tell me when I haven't done a good job of differentiating." She continued to collect and study clues about their learning traits. Students looked at her lists of products and checked off ones that appealed to them. She also had them list activities that would "make them crazy." Gathering these clues helped Katherine design more effective differentiated lessons.

Katherine used purposeful modeling, direct instruction, and discussion to share the principles of differentiation with her students. By demonstrating the rationale and application of differentiation, her students were able to see how this philosophy would be supported by the metacognitive strategies they were learning. Differentiation, supported by the five-finger test, "I" graphs, and self-assessment, allowed Katherine's students to

share control of the instruction with her. At the same time, metacognitive strategies and differentiation facilitated management sharing by building independence and a sense of responsibility. Katherine combined an appreciation and respect for differences, an understanding of how differences are to be met, and the fulfillment of basic needs with a consistent, differentiated management system.

Time and Motion Study: Management, Learning Community, and Differentiation. This community's dimensions of comfort, trust, tolerance, risk-taking, autonomy, and belongingness were evident during an observation on a day when the theme was, "We All Shine in Some Way." Throughout the day, Katherine and the students wrote words on post-it notes on each desk to describe the way each person shines. They spent a great deal of the day graphing their "shiningness" in math, reading, and social studies. Results would be used to provide scaffolding in peer expert groups before standards testing began the next week. Katherine explained the purpose: "I will use this information next week to pair 'experts' with those who need extra teaching. Your graphs will tell me where you need a little more or where you could help someone else." Katherine also explained that this information would help her set up clinics the following week. During the observation I wandered around looking at what everyone had written on the "shining" notes. I saw these words that students had written: *good thinker, knows fractions, good at puzzles, kind, big picture, funny, writer, reads a lot, helps.* I saw these words that Katherine had written: *kicks in math, sees big picture, spatial thinker, good leader, on task, scientist, computer whiz, wants to do her best, brings people together.* I also saw these words the kids had written on Katherine's own post-its: *good in math, good in science, on-task, funny, the best, she rules, BIG DOG.*

A "time and motion" study was conducted to track Katherine's interactions with students during the math lesson this day and to determine times when status was given and when students exhibited self-governance within whole group or differentiated instruction. The math lesson was a self-assessment, reviewing what they had learned over the year and responding to assignments on differentiated task cards. Coding of her interactions during the math lesson showed that Katherine made 49 points of contact with individual students in 59 minutes of instruction (see Figure 2). These contacts were coded as "pushing thinking," "clarification," "management," "jumpstarting," and "positive feedback." Math instruction occurred in three segments: whole group followed by individual work for 12 minutes; whole group followed by 11 minutes of individual work; and whole group followed by nine minutes of clinic, conferences, and individual work. During this time there were only four management interactions coded and three students needed jumpstarting because they were not making sufficient progress on the task. In addition, Katherine pushed student thinking seven times. Of the 49 interactions, 28 of were coded as positive feedback where Katherine gave status or approval. These responses were made because students were completing tasks, developing clear understandings, and demonstrating focused, independent learning. The high level of positive feedback and the low frequency of management interactions support the fact that creating a purpose for learning and building autonomy can help reduce off-task behavior. Students were all focused on identifying areas of strength and weakness in math, knowing that their work would drive instruction for the coming week.

Observation on this day of review and reflection helped to sharpen the image of Katherine's learning community. Self-assessment, shared responsibility for learning, and

Time and Motion Study: Katherine's Interactions with Individuals

Math: 5/10/01

Differentiation Task #1 (Graphing ways they shine in math.)

Type of Interaction *	**9:30-9:35**	**9:36-9:40**	**9:41-9:42**
Clarification	1	2	1
Management	2	2	0
Pushing Thinking	1	1	1
Positive Feedback	2	5	4
Jumpstarting	0	0	1

Differentiation Task #2 (Completing task cards related to self-assessment of math.)

Type of Interaction *	**9:49-9:54**	**9:55-10:00**
Clarification	5	0
Management	0	0
Pushing Thinking	1	3
Positive Feedback	9	6
Jumpstarting	1	1

* Clarification (about directions, content, tasks)

Jumpstarting (questions or suggestions that motivate and refocus)

Management (redirecting off-task behavior, dealing with misbehavior)

Positive Feedback (conferring status, affirming, agreeing, supporting)

Pushing Thinking (questions or suggestions that stretch students beyond their comfort level)

Figure 2. A study of Katherine's interactions during the differentiated segment of a math lesson.

self-management permeated the students' work all day. Katherine conferred status on individual students like Corrie, the "fraction queen," and throughout the day with the "shining" notes. It was interesting to see that many students used the same language for conferring status that Katherine had used.

Katherine pointed out that this environment was not designed and created overnight. She recalled, "It wasn't until November that I really felt like our community was working well. I didn't get their learning profiles truly pegged until the end of October. They didn't build their esteem well enough to take risks as a class until about then either." Katherine's intent was that this investment of time up front would pay dividends in belongingness, independence, responsibility, and achievement for students. She stated emphatically that this supportive environment had to be in place before effective differentiation could happen; in fact, after thinking a little more she said, "They go hand in hand."

Teaching and Learning: Content Clarity and Standards. As she established the proper environment for teaching and learning, Katherine directed her attention to designing curriculum and instruction so she could respond most effectively to the academic needs of these fifth graders. Katherine is as much a curriculum designer as she is the portrait artist and engineer of her community of learners. The prospect of laying out a week's worth of lessons lights up her intense blue eyes, her brows knit together as she "ponders," then actually pushes up her sleeves in her eagerness to explore, brainstorm, map, make connections, and create challenges.

For Katherine, effective curriculum and instruction design first requires a crystal-clear picture of content and objectives. At Redlands Elementary School Katherine has

become thoroughly familiar with state content standards, local curriculum guidelines, school improvement goals, and state testing blueprints. Just as she collected and studied information about student interests, readiness, and learning profiles, Katherine searches out ideas and resources supporting specific content areas. She researches books and articles for authentic content in the core she will teach. For example, Katherine's hunting led her to a Euclidean algorithm that provided a challenging alternative method for determining greatest common factor and she used this in a tiered lesson with students who started the unit with advanced understanding. Collecting research and strategies for spelling development, guided reading, literature circles and responsive journaling, Katherine keeps informed about best practice literacy instruction. She hunts for and reads high interest novels across a range of readability levels fifth graders enjoy. By reading the books she finds good matches of books to students, and can create "book talks" to whet the appetites of her readers, while clarifying the tasks she assigns to assess comprehension.

The required content standards have changed in Katherine's school over the past few years as a result of high stakes testing. Some of her current textbooks contain limited content support of the standards. Katherine calls textbooks "more of an underpinning" than the core of her content resources. For example, Katherine's math textbook contains minimal information on statistics and probability, so she uses a training manual on teaching probability and statistics as well as technology-based materials to support her lesson planning.

Katherine is most interested in making sure that by June all students can show at least a year's growth in each subject area from the point when they first entered her

classroom. And so Katherine's clarification of teaching and learning objectives carefully balances the importance of standardized benchmarks with personal growth and progress. In her class in 1999-2000 one student raised his test score in reading 110 points (a little less than a quarter of the total points on the test) from where he started the year. Katherine reflected about this in an interview: "He did not pass. I took the boy out to dinner because to me that was a huge success – personal growth – huge! He is not reading on grade level now, but he really grew." At the same time, Katherine is very conscious of moving students beyond the fifth grade competencies if they can already demonstrate mastery. Otherwise she feels "like I'm wasting their time and time is a big thing for me."

Teaching and Learning: The Connection with Assessment. Just as she sees assessment as the heart of differentiation, Katherine also sees it as the heart of curriculum design. For Katherine assessment takes many forms. She uses a wide array of pre-assessments to determine prior knowledge when teaching new curriculum content. During a math lesson introducing algebra, Katherine asked students, "What do you think it means to think algebraically? Take out your math logs and write, even if you write that you don't know." Oral questioning, written journal prompts, objective tests, item analysis, webbing, KWL charts, group discussions, and brainstorming sessions are some of the strategies Katherine uses to pre-assess. In mid-April Katherine gave an extensive pre-assessment for the standards tests in reading that would be administered in May. She completed an item analysis in order to plan the subsequent weeks of instruction. Her reflections explained how she would use the item analysis:

> The "plan" is that I will do a mini lesson every day in reading. The skills

> are numbered 1-12. Monday I will give out to the students the lessons they must participate in. Very few will need lesson number one....Five students will need all the lessons. My highest readers will only need three or four lessons.

Sometimes she analyzes the results of pre-assessments based on gender. In this class she observed, "My girls generally whoop the boys on pretests because they tend to be better readers and expend more effort on pretests." Knowing that, Katherine did a gender analysis on a pre-assessment for graphing and statistics. Surprisingly, this showed her that the boys seemed to have a better understanding than the girls. Katherine thought this was "way cool" and used results to pilot instruction. She pointed out, however, that all assessment is relative to the group or individual: "I am not saying these generalizations hold for the world, this is just how my class is this year."

Her formative and summative assessments can take many forms: objective, essay, open-ended problems, paper and pencil, performance-based, or authentic. She varies the type of assessment according to the content being studied and develops a clear sense of what the culminating assessment will be when she first lays out the lesson or unit. Often, Katherine's students use journals in math, social studies, science, or reading as "exit tickets" for formative assessment. Carefully articulated task cards frequently spell out performance expectations in reading. She often differentiates assessment, adjusting questions or performance tasks to be more structured for those who are struggling with a concept or focused on generating sophisticated connections for those who have mastered the concept.

Katherine contends that a key method for linking assessment, content, and objectives is to see formative assessment as a continuing process. Reflecting on the use of assessment to make daily revisions in instruction, she said, "Some kids look low on a pretest and then go like gangbusters. Some look high but can't handle the lack of structure in a lot of high differentiated tasks...back to assessment." Rather than seeing assessment as end-of-lesson or end-of-unit, Katherine incorporates it at the beginning, in the middle, and anywhere in between.

Summative assessment is vitally important to Katherine in measuring her students' personal growth and her own professional growth. She feels that her background in math is helpful to her: "I am a nut about accountability...scores... spreadsheets...all those math things." Teaching in a standards testing grade forces Katherine to reconcile what she calls "Gotta Get It Covered and Memorized by Standards Tests Needs" and her "Concept Centered/ Investigative/ Differentiated/ Deep Instruction Beliefs." She confessed to feeling "schizophrenic" about believing so wholeheartedly in two fundamentally contradictory aspects of teaching and learning – one-size, one-week, one-score testing and instruction differentiated to engage each student in conceptual understanding. However, she celebrated what she called an "epiphany" about this:

> But now, voila, it makes sense to me! The "scores" Katherine is not the evil twin to the "differentiation" Katherine. She is her rational counterpart and direction giver. My "score" side is like a map of my start and finish with mileage markers (assessments) and gas stations (instruction) along the way. My "differentiation" side is the civil engineer who plots out the roads that each traveler needs to take to get to the destination. The civil engineer has to decide whether to build bridges or

tunnels...go around the mountain or through...make a more scenic route or a more logical route....set low speed limits or make an Autobahn.

Katherine, the direction giver, invested much time and energy in mapping the "start and finish" by first constructing a big picture of assessment results that students brought with them. By the time students reach the fifth grade at Redlands Elementary they have one set of state standards test scores from third grade and one set of nationally standardized scores from fourth grade. Katherine entered all these scores on spreadsheets. This is part of the institutional data she drew from to create portraits of each learner and the class. Using students' scores for individual conferencing, Katherine guided students in setting target goals for progress and areas of emphasis for instruction. At the end of the year she entered all fifth grade scores from state standards tests and calculated the percentage gains of each student from where they started in September. The students in this class had finished third grade with national standardized reading scores at the 34th percentile and math scores at the 32nd percentile. The state standards tests are criterion-referenced with a benchmark score of 400. In third grade, 47% of this class passed the state standards test in reading, 53% in math, 34% in social studies, and 42% in science. At the end of this school year their fifth grade scores showed a rate of 74% passing in reading – a gain of 27 percentage points, 58% passing in math – a gain of 5 percentage points, 58% passing in social studies – a gain of 24 percentage points, and 74% in science – a gain of 32 percentage points (See Table 1). On the state writing standards in fifth grade 70% of the class passed. Unfortunately there is no separate third grade writing assessment for a comparison. Katherine's reaction on hearing these results was recorded in a reflection in late spring: "70%!!!!! I am stunned and thrilled...two blew me away

Table 1

Average Gains on State Standards Assessment for Katherine's Class

	Reading Grade 3	Reading **Grade 5**	Math Grade 3	Math **Grade 5**	Social Studies Grade 3	Social Studies **Grade 5**	Science Grade 3	Science **Grade 5**	Writing **Grade 5**
Percent of Students Passing Test	47%	**74%**	53%	**58%**	34%	**58%**	42%	**74%**	**70%**
Percentage Point Gain from Grade 3 to 5		+ 27		+ 5		+24		+ 32	

* No writing test in Grade 3

** The state has set a benchmark of 70% passing in each content area test

totally by passing! Jessica and Eric!!!!" Katherine pointed out that for Eric this was a real success story because his learning disability was in writing. She went on to say:

> Trevor only failed by 40 points – that is amazing for him...Bethany passed!!! Oh dear me!! You should see her national test scores from last year – yikes!! She has bloomed. She cried! So did Jessica! So did I! I made Trevor and Sally and Nadine proud of themselves as well – they did great for them.

After doing comparative studies that showed the growth from the end of third to the end of fifth grade, Katherine used the results to evaluate her teaching. Being in the habit of reflecting daily about her beliefs and practice, Katherine then compared her curriculum design and instruction from one year to the next, noting strengths, as well as weaknesses, and identifying questions that still needed answering. This self-assessment was an important aspect of Katherine's teaching because it offered her more "mileage markers" as the direction giver in the classroom.

Student self-assessment was a standard type of formative assessment in Katherine's class. During the "shining" day three weeks before state standards testing Katherine asked students to "walk" through their math books and then to graph topics they had mastered and those needing more work. She reflected on the results as she designed instruction for the next few weeks: "I am going to set up four centers next week (fractions, place value, geometry, and statistics). I will set up cycle rotations and assign experts for each center each day." Multiple dimensions of assessment informed Katherine's instruction. She used formal and informal measures for summative and formative assessment. She disaggregated data, did comparative studies, and used item analysis and student self-assessment to plot out routes her students should take.

Integrated, Concept-Linked Curriculum. In her graduate class on differentiation Katherine examined research from the science of learning linking concept-based curriculum to enduring understanding. A concept map for designing standards-based lessons was modeled in her graduate class and a significant discovery for her. In a reflection she shared, "These things really excite me. I think it is my visual/analytic side...The stuff we have to teach should fit under an umbrella of regulating concepts that integrate what the students need to know and arrange it for easy 'storage.'" Clear objectives in a conceptual framework seemed the best possible medium for designing curriculum and Katherine said it "...minimizes wasted time and worthless activities. The tasks took longer, but the thinking was more focused and specific." In addition, clustering information under conceptual headings increased the probability of transfer and long-term memory retention for learners. She said, "I think this design enables the students to retain and integrate curriculum at the most basic levels."

At the same time, Katherine believed that curriculum content should be integrated as much as possible across disciplines. Her students found content integration puzzling at times because it did not match familiar school experiences. During a lesson integrating grammar with independent novel reading, Katherine asked students to look for imperative sentences and discuss why the author had used them. Doug asked, "Why are we doing this in reading?" Katherine reflected on this later: "Language is reading and writing. I don't think many have seen it that way." Student response to this discipline integration was "inspired" and Katherine decided to try more. The students' inspiration encouraged her to find more ways to integrate.

Katherine described an important connection she discovered between content integration and assessment:

> I think the more the subjects became integrated and I saw connections between the subjects, I also saw the differences in the students relating to the content. Different learning styles enjoy different activities more when coupled with other things. For example, some of my students said, "We're kind of math phobic, or we're a little insecure about it" and they became very confident when math was coupled with reading and we did plays that related to how fractions came to be known. Through dramatic acting they became comfortable with the math.

For Katherine content integration became a wide-angle lens, providing her with snapshots of data about learning profiles that allowed her to adjust instruction accordingly.

This year Katherine decided to select a universal concept designed to work as an integrating lens for all the disciplines. After careful consideration, she decided the concept of patterns would be best. As she explained, "Patterns fit what we were doing in math...measurement...what we were doing in reading...predicting and plot...and what we were doing in science...scientific method...and patterns in history." Introducing the patterns concept to students on the first day of school, she invited them to consider other concepts that could help facilitate deep understanding and said, "Communication came up in November...Beauty started to be batted around in December." Students took ownership of concept-based curriculum and shared in creating additional lenses that would integrate content effectively.

Designing Lessons. When Katherine laid out her lessons on paper, she planned typically for one week at a time. Having several overarching concepts everyone had agreed upon helped her to streamline the planning. She used a large artist's sketchpad for this because the space provided room for "scruffy notes" and details within a big picture. Katherine talked about where she started: "I try to go to the concept level with the standards and build a framework from there." She was emphatic that standards content was not negotiable: "Basic content, the standards, is not a variable." Being able to vault from standards to the concept level presupposed a thorough understanding of content. In Katherine's words: "You've got to be so comfortable with your content that you can see how it all fits together." At this point she sees concepts as, "scaffolding to hold the pieces together." The standards content is comprised largely of facts, or what Katherine learned as "the Know" of the lesson – the definitions, vocabulary, events, dates, people, and places that inform understanding.

After starting with content, Katherine determined a few key principles or generalizations that would serve to link content with concepts and this was an ongoing process, as she explained: "We brainstormed generalizations with each (concept) and found ourselves adding to what we brainstormed occasionally. Beauty has three generalizations so far that we can agree upon." The generalizations were what Katherine referred to as "the Understand" of the lesson because they were universal statements at the conceptual level that embrace the content objectives. One generalization agreed upon for patterns was: "Identifying patterns helps us to predict change." The concept of Beauty emerged as students talked about the beauty of math, after Eric had studied a long division problem spread out on their board and suddenly exclaimed: "That's really

beautiful!" And so, one of beauty's generalizations became: "Patterns and symmetry give pleasure to the senses." By asking students to join her in constructing generalizations to focus a lesson, Katherine demonstrated the role her students played in setting teaching as well as learning goals.

Generalizations defined, Katherine was ready to map out the rest of her curriculum picture. Writing the three big concepts across the top of the paper with generalizations listed underneath, she blocked days of the week horizontally and the four content areas vertically. Then she began determining "the Do" of the lesson or what skills students would use to display their deep understanding of the content. At this point Katherine began designing specific learning experiences and wrote them into the appropriate block. A state resource guide for writing curriculum was a helpful tool for Katherine's planning. It outlined what she called the basic "KUBATD" (Know, Understand, and Be Able To Do) and gave her the scaffolding she needed when planning. For her the critical test was making sure the learning experiences she designed were in fact linked to the KUBATD she targeted. She pointed out that it was easy to miss "the Understanding" and "get fuzzy" if the KUBATD was not defined clearly.

Through the differentiation study group Katherine discovered a differentiated lesson template on a University of Virginia website. The template includes the KUBATD and she adapted the format to create lesson plans in her own computer template (see Appendix A). This came to be a daily lesson plan format and brought her large-mapped design down to the detailed level.

The 3-D Learning Space. The entire time Katherine was mapping out her lessons she was conscious of assessment on two levels. On one level she plotted pre- and post-assessments for the KUBATD. On the other she was constantly assessing how learners received and responded to the lesson blueprint. In fact, Katherine saw the convergence of learners and curriculum as a three-dimensional space: "All of the students are at different points. Not even literally, but in three dimensions. If you looked in the whole room they'd be scattered four feet off the ground, two feet off the ground, eight inches away, eight feet away." She envisioned curriculum as a kind of "blanket" touching each student where they were, but being flexible enough to move as they moved. She explained further:

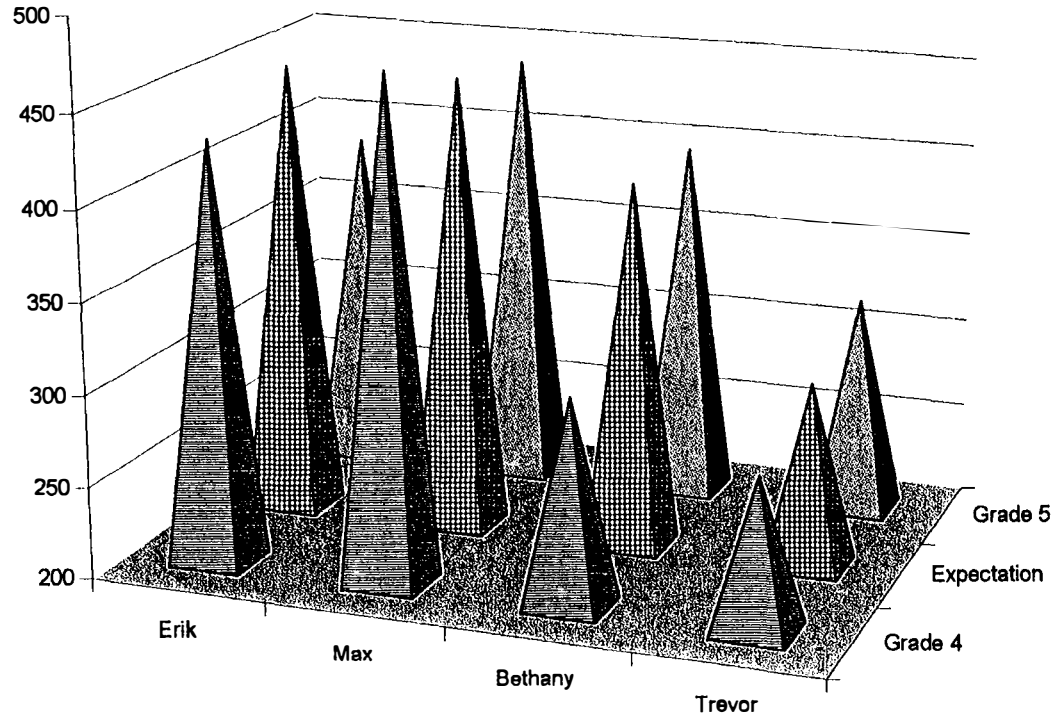
> To get them where they've got to go has a lot to do with where they started. Realistically they are not all going to get to the same point "X" we want them to get to. So then we have to set up some kind of incremental goal we want them to get to. Maybe they're not going to be able to do double-digit long division. You know, with eight digits in the dividend. Maybe our goal for that student might be to do single digit long division. The destinations are not all the same and so it's not really a straight path...there have to be multiple destinations because there are multiple entries.

Visualizing students moving constantly within a three-dimensional learning space, Katherine used the state standards test passing score of 400 as a reference point for summative assessment. She marked three peak performances for students. First, the peak they had reached when they entered fifth grade, which she determined from their third and fourth grade test scores. Second, a performance peak she set as an expectation for the

year, which was based on her own formal and informal assessment of their strengths and weaknesses. Finally, Katherine recorded the student's actual peak performance at the end of fifth grade (See Figure 3). Katherine saw students constantly moving in this three-dimensional learning space, rather than stalling at fixed points. Katherine believed it was her obligation to provide "curriculum boosters" by adjusting curriculum and instruction for readiness, interest, and learning profile. She saw these boosters as vaulting students from their entry levels in the learning space and speeding them on to the summits set by the state, the teacher, and the students themselves.

For example, Katherine knew that Trevor's known peak performance in reading was 248 when he came to fifth grade (see Figure 4). Katherine and Trevor set an expected performance peak of 300, a realistic gain of 52 points that they both thought he could make. Trevor's actual performance took him to a peak of 366, a gain of 118 points. While he did not reach the minimum state passing level, this was a considerable achievement for Trevor; his standardized reading score from fourth grade had been only in the first percentile. Tapping into his visual- perceptual strength, Katherine differentiated tasks to boost his degree of progress. She created card games that called for visual memory associations and offered him choices to learn on the computer, an area of interest for Trevor. Bethany entered fifth grade with a peak performance in writing100 points below the state's minimum passing level (see Figure 5). Katherine discovered that Bethany was "so wide open that if you say x, y, z in the morning in reading and you say x, y, z in the afternoon in science, she goes 'Oh, x, y, z again'...I could see her scaffolding things." By designing tasks tapping her ability to see connections, Katherine

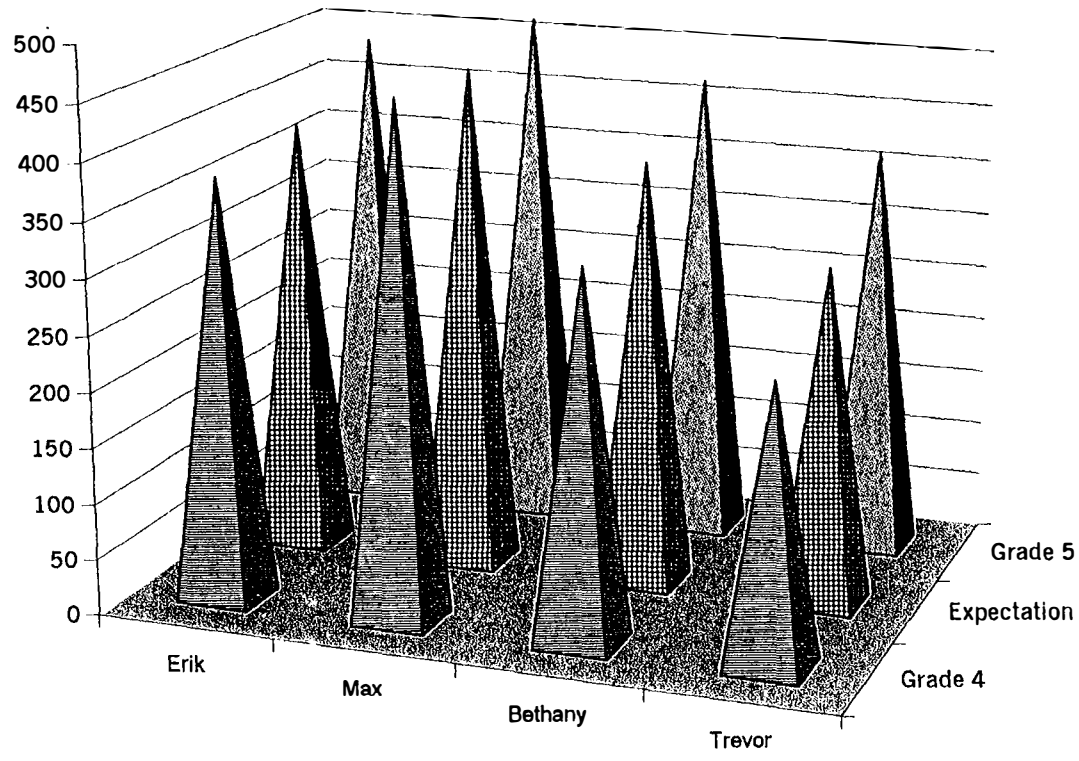
Katherine's 3-D View of Math Learning Space



	Erik	Max	Bethany	Trevor
Grade 4	430	473	311	281
Expectation	450	450	400	300
Grade 5	387	440	397	319

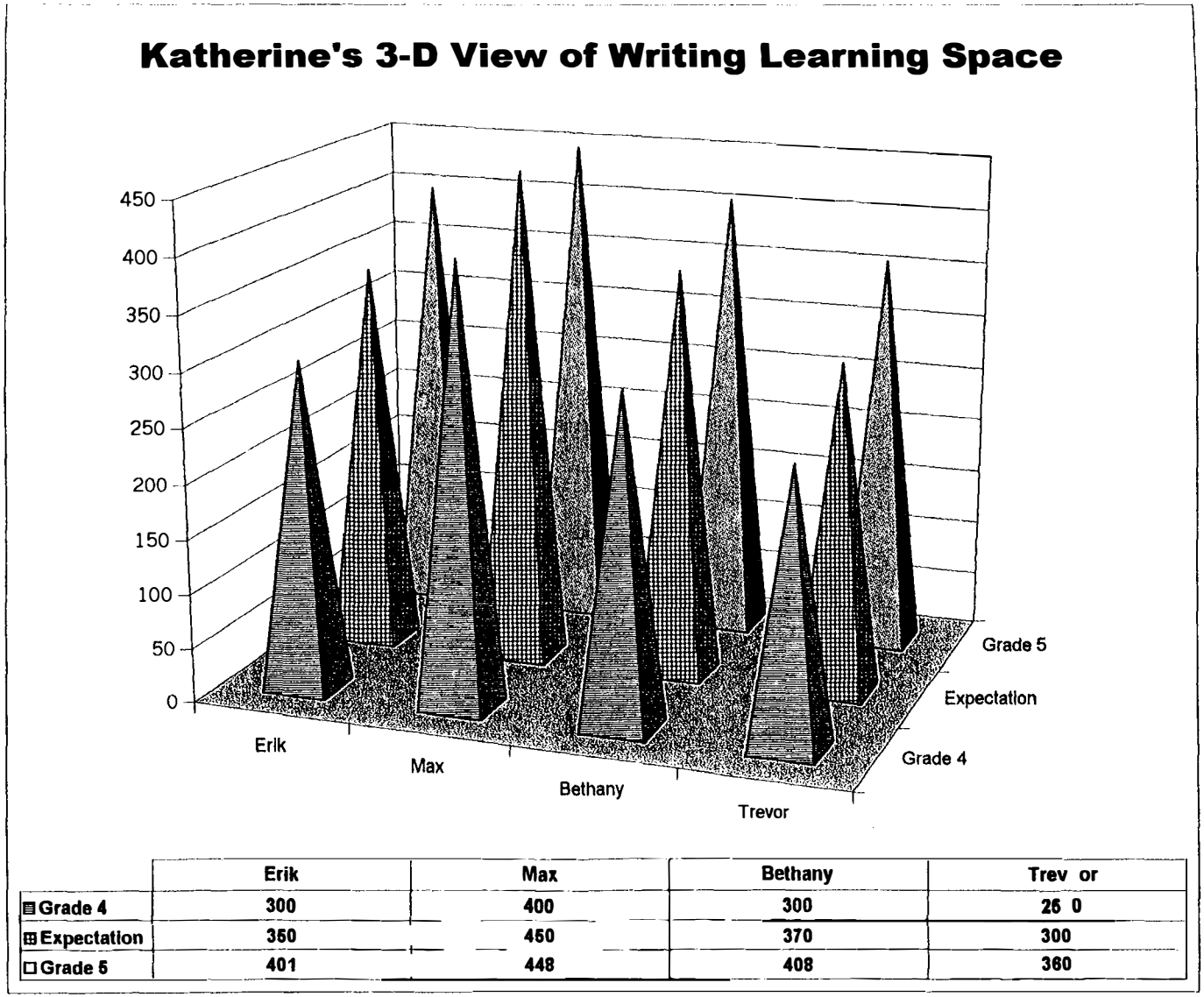
Figure 3. Katherine's visualization of peak performances in math for a sample of learners.

Katherine's 3-D View of Reading Learning Space



	Erik	Max	Bethany	Trevor
Grade 4	377	457	328	248
Expectation	390	450	380	300
Grade 5	437	467	421	366

Figure 4. Katherine's visualization of peak performances in reading for a sample of learners.



	Erik	Max	Bethany	Trev or
Grade 4	300	400	300	25 0
Expectation	350	450	370	300
Grade 5	401	448	408	360

Figure 5. Katherine's visualization of peak performances in writing for a sample of learners.

helped Bethany unleash "her voice and oomph." Bethany not only exceeded expectations, she passed the state writing assessment, and wept for joy when she heard of her score. In the fourth grade Bethany had tested at the thirty-ninth percentile in reading. Katherine used third grade reading scores to help set performance peaks in writing since there were no third grade writing scores.

Katherine used the continual flow of formal and informal assessment data to track her students as they strove to reach their performance peaks in this three-dimensional learning space. When she determined where her students were, she chose optimal routes, linking multiple paths to multiple destinations.

Responsive Teaching. Knowing that her students were all "suspended" in the learning dimension at varying entry points, Katherine grouped them in manageable clusters as she designed "boosters" for readiness levels, interests, and/or learning profiles. She clustered students to facilitate the planning process even if they were to be working individually. Recognizing that all lessons are made up of content, process, and product, Katherine realized that she could differentiate any or all of these elements by readiness, interest, or learning profile, or combinations thereof. Then she employed a variety of strategies to differentiate their learning experiences. As she did with routines and procedures for management, at the very beginning of the year Katherine's students rehearsed strategies they would use in differentiated activities. She explained, "The content wasn't differentiated. I was just introducing the kinds of activities we would be doing later on, but with the whole class doing the same thing." Students practiced contracts, peer checking, mini lessons, clinics, self-assessment strategies, tiered ThinkDOTS activities, free choice, RAFTS, and task cards (See Appendix A). For

example, when they tried a RAFT for the first time she modeled how they might respond to different audiences using the same format for every option.

Katherine started modeling word study contracts in the first few days of school. She found contracts particularly helpful when gaps between readiness levels were large; her pre-tests on spelling had shown a broad range of developmental levels. Her reflections from the first week revealed problems:

> Yikes! First hit in the head with not differentiating well enough! The list of practice study words was a disaster. Several upper end spellers looked at me like I was patronizing them!! Maggie almost sneered?! The words were too hard for three of them and the idea was a bust.

She decided to continue this modeling, however, and to work harder at nailing the differentiation. There were still wrinkles to work out, but by the end of the second week of school, with adjustments in individual contracts and more practice, word study was smoother. The students were developing a level of comfort in working with the contracts and Katherine defined five current spelling levels. She knew this modeling would be helpful in the long run because she could use individual contracts across all disciplines for a wide variety of instructional activities during the year.

Compacting (see Appendix A) was a form of contract work that Katherine introduced early on in order to exempt students with basic mastery from direct instruction. In English, for example, she pre-tested on the first unit during the second week of school. Maggie, Katie, Ann, and Ned were exempted based on their pre-tests and a compacted contract was designed for them "to do more free writing" while the rest of the class worked on basic skills. Katherine used compacting in science and social studies

throughout the year to provide extension and research experiences for those ready to move on.

In reflections from the beginning of the year, Katherine noted "by the second month we got more heavily into compacting and tiered assignments." Katherine used tiered assignments to modify the process for learning similar content across differing readiness levels. Whereas she finds contracts helpful when there are large gaps in understanding, she said, "If the kids are closer I do more tiered activities." She has found the state resource guide on the standards a helpful starting point for tiering assignments. The guide provides a benchmark for fifth grade content. Katherine explained, "I start with my middle and I go either way." She talked about a science lesson she had tiered:

> For example, the lower entry level is finding one book about a vertebrate and one about an invertebrate and they're going to read both books and do a book jacket. My higher group is going to create an ABC book that shows organisms in each of the five kingdoms, including vertebrate and invertebrate classifications, vascular and non-vascular. My medium group is doing a PowerPoint presentation on vertebrates and invertebrates.

Katherine used a tool called "The Equalizer" (Tomlinson, 1999a) to help her design tiered lessons. Presenting a visual continuum of possibilities, "The Equalizer" helped Katherine adjust the difficulty of tired tasks from single- to multiple-step, from less to more complex, or from less to more abstract.

Assessment is fundamental in creating effective tiered lessons. Katherine shared an example based on formal pre-assessments as well as anecdotal notes: "Trevor knows

what multiplication is but has no facility. Shawn does not know. Nadine is slow and pensive but has the concept."

An original self-assessment strategy Katherine created provides more help with tiered lessons. The following vignette shows how this strategy works:

Glass, Bugs, and Mud

Katherine's class had been focusing on the concept of greatest common factor (GCF) in math. Katherine stood in front of the board and quickly reviewed key ideas about the concept. She asked, "Which of our big concepts helps us tell when to stop or when we've gone far enough in searching for a common factor?" Eric said, "Patterns."

Moving to the overhead projector, Katherine guided the class through a concept attainment activity, finishing with a Venn diagram to show similarities and differences.

She asked Eric to demonstrate his technique for finding the GCF. Then she demonstrated the same process using a Venn diagram. She asked for feedback and confirmation that everyone was with her, specifically targeting Corrie because she said, "I haven't heard from you this morning." This was a good example of the way Katherine often uses "think alouds" to comment on student involvement, publicly report on how things are going, and keep her kids on track.

At this point, Katherine uses her technique for student self-assessment by asking the class, "How many are clear as glass? How many have bugs on the windshield? How many are clear as mud?" At the beginning of the year she had discussed with them the rationale for this system and modeled it (she said the kids "laughed at bugs, mud, and glass"). They created a generic rubric for each question. "Glass" meant understanding at

the conceptual and skill level, "bugs" meant understanding at the concept or skill level but not both, and "mud" meant fuzzy on concepts and skills. In this math lesson on GCF none were mud, two were bugs, and everyone else claimed to be clear as glass. Having already designed three tiered assignments, Katherine grouped students based on assessment of earlier work on GCF and took into account their glass, bugs, and mud response.

She sent a group of seven to the rug to do the exercises using Euclid's Algorithm to find the GCF rather than the two less abstract processes she and Eric had modeled on the board. There were workbook pages as an added check and to provide support. She sent the two "buggy" students to work with 2 hula-hoops that created a giant Venn diagram on the floor. They had a task card listing steps to follow using post-it notes with numbers as they sorted out factors in the hula-hoop Venn. The oversized graphic organizer provided the manipulative process these students needed to grasp the basic concept of GCF. A group of six went to the table by the window to play a GCF game that Katherine had created. These were students who Katherine knew had the basic concept of GCF nailed down, but still needed to build their confidence through application. The game had several levels of difficulty to progress through and thus improve their skills.

After everyone had settled, Corrie immediately asked to move from the game activity to the Venn activity. Within the next 10 minutes, three more students changed positions, moving from the game table and joining the Venn group. They stayed on the floor, working with the Venn diagram, for about 10 minutes and then moved back to the game table. One of these was Nadine who jumped up from the hula-hoops at one point exclaiming, "I get it!" Two students, one from the mud group and one from the bug group

told Katherine they were really buggy and muddy, and she immediately announced to the whole class that she was "opening math clinic" at the back table. After about 10 minutes of working with Katherine one-on-one they both returned to the Venn group.

This vignette highlights a number of key elements of Katherine's philosophy and her practice of differentiation. Clearly, she believes that, because students differ in their grasp of key concepts, instruction must be modified to help them build a conceptual foundation, requisite skills, and increasingly sophisticated application. Her belief that assessment must be an integral part of practice is obvious. She combined her professional assessment of student performance with the "glass, bugs, and mud" system. The students' participation in this system encouraged them to accept responsibility for monitoring their own progress. They joined with her in making assessment decisions and saw their own direct effect on instruction. At the same time, students expanded their sense of responsibility and direction by relocating when they were frustrated or out of sync. They were also willing to ask for "clinic" when they knew they needed scaffolding. Students seemed to understand the concept of a tiered lesson by moving physically through it and their purposeful movement reinforced Katherine's belief in flexible grouping. It appeared that "glass, bugs, and mud" virtually eliminated off-task behavior. Katherine moved from one group to the other providing positive feedback, support and clarification and her management system of red, green, and yellow cups worked well to focus her movement efficiently.

How Katherine Differentiates. Katherine has thought a great deal about how much she differentiates by readiness, interest, or learning profile. She has seen differentiation by readiness as the "well balanced, nutritional meal" served to learners because it builds on prior knowledge and provides moderate challenge. If her students were pushed too far without support, they would succumb to frustration and not eat at all; if not far enough, they would be too bored to even come to the table. Katherine has learned that the nutrition of the readiness "meal" is useless if the student has no eating utensils and she sees differentiation by learning profile as "the tools a student uses to access knowledge, scaffold knowledge, and retain knowledge." Katherine regards differentiation by interest as providing "yummy" food on the learning plate. She cautioned, "I think going solely by interest would be like loading a plate down with chips, dip, and pizza – very yummy but unhealthy in the long run." Cautioning that it takes a very long time to really assemble a whole learning profile, Katherine maintained that it plays a major role in effective differentiation:

> I would rank learning profile and knowing your learner as #1…I can diagnose a readiness level in a matter of minutes, interest the same thing. It takes MONTHS (emphasis in original) to truly get to know a student's learning profile. A simple Gardner multiple intelligences survey doesn't do it! So, I would think learning profile is #1, tied to readiness, and as often as possible based on interests.

Videotaped observations showed that Katherine regularly taught her novel set block this year by differentiating content according to readiness and interest, and differentiating the process (and sometimes the product) by varying the assignments for journal responses or task cards. Process variations were often by readiness, but also by

learning profile. Katherine would "book talk" several novel selections to students clustered at specific instructional levels and then invite them to choose their novel based on their interest. They chose novels by secret ballot – this reduced the urge to change books because of social rather than academic reasons – and then read in clustered groups and responded to journal prompts that were single- or multiple-step, or were more or less open-ended (readiness), or that asked for a logical listing of evidence, a graphic representation of evidence, or a sung interpretation of text (learning profile). These prompts might be individualized or designed for specific groups.

When she differentiates products Katherine often allows her students to choose tasks based on their interests and/or learning profiles. In a social studies lesson they were studying the causes of conflict that led to the Civil War and Katherine gave the entire class data about the north and south. Students chose different approaches to working with the data and created products related to population, miles of railroad, farming, and industry. Max and Doug were interested in creating battle plans. They graphed their data on Excel and came up with two intricately detailed battle plans. Other products included written diary entries of people who lived in the north or south, Venn diagrams comparing and contrasting conditions in the two areas and describing a typical family and town in each, or musical compositions that integrated the data with the culture of the time learned in Civil War songs and documents. Katherine's reflections indicated the success of these tasks:

> What they created was neat because they used very high thinking skills to extrapolate conclusions from data. Max and Doug were so engaged that they

> worked on these plans during recess as well!...They went so far above and beyond what I expected and were totally engrossed.

Product choices like these provided powerful assignments that were important, valuable, and interesting. Katherine designed all tasks with respect for each student's ability to think critically, to synthesize, and to evaluate. Basing product choices on learning profile and interest increased the likelihood for engagement and independent learning.

More Original Strategies for Flexible Grouping. In addition to "glass, bugs, and mud" Katherine has created two other strategies that link assessment and differentiated instruction. She calls one of them "differentiation on the fly" and defined it in an interview:

> It's easier to sit down and have a lesson all planned out before you start, but a lot of times you don't know until you're doing it that what you planned wasn't as high as you thought it was and it wasn't going to be as challenging as you thought. I think the two ends of the spectrum are the hardest because you'll differentiate for the lower readiness group and then find out that you didn't go far enough or that you didn't differentiate in the right way....It's more than just the planning. It's being able to walk around and kid watch as you're doing it and say, okay, this isn't what I wanted to do, we've got to move on.

Because students in her class understand the rationale and concept of differentiation, they actually help Katherine "differentiate on the fly," often suggesting to her that a task is not challenging enough or too frustrating. In one novel set lesson I observed, she had given one novel group a graphic organizer but they were doing higher-level thinking than what

was called for on the organizer. At this point Katherine "differentiated on the fly" by plugging in another strategy, "kicking it up a notch."

The second strategy is an outcome of the first. When she "kicks it up a notch" Katherine is pushing students to think a little deeper, reach a little farther, and make more connections. She described "kicking it up" this way: "We're never at a loss for something to do and rather than just sending them on to an anchoring activity, I kick it up and raise the expectations a little bit." An observation of a novel sets lesson showed Katherine suggesting to several students that they kick up their journal responses a notch by including a dialogue between two characters to demonstrate the use of inferences. In talking about this strategy during an interview, Katherine noted that when they are "really cruising along and I tell them to take it up a notch, some roll their eyes, some laugh." Katherine reported that students frequently say, "We need to kick it up a notch." Bethany asked Katherine to kick word study up a notch for her and Katherine designed "readiness and interest boosters" to help her make the leap. Katherine emphasized, "I respect their judgment when they feel like they need more. Generally, they are very proud of the fact that they've done so well with what I've given them that they want to do more." Both strategies, "differentiation on the fly" and "kicking it up a notch," allow Katherine to respond to on-the-spot assessment during instruction. The invention and application of these strategies is an example of how Katherine refines her understanding and practice of differentiation.

Differentiating Direct Instruction and Homework. Katherine frequently differentiated during direct instruction by adjusting either oral or written questions. During an observation of a lesson on algebra, Katherine paused during direct instruction

to assign problems to pairs. She put two problems on the board, one harder than the other, and invited students to choose which one they were comfortable doing. Then she said, "Now I'm going to do a hard one and these people have to do it," naming Eric, Maggie, Max, and Corrie. She explained to the class as a whole, "I'm assigning these because I've seen them doing some clear thinking about algebra. Some of the others of you may be able to do this one, but I haven't heard from you this morning and so I don't know for sure." This was another example of how Katherine used "think alouds" to provide students with a clear rationale for instructional decisions. Never spending more than 8-10 minutes at a stretch on direct instruction, Katherine punctuated this algebra lesson three times with problems she differentiated by readiness levels. At one of these points she told them she was going to give them an easy, a middle-of-the-road, and a tough problem and that they would have to act like Goldilocks "to find the best fit." When students were processing during these breaks in direct instruction, Katherine moved from one to the other telling some to "kiss your brain," exclaiming "fireworks" to others, asking some who had opted for the tough problem to try the easy one instead, and pushing others who had picked the easy one to jump up to the harder one. Katherine also stopped direct instruction several times for very abbreviated "glass, bugs, and mud" assessments, one time simply asking, "How many are clear as glass?" Taking a quick count of hands, she fine-tuned instruction in response.

In the second week of school Katherine discovered unexpectedly that homework needed to be differentiated as well. In a reflection she shared her thinking:

> I am going to have to diff (sic) homework. I hadn't really thought about this before other than having some students do less than others. Of course the sharper

> ones finish the easy homework before they even go home. Should they have to do it at all?? Darn this diff stuff....I'm going to end up having A, B, C homework too. I need to think on this some more.

Here Katherine wrestled with whether assigning less or more homework would qualify as effective differentiation. She began to see that she needed to make adjustments in the substance rather than the quantity of homework. At first she was overwhelmed at the prospect of differentiating homework, but realized there were efficient ways of building on existing resources and curriculum materials. The math textbook series provided Remediation, Practice, and Extend worksheets focused on practicing skills. She began using the worksheets and "always differentiated homework based on readiness in math." She said this was "not really creative, but it worked for drill." She knew all word study homework was differentiated because of leveled contracts and choices and reading homework was differentiated based on the novel they had chosen on their instructional level. Katherine said social studies and science homework most often was reading for review: "I didn't do as much with this, though I did make simplified readings of some texts by pulling only essential stuff out and giving them more organizers." And so by the end of the second month of school, Katherine realized she was differentiating most of the homework assigned.

While Katherine was implementing differentiation, she continually weighed and measured student response. This was followed by studied reflections on evidence that supported or disproved student engagement and the success or failure of her strategies. For example, after introducing task cards in math, Katherine commented in her reflections:

> They all seemed excited about not having to do a worksheet or problems in the book. The readiness groups were ok but I was way wrong on a few. Note: Eric is high in math regardless of special ed for other things. He failed pre-test because he couldn't read it. Duh...pay attention Katherine!

This journal entry underlines Katherine's struggle to connect beliefs and events in her teaching and allows her to uncover a pattern of thinking she hadn't been aware of. In spite of her belief about unique individual strengths and weaknesses, she had almost fallen victim to generalizations about Eric because of his special education label. Her self-monitoring deepened her understanding of Eric's needs and moved her actions into alignment with her beliefs.

Summary and Discussion. Whereas her first attempts to differentiate were "kind of hit or miss" Katherine had a better handle this year on conceptualizing how to translate her philosophy into practice. Over time and with practice, she came to see that differentiating by readiness did not guarantee student engagement in content. As a consequence, Katherine began to make the following revisions in her theory, practice, and beliefs about differentiation:

1. During her first teaching year, Katherine differentiated mostly by readiness because it was easy to test and to level work. Making adjustments for interests and learning profiles was more challenging; it was harder to collect the data she needed to differentiate this way and she did so less frequently. However, Katherine found that when she differentiated curriculum and instruction by learning profile and readiness, while targeting student interests whenever possible, she produced the best outcomes in terms of learning, management, and achievement.

2. Katherine came to see that her students needed to be learning about and understanding differentiation in order to construct the optimal environment for trust, independence, and perseverance. She pointed out to them that she was continuing to learn with them and her modeling consistently provided the support her students needed to help them develop a sense of effective differentiation.

3. Her intense focus on accountability helped Katherine establish what she called "mileage markers" that offered clear directions on curriculum goals and differentiation. Her three-dimensional view of assessment was linked to her view of curriculum design. She saw each student constantly moving in a three-dimensional learning space where differentiation, based on learning profiles linked to readiness and interests, could increase the angle of ascent as each student made gains in reaching learning goals.

4. For Katherine creating a positive learning community had always been an important part of effective teaching. In this past year, with the class that "needed a lot of love," Katherine came to see that creating the appropriate learning community had to occur for differentiation to be effective. By calling for students to be accountable to themselves, to the groups they worked with, to the class as a whole, and to Katherine, the learning community shared responsibilities for management and solved many of the problems often encountered with differentiation. When pressed for more details Katherine said without hesitation: "I think the community this year has taken away 99% of my management problems. It also has made the kids more intrinsically motivated. They care about this stuff themselves because they know they are smart and valuable... They want to be responsible."

All students in Katherine's class grew socially, learning to respect each other, themselves, and their teacher. The class as a whole demonstrated significant academic gains by the end of the year, and certain students made tremendous leaps. By monitoring their own performance and helping Katherine make needed adjustments in their learning experiences, students were able to assume more responsibility for the process and products of learning.

Questions as Katherine Journeys On. As Katherine's confidence in differentiation grew and the success of her curriculum and instruction model was confirmed by student success, negative response from colleagues increased. As a result, Katherine's self-doubts and insecurities grew and in her reflections she tried to cut through the negativity by affirming:

> I'm a good teacher. I can show documentation to prove my kids learn. They blossom in other ways too in my class that are harder to show with data. They work for me, and they respect and care about me. That part of my world is SO RIGHT(emphasis in original)!! I have never felt more alive or vital. I study hard to keep up with current research...I care. This other stuff is just distraction...I can't succumb to this negativity.

Katherine has said that always being on the outside was difficult for her. She has also shared her dream that some day she would be in a "Camelot" school where everyone was focused on students and their need to belong, to be respected, and to be autonomous. As she pursued her mission to find the invisible kids and personalize instruction for all her students, would Katherine's commitment to differentiation hold? How would her

journey be affected as she was shunned by colleagues and denied the collegial support and modeling so critical for understanding and practicing differentiation?

Eager for an opportunity to collaborate, in January Katherine volunteered to be the cooperating teacher for Mattie, a Blue Mountain College student who had participated in the differentiation study group in the fall. The education department at the college had tried to ensure that all student teaching placements in Jefferson County in the spring semester were with teachers who had received instruction in differentiation and who were committed to applying it in the classroom. Katherine was excited about working with a preservice teacher from the differentiation study group.

Mattie's arrival in the community Katherine and her students had created raised a number of key questions. How would Mattie fit into this unique learning community at this point in the year? Could Katherine provide adequate modeling for Mattie so that she could be successful with differentiation? How would the expectations of these students affect Mattie's role as an emerging teacher? How would their work together influence both Katherine's and Mattie's understanding and practice of differentiation? Would her work with Mattie temper the issues of professional isolation for Katherine? Would it be possible for Mattie, as a student teacher, to assume the multiple roles students were accustomed to with Katherine as mapmaker, artist, engineer, controller-with-a-little-c, statistician, and differentiator? A search for answers to these questions must begin with an introduction to Mattie. The answers are important if only because it is rare that these questions can be asked. Following this unusual match of a preservice with an inservice teacher, both of whom had already begun a journey toward differentiation, should lead to some answers as well as pose new questions.

Mattie

The Context

At the time Mattie was ready to student teach in Katherine's classroom, she was a second semester senior at Blue Mountain College and was certain that by May she would graduate magna cum laude. She was majoring in anthropology, with a minor in psychology, and taking teacher preparation courses for professional licensure. This made for a rigorous program and Mattie had met the challenges handily. She had maintained a 3.5 grade point average in her major and her education courses as well, and spent one semester of her junior year abroad in the Far East.

Mattie was well liked on campus and held many leadership roles. She described herself as a "spiritual person" and active in Christian fellowship organizations at the college. Her semester in the Far East was part of a Christian study abroad program. She assisted the Blue Mountain chaplain regularly and worked to expand participation in campus devotional and fellowship programs. Mattie also participated in many other traditional Blue Mountain clubs and committees. Students were eager to have Mattie work on projects because of her good ideas, enthusiasm, and reliability. Along with her academic and co-curricular responsibilities, Mattie was also a member of the college's tennis team. She loves tennis and is an accomplished player with a history of winning matches. Because of its geographic location, Blue Mountain's tennis team plays in the fall and spring semesters. Thus Mattie, an active tennis team member, had practice and matches all year.

Catching a glimpse of Mattie on campus, dashing from class to dorm to tennis practice, it was obvious that this young woman had a lot on her agenda. She hurried toward the courts, focused and intent, waving at a couple of students and yelling a response to a question about a meeting. She was undeterred on her path to practice, pitched slightly forward as she moves along, thinking ahead. Mattie was petite, about 5'2", with short blond hair framing deep blue eyes, a broad smile; she spoke with detectable traces of a southern accent. She often cocked her head to one side when hearing something important and knitted her brows to help her better concentrate. If unsure of herself, Mattie typically pulled her shoulders forward, raised those eyebrows, and looked up with a tentative, almost apologetic expression. Knowing of Mattie's many accomplishments and her leadership on campus, it would seem this expression might be rare, and yet, people who knew Mattie recognized this expression instantly as not unusual.

Mattie's Background. Mattie grew up in a small southern town in an upper-middle class family. Growing up she had a horse and lessons in riding, music, tennis, and swimming. She had lived near her grandmother and spent a lot of time with her; in fact she was named Matilda in her honor, but everyone called her Mattie for short. Mattie had traveled a lot with her family and had been to many foreign countries, revisiting several. Both parents were college graduates and they expected Mattie to follow suit. Because the local schools were found to be "not very good" she attended a small private school as a day student. She remembered a completely homogeneous student body: "It was not racially diverse at all...Middle class, upper middle class." She said the faculty was a mirror image of the student body.

When Mattie entered kindergarten she struggled because she couldn't focus on assigned tasks. "My kindergarten teacher thought I was having seizures. They sent me to the Children's Hospital and they did EKG's." Mattie has the feeling she "got in trouble a lot." She remembers having stomachaches and being sent to the office because she felt bad.

> It was kind of like in class I would be there one minute and one minute I wouldn't be there. It was kind of like I was looking through closed blinds and sometimes they would open and sometimes they wouldn't. They couldn't find anything wrong...I would stay after school to do my work until like 7 o'clock at night because I couldn't focus. I just wasn't there. I would be there during art or music but other stuff I was just kind of like not really paying attention.

Although she was already reading when she entered first grade, the attention problems had caused gaps in her learning and her teacher recommended she repeat the first grade. Mattie's mother refused. She worked hard to help Mattie fill in the gaps in her learning. Her dad worked with her too, "but he didn't have a lot of patience" and when she didn't focus her work sessions often ended in tears.

At the end of first grade and after more testing, it was confirmed that Mattie was allergic to milk. Once she stopped using milk products, her attention problem diminished. That summer Mattie's mother taught her the days of the week and other things she missed in first grade. Mattie explained that, "Reading was the one thing I could get. That's the one thing I grasped." By the end of second grade Mattie had made up for lost time. She finished second grade with "straight A's and A+'s." At that point she developed her own school performance ethic: "Then I started getting to where if I didn't

get an A or A+, I would be disappointed." She recalled that if she did get a paper with a bad grade, "my dad wouldn't be happy." Mattie's grandmother rewarded her with money for every "A" she got on her report card. "She did that with all of my cousins and that pushed me to get better grades. I would get really disappointed if I didn't make a good grade." Her mother had never really "pushed" Mattie about grades, and after a while her dad only did so "now and then." She still got help from her mother on vocabulary words and "a lot with science because I hated science," but her dad didn't have the patience to help. Once she was in high school Mattie found a new purpose for performance ethic: "I pushed myself because I wanted a scholarship to get to college and so that was my focus. I took every advanced class I could and if I didn't get an A I would be really disappointed and be upset." Mattie described herself as "going overboard" with pushing herself to excel and get the highest grades and said, "I remember my mother getting upset one time in high school about it." Mattie painted a self portrait of someone strongly motivated by extrinsic rewards and who was apt to be discouraged when those rewards were beyond her reach.

Although she had "played at school" growing up, Mattie had never imagined a teaching career before her teenage years. At the age of fifteen she said she "felt God calling me to the mission field." During high school Mattie asked a woman experienced in missionary work what she should do to prepare herself for that field. "She said that I should think about getting some background in education in case I was somewhere where there is not proper schooling." Mattie got involved in tutoring in high school. She said, "I really felt in my element working with the kids." She also taught tennis lessons and coached a junior tennis team, "and loved seeing the kids use what I had taught them."

The summer after her freshman year Mattie taught horseback riding lessons. As high school graduation approached, she investigated what would be required for teaching certification. She said once she got to Blue Mountain College, "I started taking classes and the more classes I took, the more I enjoyed them. I also organized and taught Backyard Bible Clubs in high school. I really enjoyed working with the kids and teaching them and leading songs. I guess that is when I really started enjoying teaching." While teaching was not originally Mattie's mission, it was practical for her to be able to teach as part of her real mission. The more she taught sports and church-related programs to kids, the more she thought teaching enjoyable and often reflected that, "I guess I found out that I wanted to be a teacher through church."

A Different World: College. When she arrived at Blue Mountain College Mattie found a different student body than the one she had known at home. One dramatic difference she encountered at the outset had to do with viewpoint. In an interview she shared:

> The opinions were a lot different than the conservative education that I'd had. It was something that surprised me freshman year and I think it opened my mind up to a lot of other ideas. Some I agreed with and some I didn't agree with. I don't think I was swayed in any particular way. I'm going to stay grounded in my beliefs.

Students weren't the only ones at Blue Mountain with opinions that differed from her own conservative background. Mattie said, "The teachers were a lot different, too. I remember a teacher in high school who was very closed-minded. She was my AP History teacher and she talked affirmatively about the Daughters of the Confederacy."

While her fellow students in the private school at home had been almost all white Americans, she was a member of a class at Blue Mountain with students from several cultures and races:

> They were more ethnically diverse, racially diverse than growing up in high school. I had never been in a class with people who were Asian. There were one or two Indians in my school and one or two African-Americans, so I had been around them growing up. I don't remember becoming good friends with them because I never had the chance to.

The diversity of opinions and backgrounds at Blue Mountain College served to broaden Mattie's perspective and encouraged her to plan a semester abroad. She was conscious of the differences in her fellow students and her teachers and contrasted them with her conservative educational experience at home.

Differentiation: Believing and Understanding. In terms of academic differences in high school, Mattie remembered there "was a fast track and a lower track and there were kids in special ed" but admitted she had never given it much thought. At Blue Mountain College, she said, "everyone was kind of all in there together" so she really couldn't tell who was high or low track. She did notice different accommodations were made for students with learning disabilities. "I never knew that they could do this, but some of the kids who have learning disabilities here at Blue Mountain, they could take their test in another room. I never was aware of that. I didn't know that happened."

In a curriculum and instruction course Mattie took during her junior year, several references were made to differentiation, but the course focused primarily on writing behavioral objectives, traditional lesson planning, and behavior management models.

Mattie had never heard of differentiation in any other education courses before. When asked if any of her classes at Blue Mountain had been differentiated she said, "Not really." She explained that while she might have had choices of topics for papers, "I'd say everybody pretty much has the same expectations...If you want to be differentiated, you'd have to ask for it."

In thinking about differentiation, Mattie said, "When I really understood it was last semester" in her Teaching Methods class during the fall of senior year. The Methods class was team-taught and both professors modeled differentiation during instruction. This course had been re-structured the preceding year and Mattie had heard from last year's class that she would be paired with a Jefferson County teacher in a special study group focused on differentiation. For their course, the students met in a regular, two-hour seminar each week and spent a minimum of 12 hours in a classroom field experience with their teacher partner, or "study buddy," chosen from the group. Once each month the entire group gathered at the college. Mattie's professors and the administrator representing the local school division shared teaching responsibilities during these meetings. Often the group would watch a video of a differentiated classroom and use guided questions for discussion. They might talk about books and articles they were reading or answer questions from students and teachers about their field experiences in the classrooms. After the first meeting, some study group time was reserved for the buddies to work on lesson planning.

Mattie's Methods class used Tomlinson (1999) as their main text. The teachers in the study group also read Tomlinson's book. Other readings for the students focused on invitational learning, differentiation, and instructional models. Mattie was required to

keep a reflective journal about her readings, class discussions, study group meetings, and field experience. She was also to design three differentiated lessons in collaboration with her "buddy." She was to teach all three lessons on her own; one lesson to be videotaped, analyzed and assessed with her "buddy" and then shared with the study group. Mattie learned that this was called "action research" where she and her "study buddy" would apply what they were reading and learning in the classroom and evaluate their potential application and student response. They would examine their own practice in light of theories they were studying and search for ways to improve future instruction. By semester's end all videotapes were to be copied and kept by the education department as a resource for future students. All lessons would be assembled in a resource booklet and distributed to each member of the study group.

Mattie was paired with a first grade teacher at Ellison, a small elementary school in the most affluent area of Jefferson County. There were 18 students in the class, 12 boys and six girls, and Mattie would make her first visit before they arrived, during the teachers' workdays the first week in September.

Collecting and Studying. Mattie knew that she would be keeping a reflective journal for her Methods class. Her professors had explained that she and her fellow students were responsible for making clear connections between theory and application. She knew that she would have to be a keen observer of the context and the students.

Mattie sensed the anticipation and excitement at Ellison Elementary when she arrived for her visit the week before school. Her "study buddy," Gail, met her there, introducing her to staff and faculty. Everyone made Mattie feel welcome and eager to start.

Mattie and Gail had met in the first study group meeting at the college. The focus of that meeting had been on assessment. Gail had learned that Mattie was required to prepare an assessment profile of her field experience class. She was to collect assessment data on interests and learning profiles and her instructors had provided sample assessment instruments to get her started. Mattie was also required to collect formal and informal assessment data from student records about readiness levels in the core disciplines. Her instructors also asked that Mattie conduct an "I Graph" or student self-assessment. She had seen this modeled in a video segment where students pinpointed what they were good at and what they wanted to become better at in a range of subjects. She was glad because the video had been about a first grade classroom that looked a lot like Gail's; as a result, she felt confident she could do the "I" graph. Once she had collected and studied her data, Mattie had to design a presentation of results to share in seminar. She had several options to choose from: a critical paper, a PowerPoint presentation, a graphic organizer, a spreadsheet or graph, or an artistic rendering. She had decided to compile a pie graph for her presentation.

During her initial visit Mattie talked with Gail about creating an interest profile she would administer after the students arrived.

> We decided that I would make out a ten-question interest profile with yes or no answers. Some of the questions might include: Do you like to read? Do you have any pets? Do you like math?...We decided that I would verbally ask the students the questions because not all of the children in the classroom might be able to read the questions.

Taking her understanding of differentiation beyond readings and class discussions, Mattie was beginning to construct a critical link between assessment and differentiation. The study group had discussed how continuous assessment of student needs would help to define the purpose of what was taught and learned to make it respectful of all students. Now Mattie was putting a fundamental principle of differentiation to work.

In a reflection from her first visit Mattie talked about the context of the classroom. She noted that the desks were arranged in a "square formation" facing the blackboard. This suggested a classroom where the teacher was usually in a center-stage position and all students were focused on her. There were brightly colored files in front of the room for "morning work," worksheets with coloring or other simple activities for students to complete while Gail started the day. Having helped some with the organization of the room, Mattie made arrangements to return on opening day.

Her reflections described the students' first few hours together. Mattie said they colored a back to school picture for "morning work" and she moved from one to the other reminding them to stay focused on their pictures: "The children, for the most part, worked well on the assignment. Some students were more excited than others about seeing friends from when they were in kindergarten, and they chatted away about their new Pokemon book bags or colorful folders." It was Mattie's job to re-direct talkative students to complete the task at hand. Having already been part of a discussion in her seminar about the importance of inviting students to learn, she was conscious of re-directing "without being dis-inviting." Mattie began to think about this and in her journal noted, "I realize that invitational learning is very difficult. What if I mess up and say the wrong thing? When will I know, once I start teaching, that what I am doing is working?"

Mattie's concern about performing well was cropping up. She did not want to "mess up;" she wanted reassurance that feedback on her performance would be prompt. This is a reminder of Mattie's tendency to work for extrinsic rewards and "excel," and begs other questions: Is Mattie a perfectionist? Will she have the flexibility necessary for working with today's students? What will happen to Mattie's self-confidence if what she is doing isn't "working?"

The next week Mattie met with students to administer the interest profile. She decided to expand the profile to include questions about sports and favorite school subjects. "I thought that information might help me later on in the semester when teaching the units." Mattie worked out a simple but effective management system for this assessment: "After finishing with a student, I would tell the student who was next. That student would then enter the classroom and quietly tap the next student on the shoulder." She shared that she, "really enjoyed doing the profile with the students."

On her next visit, as Mattie monitored morning work, one student refused to sit at her desk to complete the assignment. Although Mattie asked her several times to get settled, she kept walking in and out of the classroom and finally went to the room next door to see a friend. Gail went to retrieve her and talked with the whole class about rules for entering and leaving the room. Mattie reflected later:

> I thought about this incident and wondered about what I could have done to keep her from leaving the room. I asked her nicely to come into the classroom, but she paid little attention to me. Do I tell her that she will be behind in her work if she does not come in the classroom? Do I become sterner and tell her to stay in her desk in a strict tone. It is hard to know what position to take.

As Mattie struggled to resolve her position on management, she wrestled with two opposing philosophies. On the one hand, by focusing on completing the task and following directions Mattie would be pointing out wise choices. On the other, by speaking strictly and sternly *telling* her to stay put, Mattie would be attempting to control the student's actions. Mattie sensed the conflict between these approaches and ended her reflection wondering about them. The significance of this reflection, perhaps, is Mattie's inability to decide which position is right. Mattie never questioned why the student was not engaged by the assignment and what implications that might have for her behavior and the resulting management problem.

During this visit Mattie finished the interest profiles. Having collected all the other data, she analyzed the results, created a pie graph, and shared it with her Methods class. She reflected about the data wondering, "Why would three students in a first grade class not like to read?" Mattie found this hard to believe because she was reading before first grade. Some myths about reading were exploded as well:

> I assumed that all of the students that did not like to read would be in the lowest reading group. However, I found that each one was in a different reading group. One was in the advanced, one in the middle, and one in the low reading group. I assume that the advanced level reading student is not enjoying reading because he is not reading anything that he is interested in and he finds it boring. He reads well, and reads what he is told to read, rather than reading anything that sparks his attention. It must be complicated for the lower level reader to read, and because it is hard he does not enjoy it. ...The middle level reader perhaps does not like to

> read because he is either not reading anything interesting and he is bored, or he cannot fully master the skills like the lower level reader.

Mattie was beginning to hypothesize about the causes of student differences. There was pressure for her to recognize individual needs from several sources: the readings in her Methods course, the class discussions and assignments, and the firsthand experience she was now having. Not knowing enough to analyze effectively the first graders' reading differences, Mattie was operating on assumptions, stating in her journal that she had found "no evidence to prove these hypotheses about the disenchanted readers," but hoped she would find answers later.

On her next visit Mattie began to collect and study important clues about the learning profiles of these first graders. In her journal she reported:

> I noticed that one particular girl likes to draw...one boy is a perfectionist...one student is very sociable and is always in conversation with students around him, and another student likes to get things done. I decided to take note of these things after watching the video in class last Monday about the teacher using differentiation in her classroom. I discovered that I really need to get to know the children in the class in order for my lessons to be effective.

The link Mattie had seen earlier between curriculum, instruction, and assessment was being reinforced. This time she seemed to see it more clearly, in fact, it was a "discovery." She saw that formal and informal knowledge about students' learning profiles, readiness levels, and interests would help ensure the effectiveness of her instruction. Mattie made another discovery during her next visit when the reading specialist arrived with worksheets for students to complete. Mattie made this notation in

her journal: "Some students looked like they tired of doing worksheets because they sat in their desks with a bored disposition and did not look very excited. Some students were yawning." She was gathering more evidence about what effective teaching was and was not.

Teaching and Learning. By early October Mattie was ready to teach her first lesson. She arrived early and had all her materials organized before the students arrived. The lesson on beginning sounds was differentiated based on reading readiness. Mattie put the students in three teams of six students each. Then she modeled how everyone should circle the first and last letters in their name and find an object in the room that started with that letter; she demonstrated with her name on the board. When Mattie had sent each group to a different location, she went from group to group going over their directions. She had differentiated the process by readiness and had to give each group a 2-3 minute explanation of what they would be doing. The fluent readers, the Red team, were to find four objects that began with the first and last letters of their name, write the words on paper, and were given the option to draw the object as well. Emergent readers, the Blue team, were to find two objects and draw pictures of them, with the option to write the words. The non-readers, the Green team, would use green post-it notes to identify four objects beginning with the first and last letters of their names, with the option to draw or write on the notes. Mattie had designed an "anchoring activity," a management technique she had recently learned in her class, to deal with ragged time when some students would finish before others. She had provided books in the front of the room on the floor for students to look at when they were finished. "There was only one student who actually sat down on the floor to look at the books when he was finished." She explained that the

other students had wanted to help each other find more objects and she gave them permission to do that. In her reflection she felt the lesson had gone well. "The students were excited...One student even labeled his nose because he needed the letter N." Mattie did not reflect on why the anchoring activity had not seemed to work. She was comfortable with students helping each other in the time remaining.

Two weeks later Mattie talked to Gail about the next lesson she would teach. Her instructors had provided a lesson template; Mattie was to define the key concepts, objectives, generalizations, links to state standards, essential questions, pre- and post-assessments, differentiated learning experiences, resources, and time span. Gail gave her several choices of topics she might work with and Mattie had decided to teach about the changing seasons. Getting started designing this lesson wasn't as easy as she had thought. Mattie reflected in her journal:

> It was difficult for me to develop ideas for the different activities that would incorporate all of the different learning styles and levels, but for some reason, it was even more difficult to decide what I wanted the students to get out of the lesson. After talking with my professor and brainstorming with the teacher, I decided that I wanted the students to learn about the concept of change and how it happens all around them.

Mattie was struggling with the process of curriculum design. In her Methods class students had been reading about using a conceptual lens to design curriculum and instruction. A concept-based approach to learning was brain-friendly and allowed students to derive deeper meanings from patterns and relationships embedded in content. Factual knowledge was considered to be important, but only in support of larger

conceptual understanding. Mattie's class also had been discussing the importance of relating learning tasks in school to students' personal lives and experiences. Research shows that making learning tasks relevant and purposeful can increase student engagement. Mattie was beginning to see she had to take all this research into consideration, while honoring individual differences. This approach was entirely different from the way she had been taught and what she had learned in her curriculum and instruction class the year before. This was difficult for Mattie to figure out and she went to her professors and "study buddy" for guidance and support.

Deciding to focus on understanding changes in four groups -- animals, plants, people, and weather -- Mattie designed a science lesson that was linked to state content standards. In order to apply the assessment principles from Methods class, Mattie pre-assessed the students to determine their interests. She had not anticipated the outcome and reflected: "I thought that every student would pick the animal group, but amazingly, the students' interests balanced out perfectly between the different groups of animals, plants, weather, and people, with four students in the plant and weather groups, and five students in the people and animal groups." The act of reflecting helped Mattie articulate what she might have ignored – that her assumptions about students could be incorrect.

Mattie began her first lesson by tapping students' prior knowledge about change and followed with a directed listening activity on a book about fall. After she read and discussed the book with them, Mattie took the class outside to look for signs of change. At this point she set parameters for behavior; they all agreed on how they would walk and be quiet. She said, "I was very impressed at how silently and how straight the class line was while walking down the hallway. They were so well behaved that it surprised me!"

When they got back to the room Mattie asked everyone to make connections between what they had seen and the big understanding she wanted them to grasp. She said, "I made sure that we named a change that correlated with people, plants, animals, and weather." She found that time was her major enemy. "It's difficult to fit all of the things that teachers see as important for the students to do in such a short time frame. I guess this takes practice, experience, and amazing lesson planning talents."

When Mattie returned a few days later to teach the next part of the lesson, she moved them into their interest groups by modeling a management strategy she had learned in Methods class: "I then explained to the students about having six inch voices by using a six-inch ruler. The students then quietly practiced." The groups had several books on their topic, and scissors, glue, and other materials for creating a page of changes. Mattie asked everyone to work individually, sharing books and materials. She made one on-the-spot change when two girls asked if they could work together. "I was not sure that the students were at the right age to be working productively in groups, but these girls showed me that it is possible." As Mattie moved from group to group she noticed all students were engaged and working hard. "Some students were working on very intricate, detailed projects, and I had to push them along in their work reminding them that there was not a great amount of time. Some students finished early. I asked them to find a student who was still working and ask them how they could help." She didn't seem to have a specific anchoring activity planned for this lesson and asked others who also finished early to help clean up. If two lessons indicated a trend, it seemed that Mattie tended to let students who finished their work early help others to finish. While Mattie prodded her students to race against the clock and continued to be conscious of

how precious time was, she seemed not to see opportunities to implement purposeful anchoring activities she had learned in her Methods class that might provide students with additional and valued learning time.

After everyone displayed their work, Mattie asked students to write or draw on an index card one change that happens in fall. The answers taught her more about their learning needs. "After looking at the index cards, I really learned about the different ability levels in the classroom. While one student wrote in excellent handwriting, 'The tree is different' and drew a tree underneath the sentence, another student drew some orange leaves and misspelled his name while writing some letters backwards." In this case, quick, formative assessment gave her added clues about the specific needs of students: Which students were able to synthesize at a more sophisticated level? Who had developmental spelling problems? Who liked to draw?

Continuing to do the important work of reflecting on the lesson, Mattie decided she could have changed the instructions for the projects, not required labels, and given them smaller pieces of paper to work on. She said, "I also wonder if the lesson could have been stretched out into 3 lessons, the third being for presentation of the projects." She was developing a very valuable professional habit of mind -- reflecting for the purpose of refinement. She expressed enjoyment about teaching the lesson and said, "I learned more about the individual students in the classroom and the different levels they are at." For Mattie, having to differentiate this lesson seemed to uncover more evidence about why and how she could differentiate the next.

In the first week of November Mattie was ready to teach and videotape her last lesson. She received permission from Gail to rehearse some routines and procedures for

the lesson beforehand. First Mattie asked students to review the rules for good behavior. She was pleased when they offered the six-inch voice method she had taught them.

> I told the students which groups they would be in and showed them where their groups would work. Each group was made up of three students. I walked around the room listening to their six-inch voices. They did such a great job practicing that I had confidence that the lesson the following day would go relatively smoothly.

Mattie was getting direct reinforcement of another management strategy she learned in Methods class. One of her instructors had recommended rehearsing a new differentiation strategy the day before it was to be used. Mattie tried this and raised her confidence level significantly. She hoped increased confidence would positively affect her differentiation the next day.

In her lesson, Mattie wanted to connect what the kids had learned about change in people, plants, animals, and weather to changes they could see in themselves. She called her lesson "Then and Now." The two generalizations she used to define the key understandings were: "Change happens within ourselves" and "Physical appearances and skills change in students over the years." Gail had helped get baby pictures and current photos of all the students. Mattie decided to differentiate the process based on learning profile.

Mattie began the lesson by reviewing what they had learned about change thus far. She shared the kids' kindergarten pictures from the school yearbook and baby pictures of Gail and herself. She explained that they were going to make a class yearbook using their "then and now" pictures and modeled how they would make a page. The

designer would organize and place the pictures, the writer would help label the "then" and "now" pictures, and the reader would find words that would help describe the pictures. Mattie assigned these roles based on her assessment of learning profiles. She had a little trouble with role assignment, "Many people wanted to be the designer, but I think that by the end of the lesson, when everyone had performed their role, they had seen how they were useful and needed in order to create the page." She reflected immediately that, "I think this is one thing I should have pointed out before and after the actual time that the students were in their groups, the importance of every role. I did not point this out in the beginning, which I had planned to do, because I did not think the students could sit still any longer." Mattie seemed to see that taking the time to explain the roles involved in this process would have prevented confusion and complaints later. She saw how critical it was that each student felt "useful and needed" in order for the differentiation to be effective. Mattie seemed to have overlooked the important role the learning community plays in a differentiated classroom because of the trust and respect required when everyone is working in different ways.

In assessing the lesson she said that every group finished the project with "100% accuracy" although many had used "36-inch voices" instead of the six-inch ones they had agreed upon. She found that, "The kids with good reading skills were able to read to those who had not yet mastered those skills, and the kids with good handwriting were able to use their skills. The designers were able to use their skills of depth perception and spatial understanding along with their tactile learning styles." Mattie was rewarded by the fact that the tasks she had differentiated were well matched to skills, abilities, and talents. Although there were management problems, all in all things had gone well. Some

students had written addition and subtraction problems under their "now" pictures to show ways they had changed. Mattie said, "I was very impressed at this because we did not even discuss it in the large group, but it showed that the students had mastered the concept of change and were able to associate it with other areas in life." One student was still struggling with how to write the word "change" and gave Mattie more evidence of "so many different levels of readiness in the classroom."

With this lesson Mattie had the video to review and noticed something was missing:

> Another thing that might be done differently is for me to give more praise to the students. After watching the video I noticed that I did not praise the students enough for the hard work that they do...Students need to know that they are being productive in the classroom and that they are good at something.

Mattie realized that she spent all of her time on directions, clearing up misunderstandings about roles, reducing noise, and keeping students focused on the objective of the yearbook labels. The video helped her discover a critical omission: positive feedback. Mattie hadn't seem that providing positive feedback might have increased responsibility and engagement among students, thus freeing up some of the time she devoted to all those other teacher-directed tasks.

After her final visit to the class and a going-away party, Mattie shared a slightly different reflection; this one was about her own learning style.

> I have always been somewhat hesitant in asking for advice or help on activities, but I knew that in this particular class, there would need to be a good amount of interaction between my teacher buddy and myself. I learned not to be afraid to ask

for advice or to even call her at home. I was worried that I might be a burden on her because I was calling her so often, but I now realize that it was better for me to take this risk in order to be an effective teacher.

Mattie needed reassurance that what she was trying to do was going to work. Her past history had already indicated that it was important for her to get a "good grade" and she said had she knew it was more important to ask for advice than to "collapse trying to do things without help." She found herself in new territory with her Methods class; things were neither simplistic nor formulaic. She complimented Gail and said, "Her suggestions always made the lessons run smoother and her willingness to let me take control of the classroom helped me to learn more about teaching." Mattie called teaching "taking control of the classroom." Discussions in Mattie's Methods class about invitational learning had explored the importance of inviting students to share control of the classroom community. Her class had listed the beneficial outcomes of this strategy: increased respect of self and others, more responsible decision-making, greater independence, and less off-task behavior. Mattie seemed to have held onto a pre-existing view of teaching as taking control; theory and research were as yet not able to alter that image.

Summary and Discussion. Mattie said she hadn't been aware of the concept of students needing different entry points to learning, even though she was seen as a "problem" during her first two years of school, before her milk allergy was diagnosed. She had not been conscious of the need for differentiation before her Methods class and the study group experience at Blue Mountain College.

In a final paper she wrote for her Methods class, Mattie summed up the following insights she had gained from the study group experience:

1. She "understood that students were different, they were all at different levels of readiness."

2. By the end of the class Mattie knew "that it takes a large amount of time to develop a good concept-based lesson plan." After deciding she would teach a science lesson, she got stuck when it came to figuring out what she really wanted the students "to get out of the lesson." She wasn't sure how to connect the science content the kids had to learn with a concept and have it all make sense.

3. She needed support from people with more expertise to develop the concept-based plan. When she realized she was stuck Mattie went to one of her professors asking for help. Mattie also talked with Gail, her "study buddy," but this method of lesson planning was new to her as well; this was also her introduction to differentiation and concept-based teaching. With ideas from the professor, Mattie and Gail struggled to put theory into practice.

4. Mattie's teaching experience led to this discovery: "I realize that the more time that is spent planning for a lesson, the better the instruction will go, and the better the instruction, the better the students will do on the assessments." She was forging links from planning, to effective teaching, to achievement.

5. She found that by using the concept of change she could make connections from standards in science to those in history, English, and geography. "I think that when designing curriculum for a class, it is important to see the flexibility of the materials and to know it is possible to teach several different subjects within the same lesson. This

makes the planning not as overwhelming." The study group had concentrated on the problem of teaching conceptually while still addressing all standards content before state testing. The teachers were concerned that shifting focus to concepts from facts would result in poor student performance on state tests. Listening carefully to this discussion, Mattie had weighed the concerns expressed and decided in favor of integrating content.

6. Mattie had learned that certain management strategies work: six-inch voices, rehearsed procedures and, to some degree, anchoring activities. Management, as an issue, echoed through every one of her reflections. At some point she made an important discovery: "I also feel, for the most part, I can handle unpredictability in the classroom, which can be controlled somewhat through organized lesson planning." She was beginning to see that clarity of curriculum and instruction might reduce management problems.

7. She saw effective differentiation was related to "organized lesson planning that was smoother because of the assessment profile." She could already see differentiating content, process, or product required her to manage and execute multiple tasks simultaneously, and knew she needed to be extremely well organized before teaching.

8. By correlating different content areas with a single concept, Mattie saw "how many different strategies I could implement in one lesson." Discussion seemed particularly well suited to making linkages between the concept of change and the knowledge students already had from history and from stories they had read. Cooperative learning had worked well for designing the class yearbook; groups worked cooperatively to produce yearbook pages but with individual roles based on their different learning profiles.

9. As Mattie thought about the varying levels of readiness in this first grade classroom, she realized she needed to adjust questions when using the discussion method. She reflected, "I realized that I was capable of changing my questions to meet the level of the students."

10. Mattie also stated that she knew it was "possible to instruct students in multidimensionality through the differentiated lessons. Because the students were grouped in different readiness and interest levels, they were able to do different things while still learning correctly."

11. Mattie saw how reflection could help improve her practice. "I also found how I could later improve the lesson by reflecting upon what things worked well, such as the cooperative learning that took place in each group."

Questions as Mattie Journeys On. Mattie had already met her clinical instructor for student teaching in the study group. Her friend Britt had been Katherine's "buddy." Mattie knew from Britt and from study group meetings that Katherine was very adept at differentiation. In fact, she differentiated almost all the time. Katherine also was focusing her lessons for the whole year on a couple of big concepts. Mattie's work in the study group had been with a teacher who knew as little about differentiation as Mattie did. Mattie's "buddy" had a traditional approach to curriculum and instruction and had been unfamiliar with concept-based teaching. Would Katherine expect that Mattie already knew enough to design lessons linked to concepts? Would Katherine find Mattie a "burden" if she asked for reinforcement and guidance? Would Mattie's emerging confidence hold and build in a classroom where students expected differentiation? If her

confidence slipped, how would that affect Mattie's ability to design clearly focused, appropriately differentiated curriculum and instruction?

The quick assessment she had done after her second lesson confirmed for her that differentiation had worked, but was this really effective differentiation? Was this what Katherine would be looking for? It was hard to tell from the study group; when all the students had shared their videotapes it seemed she had done a good job. More importantly, did she know enough to differentiate effectively for Katherine's students if their teacher was as adept at it as Britt said?

Issues of organization, time, and management had held Mattie's attention during the study group experience. How would management issues differ for Mattie in a fifth grade classroom after working with first graders? What kind of management philosophy did Katherine have and would it be something Mattie could accept and practice? In interviews and reflections Mattie had never mentioned the changes differentiation could trigger in the classroom community. How would those changes be manifested in Katherine's classroom? Could Mattie understand and join in this community? Would the community understand and accept her? These questions can be answered by studying what happened when Katherine and Mattie's journeys converged in the classroom of fifth graders who "needed a lot of love."

Katherine and Mattie

In January Mattie reported being "excited and a little bit nervous" about student teaching with Katherine. Katherine shared Mattie's excitement and was "worried" about having her first student teacher. Jefferson County had started a program the year before to train clinical instructors to mentor student teachers, but Katherine had been in her first year of teaching and was ineligible to participate. Planning for Mattie's arrival, she gathered advice from her principal and faculty and thought back to her own student teaching experience. Katherine put together vital information for Mattie about daily schedule, school policies, projected testing dates for spring semester, and other details to help Mattie understand operations in the fifth grade at Redlands Elementary. Katherine prepared student folders for Mattie with "get to know them" information including formal and informal assessment data, anecdotal notes on all the students, work samples, letters, and photos. Katherine also described content the class was studying in each subject area and shared her vision for pacing instruction from February through April. Knowing how important it was that Mattie have a personal space in the classroom, Katherine cleared out part of the teacher desk in the back of the room and gave Mattie two drawers.

The week before Mattie officially began her student teaching, she spent three days observing Katherine's class. During that time, she "tried to learn every student's name," looked over student writing, helped kids with group and individual work, and tried to "get to know the level of the students." Still a little fuzzy on her understanding of how and why lessons were being differentiated, Mattie watched a science block that she said "was differentiated by readiness (I think)." The day before she started her placement Mattie

and Katherine discussed a tentative schedule for the semester. They decided that Mattie would teach lessons on novel sets by the end of the first week and began planning.

As Mattie got closer to her first day, she became increasingly nervous. After several visits to Katherine's classroom Mattie noted, "her class is completely differentiated." This was a first for Mattie. Even in her study group field experience, differentiation had been applied to a limited degree and as a beginning step. Mattie pointed out this important observation about Katherine's students: "The kids are accustomed to it. It's normal for them. They're used to being split up into different levels and different groups. They also use whole group instruction." Here was a critical factor facing Mattie: the students she would be teaching *expected* differentiation. They were comfortable with more traditional whole group instruction, but "used to" working on differentiated assignments. She had taught three differentiated lessons in Gail's class first semester, but here was a class of fifth graders who expected her to do so all day each day.

Oddly, Mattie did not have the classic worries about classroom management that one might expect, given that this classroom had been completely differentiated. Instead, she said, "I am not worried about classroom management in the fifth grade. I am more worried about developing lesson plans that the students will really grasp the information from." Having seen Katherine's lesson plans during the previous week, Mattie may have felt uneasy when she realized that Katherine's planning was not "by the book." Katherine planned concept-based lessons she mapped out for the entire week, focusing on what students should "know, understand, and be able to do" or what she referred to as the "KUBADT." Mattie was accustomed to a more traditional lesson planning approach and had been exposed to Katherine's format only briefly in the study group. The lessons

Mattie had created with Gail had not followed this format. Mattie realized that Katherine used textbooks and accompanying teacher manuals as supplements for planning and as starting points. As Mattie had already reflected, the behavior of this class was "relatively calm," thus tipping the balance of her worries to lesson planning. However, Mattie reflected, "I think everything will work out, especially with the mentor teacher that I have. I know she will give me good advice on lesson plans."

Week One: Surprise! Katherine modeled teaching novel sets during the week Mattie observed. Mattie saw how Katherine "book talked" selections at different instructional reading levels and allowed students to choose what they would read based on their interests. Katherine had Mattie choose the novels for her lesson and then did "readabilities" to determine levels. Katherine said Mattie had the hardest time finding the right book for the more struggling readers because "it's very hard to find high interest, low readability level materials." Mattie ran out of planning time and ended up with just one book for struggling readers after finding several for the other three groups. When asked about having an assigned book for the struggling readers when others got to choose, Mattie replied, "They didn't pay any attention to it...I didn't notice any reaction." She added, "In order for good group discussions to be going, I needed all three of them on the same book." Mattie was strategizing group assignments. There were more considerations to keep in mind than just reading levels, but she felt confident about her decision because Katherine had agreed.

After Katherine's modeling, Mattie led book talks for the other three groups while Katherine started the struggling readers with their novel. Another strategy Katherine modeled for Mattie was how students would actually come to a decision about books. "I

suggested she do secret ballots picking the books because I'm noticing a lot of times my students will cluster together with their friends rather than picking a book they are truly interested in." Mattie checked with Katherine on her groupings once all ballots had been tallied and was pleased when Katherine said, "I think they're going to work. I think we've got a diversity."

Although Katherine reported that the book talks and balloting went well, Mattie expressed surprise.

> I was surprised that any of the kids liked any of the books because I was nervous and I didn't know if any of the book talks were going to go very well or not. *Where the Red Fern Grows* is a thick book and I didn't think anyone would sign up for it. Maybe the talk about blood and gore helped. I was surprised they listened to me. I didn't expect them to. I don't know, it was my first lesson and I didn't know how they were going to react. I hadn't really worked with fifth graders in a while. I had been a camp counselor but that was a different thing than teaching. I was surprised at how smoothly they went into their groups. They are a good group.

Obviously "surprised" by her successes with the book talks, gaining attention, and giving directions that were followed, her repetitions of the word suggest scant confidence.

Mattie unexpectedly encountered something else. "Another thing that surprised me was when the *Tales of A Fourth Grade Nothing* group was working, I sat down with them when they were reading. They read for a little bit and then one girl set down the book and said, 'Okay, this is what I've found.' I was really impressed by that." Here, Mattie was seeing the unique learning environment in this classroom. Students in

Katherine's class were largely self-guided in their learning and Mattie found this surprising because it was neither the norm nor her own expectation. Her surprise may have been even more dramatic as the group she was "impressed with" was made up of struggling readers and thus not traditionally a group that teachers would characterize as independent.

Once the students began their novels, Mattie taught a lesson on figurative language, character descriptions, and inference and asked students to search for examples in their reading. Katherine helped her plan a lesson where the process was differentiated by readiness and interest as the content had been. She reminded Mattie of the importance of clearly focused objectives and questioned her about what students should know, understand, and be able to do. Katherine was modeling for Mattie that effective differentiation will depend on effective curriculum and instruction. In one lesson the more advanced group worked with point of view in addition to language and characterization. Katherine helped Mattie narrow her objective because she felt it "was a little bit broad." In the writing block activity Mattie asked students to create a paragraph describing characters' feelings and asked them to project themselves into the novel to decide what their feelings were about the main character. She offered a graphic organizer to give support to students who were still having difficulties organizing their writing or producing a clear, concise paragraph.

Observation of this lesson showed that as Mattie interacted with novel sets groups and individual students she:

- Reminded students about the task assignment
- Directed students to the task at hand: "I said, look and see if you can find any adjectives and they found one."
- Read with novel groups and participated in their discussions

- Used questioning to guide thinking: "I would stop and say, 'Do you see any examples of figurative language?' And then I said, 'Oh, there's one, and here's another one. And then it would start clicking."
- Modeled thinking and writing she wanted the kids to use
- Refocused students to help them stay on task: "Then I went over to the *Tales* group. They had started off good but then the girls had gotten silly. I had to refocus them."
- Provided support for the more struggling writers by using more questioning to guide them and by giving them the graphic organizer
- Checked for understanding to make sure the graphic organizers were being used correctly: "I checked to make sure about what they had written down because they had a graphic organizer."

While Mattie was interacting with students during the lesson, Katherine was modeling two differentiation strategies for Mattie. Katherine had noticed that the lower readiness group was "kicking it;" they were doing "higher-level thinking than Mattie was calling for on the organizer." Having seen this, Katherine implemented her "differentiating on the fly" strategy. Then Katherine modeled the strategy that "differentiating on the fly" triggered – "kicking it up a notch" – and described it this way:

> We started talking about inferences and whether they were making them from their experience or how they were making decisions about where to put characteristics. Mainly I was making them talk about what was going on in their heads when they were making decisions to make sure that what I was seeing and they were putting on their charts they had really thought through and weren't just filling in the boxes...I said, "Well, if you were in this story, how would you feel about Fudge?"...and I had them write a little bit of dialogue.

When Katherine "kicked it up a notch" with the *Tales of a Fourth Grade Nothing* group, Mattie stopped to watch and take notes. She followed along behind Katherine to see how the students in the *Tales* group included conversations in the paragraphs they were writing.

When Mattie made the transition from novel discussion groups to the writing assignment, she used a management technique she had seen Katherine use frequently. After a nonverbal cue check with Katherine, Mattie clapped rhythmically to get everyone's attention and gave a two-minute warning; she followed this by asking everyone to find a good stopping place. Katherine's students were familiar with this routine; they knew it meant a transition in instruction was about to ensue. As some students finished before others, Katherine drew attention to a fundamental rule by stating clearly: "As you get finished, remember to make good choices about how you spend your time. Remember in here there's no time to waste." The notion that "there is no time to waste" was a cornerstone of Katherine's management and teaching philosophy and a principle that she wanted Mattie to embrace and apply.

Mattie reflected on other management challenges: "I am realizing that I need to be firmer with the students, but it is difficult." She had to split up two boys who were not reading silently as they had been instructed. Again, Mattie was surprised at their reaction: "I was amazed at how obedient the boy was when I asked him to return to his seat." Her amazement showed that Mattie seemed not to believe her management would work. She went on to say, "I guess I should not really be surprised since I am the teacher, but I am. They actually listen to me when I tell them to do things." Underestimating her competence or the students' could undermine Mattie's instruction and management.

Although she said she was amazed at how "cooperative" Katherine's students were, Mattie said, "It is tough working with the lower group kids. Katherine admitted that this was a big problem for her as well: "They need more direct instruction. I've got to be ready to go right to that group to give them the guidance they need." In this first week as

Mattie worked with the lower readiness group, Katherine facilitated the work of other groups, or vice versa. The difficulties of getting group work started presented special challenges for Mattie. She realized she had to be aware of needs across the room while working with some students up close. To help with this Katherine modeled another management technique: using green, yellow, and red cups to signal when groups were moving ahead, semi-stuck, or stuck on their task assignments. Katherine's students were well versed in this procedure and knew to pick up a stack of cups as they headed off with their groups. Scanning the room, Mattie could then spot a red cup and move to that group next.

Reflecting on these beginning novel sets lessons, Katherine said Mattie "had a good rapport with the students and most of them were on task" and she felt the transition Mattie made from direct instruction on figurative and descriptive language to the differentiated novel groups "was very smooth." Katherine did point out the importance of recognizing that struggling readers need opportunities to analyze, synthesize, and evaluate. Mattie reflected on how she could have improved her instruction in these first attempts: "I could have picked up on some of the things that they were doing well, but I'm still kind of nervous about that." After Katherine encouraged her to offer positive feedback during instruction, Mattie shared what this improvement would mean for the students: "Because someone realizes that what they're doing is actually worthwhile -- they can produce it. It makes them go a step further."

Observing one of Mattie's first lessons, I was surprised by seamless instruction and management. For a first attempt at designing and implementing a novel lesson differentiated by readiness and interest that integrated literature, English skills, and

writing, this was a resounding success. Clearly Katherine had given Mattie plenty of assistance with planning and execution. Mattie was imprinting on good teaching and management; this made Mattie look like a seasoned professional, balancing differentiation and best practice instruction in reading. During this week Mattie's college supervisor observed her and described instruction as "smooth" and "well done."

Katherine approached her work with Mattie in the spirit of co-planning and co-teaching. She said, "I'm trying to make it more of a 'we' kind of collaboration, rather than telling her how to do everything." When she and Mattie were planning together Katherine asked questions ("What do you think would be more interesting? What other products could we use?"), and gave Mattie ideas for resources ("I've got different resources that I have in a big file that I've been able to give her and have her try"). When Mattie taught the lessons she had planned, Katherine provided immediate feedback ("We've been doing a lot of post-conferencing when a lesson's done (sic) and I'll ask her: What do you think we could have done differently?") and she modeled a lot ("I showed her a lot of things...modeling just good strategies...going from group to group with her so she can watch how I interact with the students").

After instruction Katherine demonstrated how reflective journaling pushed her thinking about improving instruction. She shared her reflection strategy:

> I may not write eight pages a night, but I'll sit down and say I really blew it today with Corrie. I could tell she was not in a very good mood and I went ahead and pressed the issue. Maybe I need to consider doing this better the next time.

Mattie also saw Katherine using summative reflection, thinking about the effectiveness of last year's lessons in comparison with this year's in order to judge the

effectiveness of her instruction over time. Katherine summed up a discussion she and Mattie had about reflection and the part it plays in the art of teaching: "We were talking about how when you stop reflecting, you might as well retire because there's always something you can do better."

Week Two: Success and More Surprises. During the second week Mattie added the word study block to her planning and teaching list. Word study, or differentiated spelling, was a new concept for Mattie. "When I was in elementary school we had random lists every week. We worked out of a spelling workbook and now that I look back on that, maybe those words didn't have a central theme." Pre-assessment was the key to effective word study and Katherine's modeling helped Mattie launch a word study lesson herself.

> First, I pre-assessed all the kids in their different levels. The kids that scored pretty high in their levels, I tested them for the next level. Katherine and I looked at the scores in each group and we saw where they could grow a little bit more in each skill level. So I took words from a skill that they could do better in, and then I took other words from a skill that they had already mastered. All of the kids that I retested moved up a level.

Mattie was learning how pushing the students just a little beyond their comfort level in spelling would stimulate growth.

Katherine modeled how students worked with their word study list each week on independent contracts. Mattie followed suit, having students do word sorts and other activities in preparation for the test at the end of the week. I observed Mattie giving the differentiated word study test on five developmental spelling levels. Mattie explained

how it went: "They know what their level is and they keep track of it. And they are patient while the other words are getting called out. I think Katherine did a good job training them. It's become a habit. It's a system that they are used to." Mattie felt that this was a routine students could become accustomed to, "It's just a pattern or habit they get into like brushing their teeth at night before they go to sleep."

The modeling Katherine had provided on the word study unit was essential for Mattie on two levels. First, it was critical that Katherine helped Mattie see the rationale for differentiating spelling. Mattie could then reason that:

> It doesn't make sense to give kids that are at a lower level of readiness words that are in the "Derivational Constancy" stage. It wouldn't make sense to give kids in the "DC" stage words that were in "Within Word" or "Syllable Juncture." So each student is getting challenged but at the same time they have a sense of achievement.

On the second level, Katherine's modeling of routines and procedures for managing differentiated spelling contracts and assessment helped Mattie make at least a tentative commitment to this as a practice she would use in her own classroom. She explained why she would "probably" use it: "It makes sense to me because I knew how to do it watching Katherine. The kids are learning so it makes sense for me to do it."

Mattie designed another social studies lesson on women's suffrage, differentiating the process by readiness and learning profiles. One group worked on designing picket signs by looking at authentic artifacts. Another group created a newspaper by looking through primary documents and biographies of women active in the movement. Two groups prepared debates, one side for women's suffrage and the other opposed. Mattie

appointed leaders for each group. Mattie was struck by the benefits of flexible grouping. She had placed one of the special education students, Jessica, in an advanced group that was debating reasons why women should vote and Mattie observed, "It was really neat to see her blossom." This underscored a point Katherine had made during Mattie's first week: struggling readers can succeed with high level thinking tasks. Once again, Mattie was surprised. "I was surprised that they were so engaged." She was still lacking confidence that her careful planning of purposeful tasks for this social studies lesson would lead to student engagement. Her surprise also suggests that Mattie saw student engagement purely as good luck.

By now Mattie was planning and teaching word study, novel sets, writing, and social studies. All of these lessons were differentiated and Mattie was meeting with significant success. Katherine was modeling math lessons for her, but Mattie hadn't taken this subject on yet. There were a couple of reasons for this. Katherine had started Mattie with the language arts blocks because she knew reading and writing were essential for all other learning and that resources for differentiating language arts were plentiful. It seemed logical to give Mattie social studies next because she was comfortable with the content, although she was not familiar with the state history that was taught and tested in fifth grade. At the same time Katherine was having a hard time letting go of math because this was her area of expertise. Math was a subject Katherine's students feared at the beginning of the year; she had watched them grow to love math and she did not want their fears to resurface.

Katherine modeled for Mattie a math lesson on greatest common factor, connecting the topic to the big concepts the class was focusing on. Mattie watched as

Katherine used a concept attainment strategy, differentiated questions, and her original "glass, bugs, and mud" strategy. Mattie saw kids move themselves from one level to another, saw how Katherine deftly moved from group to group facilitating learning and providing scaffolding, and watched her open "math clinic" when students were stuck. Mattie gave this description of how Katherine held the students' attention:

> She loves the subject, that's what helps the most I think - to love what she's teaching and know it really well. She knows what levels the kids are at (sic). She does a pre-assessment of each chapter before she starts and knows which level to start with the lesson. I really like the way that she has different activities for each student to do, based on his readiness and level of understanding of the content. The kids never feel dumb because they are at a certain level or because they have what she calls "mud."

Mattie noted the role that content knowledge plays in designing effective differentiated lessons. She also acknowledged the importance of assessment in creating the right match of instruction for individual needs. Mattie also took note of how Katherine provided scaffolding for students who were outside their comfort zones: "Some kids get frustrated at being 'buggy' or 'muddy.' But they don't complain about going to the conference table to master the times tables. I have seen one student in particular pretend that she is 'glass,' but then, after a while, she realizes that she needs help." Mattie admitted to being very "nervous" about teaching her first math lesson the next week. Her nervousness was understandable. Katherine's modeling showed that she was in command of the content, her objective was crystal clear, and her connection to larger concepts and generalizations led students up to a level of deep understanding. The differentiated tasks Katherine had

designed were respectful and purposeful for all students, and with student engagement observed to be about 100%, management problems were non-existent. Students self-assessed and took responsibility for their learning. This was a tough act to follow. Having been "surprised" when students simply listened to her and were engaged it was no wonder that Mattie found Katherine's teaching intimidating.

Overall, Mattie received high praise for her performance to date. In her formal observation notes as Mattie's clinical instructor Katherine wrote: "She has met or surpassed all my expectations" and "she shows a good grasp of differentiating for student needs." In addition, Mattie's supervisor from Blue Mountain described her planning and work with differentiated groups as "excellent."

Week Three: No Eating, Sleeping, or Human Interaction. By the third week Mattie was teaching "about three lessons a day" – novel sets, word study, writing, and social studies. Some of the writing and all of the novel sets and social studies lessons were differentiated. Mattie continued to use Katherine's management techniques -- the clapping rhythm, red/green/yellow cups, positive reinforcement ("I like the way Ned and Pattie are sitting quietly"), and restating the community rules about making wise choices and not wasting time.

Midway through this week Mattie taught her first math lesson on bar graphs and pictographs, which was a review for the students. Mattie had found a model for the lesson on the Internet. She showed it to Katherine, who liked it, and Katherine differentiated it with some help from Mattie. Mattie reiterated that she was nervous about teaching this lesson and not just because of Katherine's expertise and passion for the subject. Mattie felt "rusty about the graphing" because it was something she "hadn't covered in a long

time." Mattie and Katherine had designed a tiered lesson on bar graphs using Valentine candies for data.

The most advanced group was working at the computer center to generate a graph of their candy colors using Excel and to sort the candies by another attribute, frequency of Valentine messages, converting the frequencies to fractions, decimals, and percentages. Ultimately, they would graph the whole class data on a spreadsheet and present it to the class using the video-to-video format. Another group laid out their candy colors in "bars" on paper and then transferred the image to graph paper, which Mattie had provided. Then they had to describe their graph in three sentences. The last group did what Mattie had done in direct instruction; they sorted their candy, wrote corresponding proportional fractions and transferred this information to graph paper. Katherine assisted Mattie with this lesson, consulting her from time to time, and moving about the room facilitating group work. Katherine gave groups positive feedback and "kicked it up a notch" by asking the computer group to graph the pairs of data they had generated. Mattie moved from group to group, but seemed hesitant in her interactions with the kids. She did not offer much praise and often just listened and watched instead of asking questions and getting involved.

In an interview about the lesson, Mattie referred again to her nervousness at teaching her first math lesson. Mattie said, "Katherine loves math and it's her thing. The kids know that she love it. I was nervous standing in her place when this is something she excels at." Mattie reflected that the lesson had gone "for the most part pretty well" but that it was too long (1.5 hours). She said, "I know that the kids on the lower readiness level understood the graphing part and got it. The kids in the higher level got bored

because it was too long." Looking back, Mattie saw that she could have condensed her direct instruction, gotten everyone started sooner, and then "worked with the lower group once they were in their group to make sure they had the content."

Reflecting on how to improve her instruction, Mattie focused on assessment as the key: "Over time, I'll know the kids better. Especially when I'm teaching math. This was my first math lesson so I don't know a whole lot about their math background." Mattie recognized that by teaching the math she could hone her differentiation strategies and learn more about student expectations and abilities. Mattie felt that the task cards had been a help in managing the lesson. They gave her valuable time to move from group to group when the differentiated tasks began. Katherine had done the cards after she and Mattie had agreed on the substance of the tasks.

Mattie gave herself credit for smooth transitions during this lesson. She said, "It got a little noisy, but that's to be expected." But she gave herself a poor mark for organization, "The task cards were out but I didn't set them where they were supposed to be and I had to get the graph paper out." Mattie also forgot to assign group leaders. Her instruction on pictographs was something Mattie felt had not worked well. "I forgot to tell them that they didn't need a 'Y' axis for a pictograph. That's one thing I hadn't thought of at the time, but I get so into something that I leave small things out." She was mad at herself for overlooking this detail, and when she realized what she had not done, she said, "It makes me really angry that I didn't do it correctly and I don't want to do it again. It's embarrassing." When asked why she felt angry she explained, "Because I like for things to be perfect." Modeling constant reflection, Katherine showed Mattie that she was never satisfied that a lesson was perfect; there was always room for improvement

and that was not a negative attribute. Mattie's attitude about perfection seemed to conflict with Katherine's modeling.

Management problems began to increase this week. In order to establish firmer control in the classroom, Mattie asked Katherine if she could rearrange the desks into a "U" formation, breaking up the pods. Although Katherine did not like the idea, she allowed Mattie to make the change. Katherine commented that Mattie seemed "most comfortable when she had the kids' attention in front of the room" and she hoped the new arrangement would bring Mattie more management success. In her reflections Mattie shared that "things were getting really stressful" and planning was becoming a problem.

> I felt that my ideas were not really that exciting. I was exhausted. It sometimes took me five hours to plan one lesson. There was not enough time to sleep...The entire weekend was spent typing out lessons and searching for materials on the web. I still could not get ahead. I was barely getting the lessons planned the night before...I knew that differentiation was one of the best methods to use, but it was becoming impossible for me to get everything done.

Even with Katherine's support Mattie was unable to keep up the pace. Lesson planning seemed to be her undoing and differentiation seemed to be the breaking point. There weren't enough resources readily available for her to differentiate the new material she now had to teach and her search for materials was taking up every spare minute of time. When Mattie had started teaching, most of her lessons were review. As she began to introduce new content, it became increasingly difficult for her to create original, "exciting," differentiated lessons. By the end of the third week a defeated Mattie reflected:

> I was beginning to come to the conclusion that in order for me to be an effective teacher, I needed to give up eating, sleeping, and all human interaction. There was just not enough time, and if this was what it took for me to be effective, then I might as well quit. Sleep looked very appetizing.

Mattie's well of confidence was just about depleted. Frustration overshadowed success. Observations documented by Katherine and Mattie's college supervisor indicated "problems with organization" and a lack of advanced planning. To make things even more difficult, conversations with her fellow student teachers in traditional classrooms, with planning from textbooks and teacher manuals, revealed a positive contrast to Mattie's negative picture: the others were gaining in assurance and confidence, already having had lessons planned and materials prepared for the next two weeks!

Week Four: A Cry for Help. As the pressures mounted during the next week, Mattie found that planning lessons was out of her control. Her reflections highlight her frustration:

> I was unable to get the grading done in time and the lessons were barely being approved before they were taught. I knew that I had to create the objective first before writing out the lesson plan, but this did not make sense to me. How could I write out the objective before I knew what the activity would be?

Mattie was struggling with an age-old problem of faulty curriculum design: starting the lesson with the activity. Katherine had modeled "best practice" planning that started with assessment, linkage to a big concept, and a clear delineation of what she called the "KUBATD" -- what students should know, understand, and be able to do. Katherine showed Mattie her weeklong lesson mapped out on artist's paper, but Mattie had been

using the traditional lesson plan with behavioral objectives that she had used in her curriculum and instruction class. That process didn't address the KUBATD that Katherine wanted Mattie to clarify. Mattie was falling behind as she tried to piece together an increasingly confusing puzzle with growing management challenges and mounting paperwork.

To give her the support she needed, Katherine agreed to meet Mattie after school hours to help her with planning. While she was more than willing to help with planning, Katherine was very conscious of the calendar. She knew that Mattie needed opportunities to plan and teach on her own. Not recognizing the severity of Mattie's frustration, at the end of the preceding week Katherine had begun to leave the room occasionally and trust Mattie with more of the planning. As this week began, Katherine saw Mattie's dilemma more clearly.

> She can't seem to pull ahead and get organized. On a lesson plan today under "concept" she wrote "unknown." She wants to start with activities instead of objectives. After all the differentiation (training) she thinks concepts are suffixes and World War II. And she's struggling with management. I let her rearrange the desks to facilitate her management but now the "community" in my room is changing.

Katherine was experiencing her own case of nerves. She felt that by now Mattie should have been able to keep up with grading and planning. She knew that these were "learned skills" but she wanted to see Mattie achieving more significant improvement and growth than she was. In her reflections Katherine noted Mattie's low level of confidence: "She

must ask me 40 times a day, 'Is this okay?' I need her to be gaining enough confidence at this point to trust her instincts more."

By mid-week both Mattie and Katherine cried for help. They asked that I meet with them, not as researcher, but as a coach. After a two-hour informal meeting a plan evolved to provide the necessary scaffolding:

- Katherine would coach Mattie as she worked through week-long lesson mapping on easel paper.
- Permission was granted from the chair of Blue Mountain's education department for the "big map" plans to satisfy daily lesson plan requirements for her student teaching portfolio. It would not be necessary for her to type everything she was mapping by hand.
- Co-teaching and co-planning would assume a greater part of Mattie's student teaching experience than in a traditional placement.
- Permission was also granted for Mattie's and Katherine's co-teaching hours to count toward the minimum number of teaching hours Mattie needed for her student teaching program.
- Mattie and Katherine would alternate planning and teaching duties, with Mattie slowly taking on the full responsibility for planning and teaching over the next 3 weeks.

Katherine and Mattie were both relieved to have developed what seemed a logical solution to a messy problem. Mattie expressed her feelings in a reflection after the meeting:

> I think that this is going to be a good idea. I know that there are things that I did not fully comprehend last semester about differentiation that I need guidance with. The cooperating teacher and I will now be co-teaching for awhile. This way I can relearn the method of lesson planning for differentiation the correct way.

Katherine was concerned about Mattie's limited experience with lesson planning. Planning concept-based, differentiated lessons focused on the KUBATD had been covered only briefly in her Methods class and not at all in Curriculum and Instruction. Katherine said, "I am working very hard to help Mattie get this stuff, harder than I

thought I would have to." Katherine wished Mattie had a better foundation in best practice curriculum design.

Katherine and Mattie agreed to meet on Sundays at Barnes & Noble to map lessons for the week. However, the bright prospects of their new plan were dimmed a degree by disappointment and worry. Katherine analyzed her expectations for Mattie to see if they were "too high." She enumerated the expectations she had about Mattie before she arrived: 1) She would be comfortable writing lesson plans; 2) She would have a "working knowledge" of the substance of Tomlinson (1999a); 3) She would be prepared and punctual; and 4) She would share cutting edge theories and techniques from her college classes. Katherine was disappointed with Mattie's largely traditional preparation in lesson planning, her cursory knowledge of differentiation, her disorganization, and her inability to share new ideas, and she was worried about management as she saw her community "dissolving," upset that she had to play "tough cop" with her kids. She reported that the students "are acting weirdly toward Mattie's style and I am seeing rebellions brewing." After rearranging the desks, Katherine saw her class becoming "more traditional than I care for" but she also saw that Mattie "still had difficulty keeping their attention." Katherine observed that Mattie's "delivery is a bit flat" even though the new desk orientation made her "the focal point of the room...the object of knowledge."

Mounting frustration and fatigue probably contributed to Mattie's flat delivery but additional distractions may have intensified it. She had heard that her grandmother was critically ill at home and not expected to live. While she was encouraged by the new plan of action she and Katherine had laid out, Mattie had reservations: "I think things are going to be better, but I am still nervous."

Week Five: Mattie's Grief, Katherine's Refocus. Mattie was called home at the end of the week to be with her grandmother who died shortly thereafter. Mattie spent the following week at home with her family. She and Katherine were in touch by email, but she would not return until the first full week in March.

Katherine used this time to rethink her role as Mattie's mentor. She was confusing Mattie the "student" and Mattie the "colleague." As she reflected, Katherine realized, "When I view Mattie as a 'student' I have patience with her, but when I view her as a 'colleague' I find myself wanting her to know more, do more. In half a semester she will be a certified teacher." Anticipating Mattie's arrival, Katherine had shared her excitement at finally having someone with her, thinking about differentiation in similar ways and breaking the pattern of isolation. While Mattie was away Katherine began to see Mattie's role in a new light: "When I view her as a student in need of differentiation, my perspective changes." This was an "ah ha" for Katherine. She began to look at Mattie as she does her students.

> Well, none of my children in my class have problems. They all have exceptionalities -- weaknesses and strengths, and areas of potential growth. Everything is very positive. I was being very negative with Mattie and not giving her the same benefit of the doubt. I was thinking I really expected her entry point to be different than where it was. I expected her to be much more prepared. With my students when they come in and they're not prepared to the point I expected them to be, I go to where they are and I start there.

Katherine focused on Mattie's learning profile. Her analysis showed that Mattie was "pragmatic and sequential, not global -- she sees trees and not forest" and that lack of

detail blocked her. Katherine saw that Mattie's learning style was more auditory and less visual than hers. "My flow charts don't work for her and she needs to work with someone to bounce ideas." Later interview responses from Mattie confirmed this. Katherine also discovered that Mattie did not get the "adrenaline burst" she did from meeting the challenges of differentiation, a puzzle Katherine "thrived on putting together." Instead, when overwhelmed, Mattie "shut down," and Katherine could see a glazed look in her eyes as Mattie's well of confidence dried up.

Along with assessing Mattie's learning profile, Katherine assessed her readiness level regarding lesson design. Katherine began to see that Mattie viewed lesson planning as a linear, two-dimensional process while she saw it in three dimensions.

> Mattie wants to go from point A to point B when none of my students really exist at point A...Some are going to get to Z and some aren't going to get to A...I think she wants to go straight there in one movement when there have to be multiple destinations because there are multiple entry points.

Katherine wanted Mattie to go beyond the basic tendency to "track" students into a low, medium, or high learning slot. She wanted Mattie to get a better handle on who the kids were individually so she could make wiser choices fitting tasks to kids.

> Where she can say, okay, Bethany is a little behind in reading but she's really great at problem solving, and she really likes to do skits. She really enjoys writing dialogue. She enjoys interacting. And then Mattie could cluster students by maybe one learning characteristic at a time. When I group them it's not always on readiness, it's not always on interest... I think she's a little

overwhelmed by the concept, not knowing what to differentiate by, who needs what, or knowing the students well enough. I've had them for months and months. Katherine realized that she had "assumed a lot" about Mattie, based on what she knew about the program at Blue Mountain and what she had heard about Mattie's reputation as an honor student. She reflected that in the beginning she should have done some "kid watching" with Mattie to get "an idea of her comfort level." Katherine decided that now it was time to do what she called "side-by-side modeling" and "step-by-step" coaching. She refocused their co-teaching and co-planning goals as follows:

1. Katherine would "walk" Mattie through a tiered lesson she had designed on simple machines. She would demonstrate how she laid out the concept and generalizations, pre-assessment, and the KUBATD. Then she would show Mattie how she created a tiered lesson with a strategy called ThinkDOTS (see Appendix A). Katherine would model how she used the state's curriculum "resource guide" to create a middle tier activity and then design a more complex tier for advanced students and one less complex for students still struggling with basic knowledge.

2. Katherine would coach Mattie as she planned a science lesson on weather, using the exact same approach Katherine had modeled with simple machines. Mattie would design tiered ThinkDOTS activities adjusting for readiness levels and learning profiles.

3. Next, Katherine would model an application of Tomlinson's (1999a) "Equalizer" because she had discovered that Mattie "didn't have a good handle" on this valuable support structure. "We'll go through the Equalizer points and I'll show her how to apply those with this ThinkDOT activity."

4. Then, Katherine would model a RAFT (See Appendix A) on a state history review. Mattie could then do a RAFT on her own for a lesson she would teach in social studies.

5. Katherine would help Mattie sharpen her assessment of individual students. Katherine believed that this plan would help her give Mattie the scaffolding she needed so that "when she's done (sic) she can do this on her own." She was very worried about Mattie's lack of confidence: "She needs a lot of reassuring and a lot of encouragement. She checks everything with me." Mattie was to give the signal when she was ready to fly solo. She hoped Mattie would fly on her own as soon as the refined plan of action took hold.

Week Six: Planning and Rethinking in Action. When Mattie returned she began working with Katherine to map out the week's lessons using the big sketchpad. Together Mattie and Katherine planned a math lesson on the addition of mixed numbers. Katherine had differentiated activities for the more advanced students who would modify recipes to feed the entire class and for the on-grade level students who would calculate distances on a map and then create a math center activity. Mattie's job was to design the more introductory activity. Katherine was disappointed to report, "the small part I left her to complete last night was not done this morning," so they were limited to two tasks. Katherine worked with the map group and said, "with a lot of support those kiddos did okay." Mattie agreed. The advanced group that Mattie facilitated, however, had problems that she attributed to an excess of leaders in the group. Mattie said, "I think the kids need a break from working together so much." But Katherine's reflections offered a different perspective: "The students in her group did not understand the task and they handed in

something less than I expected. Mattie did not realize they were off track until we looked at it later." Mattie's lack of focus may have been her reaction to letting Katherine down by not completing the task cards she was assigned.

Katherine began modeling a ThinkDOTS tiered lesson in science for Mattie (See Appendix A). During this lesson, Katherine noticed that Mattie seemed "dazed," showed a "lack of responsiveness," and apologized for being "out of it." Katherine thought Mattie's fogginess was probably "the aftermath of her grandmother's death" but she was worried nonetheless. As for Mattie, her reflections focused on something else:

> These lessons are still taking up time to create and develop. I feel like I have a mental block. I was so overwhelmed a few weeks ago about developing lessons that I am really nervous about getting everything done. I really want to succeed in this, but I am still afraid of not being able to get everything done.

Mattie did not seem convinced by the plan of action she and Katherine had developed; her doubts and fears still overshadowed the possibility of success.

In spite of lingering doubts and worries, Mattie described a bright spot in her efforts to design a social studies lesson on state exports.

> I started with writing down the Know, Understand, and Do. I then began brainstorming about what I was going to teach. This helped me to organize the materials and it helped me teach the content to myself. I am not from this state, so I am learning the material for the first time. While I brainstormed, this helped me decide how I wanted to introduce the material. This format is beginning to make more sense to me.

Mattie's lessons were starting to take on the clarity Katherine had been pushing for (see Appendix F). Although difficult to master, Mattie was beginning to see the rationale for this process.

Mattie tried to vary her instruction by giving students individual tasks differentiated by readiness in social studies. She said this was "almost impossible to enforce during the class period" and shared this discovery: "I also am finding that differentiated lessons work better when classroom management is in effect." This is the first time Mattie had articulated this connection. In spite of all Katherine's modeling, Mattie had to see the relationship of differentiation to management for herself. This may have occurred at this point in time because difficulties with lesson planning were easing and her focus could shift to management issues. It is also possible that Mattie was learning a skill that effective, experienced teachers possess -- the ability to multi-task.

As the week progressed Mattie was doing more of the planning on her own. Katherine had modeled a RAFT (see Appendix A) by this time and Mattie began designing a lesson incorporating this strategy.

> I worked on a RAFT project for the kids to do when studying about banking. I am finding that it is easiest for me to begin with the know, understand, and do format...While planning a math unit, I decided to think of it as a puzzle. I first put together the border or the outside pieces, such as what would be covered each day. This was done after a pre-assessment. After deciding what would be covered each day, I brainstormed about each topic and worked on a direct instruction approach. After the direct instruction approach I looked for activities for the students to do at different levels.

Mattie had identified Katherine's view of best practice lesson planning as what was "easiest" for her. She had also used a metacognitive thinking process by seeing the planning as a puzzle. Her description of this process shows that Mattie was developing her own theory of lesson planning based on Katherine's modeling, her own application, and reinforcement she was getting from students. She went on to describe more of this process: "I add a piece at a time for each day. As I find something or think of something for the kids to do, then I place it in that day." She saw that she did not have to have the lesson perfectly formed at the outset; she could add to and improve upon it as she reflected on her design. It was a comfort to know that she could do this, but it was still demanding. Finding science resources was a particular problem because the textbook was not aligned with the state standards. She found herself spending "hours finding a picture of something like a hygrometer." Mattie wished for a science textbook that contained the appropriate content and ideas for differentiation by readiness, interest, and learning profile. Considering her overall efforts at lesson planning at this point, however, she said, "I find that this is taking me a while to bring together," but added, "I think after practice, I will be able to do it a bit faster."

Katherine's assessment of Mattie's understanding of differentiation at this point was quite positive, in spite of the problems both of them related. In her reflections during this week Katherine stated emphatically: "Mattie does KNOW and FEEL the NEED to differentiate. She is WAY ahead of other teachers, student or inservice, in that respect."

Week Seven: Plans Change. After talks with her family, particularly an aunt who is a teacher, and more conversations with fellow student teachers who were by this time teaching all day on their own, Mattie decided on a new plan. She would skip over the co-

teaching and co-planning stages she and Katherine had outlined and begin on her own. In a reflection at the beginning of this week Mattie shared her thinking: "I decided that I needed to go ahead and begin teaching and planning on my own. I felt that if I did not go ahead and take over on my own, then I would never develop the confidence that I need to be a good teacher." She said Katherine had agreed to give her advice, but Mattie said she "felt comfortable with the kids now and I need to go solo." To prove to herself she could do this, she felt she had to "take over" in the classroom.

Katherine accepted Mattie's change of plans saying, "I think Mattie's experience with me is too different from the norm for her to feel comfortable." She said Mattie had been sharing worries with her about "getting in enough hours" of real teaching and "passing student teaching." Mattie had expressed concerns to Katherine about "getting a good grade or being ready to teach on her own." She had also told Katherine that a fellow student teacher named Gretchen and her tennis coach both had encouraged her to "get in and get it over with and differentiate when you can." Mattie had a new resolve about lesson planning.

> I am trying to start off simple with my lesson planning, and if time and creativity allows, then I will implement some differentiation into the planning. But I do not want to kill myself with differentiating everything all at once. I need to improve my classroom management skills before I can differentiate everything.

Differentiation was going to take a back seat to management under Mattie's new plan. Mattie's official weekly self-assessment forms for student teaching had consistently focused on three areas that she felt needed improvement: classroom management,

planning, and organization. She saw that reducing the attention to differentiation might help her improve management and simplify planning and organization.

But Mattie did not refrain from differentiating and actually worked hard this week on varying her practice of differentiation. Katherine had already talked with her about moving away from a predominantly "high, middle, low" readiness approach. Mattie responded to Katherine's coaching by differentiating a social studies lesson based on choice. "I had the students choose which region of the state they would like to work with. The kids got either their first or second choice. I also assigned them roles according to readiness in the groups." This was an interesting way to combine interest or choice and readiness differentiation. "There were different tasks according to different readiness levels such as a researcher (the high level) and the transportation manager (low level)...they were each challenged at their readiness level." Mattie reflected that this "worked fairly well" and while they did "get a little loud" she said they "were talking about the assignment."

At one point during this week Katherine said Mattie asked her: "Am I ever going to get this right?" Katherine responded that there were always things she would change about her teaching. It was Katherine's impression that Mattie "got the point" but she knew Mattie was "still learning that good teaching isn't a one-shot deal, it's a continuum." She knew it was important for Mattie to break away from thinking that any lesson could be "perfect."

Under "strengths revealed to date" on her weekly self-assessment form Mattie listed the following: (a) direct instruction is a little better; (b) organization is a little better; and (c) grasp of differentiation is better. Katherine's weekly evaluation form

complimented Mattie's "diligent work on lesson planning," her search for new strategies to solve problems, and an increased confidence level. But Katherine continued to worry that the workload would become overwhelming and she was on the lookout for "that glazed look again." She was feeling "very protective" of Mattie at this point: "I want her to be successful. I want her to love teaching. I want her to develop the critical skills." In her reflections mid-week Katherine thought about why it is "terribly difficult" for a student teacher to differentiate instruction.

1. They have little experience in diagnostic assessment – kid watching, pre-testing, multiple intelligences, learning styles – book learning on the subject and doing it are two different things.

2. Classroom management also causes stumbling blocks. To really get the cooperative community moving and working takes a lot of juggling and a firm hand...Diving in during student teaching doesn't give you a lot of time to develop these routines and attitudes. I have learned that Mattie can't just take over with my discipline style. It isn't her and she isn't me. Plus, I have months and months of experiences and bonding time with these students...I don't think this is a Mattie problem, but a student teaching design problem.

3. Knowledge of the content area also holds Mattie back from diffing. To integrate and differentiate you have to really know what you are teaching and the outcomes you need. I am getting the hang of it more this year after muddling through it last year. It takes a good grasp of the Equalizer and the content to plan a differentiated lesson. What is simple? What is abstract? The Equalizer confuses Mattie because she doesn't have a good grasp of what the ideas mean in the context of the content.

4. There is so much to learn! Textbooks, basals, novel sets, spelling assessment, reading inventories, integrating technology, unaligned science book, too low history book...You really can't differentiate effectively until you have a handle on all the resources available to you.

From Katherine's perspective assessment, management, content, and resources were stumbling blocks to differentiation for a student teacher. Her concerns seemed to suggest that at the least a full-semester placement was necessary for student teachers to achieve some level of comfort with differentiation. They would need the time to truly know the students, learn about the appropriateness of assessment options, and become familiar with an extensive elementary content and the available resources. Katherine also voiced some concerns about people in her role: "This is a huge time commitment and emotional commitment on the part of the cooperating teacher." Her reflections rambled on to thoughts of extending the contact between the student teacher and the cooperating teacher to the preceding semester -- some "planning hours built into the schedule prior to student teaching." Katherine narrowed the focus of her problem solving to teacher preparation; the student teaching program needed revamping if preservice teachers were placed in differentiated classrooms; coursework leading up to student teaching should place greater emphasis on building the learning community, shared classroom management, differentiation, and best practice curriculum design.

As Mattie spread her wings to fly solo this week progress was made, and at week's end Katherine shared exciting news.

> Mattie is improving. She is getting there! She is going to be a good teacher. We had a bad hump to get over but it is okay. She is including me in her planning by

> asking me questions constantly...She isn't really diffing the high end like I would but she is diffing! We are collaborating more than she thinks...Her grouping is getting better; she is feeling the kids out better...She did a nice set of task cards for travel brochures and attached well done rubrics to the back of each – solid differentiated lesson with lots of choice and technology integration!!

They had moved away from a strict co-teaching/co-planning schedule, but Mattie still relied on Katherine for scaffolding. Katherine shared a truly rewarding consequence of the hours spent helping Mattie plan: "Mattie's plans look worse but are actually better. At least her sketchpad is filling up and her first line is 'What students will understand, know, and do'! That is half the battle!" (See Appendix F). Noting an area where Mattie still needed work Katherine said, "She asks for 'glass, bugs and mud' too soon." And Mattie admitted to persistent problems with math.

> I feel very comfortable teaching social studies, but I have felt insecure about math. I think it is because social studies is my favorite subject. I feel like you can do so many fun things with social studies. I guess you can with math too, but ideas for social studies seem to come to me a lot easier.

Content knowledge had been a problem for Mattie all along. Neither her major in anthropology with a minor in psychology, nor her teacher preparation courses had given her the foundation she needed in math, science, or technology.

Mattie continued to talk about management concerns: "The students also forget to obey my corrections from time to time when the cooperating teacher is not in the classroom... I am finding that differentiation is more successful at the beginning of the period than at the end, because I have not completely grasped a classroom management

method with this class." In her official weekly student teacher evaluation Katherine bulleted "improving management" as a goal for the next week. Katherine was concerned that Mattie frequently finished instruction early and spent nearly half an hour letting the kids clean up the room. In Mattie's words: "Things got a little crazy so I had them pack up to go home and begin cleaning up the room." Using precious learning time for room cleanup because things were "crazy" violated one of Katherine's fundamental rules: There is no time to waste.

Week Eight: The "Hadn't-Got-It-Rights" Try to Win. Mattie used the big artist's pad to plan this week's lessons. It was going to be her first week of teaching everything, but the week started on a wobbly footing. Mattie had spent hours at the end of the previous week planning reading and writing lessons on non-fiction. Katherine asked her to revise them because she had not connected content with objectives clearly enough. Mattie was upset by this but admitted that, "I thought I was focusing on the objectives when I planned, but I did not have these clearly stated within the outline of the lessons." Katherine's reflections over the weekend echoed what Mattie had said: "When Mattie showed me her roughed out lesson plans they didn't match her know, understand, and do." Mattie started over and when she met with Katherine on Sunday she reported, "Katherine was pleased, which did give me some relief." In fact, Katherine said Mattie's planning was really improving. "She came with a MUCH (emphasis in original) better sketch for the week's lessons and KUBATD. I helped her flesh out the differentiation parts and showed her where she was diffing by interest as well. The days look solid...the language arts block lessons are lovely." Mattie was using student interest surveys to locate articles for the research projects. Katherine explained, "Mattie had the research

ideas and I showed her how to diff it." There were still gaps in the lessons where she was having problems fine-tuning the differentiation, but Katherine helped her fill in the missing parts. Mattie shared an example from an integrated research unit she was creating.

> I could not decide if I wanted the students to choose topics to research based on the weather unit that we will be studying in science or have them choose their own topics. Katherine helped me to see that it would be better to give them wider choice options and to focus on all of the fourth and fifth grade science and social studies standards.

Katherine was urging Mattie to combine social studies and science both to facilitate differentiation and because her level of concern about state testing was rising. The standards tests were only a month away and she wanted the kids to have plenty of content review.

Katherine called Mattie's science lessons "solid" and complimented the hands-on activities she included. Katherine modeled good strategies for showing a video and helped Mattie create "leveled questions" to differentiate for individual students. They were still co-planning but Katherine was "letting Mattie have ownership" of the lessons.

Management leapt to the top of Mattie's to-do list and at the beginning of the week she instituted a new system. She asked her aunt for advice. "She convinced me that kids needed boundaries. I knew this, but I had not really set any in the classroom. It was hard for me with Katherine there all the time. I found her setting all of the boundaries...Even though I was teaching everything, I found her taking care of the management problems." On her aunt's advice, Mattie decided to adopt a behavior

modification system that would use checkmarks for negative reinforcement. "I wrote kids' names on the board when they were acting up. I gave them a warning and placed a check beside their name...We also developed our own class rules. I remember introducing these things to the kids and them applauding afterwards, which felt kind of good." When a name was written on the board, after a warning and check mark had gone up, Mattie would send the student to the office.

Mattie and Katherine discussed her new approach. Katherine said, "I mentioned that I don't generally use a punitive system but rely more on 'I like the way Eric is listening' strategies and catching the kids being good." She tried to help Mattie understand the importance of a respectful community and the fact that off-task behavior was more often erased "by kicking up instruction or varying her teaching style" than by putting a name on the board. Katherine was "scared" about Mattie's new system and said her "butterflies had butterflies." But in spite of her misgivings and perceived threats to the learning community, Katherine added, "I support Mattie's check mark system. It isn't inherently evil, it is just not something I do." She told Mattie she would leave the room so the kids wouldn't turn to her with questions, but confessed: "The real reason is I don't want to be a part of it. She needs to try it, but I don't want to be party to it."

With her new management system in place Mattie was confronted by a disheartening realization. By the end of the second day nine children had checks by their names. She explained, "I was supposed to send them to the office. Well, I never could seem to send them. I just could not do it." Mattie developed strong feelings about this system very quickly: "I decided that I hated this method." Not only did she hate it, but the kids did as well. She decided to consult her aunt again, who convinced Mattie that

writing the class rules and taking away recess would probably work better. Katherine was strongly opposed to this system for two reasons. She had worked very hard to model a love of writing for these students – a love that had not been there for many on their arrival in September. She also knew this to be a restless, "squirmy" class and believed they needed every available opportunity to move; for Katherine this new system was potentially more damaging than the names and check marks. While it may have worked for Mattie's aunt and her students, Katherine was convinced it would collide with the control-with-a-little-c/shared management model she and her students had carefully fashioned over the past six months, and collide it did. Mattie wrote an account of a "bumpy" week: "The kids hated copying down the rules and I found myself hating seeing them copy down the rules. But by Thursday I decided that I could not change them a third time in one week. I just did not think that the kids could handle it." Mattie and the kids struggled along under a weight of mismanagement they had all rejected both in principle and in action.

This was the week I observed Mattie teaching a lesson on main idea, thesis, paraphrasing, and note taking to prepare the class for research work they would soon be doing. She had differentiated the learning experience based on interest, providing students articles on dogs, weather, bikes, and food. The students used index cards to record details supporting main ideas and Mattie checked to ensure they were correct. Mattie then asked them to apply what they had learned with their research project. While the lesson was well designed, I noted Mattie's delivery as "flat," and she seemed to be "going through the motions" of the lesson, not noticing the kids' obvious excitement about the whole notion of "research." This supported concerns Katherine had voiced in

an earlier interview about Mattie's lack of "that passion thing." Organizing materials and supplies continued to present a problem for Mattie. Things were spread out in disarray on the counter, on the half-table, and on the common table Mattie used in front of the room. At one point she prodded the kids to clean up before lunch and Jessica asked why Mattie hadn't cleaned up her own mess. Katherine overheard Jessica's remark and reminded Mattie "to model" for the students.

A lack of "that passion thing" notwithstanding, Mattie's lesson had ambitious scope. Some kids hunted for resources using book marked websites she had provided for scaffolding, while others filled out index cards she had distributed so they could request help, and still others signed up for mini-conferences with her. Within the span of a few minutes Mattie was meeting with one student at the conference table, checking on students at computer stations, and counseling Doug to "make wise choices" as he wandered around the room. Katherine was helping then find books and checked on computer usage to make sure no one wasted any time. Even though Mattie had resolved that she would teach solo this week, Katherine was providing a lot of support during the lesson I observed. Support was not unsolicited as Mattie asked for help or feedback from Katherine on instruction, management, resources, and assessment (see Figure 6). In some cases Katherine initiated the support. For example, on four occasions she had to cue Mattie for transitions. Mattie had either not internalized the schedule or could not keep track of the clock when students needed to move from reading to another activity. In most cases, however, Mattie was asking Katherine for ideas about how she could improve her efforts to differentiate or simply for the location of materials.

Time and Motion Study of Katherine and Mattie
Science/Research/Writing: 3/21/01

Time	Katherine	Mattie
10:38	Cued for transition (M)	
10:55	You lost a couple high kids, need to kick it up a notch	Asks for feedback on instruction (I)
10:57	Assessing a student placement in group (A) Using the IIM cards (research) with strugglers may help better than note cards; use color coding; can provide more scaffolding for these learners (I)	That makes more sense (PF)
11:12	Yes	Asks if it's time to transition (M) Asks about location of materials (R)
11:18		Checks with Katherine on materials (R)
11:25	Motions to Mattie to have students get ready to transition to art (M)	
11:26	Do you want to take students to art? I'll do it if you want to conference with Maggie (M)	May I conference with Maggie (who has been absent)? (I) Thanks (PF)
12:15	Checks on what Mattie's instructional objective is; asks if everyone has a research topic Do you want me to help with mini-conferences? (M)	Notices lots of students want mini-conferences about research topics (I) Thanks (PF)
12:00	Good! (PF)	I found the envelopes with the research activities! (R)
Planning Time 12:00 – 12:41		Asks about location of materials (R) Mattie conference with Maggie
12:57	Signals to Mattie to have them clean off desks as students are getting in line (M)	Mattie tells students to clean up desk areas before going to lunch (M)
1:01	You need to clean up your (Mattie's) table as well! (Laughs) (M) Good! (PF)	Mattie cleans up her area.

I = Instruction **M = Management** **A = Assessment** **R = Resource** **PF = Positive Feedback**

Figure 6. A study of the interactions between Katherine and Mattie during an interval of instruction.

In an informal discussion with Mattie after the observation, she said she had been disorganized and that direct instruction had gone too slowly. She was discouraged, complained of fatigue (especially with tennis season in full swing), and said she felt like she was on the "Survivor" television show, waiting to see when she would be kicked off the island. She described how when she had been losing matches in the fall and just playing poorly, she "gave up" but hoped she would do better during spring term. She was not happy with her planning for the day's lessons and thought her transition from the big planning map to direct instruction had been poorly executed. Mattie also said Katherine "intimidated" her because she did so many things well. When I suggested she forget about differentiating to reduce stress, however, she stated emphatically, "I can't imagine teaching any other way."

When asked to assess the lessons she had taught that day, Mattie's first response was that they were "bad." However, when I pushed her to think about what had gone well she acknowledged these strengths:

- She had integrated social studies, science, reading, and writing standards
- She had organized a system for managing the research contracts
- She had assessed students well and differentiated by interest on four levels
- She had modeled note taking with a neat transition to the actual research topic
- She had moved from group to group, checking on progress and asking questions which guided learning and management
- She provided scaffolding for learners, book marking websites, distributing request-for-help cards, and offering mini-conferences
- Students were mostly on task during all lessons
- She functioned well considering she was being observed and the clinical instructor was also in the room.

Mattie seemed shocked that she could report this much done well. In fact, if this had been a formal student teaching evaluation she would have had high marks for what she had attempted and accomplished. When encouraged to reflect on what she could do to

improve the lesson, she noted that her "presence" in the classroom was less than commanding. Mattie agreed presence was in large part a state of mind but seemed unsure of how to achieve that presence. Although students were mostly on task, there had been management problems. When her back was turned, Doug, Michael, Eric, and Ned were disturbing others and being disrespectful. Mattie was fully aware her students knew the management system had been a fraud. When she clapped to get their attention she got a feeble response. Mattie felt she needed more of a script to follow; she thought the problem might be the big map not giving the details she needed for delivering her planned instruction.

On Friday of this week Mattie taught new math content. She was insecure about the topic, probability and statistics, and consequently "not completely confident" about teaching the lesson. The following vignette describes what happened.

Stems and Leaves or Leaves and Stems?

The camera was set up and running at 9:55 as Mattie began the math lesson. She told the children they would be working on graphing data in a different way. She began putting data points across the board while unfolding a large brown stem and green leaves with data points, which she began taping under columns labeled as "tens" and "ones." Mattie crossed out the data points as the kids helped her place them in ascending order column by column. I noticed immediately, she had reversed the tens and ones placement with the stems and leaves on the board and many students soon became confused. In spite of this mistake, when Mattie did "glass, bugs, and mud" almost everyone claimed to be "clear as glass."

Mattie told them they would be working in four groups and distributed task cards and materials just as Katherine came back in the room. The task cards were differentiated by readiness. One group, working on high temperatures for American cities, their leaves already cut with half the data provided, were to fill in the remaining data and answer specific questions. Another group, working with weather data, chose 15 cities with lowest temperatures and put them in a stem and leaf plot. Another group had weather data but chose all data points. The last group worked with sports data, also choosing their own data points. They decided to graph men's and women's scores and do a double stem and leaf plot. Mattie and Katherine both started working with each group. At this point I realized there was a lot of confusion about task cards. Katherine and Mattie put heads together and Katherine quickly pointed out Mattie's error on the tens and ones placement.

Katherine then asked everyone to stop what they were doing and return to their desks for a few minutes. Mattie, face crimson, explained to them she had made a mistake, and showed them the difference between what she had told them to do and what they should do. I could see Mattie was stunned, not knowing what to do next. Katherine said from the back of the room, "You might want to run through some new data points to show them how they should line up." Mattie turned to the board and began re-teaching. There seemed to be a cloud of uncertainty hovering over a third of the students. Katherine sensed this and asked if they wanted to do "Cry for Help" (See Appendix A). Katherine gave much positive feedback, thus conferring status on those who "got it," as they played the game. Her pace for "Cry for Help" was quick, efficient, and left no time for distractions. The students were as "with" Katherine as they had been "not with" Mattie. Observed from the sidelines, Mattie appeared completely deflated, her face mask-like,

her shoulders slumped. Robotically, Mattie sent students back into groups to begin their assignment. She and Katherine both moved from group to group and made sure everything was clear, but while Katherine was animated in her interactions with students, Mattie was not; she was just going through the motions.

For the rest of the day Mattie's instruction continued flat and vague. After lunch Mattie taught science as if she were saying, "Just let this day be over." Chaos reigned during this research lesson until the groups made presentations of their work on citing sources, but even then their products were vague and sloppy. Catching a glimpse of Katherine during the presentations, I could see her disappointment and I knew Mattie must have seen the same.

This vignette shows Mattie incapable of getting over the "bumps" in her instruction. The bumps seemed to obstruct her, whether or not she was attempting to differentiate -- something she had demonstrated she could do with "some success," Katherine said. Mattie's struggles were complicated by a lack of passion, presence, or self-confidence.

After the students left that day Katherine showed Mattie several lessons printed from a differentiation website, and they discussed how this might work for Mattie, giving her the details she needed to go by that weren't in her "big picture" plan. They talked about how the scaffolding of a clear script and a "to-do" list to share resource collection duties might help Mattie develop "with-it-ness." Mattie talked about how she had searched for the right method in lesson planning and hadn't quite got it right, how she had been searching for the right management system and hadn't quite got it right either,

how she had tried to hit a comfortable stride with direct instruction but hadn't gotten it right. Katherine reiterated, "You CAN do this"(emphasis in original). But by week's end, Mattie seemed unable to shake off her first intense feelings about the math lesson.

> I tried to bounce back, but I felt my confidence draining. I looked at the teacher and saw how much she loves the kids, and I know that she is watching me. I always feel there is something that I could be doing better. I felt very inadequate. The day seemed to get worse. Science was so boring. I wanted to crawl in a hole and stay there, but I knew I couldn't, I had to keep going.

Mattie seemed to think the "hadn't-got-it-rights" were winning. Finding something to improve in her teaching was not a positive, as far as Mattie was concerned; from her perspective the imperfections implied inadequacy.

Week Nine: Drown or Swim. The previous week Mattie had said: "Just let me teach everything and let me see if I drown or if I swim." Although Katherine had been leaving more often, Mattie still relied on her for a certain amount of support and continued to ask her to co-teach. Katherine reported "walking a fine line" between helping too much or just enough. Over the weekend she decided Mattie was right: it was time for her to drown or swim. After all, there were only two weeks left before Katherine took back all instruction, after Mattie's departure. Katherine felt she was giving Mattie all the support she could muster: "She has all she needs. The part she doesn't have has to come from herself." She asked for a copy of Mattie's plans every morning and promised to stay in the computer room, just around the corner, in case she was needed. She would check with Mattie at planning time and get their "to do" lists each afternoon.

Mattie came in Monday armed with a new token economy system for management. She had designed her lessons using the template from the differentiation website. When her college supervisor observed a math lesson Mattie taught that day, she noted that Mattie's plans were done in "an easy to follow format" and "continued to provide throughout for differentiation"(See Appendix F). Her supervisor commented that the new lesson plan clarified content as well as the instructional process, and commended her for pre-assessing student needs and having anchoring activities in place. Additionally, her supervisor had been interested by the way Mattie differentiated based on choice, and remarked that some students chose to work with others who had like tasks while some preferred to work alone. Mattie's reflections about the lesson said, "Math went fairly well. I felt confident about it."

Mattie struggled to communicate her changes in management, sometimes missing the students who left for special services. This caused a caterpillar effect as different students reached different degrees of understanding these modifications. And there were still content issues. Mattie reported, "Wednesday was really rocky. I did not know the content for weather as much as I would have liked to. I had checked out many books from the library and taught myself as best I could, but I just was not smart enough in that area."

Katherine reported being disappointed by the science unit Mattie had taught on weather. The students had done better on the pre-test than they had on the post-test. Mattie blamed fifth grade content, but Katherine believed there was more. She saw Mattie's last minute preparations, her tendency to give up after a mistake, and her inability to take a firm position on management as the root problem. Katherine suggested

that Mattie rely more on textbooks to find the structure and organization she seemed to require. Mattie agreed, but was determined to continue differentiating as much as possible in order "to be fair to the kids."

Although Mattie still referred to teaching as a "fight," she began to say some good things about happenings in class. "The math was easing along. The kids were grasping the content, which was a very comforting feeling." During an observation of a social studies lesson Mattie asked the students to look for patterns in their definitions of state and local taxes. This was the first time I had seen Mattie connect a lesson to one of the big concepts the class was focused on for the year though this was something Katherine had encouraged Mattie to include in instruction. During this lesson Mattie made a smooth transition from direct instruction to the differentiated learning experience. She had five groups with task cards at the ready and had differentiated process by readiness and learning profile. Some students worked on defining more basic aspects of local taxation. Others worked on defining the process of state taxation in regard to corresponding services, which Mattie thought to require a more advanced understanding.

I studied Mattie's movement from group to group during the differentiated segment of the lesson to show the degree of contact she had with students (see Figure 7). Between 1:56 and 2:45 Mattie interacted 11 times with individual students and 47 times with groups. Her interactions were coded across the same five categories as the time and motion study of Katherine: clarifying directions, jumpstarting, management, pushing thinking, and positive feedback. When she clarified directions Mattie typically went over the steps on the task card and answered basic questions about the objective. Jumpstarting was when Mattie asked a question ("What do you think should come next?") or made a

Time and Motion Study: Mattie's Interactions with Groups and Individuals
Social Studies: 3/29/01

Group	**1:56-2:04**		**2:04-2:17**		**2:17-2:28**		**2:28-2:34**		**2:34-2:45**	
	Group	Indiv.	Group	Indiv.	Group	Indiv.	Group	Indiv.	Group	Indiv.
1 (3)	1 C	1 J	2 C/PF		1 J 1 M			1 P	2 M/PF	
2 (4)	1 J		1 C 1 J		2 C/PF	1 J			1 P	1 M
3 (3)	2 M/PF		1 C		1 J	1 M	1 P 2 J		2 P/PF	1 C
4 (3)	1 C		1 J 1 P		2 P/PF		1 J 1 M 1 C		1 M	
5 (3)	1 M	1 J	2 C 1 J	2 J/PF	1 P		1 M		2 P/PF	
6 (3)	2 M/PF		1 C 1 P				1 C 1 J		2 P	2 C/PF
Total	8	2	12	2	8	2	9	1	10	4

C = Clarifying Directions
J = Jumpstarting
M = Management
P = Pushing thinking
PF= Positive Feedback

Figure 7. Mattie's interactions with students during a differentiated segment of a social studies lesson.

statement ("Markers might help you make a clearer illustration.") to move students from neutral into gear. Management was any correction of behavior. Pushing thinking was Mattie asking a question or making a statement to "kick it up a notch," making students stretch beyond the basic assignment ("How are taxes like using the red/green/yellow cups in group work?"). Positive feedback was any form of praise or confirmation of status by Mattie about a single student or a group.

Mattie's most frequent interaction was jumpstarting groups or individuals (14), the next most frequent being a clarification of directions (13). It seemed the kids had not been totally engaged in the direct instruction and now they wanted Mattie's attention, or the directions on the cards were not clearly related to the direct instruction. The high number of jumpstarts probably supported Katherine's view that Mattie had been encouraging "learned helplessness" among the students with her ambivalent management program. Mattie pushed thinking 11 times, which seemed to be her attempt to "differentiate on the fly," when her assessment of where to place students or her design of the task itself had not produced an exact fit. Her fewest interactions were for management and positive feedback. This was mixed news. Earlier in the week management would probably have been highest, but in fact the largest group had no management interventions on a group level and only one on an individual level while no group had more than two management interactions in all. On the other hand, Mattie continued to give positive feedback sparingly, a behavior she had identified as important and one she wanted to incorporate in her teaching.

Point-to-point contacts like the ones tracked in the time and motion study helped Mattie deepen her knowledge of students; something Katherine cited repeatedly as the

basis of a truly successful differentiated learning experience. In an interview later that week, Mattie discussed her growing knowledge of the class who needed a lot of love. She could see that Katina had a low level of readiness in many subjects but that orally she had real strengths. She knew Jessica was pulled out for special education services, but no longer needed them. "I don't ever put her in the low level group because that's not challenging for her." She had also seen Nadine's complex thinking although she still struggled with words, Bethany's leadership strengths and her concerns for others, or Max's love for math and science with his concomitant weakness in writing. Although Eric's erratic behavior problems made her uneasy, Mattie had recognized his love of motorcycles and knew she could engage him by plugging into his interest. She knew Doug needed to move and that, when interested, he could "write some really good stuff." She described Katie as on grade level in science, stronger in social studies, and in need of challenge in writing. Katherine had expressed concern about Mattie's tendency to form superficial pictures of each student as "high, medium, or low." Mattie finally was developing an in-depth portrait of each student as Katherine had during the first months of the year. After talking at length about each student, Mattie said, "the more I know them, the more problems and differences I know they have." Interactions with students, like the 58 I had tracked in social studies, helped to deepen Mattie's understanding of the students while at the same time expanding her ideas of how to differentiate for them.

At the end of the social studies lesson the group presentations were solid. Mattie said, "It was very rewarding to see them grasping the content. I wish I could see it all the time." Although Mattie seemed to focus on the distance between her teaching and

Katherine's rather than on the gap she had closed, it seemed that Mattie would not drown and, after all, showed signs of doing more than simply treading water.

Week Ten: Rough Navigating. This was one of the first Sundays in weeks that Mattie and Katherine did not meet to plan. Mattie said, "I thought I had a handle on things. It was an attempt to be independent, although I did email her approximately 10 times on Sunday with questions." In her self-assessment from the preceding week she described herself as "beginning to have a better understanding of differentiation." Mattie still listed management, organization, and confidence as areas for further work, but it sounded like her competence and confidence in differentiation was growing.

On the other hand Katherine's impatience and frustration were also growing. She was hopeful when Mattie cancelled their meeting, but also "scared." Recently Katherine had described her feelings about Mattie's teaching with words like "scared," "fearful," or "petrified." When asked about this Katherine replied that she was:

> Scared my kids won't get what they need... We've got the state assessments coming up and you're scared you won't cover the content well enough.
>
> Scared that she'll break someone. I mean, you know, hurt their feelings. I've got a pretty novel community in my room. Everybody is very supportive and I've seen so much growth in the kids – self-confidence and all that other stuff.
>
> I was really afraid of her taking over and destroying our little community.
>
> Scared that I won't teach her well enough.
>
> Being scared about having to be the big, bad wolf this week.

Mattie's weaknesses in content areas made Katherine anxious about testing results. It was hard for Katherine to see Mattie's lack of clarity about management triggering disrespect

and distraction within her learning community, but Katherine worried too that Mattie's continuing struggles might be the fault of the mentor. She kept thinking, "If she hasn't learned it, then I haven't taught it." One of her biggest fears was she would have to intervene: "For the most part I've remained pretty positive though we've had a couple of close calls with management. With the management thing, it was very hard for me not to assert my control." Dealing with these fears created a singular learning experience for Katherine: "I think it was good for me because I need to learn how to let other people have ideas and not be so controlling." Katherine had defined her control as a heavy "emotional investment" in her students, the learning community, as well as in curriculum and instruction. Katherine's tendency to control may have contributed to Mattie's feelings of inadequacy. She admitted it was "vitally important" for her to give Mattie more control, but she had wanted Mattie to be less reactive and more proactive.

While acknowledging her fears and frustrations, Katherine pointed out the real gains Mattie made. "I still see her confidence as low in content areas but I'm noticing it growing in instruction and handling the students." Observing Mattie's lessons over the past week Katherine saw she was handling more management problems on her own. She also saw Mattie's understanding and practice of differentiation improving, with limitations, as she shared in the following reflection:

> The differentiation is getting better. She's still having a hard time seeing how all of this relates to the big concepts that we have...She still sees it as teaching discreet things. The "diffing" is getting better and I think the big picture has to come from being so comfortable with your content that you can see how it all fits. She isn't confident enough to see any connection.

Mattie's inability to link differentiation with a concept-based curriculum framework nagged at Katherine. She really wanted Mattie's lessons to reflect the connections to concepts and knew her students stood better chances of deep content understanding when lessons were presented that way.

Mattie's interview comments that week echoed what Katherine had said about instruction. When asked about her understanding and practice of differentiation at this point in time, Mattie said, "It has gotten easier. It is more like second nature for me to plan the lessons, especially in the afternoon classes when the kids are all together during science and social studies because it makes it better for them to learn." She still referred to differentiation as a "method," even though she claimed it as a belief. Mattie talked about how hard it was to plan differentiated lessons for a whole day, much less five in a row. "I was doing fine when I was just teaching one lesson a day...When you put it all together, it's pretty hard to juggle."

Managing group work was challenging to say the least as the time and motion study had shown, and as Katherine had been urging, it was time for Mattie to try some other instructional strategies. She said, "I think that Mattie thinks if she breaks them into groups that she is differentiating." Katherine had modeled differentiated contracts, task cards, ThinkDOTS, and RAFT assignments that could be completed by students individually, but for some reason Mattie seemed to be stuck on group work.

When asked if a lesson could be differentiated and students still not grasp the content, Mattie said this could happen if she did not focus on the "know, understand, and be able to do" of the lesson. She thought students might miss critical content because of problems with direction instruction.

> Direct instruction has been a problem because I feel like going straight into differentiating everything I didn't really get the basics down of everything else first -- like lesson management and direct instruction. I don't feel like I got to warm those up before I went into differentiating. I would differentiate things and then it would just get harder and harder and harder to keep the class controlled and bring them back together.

The reason Mattie went "straight into differentiating everything" was because it was the existing instructional model. It would have been difficult for Katherine to "undifferentiate" instruction. Looking back on her teacher preparation courses, Mattie wished there had been a greater emphasis on management and differentiation with a wide range of options for direct instruction.

On Monday of that week an observation of a math lesson showed Mattie differentiating the process by choice and interest, allowing students to construct a sample space and probability line in their math logs using a spinner, dice, or plastic cubes. The transition to five differentiated groups was smooth.

A time and motion study of the lesson showed Mattie making 22 group and 13 individual interactions during the 24 minutes of differentiated instruction. There were few management interventions with groups or individuals. The majority of interactions were to clarify directions or jumpstart groups or individuals, as many of the students had not been paying attention when Mattie was instructing directly. Once again Mattie gave positive feedback sparingly, for out of 35 total interactions only two were noted as positive feedback. Encouraging students by awarding them status through positive feedback was something Mattie continued to overlook.

For an English lesson on adverbs this week Mattie used traditional whole group instruction with students reading sections from the textbook. This lesson was not differentiated but riddled with management problems even so.

Also this week the principal, Mrs. Hooper, observed Mattie teaching social studies. The lesson focused on the compass rose and relative location; Mattie had differentiated the process by readiness, creating task cards with adjusted questions to follow a hands-on activity. Mrs. Hooper complimented Mattie's efforts to differentiate and to combine visual, tactile, and auditory elements in her instruction. Mrs. Hooper said in an interview that Mattie was the only student teacher she had observed who had given a differentiated assignment: "I don't see them differentiating any kind of products or anything like that. They are all basically doing 'this is what you're assigned and this is what you do.'" She said she rarely saw student teachers pre-assessing students and that often "the mentor-teacher doesn't do it either."

Mattie began relying more on textbooks to organize her lessons. She wished the books were closer to "talking about what the kids needed to know" and would have liked it if they had included ideas for differentiation by readiness, learning profile, and interest, but at least they provided an "anchor" and more structure. "I think that is one thing that I have been needing this semester – more structure…I wanted something to aid me in introducing the material and I would go from there with different things." By mid-week things looked brighter. "I was beginning to feel like I had a hang of things. I was exhausted but the days were beginning to go a little smoother."

During a mid-week math lesson, two boys got into a fight and the principal advised Mattie that Katherine was to spend the rest of the day in the classroom. Katherine

had complimented Mattie on her handling of the situation, but Mattie said she had "not wanted Katherine there." She described the way her feelings of inadequacy were heightened by Katherine's presence during language arts.

> I looked at her and saw a face of excruciating pain. I guess the lesson was going worse than I thought. This immediately made me lose my confidence. The kids were not all on task, and their products were not as challenging as they should have been. The entire time before lunch she had a face of pain. I wanted to quit right there and then and let her take over. If I was so bad, then why wouldn't she just tell me to move aside? The day slowly fell apart. I felt like a failure.

Earlier Katherine had shared a list of her fears. In this lesson the students' poor products, the fighting and disrespect, and being called back to the room to baby-sit made Katherine feel she had failed Mattie. Finally, the last of her fears was realized when she became "the big bad wolf" and her face revealed her inner feelings. Katherine's expression did not improve when Mattie ended social studies with wasted time. Mattie confessed that she had "spent too much dead time" cleaning up the room and she went home and cried in frustration. "I wanted to be successful, but I was feeling like it was impossible." Mattie reported a good day on Friday but navigation had been rough. Her final reflection for the week said, "I ended on a good note but it was hard to get there."

Week Eleven: The Forward Crawl. This was Mattie's last week of teaching in Katherine's room. During the twelfth week she would assist a little in Katherine's room but spend most of her time observing classes in other grade levels. Katherine agreed to meet Mattie at Barnes & Noble again on Sunday but was dreading it. She was discouraged and felt her coaching had not been too helpful to Mattie. In looking over

Mattie's plans, Katherine observed, "None of the ideas for science were differentiated in any way, but they were good solid lessons." Katherine described Mattie's ideas for math on Monday and Tuesday: "There was no differentiation in them at all. They were, again, just good instructional kind of plans. You know, kind of following the internet lesson format with the objective, direct instruction, and guided practice, and they were solid, they were good." She encouraged Mattie to add one or two activities each day for the advanced kids, justifying it this way: "I mean they all need the differentiation but I feel worse for the kids who are above the expectations if I don't have something for them. I feel like I'm wasting their time and time is a big thing for me." She went over a pre-assessment that Mattie had done and said "it was really good" and helped her think about a post-assessment that would be performance-based.

Before their last Sunday session ended, Mattie broached the subject of the faces Katherine made while Mattie was teaching. This took a lot of courage, but she felt the subject had to be addressed. "It was not easy to talk to Katherine about it, but the faces were really bothering me. I was letting them shatter my confidence." Katherine referred to this later as a discussion about, "You know, what my role was, what her role was, what kind of conflicts we've been having." In a reflection that Sunday night, however, Katherine revealed how Mattie's comments had shaken her confidence: "Did I assume too much? Did I go too fast for her?...Maybe I am too much of a perfectionist to have a student teacher. Maybe I am too much of an outlier." Struggling with confidence issues, Katherine and Mattie were feeling their way along a path to competence in differentiation, unsure of their footing.

Mattie felt "pretty prepared" for the week and on Monday Katherine observed her math lesson. Mattie reported, "It went really well. I did not really look at Katherine much while I was teaching. I felt confident about things and I kept myself focused on what I was doing. The kids responded well to the lesson on tree diagrams. The differentiated groups even went really well." Katherine's comments in an interview later that week called Mattie's math lesson "great" and "solid." However, according to Katherine's analysis Mattie had not really differentiated the group assignments; but again had equated grouping with differentiation: "There was nothing differentiated about the tasks except that they were different...they all had the same number of possible combinations when they finished." Katherine was disappointed that Mattie had not at least tiered the assignment for the more advanced learners, as suggested. "I think if I had spent time with her she would have done it. But when we separated all she could do was just that lesson." Mattie knew she should have challenged the advanced students more. In her reflections she noted, "It was difficult to motivate them," and wondered if the lesson had "offended" them because it was too simple. Mattie's thinking here underscores the critical role that reflection plays in both the understanding and the practice of differentiation. In her journal, her first statement referred to how well the "differentiated groups" had gone. But as she wrote in more detail about what had happened, she was forced to admit that she had not met the needs of the advanced learners. She said she could have been "more creative with the task cards" for the advanced group and reminded herself, "Every lesson always needs improvement."

As the week unfolded, Mattie taught a mixture of differentiated and traditional lessons. A reading lesson on an Edgar Allen Poe story was not differentiated, but

afterward Mattie did reflect on ways she could have modified her questions to meet the range of learning profiles. Most of her language arts lessons for the week were differentiated based on word study or reading readiness levels with some on interests as well. The students were still working with adverbs and she designed a lesson differentiated by readiness and product. Students re-wrote a children's book, using a model from their readiness level, adding adverbs to enhance the story. Mattie "kicked this lesson up a notch" by making arrangements for the kids to read their books to kindergartners. She reflected on how hard they had worked on this assignment and what was happening as a result. "I think the main thing that made them work so hard on their books was that there was a purpose or an event that was going to take place with the books. The students knew that they were going to share their books with kindergartners. Every single student stayed on task." Mattie saw management problems evaporate when a clear purpose was set for learning.

By the end of the last week, Katherine was pleased at Mattie's ability to nail down the "know, understand, and be able to do" in her lesson plans even though the differentiation "box" was empty more often. Overall, however, Katherine acknowledged that Mattie had moved forward in her understanding and practice of differentiation. In spite of the reversion to more traditional instruction during this last week, Mattie made it clear in a final interview that, "I did differentiate until the last day." When asked if at times she had just wanted to not differentiate at all, Mattie said, " No." Pressed to explain her answer, she responded: "Well, I've got this kid in the class who is brain damaged and he can't even write a sentence. What is the point of not differentiating? Do you want him to just sit there and do nothing?" Knowing that the skills Mattie had tried to master were

"overwhelming and not easily acquired," Katherine said, "I do believe she internalized many key ideas in differentiation that will go along with her. She'll take her experiences out into the field and begin applying them as she is comfortable." Katherine was disappointed with herself for not producing a better product: "I dreamed of turning out a complex, integrated, diffing machine. I was disappointed that Mattie left more as a wind up toy headed in the right direction." While Mattie's expectations for herself were often excessively low, Katherine's expectations for herself were sometimes too high.

Summary and Discussion. As student teaching drew to a close Mattie evaluated her understanding and practice of differentiation She believed she had made significant gains in her ability to assess students and appropriately differentiate based on her findings. "It is second nature for me to differentiate now as far as readiness goes. And I could do interest or choice." Mattie felt that differentiating by learning profile was more difficult because it took "more time to plan" and longer to gauge student needs. Her comments were reminiscent of Katherine's stories about how long it had taken her in the beginning of the year to differentiate based on learning profiles. Mattie said that tiering lessons had become "much easier" and that having Katherine model differentiation strategies helped to clear up a lot of confusion about what differentiation really looked like in the classroom. Mattie said that she had been fuzzy on lesson planning, even after her Methods course and the study group. "I don't think I understood it last semester because starting off it was really difficult." Although she admitted that thinking about concepts and the KUBATD was "very hard" at first, she said it was necessary so students were not "fuzzy" about what they were learning.

When asked if she would differentiate in her own classroom, Mattie said, "Yes, definitely. I just have to figure out how to do classroom management first." She worried that attending to management first and ignoring the need to differentiate would mean "kids would be left out," but knew management was critical. Thinking about this, both Katherine and Mattie wondered what might have happened had they been "buddies" in the fall semester for the study group. Mattie said she thought this would have made management "much easier" and it would have been "very helpful" for lesson planning. Katherine said:

> If Mattie had been my "diff" partner, she would have had a lot of experience with me beforehand...I think she could have gotten a handle on my classroom. It took her weeks to get up to speed because I do run an odd ship... I think that whole continuity would really be beneficial. In one place the whole year -- I'd really push for that.

Katherine described Mattie exiting her student teaching with "knowledge of the need and a bag of tricks that will help her differentiate." Mattie confirmed this in her own words when asked why all classrooms should be differentiated: "Because not all kids are the same. I just feel like you're asking the question 'What color should I paint the sky or what color should I paint the grass in this painting?' Kids are different." Although she had not become the "complex diffing machine" that Katherine had dreamed of, Mattie now held a fundamental belief that all classrooms should be differentiated. When asked what advice she could give to other student teachers if all classrooms became differentiated Mattie said: "Go in first with some kind of classroom management agenda. Then, get to know your students the best you can; do assessments if the teacher doesn't

have any of the kids. Ask for advice and don't try to do it all. Don't give up and don't quit. Try to differentiate." Mattie had not quit nor had she given up. She had succeeded in differentiating, in fact insisted on it – if not every day of every week. She had been able to do more than simply tread water. She was moving forward in her understanding and practice, if only at a slow crawl. Katherine knew she had not been the perfect mentor and she was already constructing plans for a new and improved co-teaching plan for other student teachers, but Katherine also knew that Mattie's forward crawl was in large part a result of her coaching and modeling. As fellow explorers, Katherine and Mattie had both profited from journeying together on their road toward expertise in differentiation.

Epilogue. Mattie accepted a teaching assignment at home for the month of May after her graduation from Blue Mountain College. She contacted me in mid-May to ask my advice about an inservice she had been invited to present on differentiation. Mattie had told the school principal about her student teaching experience and shared her portfolio of differentiated lessons, showing how she had planned by first targeting the "know, understand, and be able to do" of the lesson. The principal was very excited and had already read Tomlinson (1999a) but wanted her faculty to learn more about differentiation and best practice curriculum design. She asked Mattie to talk with the teachers about her experience and to share examples of her lessons and reflections.

The following week Mattie presented the inservice and reported that the teachers were most attentive. "I spoke for about 30 minutes, explaining differentiation and talking about the process I used in planning a lesson. I talked about the initial struggles deciphering a concept and a topic." She gave specific examples of anchoring activities and lessons differentiated by choice and readiness. "I talked about how learning profiles

can be differentiated in instruction." Two professors from a local university were visiting the session. They said they were teaching differentiation to their graduate students and were intrigued by Mattie's presentation. Mattie said, "The teachers applauded and asked me all kinds of questions. I tried to answer them based on what Katherine would do." The professors helped Mattie answer some of the faculty's questions. Mattie was pleased at the invitation to present and proud to have been regarded as an "authority" so soon after finishing her student teaching. She was happy to share her understanding and practice of differentiation she had learned from the class who needed a lot of love.

Chapter 4

Assertions and Findings

Restatement of the Study's Questions

The questions this study sought to answer were:

1. How do an inservice and preservice teacher each come to understand and practice differentiation?
2. How does their understanding and practice of differentiation affirm or refute existing research about building teacher competence in addressing student diversity?

Feiman-Nemser and Remillard's (1996) definition of learning to teach -- knowing who is learning, what they are learning, what the context is for learning, and how they learning -- is useful in clarifying the process of how a preservice and inservice teacher learn to differentiate. In addition to describing the "who" and "where" of learning, this study attempts to bring the "what" and "how" of teacher learning together as recommended by Feiman-Nemser and Remillard (1996) and Carter (1990) by analyzing the content, context, and process of Katherine and Mattie's understanding and practice of differentiation.

The "what" and the "how" of learning about differentiation are interdependent, the one influencing the other, sometimes accelerating movement toward expertise, in other instances blocking the route. In the early stages of analysis I created a continuum of stages to interpret Katherine and Mattie's evolving understanding and practice of the "what" and "how" of differentiation (see Appendix C). Further investigation revealed that this model could not account for the complexity of content, context, and process

Katherine and Mattie were experiencing. Additional analysis led to the emergence of a map, with specific "sites" that described the travelers, the process of the journey, the knowledge and practice needed to move from site to site, and the roadblocks and pitfalls along the way (see Figures 8 and 9). A map key bulleting detailed data became an outline defining each site. In accordance with Erickson's (1986) methodological paradigm, the maps and keys present a synoptic view of the data and subsequent analysis. Each site on the map incorporates multiple components and is connected to at least one other site. Katherine and Mattie move from site to site in a cyclical process that repeats hourly, daily, weekly. At the same time, movement from site to site occurs as a larger journey toward competence in differentiation progresses over months, years, careers. As the map keys filled with data points and defined larger concepts, each site became the core of the study's four assertions.

Assertion 1. The practice of differentiation is dynamic, constantly shaped and refined by Katherine and Mattie's changing beliefs and knowledge.

Who is Learning. In order to determine how Katherine and Mattie's beliefs and knowledge influence their capacity to practice differentiation (Paine, 1990) it is first necessary to understand who they are as learners. We see that Katherine and Mattie are alike in many ways that make them typical of the majority of preservice and inservice teachers in the United States (Paine, 1990). They are Caucasian, middle class, and were raised by parents who expected them to complete college. There was very little diversity

Sites Katherine Visits on Her Journey to Expertise in Differentiation

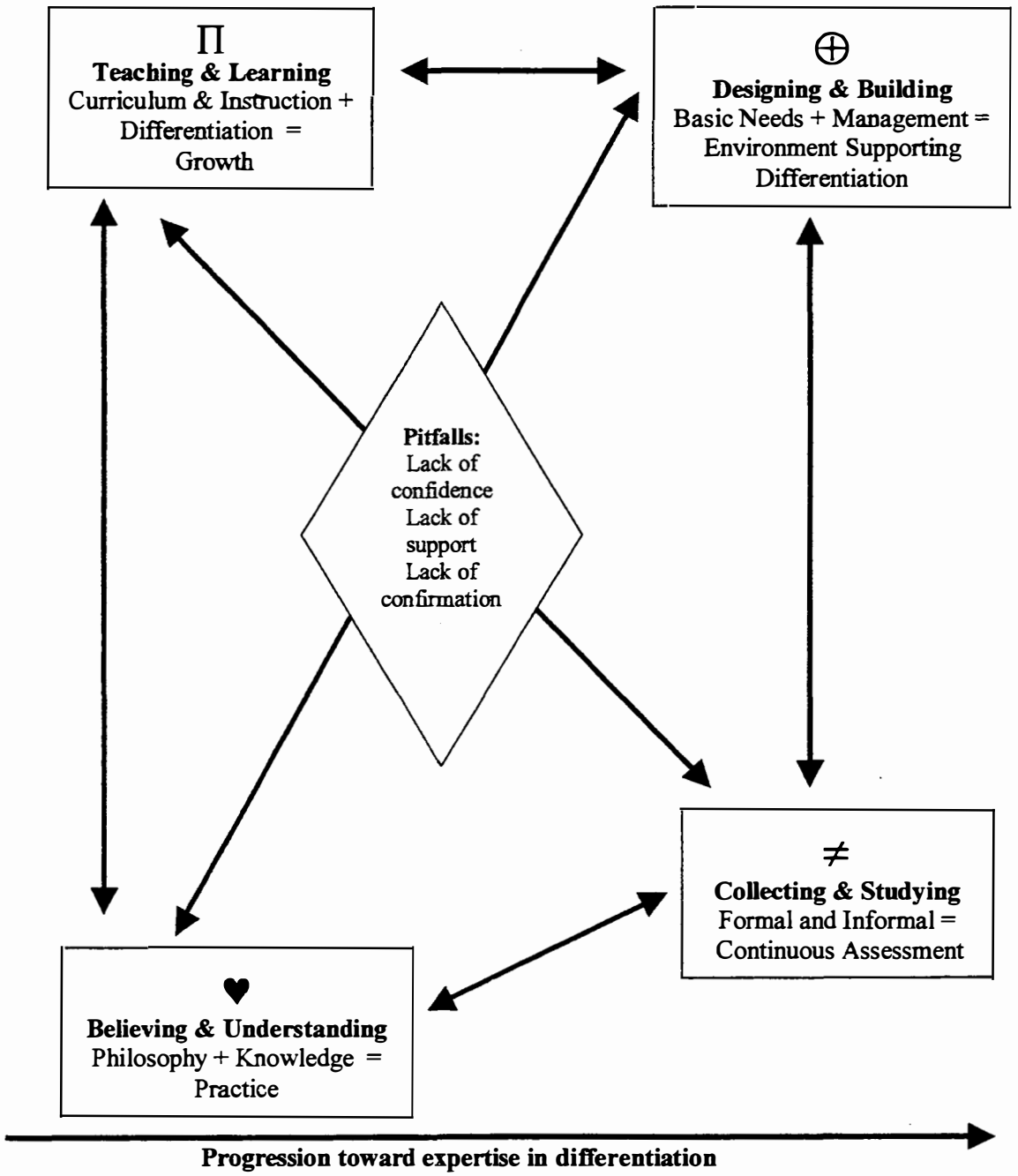


Figure 8. Katherine begins with Believing and Understanding and moves among all four destinations as she progresses on her journey, revisiting all sites throughout each year.

(Figure continues)

Map Key to Katherine's Sites

♥ **Believing and Understanding**	**Philosophy** Prior Experience Recognizing Individual Needs Kids Aren't Problems Needs Have to be Met Students Must Derive Understanding Self-system Influences	+	**Knowledge** Content Pedagogy Theory Research Modeling	=	**Practice** Collaboration Action Research Support Reflection Refinement	
≠ **Collecting and Studying**	**Formal** National Standardized Test Data State Standards Test Data School Testing Data Formative and Summative Data	+	**Informal** Anecdotal Records Inventories and Surveys Observation Pre-Assessment Self-Assessment Dialogue with Parents	=	**Ongoing Assessment Profile** 3-D View of Learners and the Learning Space	
⊕ **Designing and Building**	**Basic Needs** Safety Love Belonging Respect Shared Decision-Making Goal Setting Continuous Assessment	+	**Management System** Differentiated Shared control Routines, Procedures Modeling Teambuilding Teaching Differentiation Continuous Assessment	=	**Environment Supporting Differentiation** Comfort Trust Risk-taking Status Independence Perseverance	
∏ **Teaching and Learning**	**Best Practice Curriculum & Instruction** Know, Understand, Do (KUBATD) Concept-Linked, Integrated 3-D View of Curriculum Continuous Assessment Respectful Learning Experiences	+	**Differentiation** Content, Process, Product Continuous Assessment Readiness, Interest & Learning Profile Choice Flexible Grouping Effective Strategies	=	**Growth** **Student** Engagement Autonomy Achievement	**Teacher** Confidence Competence Confirmation Commitment

♥ What drives Katherine
⊕ Where ♥ and ≠ converge
≠ Katherine's ♥ send her here
∏ Reaching the goal re-routes Katherine to ♥, ≠ and ⊕

Figure 8 (continued).

Sites Mattie Visits on Her Journey to Expertise in Differentiation

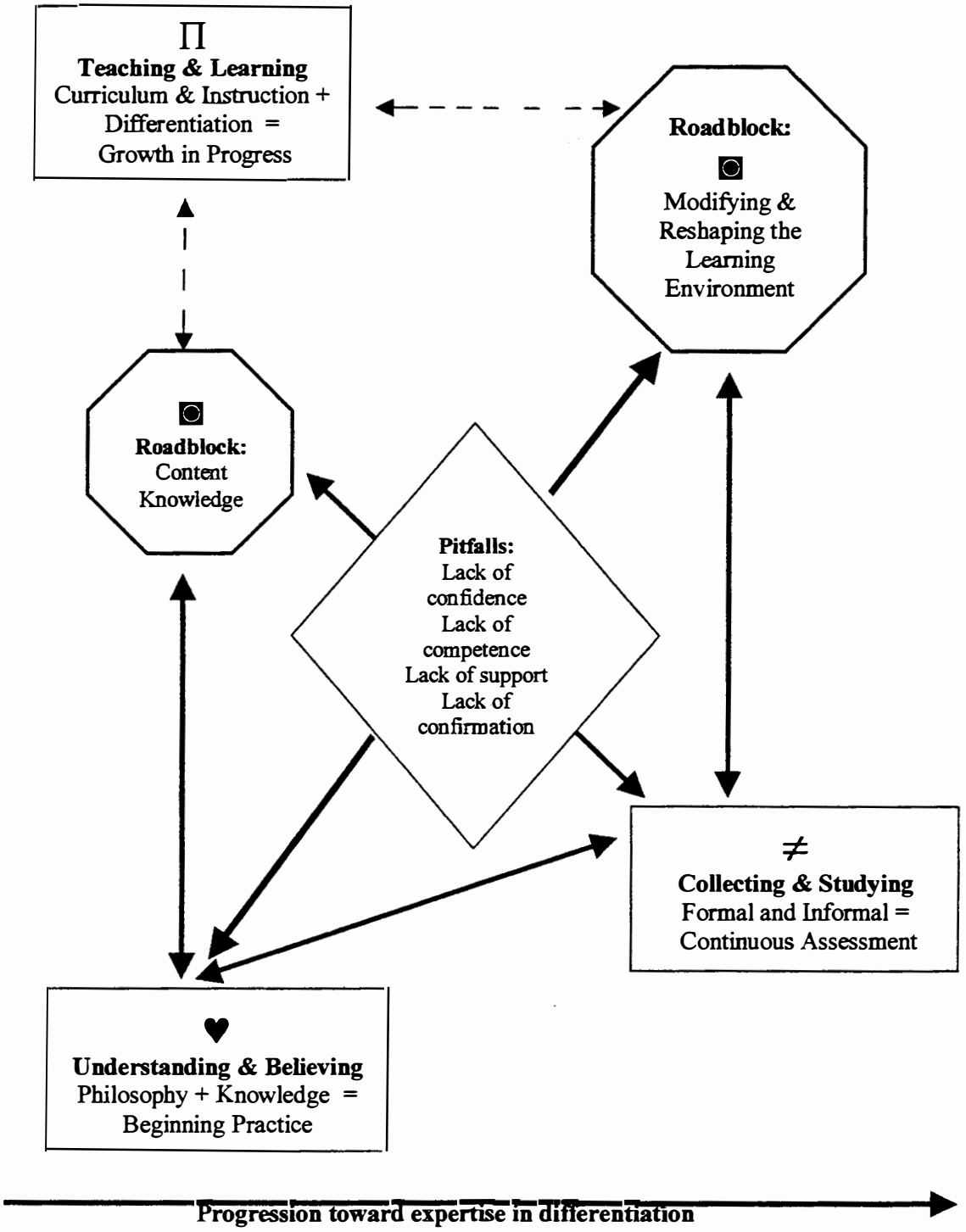


Figure 9. Mattie begins with Understanding and Believing and moves among three destinations, trying to deal with two roadblocks as she progresses on her journey.

(Figure continues)

Map Key to Mattie's Sites

♥ **Understanding and Believing**	**Knowledge** Content Pedagogy Theory Research Modeling	+	**Philosophy** Beliefs Emerge After Instruction Recognizing Individual Needs Kids Aren't Problems Needs Have to be Met Understanding is Taught Self-system Influences	=	**Beginning Practice** Collaboration Action Research Support Reflection Refinement	
≠ **Collecting and Studying**	**Formal** Formal Documentation National Standardized Test Data State Standards Test Data School Testing Data	+	**Informal** Informal Documentation Anecdotal Records Inventories Surveys Observation Self-Assessment Dialogue with Parents	=	**Continuous Assessment** Seeing More Than "High, Middle, Low"	
■ **Modifying and Reshaping**	**Design Roadblock** Katherine's Design Control with Teacher Ambiguity Unsure of Importance Inconsistence	+	**Management Roadblock** Katherine's System Negative Reinforcement Token Economy Inconsistent Inequitable Undecided	=	**Conflicts with Differentiation** Unsafe Lack of Trust Too Risky Diminished Status Learned Helplessness	
∏ **Teaching and Learning**	**Content Roadblock: Curriculum & Instruction** Applying the KUBATD* Weaknesses in Content Struggling with Concept-Linked, Integrated Trying to Develop a 3-D View of Curriculum Searching for Resources Looking for Scripts	+	**Differentiation** Applying Principles of Differentiation: Continuous Assessment, Flexible Grouping by Readiness, Interest, and Occasionally Learning Profile Applying Appropriate Strategies	=	**Growth** **Student** Moderate Engagement Limited Autonomy Limited Achievement	**Teacher** Increasing Confidence Developing Competence and Autonomy

♥ What drives Mattie
≠ Mattie's ♥ send her here
■ Roadblocks for Mattie
∏ Reaching the goal re-routes Mattie to ♥, ≠ and ■

Figure 9 (continued).

* Know, Understand, and Be Able to Do

in their school experiences before college and neither Katherine nor Mattie recalled any more than a glimpse of differentiation from kindergarten to high school graduation. Both began picturing themselves as teachers at an early age.

Katherine and Mattie tend to set extremely high expectations for themselves and each demonstrates a strong need to belong and to be affirmed. Both are risk takers but at the same time exhibit characteristics of perfectionism. This combination of conflicting qualities creates internal tension for them as they chart new territory in teaching and sometimes fall short of their goals.

Mattie and Katherine are different in many ways as well (See Figure 10). Mattie is younger and has significantly fewer life experiences than Katherine. Mattie's knowledge of elementary content is limited while Katherine's is extensive. Mattie tends to be motivated extrinsically, Katherine intrinsically. Katherine is generally an independent and original thinker, reading, studying, and producing on her own, while Mattie is more dependent on others for ideas and direction. Katherine has always seen herself as different, even calling herself an "outlier." The professional isolation she has experienced is not unique to her teaching assignment; she admits that getting along with others in working situations has always been difficult for her. Mattie does not see herself as odd or unusual and is generally regarded as easy to work with and well adjusted.

In terms of differences directly affecting teaching, Katherine is a global thinker and likes to sketch the big picture. Concept-based curriculum design is a natural for her but is difficult for Mattie who is a linear thinker eager for written steps, not visual images. Katherine is challenge-driven and thrives on tough problems and open-ended

Katherine and Mattie:
A Comparison

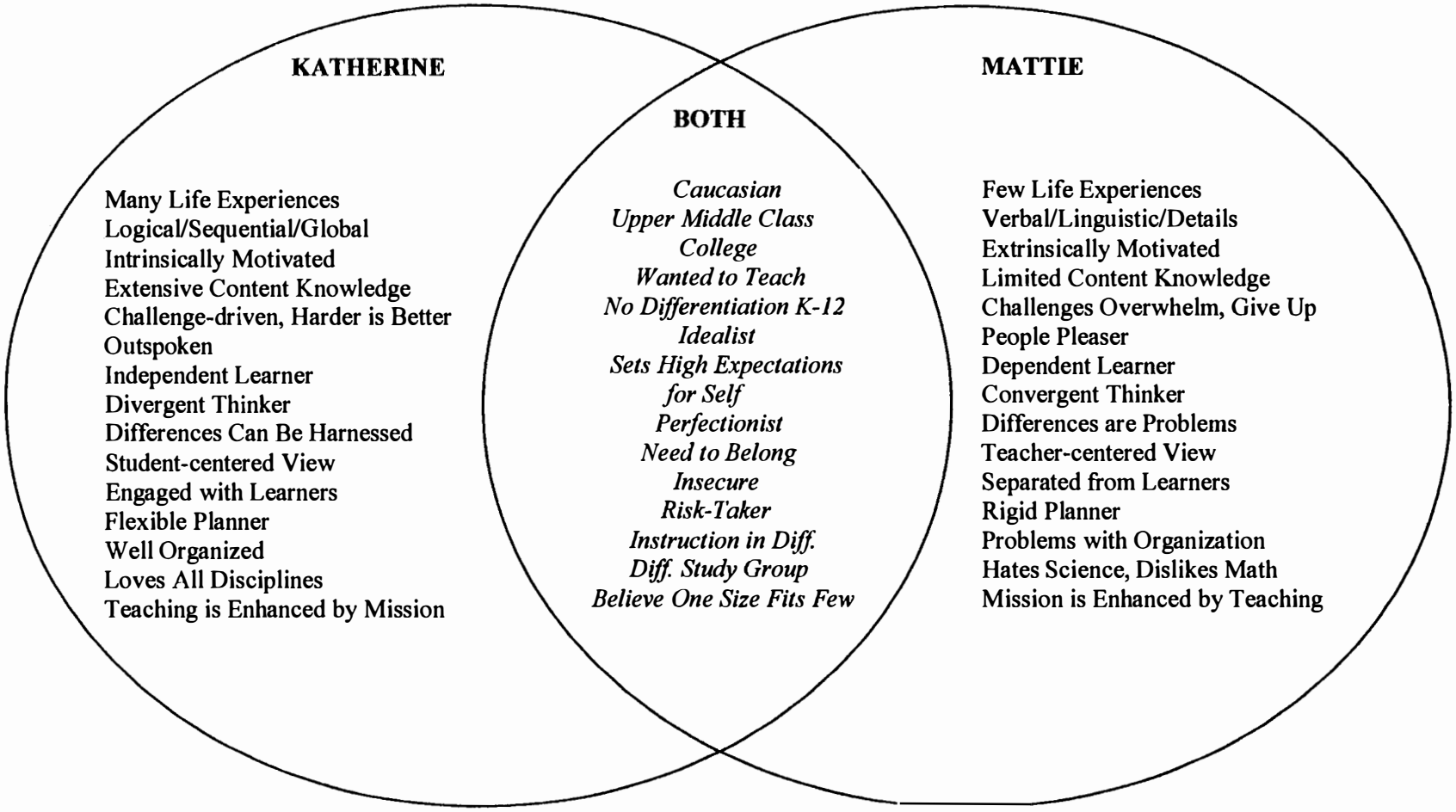


Figure 10. A summary of the similarities and differences between Katherine and Mattie that affected their journey together.

questions. Mattie, on the other hand, is often overwhelmed by too many challenges and tends to shut down when faced with puzzling dilemmas. Katherine is a flexible planner and extremely organized, while Mattie requires rigid, scripted plans and organization is not her strong suit. Completing multiple tasks simultaneously is natural for Katherine while Mattie must limit her attention to one or two at a time. Whereas Katherine defines the learning community as student-centered and management as "control-with-a-little-c," Mattie still holds the opposite view -- that the learning community is teacher-centered and management is "control-with-a-big-C." Their differing views of the learning community place them apart in the classroom; Katherine is engaged along *with* students while Mattie is usually engaged *alongside*.

Self-system Factors. Based on Connell and Wellborn's (1991) criteria, self-system processes related to control, confidence, and competence affect Katherine and Mattie's beliefs and understandings about differentiation and create pitfalls in their path. Katherine finds it hard to give up leadership of the learning community and her control of instruction, especially in math. Mattie wants to "take" too much control of the learning environment and yet seems to have too little control of instruction. A focus on how much she needs to know rather than on how much she has learned appears to shape Mattie's assessment of her competence (Berliner, 1988; Britzman, 1991; Tomlinson, et al., 1995). Katherine seems "perfect" to Mattie, yet she frequently verbalizes self-doubt about her own teaching performance and her ability to be an effective mentor (Beasley, et al, 1996). She looks for confirmation of her competence as a clinical instructor; she is a novice in this role and is frustrated by a lack of training and benchmarks for her performance. Mattie's confidence hovers at a consistently low level. Confirmation of Mattie's

competence is blocked by gaps in content, management, lesson planning, and organization (Hollingsworth, 1989). Professional isolation threatens Katherine's commitment to differentiation (Birchak, et al., 1998; Borko, et al., 1997); she looks to students, colleagues, administrators, parents, and Mattie for confirmation of her beliefs. Mattie relies primarily on confirmation from the students and Katherine. When the response she gets is lackluster or negative, her beliefs in differentiation appear unshaken, but her confidence in her capacity to differentiate is compromised.

What is Learned: Emerging Beliefs. Knowing who the learners are, it is now possible to make use of the maps and keys at hand to trace the path Katherine and Mattie take as they come to understand and practice differentiation. They both start on the map at the point where beliefs about addressing student needs are formed.

Katherine's prior experiences shape her belief about the importance of addressing individual student needs. As early as elementary school Katherine sees, as Paine (1990) has, that she has problems but is not a problem herself. Reis et al. (1998) noted that curriculum and instruction providing an equal challenge for students with varying abilities is not identical. Katherine's experiences with her own children's education and her work with Alzheimer's patients and emotionally disturbed children confirm this. Explicit theory and research about the principles of differentiation follow after these life experiences, confirming Katherine's beliefs and supporting Tomlinson's (1999a) view that teachers often believe in differentiation before they have a word for it.

Unlike Katherine, Mattie discovers the need for responsive teaching through explicit instruction in her Methods course at Blue Mountain College (Brimijoin, 2000; Ducette, Sewell, & Shapiro, 1996). Her course work coupled with the diversity she

experiences at college leads Mattie to formulate a seminal belief in differentiation. This is strengthened and defined further by her study group experience. Student teaching in Katherine's class then provides a rich context for Mattie to develop what Bransford, Brown and Cocking (2000) refer to as a "flexible representation of knowledge" (p. 78). In Katherine's classroom Mattie translates theory into practice and affirms her basic beliefs in differentiation based on the response from Katherine and her students.

Content. With beliefs defined, the challenges of developing a deep understanding about differentiation drive Katherine and Mattie to learn and apply principles of responsive teaching (Howey & Zimpher, 1996; Simpson & Ure, 1994). In order to analyze their lived experience (Erickson, 1986) of differentiation, it is necessary to examine the content Katherine and Mattie are learning.

Katherine's Knowledge of Differentiation. Katherine's intuitive grasp of differentiation, her life experiences, and her self-system processes accelerate her learning about responsive teaching. In particular, her auto-didactic approach to learning pushes her thinking and leads her to find exemplars of differentiation. Like Dewey (1910) and Wiggins and McTighe (1998), Katherine knows that content knowledge is the bedrock of effective differentiation. She also understands the "user friendly," brain-compatible rationale for concept-based curriculum and instruction (Erickson, 2001). She knows that by clarifying the "know, understand, and be able to do" and matching this to differentiated tasks based on continuous assessment, her learners are likely to be engaged and motivated (Lidstone & Holligsworth, 1992; Tomlinson, 1999a). As a result of her advanced knowledge level Katherine can almost always anticipate student response to specific situations. She is keenly aware of how unfocused curriculum and disorganized

instruction cause off-task behavior among students. In spite of her brief time in the field, Katherine has reached what Lidstone and Hollingsworth (1992) might describe as a comprehensive stage of differentiating -- her beliefs and pedagogy mesh. Being at a comprehensive stage of understanding differentiation, Katherine is able to experiment with lesson design, trying new formats and organizers, making subtle adjustments that will sharpen and refine her practice. She learns how differentiation and best practice curriculum and instruction fit and then tests the goodness of that fit through deliberate, summative assessment.

Because she operates at a comprehensive level of practice, Katherine can make her own discoveries, generating a new set of understandings about differentiation for the profession. She develops a three-dimensional model of assessment where learning profile and interest potentiate readiness differentiation. Her assessment model helps her accomplish what Berliner (1988) describes as important work for teachers – identifying misconceptions that students bring to learning and using that information to modify instruction. The more sophisticated her assessment becomes, the more important Katherine perceives the role of learning profile in effective differentiation, and her knowledge work (Schlechty, 1997) leads her to find additional means for facilitating that method of differentiation. Her knowledge work takes shape as she invents original strategies for assessment such as "glass, bugs, and mud," "differentiating on the fly," and "kicking it up a notch." These strategies crystallize instruction and deepen understanding (Rohrkemper, 1990; Wiggins & McTighe, 1998).

Grasping the important role the learning community plays in supporting differentiation is new knowledge work for Katherine this year (Furman, 1998; Solomon,

et al., 2000). She recognizes the significance of status in promoting autonomy in this community (Cohen & Goodlad, 1994). She develops her own techniques for awarding status -- "kiss your brain" and "fireworks" -- and designs whole days, such as "The Ways We Shine," around the concept of recognition. She reflects on her management philosophy of shared control and self-regulation and realizes she differentiates management.

At Katherine's level of belief, understanding, and practice she is developing a model for applying the principles of differentiation, testing student response, making corrections, looking for hard data to confirm her own theories, and strengthening her commitment to differentiation as a result of that confirmation (Howey & Zimpher, 1996). In working with Mattie, Katherine applies this model, concludes she is not successfully coaching Mattie on curriculum design, and realizes she must differentiate for Mattie's learning profile (Narvaez, 1991). After a careful evaluation of Mattie's learning profile, Katherine's adjustments in coaching give Mattie the support she needs to spur her learning and reduce her anxiety. This is one example of how Katherine turns failure into success through reflection and refinement (Carter, 1990).

Katherine learns from Mattie as well. She learns to be less controlling, she learns that mentoring a student teacher to assume a fully differentiated classroom is a huge commitment of time and energy, and she learns how easy it is to overwhelm Mattie and shut her down with a frown or grimace. As Mattie's content, lesson planning, and management roadblocks result in disengagement, taught helplessness, and limited student achievement, Katherine reinforces her beliefs that best practice differentiation almost guarantees student engagement, autonomy, and achievement.

Mattie's Knowledge of Differentiation. Because of fewer professional and life experiences, her recent discovery of differentiation, and self-system processes, Mattie differs from Katherine in her general knowledge about teaching and her particular knowledge about differentiation. Her prior beliefs and experience do not hinder her understanding of differentiation, but neither do they accelerate it. Although her learning accelerates in the differentiation study group, gaps in Mattie's content knowledge create roadblocks for her as Erickson (2001) and Hollingsworth (1989) predict. Unlike Katherine, Mattie is not ready to conceptualize a model of differentiation in practice because she is still trying to see what differentiation looks like and how it works, and trying to grasp the connection between purposeful assessment, clear objectives, and differentiated tasks (Tomlinson et al., 1995).

Mattie's learning is rudimentary; she is testing the format of writing lessons, the content and process of best practice curriculum design, techniques for assessment, strategies for differentiation, timing, and transitions. However, she arrives in Katherine's classroom with what Giroux and McLaren (1986) call a critical pedagogy in that she begins with student needs as the place to start teaching. Two factors influence her critical pedagogy -- her participation in the differentiation study group and Katherine's philosophy of and expectations for differentiation in her classroom (Birchak, et al., 1998; Brimijoin, 2000; Melnick & Zeichner, 1998). These two factors shift Mattie's entrance level in student teaching from the typical focus on management to a focus on student needs (Lidstone & Hollingsworth, 1992). Mattie expands her knowledge of student needs as she attempts to develop a multi-dimensional view of each individual based on readiness, interests, and learning profiles. As Katherine did years ago, Mattie learns that

fair does not mean identical in designing learning experiences (Reis, et al., 1998). Her learning refutes research by Feiman-Nemser & Remillard (1996) that says prospective teachers tend to overlook diversity. Katherine's emphasis on assessment and her modeling help Mattie develop greater competence than is typical for a novice in terms of diagnosing individual needs (Berliner, 1988).

Mattie devotes a great deal of time to learning basic content, especially in math, science, and technology, and comes to see that gaps in these areas slow her progress (Feiman-Nemser & Remillard, 1996). She learns how Katherine determines the "know, understand, and be able to do" (KUBATD) and, after struggling through an evolution of design methods (see Appendix F), she adopts a model linking the KUBATD with required standards content (Tomlinson, 1999a; Wiggins & McTighe, 1998). Her adoption of this design is a direct outcome of Katherine's coaching and in-process modeling.

Her struggles with learning the art of curriculum design while she is learning to teach and differentiate compel Mattie to seek alternatives to the traditional sequencing of student teaching duties. She and Katherine propose a co-teaching/co-planning schedule that is approved by the college and school. However, in spite of her efforts to make it work, Katherine is unable to create the structure Mattie needs at the time. As Berliner's work shows (1988), novices need rules in place and the ambiguity of collaborative teaching leaves Mattie confused and sends her searching for alternatives from friends and relatives.

Katherine models key strategies for implementing differentiation, as recommended by Tomlinson et al. (1995), and enhances Mattie's knowledge of differentiation. Strategies such as tiered lessons, RAFT, ThinkDOTS, and contracts (see

Appendix A), become vital tools for Mattie to create differentiated learning experiences that are relevant and engaging. With Katherine's assistance, Mattie is able to reach what Lidstone and Hollingsworth (1992) call a routine stage of operations, where she applies differentiation in appropriate contexts to meet student needs. However, because of a management roadblock, her beliefs and pedagogy are often in conflict. When she shares her concerns with Katherine and her supervisor, however, and they intervene with suggestions and encouragement, as Fuller (1969) notes, Mattie makes an occasional leap to the comprehensive level of teaching (Lidstone & Hollingsworth, 1992) and shares positive reports of beliefs and pedagogy in balance. In fact, based on observations and results of time and motion studies, Mattie's successes with differentiation challenge Berliner's (1988) statement that modifying instruction for individual differences is "beyond the comprehension of the beginning teacher" (p. 21).

Learning that students will listen to her, engage in lessons she designs, and think deeply about content she teaches, Mattie is frequently "surprised." Her surprise seems to stem from two sources. On the one hand, Mattie tends to doubt the students' capacity to self-regulate as well as her ability to perform according to her own high standards. On the other hand, in contrast to Katherine, Mattie has difficulty predicting what the outcome of teaching and learning will be, a common characteristic of novices, according to Berliner (1988).

In terms of management, Mattie begins to understand, from her lesson on adverbs, that when the learning task has a clear and relevant purpose, management problems vanish (Feiman-Nemser & Buchmann, 1990). She is just beginning to see the connection between management and lesson design when she completes student teaching. Her views

of what is fair as opposed to what is identical are still muddled in relation to her management philosophy. Katherine's modeling does not accelerate Mattie's learning in this area; Mattie's management schema differs so greatly from Katherine's that she is unable to define Katherine's process and leaves student teaching without clearly articulating her own philosophy. While Mattie learns from successes in best practice curriculum design, assessment, and differentiation, she seems to learn more from failures in her attempts to create a management system (Carter, 1990).

Mattie learns from Katherine that reflection allows her to find patterns and see similarities in context (Berliner, 1988; Feiman-Nemser & Buchmann, 1992; Hollingsworth, 1989). Katherine models what Zeichner and Liston (1987) recommend as "routine and reflective action" (p. 24). She encourages Mattie to orient her teaching by inquiry in order to assess her habits of mind and disposition (Putnam & Borko, 2000; Walker, et al., 2000). Reflection is a daily ingredient of Katherine's practice and it becomes so for Mattie as well, helping her develop a language about differentiation events, their interpretation, and her view of them, as Doyle (1990) recommends. By learning to question her actions, to discriminate about when to "differentiate on the fly," "kick it up a notch," and to see the limitations of her control-with-a-big-C management system, Mattie participates in teacher education as well as student teaching, according to Feiman-Nemser and Buchmann (1986). Mattie imprints on Katherine as she learns how to transform and refine theories of differentiation in practice (Levine, 1996; Maxson, et al., 2000; Morales, 2000).

Mattie leaves her teacher preparation program with changed beliefs and a commitment to differentiation, accomplishments that Paine (1990) applauds. This exit is

untypical (Feiman-Nemser & Remillard, 1996; Hollingsworth, 1989) and most likely a result of the richly detailed coaching and modeling Katherine provides as she guides Mattie in how to teach a class that "needs a lot of love."

What Katherine and Mattie learn about differentiation enriches and fortifies their beliefs about addressing student variance. As they apply their beliefs and knowledge in the work of teaching, they move to the next site on their map.

Assertion 2. Katherine and Mattie enact their beliefs and understandings about differentiation through continuous, multidimensional assessment.

Katherine and Mattie's beliefs and understanding about differentiation are immediately translated into a wide range of assessments to gather information about specific student needs. At the same time, an assessment of Katherine and Mattie's content knowledge about differentiation provides rich information about their progress in understanding and practicing responsive teaching.

Katherine's View of Assessment. Katherine does not view assessment as a linear process or a dull instrument designed only to follow teaching and track results. In fact, Katherine perceives student assessment in three dimensions: tracking known achievements, targeting moderate challenges, and setting realistic goals for expected performance (Bruner, 1963; Tomlinson, 1995b). Katherine applies assessment in multiple dimensions in the classroom and demonstrates this for Mattie. Katherine sees assessment as a powerful tool to be used through the whole process of teaching and learning, one that demands the same type of evaluation skills good teachers use for effective management.

For Katherine, assessment is a multilevel feedback channel through which she monitors the performance and self-assessment of her students.

Katherine discovers that integrated, concept-based lessons provide what Faulk (1999) regards as multiple points of entry so essential for all students. As a result, Katherine finds that integrating curriculum potentiates differentiation, actually "kicking it up a notch," by producing a rich dividend of assessment data. When students respond to interdisciplinary lessons, Katherine and Mattie see new abilities, interests, and dislikes surface like fish to a fly (Brandt, 1998). This bonus of assessment data facilitates learning profile differentiation, which Katherine finds highly engaging and motivating for all students, particularly for those with special needs (Franke, et. al., 1998; Gardner, 1983; Sternberg, 1996). Curriculum integration offers an efficient means for collecting critical data and causes the frequency of Katherine's learning profile differentiation to increase.

On another level, and following the advice of Feiman-Nemser and Remillard (1996) and Narvaez (1991), Katherine discovers the importance of assessing Mattie's readiness, interests, and learning profile. Her assessment of Mattie supports Levine's (1996) view that teachers must use knowledge to self-analyze and engage students in different ways depending on their needs and strengths. By applying assessment results about Mattie's readiness, interests, and learning profile in her coaching, Katherine accelerates Mattie's progress toward competence.

Katherine also self-assesses her performance through ongoing reflection as recommended by Zeichner and Liston (1996). Not only does she assess her teaching on a daily basis, she also compares this year's teaching to last year's, using summative results to focus and refine current practice.

Mattie's View of Assessment. Mattie's first discovery of the link between ongoing assessment and differentiation comes near the end of her study group experience. She realizes that the match of task to need is totally dependent on using an appropriate assessment instrument and then applying the data to inform her instruction. Katherine models her 3-D assessment for Mattie and introduces her to a multitude of strategies for the collection and study of data (Simpson & Ure, 1994). According to Tomlinson (1999a), when Mattie uses the results of continuous assessment to adjust curriculum and instruction for diverse learners, she enacts a fundamental principle of differentiation.

Although she leaves student teaching without a sophisticated understanding of Katherine's 3-D view of assessment, Mattie does begin to see learners as more than simply "high, middle, and low," a perception which Gamoran and Weinstein (1995) describe as critical in today's inclusive schools. Because of Katherine's consistent coaching, when Mattie leaves her class she takes with her a detailed portrait of each child's strengths and weaknesses, likes and dislikes, and styles of learning. Mattie's in-depth view of the kids in Katherine's class grows out of her unflagging application of ongoing and multidimensional assessment. This process becomes embedded in Mattie's planning with pre-assessment appearing as a first step in every lesson she designs.

Because of her mentor's modeling, reflective practice (Zeichner & Liston, 1987) becomes a characteristic of Mattie's student teaching experience. Mattie's reflection journal is in large part a self-assessment of her understanding and practice of differentiation. Through her reflections she collects and studies informal data about how students respond to her curriculum, instruction, differentiation, and management. The

more she analyzes her teaching and student performance, the more forward progress she makes on her journey toward expertise in differentiation.

Time and Motion Studies. As an assessment tool, time and motion studies (Wolcott, 1994) show that interactions with students during differentiated lessons provide a wealth of informal assessment data from each student. This informal data assists Katherine in her application of "differentiation on the fly" and helps her adjust instruction either by lowering or raising the level of challenge. Katherine uses the data tracked in the time and motion studies to differentiate other lessons as well, thus creating a continuous feedback loop wherein differentiation precipitates more differentiation. Time and motion studies also quantify the high frequency of individual contacts Mattie makes during differentiated segments of instruction, something the Redlands' principal does not see with most student teachers (Feiman-Nemser & Buchmann, 1986).

Assertion 3. Creating a context that supports differentiation is critical for Katherine and Mattie's successful translation of beliefs and understanding into teaching and learning.

Context. The learning community influences the effectiveness of differentiation on two levels. First, a student-centered learning community supports and strengthens differentiation and may promote engagement, autonomy, and achievement. Second, the context for Katherine and Mattie's learning affects the likelihood of success in their efforts to teach responsively. After an initial visit to the assessment spot on their roadmap, a place they constantly revisit, their next stop is a community construction site.

The Student Community. Blending her beliefs and understandings with the results of her assessment, Katherine creates a blueprint to construct a learning community which supports the foundational principles of differentiation. As suggested by Tomlinson (1999a) Katherine realizes this site on her journey is critically important. She knows that differentiation requires respect and tolerance for individual differences and needs; consequently Katherine designs the community to offer a sense of love, safety, and belonging as called for by Maslow (1970). By encouraging self-assessment and goal setting as Furman (1998) advises, Katherine promotes "deliberative discourse," explicitly teaching students about differentiation and how to build a heterogeneous, postmodern community (p. 300).

After ensuring that students' basic needs are met, Katherine focuses on designing a management system that meets Solomon, et al.'s (1992) criteria for "developmental discipline" (p. 48). These criteria include encouraging students to be self-governing, holding class meetings, working collaboratively, and solving management problems, thus becoming as autonomous as possible. Developmental discipline calls for teachers to focus on activities that increase interpersonal understanding, respect for individual strengths, and intrinsic rewards. Katherine's management system incorporates all of these criteria with shared control embedded in the heart of the model (see Figure 11). Seeing each student as capable of reasoning to resolve problems and make strong contributions (Solomon, et al., 1992), Katherine discovers that she differentiates management. Although her three "universal" rules are one-size-fits-all, the balance of her management system is delivered on a sliding scale based upon individual needs and situations.

KATHERINE'S MANAGEMENT FRAMEWORK

Philosophy of Management

Pacing + Engagement Reduces Disruption
Make Accommodations for Behavior Traits and Learning Profiles
Be a Teacher Among Students; Maximize Proximity
Maximize Student Space and Respect Personal Boundaries
Know Students Well Enough to Turn Weaknesses into Strengths
Prevention is the Better Part of Cure: Stop It Before It Happens

Shared control

- Routines and Procedures
- Teamwork – Roles, Leaders
- Modeling
- Ownership
- Decision-making
- Choice
- Time Management
- Transitions
- Student Understanding of Differentiation
- Self-Assessment
- Scaffolding

Philosophy in Action: Responding to Misbehavior

Visual Disapproval
Proximity
Removal of Distraction
Review of Rules
Nonverbal Cues to Offer Escape Route
Hall Talk – No More Than 30 Seconds
Immediate Office Referral for Physical or Emotional Violence
Separate Childish Misbehavior from Serious Misbehavior
Note Home for Consistent Problems
Listen to the Kids – "Off the Records"
Understand that Students are Emotion Mirrors
Model How You Deal with Conflicts, Choices: Self-Talk
Talk About Choices, Consequences, Cause and Effect

Figure 11. Katherine's process for establishing shared control embedded in the framework of her management philosophy.

Katherine's system is predicated on the belief that each student will make reasonable decisions and self-adjustments.

Katherine continually confers status (Cohen & Goodlad, 1994) on individual students, validating each child's self-worth, something Kunc (1992) maintains as essential for nurturing self-confidence. Katherine's ability to confer status depends on her use of continuous assessment results to pinpoint talents and strengths. Awarding status is a management tool for Katherine and an esteem builder and self-management tool for her students. Time and motion studies of Katherine during differentiated instruction show that awarding status in the form of positive feedback is one of her most dominant interactions with students.

Katherine finds that a safe, respectful, and trusting learning environment supports conceptual and flexible learning (Deci, et al., 1991). Furman (1998) notes that the intimacy of small groups promotes inclusive discourse. The inclusive discourse that is a side effect of differentiation in Katherine's class fosters a sense of acceptance among her students. As Connell and Wellborn (1991) have seen, Katherine discovers that in this supportive environment some of her most disadvantaged students become so engaged and autonomous the community itself seems to raise their level of performance.

Mattie begins her journey with Katherine as unsure about management as most novices (Hollingsworth, 1989), but does not direct her full attention to it at the outset, even predicting management will not present as much of a challenge as lesson planning. Mattie seems unable to see the learning community elements that support differentiation and sees herself as controller of the kids, a view she does not discard (Gamoran & Weinstein, 1995). Unable to understand Katherine's management philosophy, Mattie

rejects it out of hand. The inconsistency she demonstrates as she tries to establish her own system discourages self-regulating behavior among the students and reduces their engagement and independence (Connell & Wellborn, 1991). Even though Katherine consistently models community values in support of differentiation, Mattie finds a management roadblock in her way when confronted with a classroom full of ambiguity, colliding interests, diverse learning styles, and wide ranging abilities (Giroux and McLaren, 1986).

Mattie's reflections and the results of time and motion studies (Wolcott, 1994) show that not only does she neglect opportunities to give students positive feedback during instruction, she also does not assign the importance Katherine does to conferring status. By conferring status infrequently and undervaluing its importance in this community Mattie misses one potential path around her management roadblock.

Without a clear understanding of the rationale and purpose of Katherine's differentiated community design, the modifications Mattie makes in the community work against effective differentiation and cause her behavior to conflict with her beliefs (Lidstone & Hollingsworth, 1992). Katherine models principles of this learning community that support maximization of motivation, performance, and development (Deci, et al., 1991), but the majority of her coaching and explicit instruction for Mattie is focused on lesson design and assessment. Mattie's teacher preparation courses do not address the nature or role of a differentiated learning community (Ducette, Sewell, & Shapiro, 1996) and Katherine's model is not explicit enough to send Mattie around the roadblock she faces. Mattie was not there when Katherine designed and built this community from the ground up. They found themselves wishing they had been partners

in the differentiation study group. Time together at the beginning of school would have allowed Mattie to help with the community design and construction and may have sharpened her understanding of its significance and operation.

The Teacher Community. Feiman-Nemser and Remillard (1996) maintain that where and when learning takes place helps to define the process of learning to teach. Katherine's context for learning about differentiation has been through a myriad of life experiences and in her own classroom "laboratory" over the past two years. The class of students who "need a lot of love" has challenged Katherine to refine her practice of differentiation. However, the resistance Katherine experiences from her colleagues slows her progress (Birchak 35 al., 1998; Borko et al., 1997). The isolated context in which she works is relieved somewhat by having a student teacher, but she realizes Mattie is unable to fill the role of a colleague. Katherine does receive the support of her county and school administration for her efforts to differentiate and this offsets the isolation she feels by nurturing her self-worth and confidence (Kunc, 1992).

Until her student teaching begins, Mattie learns about differentiation through her Methods course at Blue Mountain College. While that course has the study group/field experience component, the majority of hours are sequestered in a context-free, largely homogeneous college classroom. All other field experiences in Mattie's teacher preparation program are in classrooms where the teachers have little or no background in differentiation. Even her study group partner this year is as much a novice as Mattie about effective differentiation. Although Mattie sees video images of differentiated classrooms, acts out scenarios from her readings, and tries her hand at designing sample

strategies and lessons, she does not take on the role of teacher in her field experiences for more than an hour at a time.

In Katherine's classroom Mattie finds herself at the center of a fully differentiated world of learning. She finds the center of that world quite a contrast to the peripheral position she had in her field experiences. Even with twelve full weeks in Katherine's class, Mattie does not have sufficient time to develop expertise, as Berliner's (1988) research shows. In addition, the pace Katherine sets is quick, surefire, and non-stop. Mattie misses seeing Katherine's methodical pace at the beginning of the year as she leads students through whole group, direct instruction, rehearsing procedures and transitions until they become routine. This slow, deliberate modeling is the type of explicit instruction Mattie needs. If Mattie had been a participant in that phase, helping to put the community in place, she might have developed a management style compatible with differentiation and it might have seemed natural to her. If she had been in Katherine's classroom all year, she might have developed a better understanding of this unique community and felt a greater sense of belongingness herself.

Assertion 4. The process of understanding and practicing differentiation is different for Katherine and Mattie.

After Katherine begins ongoing construction of the learning community and Mattie bypasses the site after encountering a roadblock, they move toward the teaching and learning site. This is where their beliefs and knowledge will take shape in curriculum, instruction, and student growth. The assessment and community sites provide access to

differentiated curriculum and instruction. Once they have begun to translate beliefs, knowledge, assessment results, and community values into teaching and learning, Katherine and Mattie move back and forth from one site to another, continuing to gather data to inform instruction.

Process. Analyzing how Katherine and Mattie learn to differentiate can identify differences in their understanding and practice. Determining these differences may offer clearer guidelines for preparing the novice and suggest stronger support structures for sustaining the near expert as they strive for competence in addressing student variance.

How Katherine Progresses in Her Learning. Katherine is skillful at linking differentiation with integrated, concept-based curriculum and essential understandings (Erickson, 2001; Wiggins & McTighe, 1998). This linkage is comfortable and logical for her – she sees these elements as naturally interdependent. Katherine is masterful at balancing skills and challenge, a state that Csikszentmihalyi (1997) says leads to "flow." For example, during one hour while Katherine teaches reading, I observe two seven-minute spans when she and the kids are 100% in "flow," with literally not a sound in the room except pages turning and an occasional shuffle. Katherine thinks this level of student engagement might be due in part to exemption from the parallel block schedule and she questions whether the same degree of growth would have occurred for her students, Mattie, or herself if they had the constant interruption of changing classes.

Katherine creates learning experiences characterized by the respect, risk-taking, and student-centeredness evident in the learning community (McLaughlin & Talbert, 1993). By instructing students in the principles and practice of differentiation and

encouraging them to add their own concepts to the lenses used for learning, Katherine invites her students to share in the pedagogy as well as the discipline of the classroom.

Student growth, as an outcome of engagement and autonomy, is Katherine's goal and the hard-earned reward for continually visiting all the sites on her roadmap. Scores on standards tests at the end of this year document significant growth for most students, especially in social studies and science -- content she had targeted specifically for differentiation this year. Without hesitation, Katherine attributes the credit for the students' success in science and social studies to differentiating curriculum and instruction. Echoing the research of Battistich, et al (1995) correlating student-centered communities and positive student outcomes, particularly among disadvantaged populations, Katherine says:

> The content scores improved so dramatically because of differentiation. I am convinced of this...The facts stuck because they were scaffolded into existing information, taught at the students' readiness levels, hooked in with interests, and nailed down with instruction targeted to the students' strongest learning styles...Differentiation works in a Standardized Testing World. It isn't just something we "could" and "should" all do if it "weren't for these darn tests." We can't afford NOT (emphasis in original) to do it and expect to meet state standards, especially in low socioeconomic areas like Redlands.

Katherine's learning about responsive teaching convinces her that differentiation and standards testing must support each other, in contrast to conclusions drawn by Ducette, Sewell, and Shapiro (1996). Convinced of the connection between autonomy and student growth, Katherine worries that Mattie's weaknesses in math, science, and technology

could adversely affect her students' test performance in May (Darling-Hammond, Wise & Klein, 1999). Katherine supports Mattie by providing resources on statistics and probability, for example, but Mattie feels the pressure of time and the complexities of teaching working against her, a condition described by Howey and Zimpher (1996) as common for novices. Standards test scores in math at the end of the year heighten Katherine's worries about how Mattie's content roadblock might have affected instruction. When she disaggregates the math scores Katherine finds the students' lowest performance on the statistics and probability strand Mattie had taught. This circumstantial evidence strengthens Katherine's case for best practice, differentiated curriculum and instruction.

Raising student achievement by emphasizing curriculum integration, differentiation by learning profile and interest, and social development turns this classroom of kids who "need a lot of love" into a group of autonomous learners. Clear evidence of students' growth confirms Katherine's already strong belief -- her application of differentiation and best practice curriculum design is working (Robinson, 1998). Student autonomy strengthens Katherine's understanding and practice of differentiation in three important ways. First, test data at the end of fifth grade give Katherine proof of student and teacher competence and confirm that students are taking responsibility for their own learning, getting the support they need to risk and persevere, and making significant gains. Second, this confidence building allows Katherine to articulate the connection between what is taught and what is learned, and provide a language for Mattie by defining what teachers should know, how they might act, and what judgments they might make (Doyle, 1990). And third, an increase in confidence helps Katherine see

herself as a maturing decision-maker rather than a novice technician (Zeichner & Liston, 1987). This realization lends a critical sense of purpose and a new importance to her work.

Katherine is not sure she has learned adequate coaching skills for mentoring Mattie. She knows her model of teaching and instruction is sound, but coaching is different. Katherine operates at an intuitive level when designing curriculum and integrating content and it is challenging to communicate this process of planning and design to Mattie. This process is exhausting and frustrating and requires a huge time commitment from Katherine; she gives several hours of every Sunday afternoon for eight weeks to coach Mattie. As her confidence in mentoring grows, Katherine becomes what Beasley, et al. (1996) call an "intentional learner" with Mattie, articulating the process of differentiation to enrich their collective understanding. Intentional learning encourages Katherine to refine her own theory of differentiation, making new adjustments to improve her practice.

In summary, Berliner's (1988) stages of expertise are a helpful framework for assessing Katherine's learning process in understanding and practicing differentiation. Berliner's research describes a proficient teacher as intuitively analyzing options and making appropriate decisions, generalizing based on themes that develop through applied practice. An expert teacher's performance is seamless, responding primarily in nonanalytic ways and apparently simply sensing the appropriate response to most events and circumstances. Berliner's description of an expert includes this caveat, "When things are going smoothly, experts rarely appear to be reflective about their performance" (p. 6). Taking into account Katherine's unfailing commitment to reflection, it appears that

Katherine's understanding and practice of differentiation falls somewhere between Berliner's description of proficiency and expertise, a level I believe can be called reflective adeptness. According to Morris (1973), one who is proficient has gained a high degree of competence through training while one who is adept has a natural aptitude improved by practice. The latter definition connotes Katherine's general level of competence; reflective adeptness seems to capture the particulars as well -- her constant self-assessment, reflective action, theory testing, and model building.

Bringing together the content, context, and process of Katherine's reflective adeptness in differentiation generates a new view of her journey toward expertise (see Figure 12). At the outset the need to differentiate drives Katherine's practice. As her commitment to differentiate for all learners strengthens and her performance advances to the reflective adept level, Katherine sees herself as "driving the differentiation." Katherine moves through every stage on her journey, from discovery to driving the differentiation herself. Consistent reflection enables her to cycle continually through all stages, building competence.

How Mattie Progresses in Her Learning. Before she arrives in Katherine's class, Mattie predicts that her experience in the differentiation study group has given her the confidence she will need to differentiate curriculum and instruction (Birchak, et al., 1998). Soon after student teaching begins, however, she sees the complexity and challenge of constant differentiation are greater than she imagined. Mattie finds she is still struggling to grasp the basic principles of differentiation; they are working against all she has learned before in every teacher preparation class. With the exception of the Methods course, no other class provided anything more than a vocabulary definition of

The Content, Context, and Process of Understanding and Practicing Differentiation
Katherine's Stages of Learning

Through induction she...
DISCOVERS THAT STUDENTS DIFFER AND THEIR NEEDS MUST BE MET...

Immediately she begins to...
DOUBT CAN I DO THIS? HOW CAN I DO THIS? CAN THE KIDS DO THIS? CAN THE PARENTS UNDERSTAND THIS?

Her doubts push her to....
DERIVE THEORY, RESEARCH, MODELS

Knowledge modifies existing theories and ...
DIFFERENTIATION BEGINS TO DRIVE PHILOSOPHY

Enacting her philosophy means she...
DOES APPLY THEORY IN PRACTICE

After practice she....
DETERMINES STUDENT REPONSE TO DIFFERENTIATION

Student response enables her to....
DISCARD WHAT DOESN'T WORK AND REFINE

Driven by Ongoing Reflection

Figure 12. Katherine moves through these stages as she learns about differentiation.

(Figure continues)

Refining and improving she...

DOES, DETERMINES, AND DISCARDS again and again...

Increasing competence, confidence, and predictable student response motivates her to...

DIG FOR DATA TO SUPPORT HYPOTHESES ABOUT STUDENT SUCCESS

The evidence confirms her hypotheses and she...

DECIDES DATA SUPPORTS DIFFERENTIATION

Confirmation of teacher and student competence helps her...

DEFINE A CLEAR COMMITMENT TO DIFFERENTIATION

Commitment leads her to...

DRIVE DIFFERENTIATION

Driven by Ongoing Reflection

Novice | **Advanced Beginner** | **Competent** | **Proficient** | **Reflectively Adept** | **Expert**

Katherine's Location on the Understanding and Practice Continuum

Figure 12 (continued).

differentiation and none used the model itself in class. Mattie realizes that her preparation for a totally differentiated classroom has not been sufficiently multi-dimensional at the "micro" level as recommended by Freiberg and Waxman (1990). Arriving in Katherine's classroom in the spring semester, Mattie discovers the process of differentiation is in place -- students are accustomed to it and even expect it -- and Katherine has set a rapid pace for enacting the process. Without a deeper knowledge of content, curriculum design, differentiation, management, and the role of the learning community, and at the same time dealing with self-system processes that compromise her self-confidence, Mattie is out of sync with the process and pacing of Katherine's differentiation.

Mattie depends on Katherine for intensive modeling and coaching on best practice curriculum design, as recommended by Tomlinson, et al. (1995), because this design concept puts Mattie outside her comfort zone of learning. Within a few weeks of her arrival in Katherine's class, Mattie realizes the limitations of her lesson planning experience and begins to deal with a roadblock in content that hinders student learning as well as her own. The pressure to map differentiated, best practice lessons for a week at a stretch becomes overwhelming and Mattie cries for help.

Katherine answers Mattie's pleas with consistent modeling and dogged insistence on clarification of the "KUBATD," and, finally, Mattie's re-shapes her approach to curriculum design. Katherine's firm stance on high quality lesson design and her refusal to provide hollow praise for a "less than" effort helps Mattie resist the urge to compromise her transforming beliefs about student needs, an otherwise common outcome of many student teaching experiences according to the research of Feiman-Nemser and Buchmann (1990). In the last two weeks of student teaching Mattie reports that the best

practice design process is easier and that differentiating lessons is "second nature" (Britzman, 1991). Katherine confirms this by happily describing Mattie's lessons as "solid."

As Mattie struggles to assume full responsibility for instruction, Katherine urges her to use teacher manuals accompanying textbooks in math, science, and social studies. She does this because she knows that Mattie needs the structure and scripting they will provide (Berliner, 1988; Hollingsworth, 1989). The one-size-fits-all manuals at hand trouble Mattie, however, and she longs for manuals in math, social studies, and science that can "teach me how to differentiate the content – textbooks that are better." She has seen teacher manuals streamline the planning process for her peers and thinks that manuals with ideas for content differentiation by readiness, interests, and learning profiles would be a valuable resource for her (Lampert, 1984).

While Mattie wrestles with curriculum design, she also attempts to differentiate each lesson because Katherine's students expect it; a contextual accommodation that Giroux and McLaren (1986) point out can be difficult for novices. She begins to develop a definition of diversity for Katherine's students and attempts to connect curriculum and instruction to this definition, a task Tomlinson, et al. (1995) and Melnick and Zeichner (1998) describe as extremely challenging for preservice teachers.

Katherine models the creation of adaptive tasks (Rohrkemper, 1990) for Mattie to provide a moderate challenge for learners. Katherine shares her 3-D view of curriculum with Mattie and tries to show her how differentiation "boosters" could support students as they make leaps in understanding from known to expected performance levels (Vygotsky, 1978). Trying multiple entry points in coaching Mattie, based on Faulk's (1996)

recommendations, Katherine finally succeeds in helping Mattie see the multi-dimensionality of all learners (Gamoran & Weinstein, 1995). According to Lidstone and Hollingsworth (1992), Mattie seems to be operating at a high level of cognitive processing as she consciously matches instructional strategies to student needs. Mattie sees real gains for students in word study, reading, and social studies as she becomes more skilled at adapting tasks. In her adverb lesson she recognizes that purposeful differentiated tasks increase student engagement and virtually eliminate management problems. Katherine's modeling and her collaborative reflections with Mattie bring to attention the critical importance of student autonomy, but Mattie does not clearly define autonomy as a primary goal of teaching (Feiman-Nemser & Buchmann, 1986). She continues to envision the teacher as teller and the student as listener (Nelson & Hammerman, 1996).

In assessing Mattie's progress as she learns how to differentiate, Lidstone and Hollingsworth's (1992) Model of Complexity Reduction is a useful tool for interpretation. At first, Mattie is "subject/student learning focused," which is an unlikely beginning based on the research (Lidstone & Hollingsworth, 1992, p. 47). Most beginning teachers start at the management/subject level, but for Mattie her attention to management at the beginning is overridden by her attention to student needs. As a result, she develops what Lidstone and Hollingsworth call a "routine" (p. 45) level of processing student learning by the end of student teaching and even reaches the comprehensive level to some degree, but her subject and management processing remains at the rote level where beliefs and teaching performance are in conflict.

Starting with the needs of students increases the complexity of teaching for Mattie. She states in an interview that she might profit from "more praise" from Katherine and her remark suggests Katherine might profit from training in mentoring. The fact that Katherine does take reflective action to make adjustments in her coaching no doubt helps to increase the level of comprehension Mattie reaches, but she is unable to help Mattie find a better balance of management/content/student learning to reduce the overall complexity. According to Paine (1990), however, Mattie's decision to begin with the needs of students is where all preservice teachers should start and continue to focus their learning to teach.

As long as Katherine is modeling and coaching, Mattie's progress seems steady, but when Katherine pulls away, Mattie falters. Katherine's expectation is that Mattie will be making decisions like those at what Berliner (1988) describes as the competent stage, where teachers make curriculum and instruction decisions, understand what to address and what to ignore, and perfect their timing. At the rote stage of learning content and management, however, Mattie is unable to apply her beliefs in all contexts. She actually deconstructs the process Katherine models for her at the outset; her first word study and reading lessons are nearly seamless, but later lessons become disjointed, ambiguous, and fraught with distractions. She struggles with the interpretation of events and searches for ways to establish habitual responses in management and instruction (Berliner, 1988). While she applies Katherine's positive management style in the first weeks, by the fourth week she abandons that approach for a punitive model.

A synthesis of the content, context, and process of Mattie's learning to differentiate creates a series of stages she moves through on her quest for expertise (see

Figure 13). Unlike Katherine, Mattie begins with instruction but soon finds differentiation driving her philosophy, just as Katherine does. She also doubts her ability to differentiate, as Katherine does at the beginning, but doubt recurs for Mattie almost every step of the way. She proceeds to the do-determine-discard stage, frequently cycling through those three steps. Rather than digging for data as Katherine does, the data often surprise Mattie, helping her to generalize from specific contexts and build support for differentiation. The content, context, and process of Mattie's learning experience with Katherine leads her to adopt differentiation as a disposition (Archambault, et al., 1993) and proclaim that it will drive her teaching when she has her own class.

Qualitative research enables us to hear personal stories (Carter & Anders, 1996) that describe the learning experience of Katherine and Mattie, largely in their own words. As they learn the "what" and "how" of differentiation, they pass through certain stages of development together, but are often miles apart. At times they are both in the do-determine-discard stage as they co-plan and co-teach, but Katherine operates at a level of reflective adeptness while Mattie is a novice with management, content, and pedagogy, an advanced beginner with curriculum and instruction and some differentiation, and occasionally competent in differentiation and lesson design (Berliner, 1988). They both progress in their journey, but at different rates and levels of sophistication. Katherine reaches out continually to give Mattie a helping hand and Mattie supports Katherine with her beliefs, interest, and determination. Self-system processes, prior experience, and the complexities of learning to teach responsively maintain a distance between them, but they each discover evidence that reinforces a commitment to respond to the needs of all learners in spite of frustrations and obstacles that block the way.

The Content, Context, and Process of Understanding and Practicing Differentiation
Mattie's Stages of Learning


Through instruction in theory, research, and models she...
DISCOVERS THAT STUDENTS DIFFER AND THEIR NEEDS MUST BE MET...


Immediately she begins to...
DOUBT CAN I DO THIS? HOW CAN I DO THIS? CAN I DO THIS ON MY OWN? CAN I DO WHAT THE KIDS EXPECT?


Her doubts push her to....
DERIVE THEORY AND RESEARCH FROM MODELING AND COACHING


She begins to...
DOUBT CAN I LEARN ENOUGH? WILL I KNOW HOW TO USE IT?


Knowledge modifies existing theories and ...
DIFFERENTIATION BEGINS TO DRIVE PHILOSOPHY


Enacting her philosophy means she...
DOES APPLY THEORY IN PRACTICE


She begins to...
DOUBT AM I ORGANIZED ENOUGH? DO I KNOW THE CONTENT? IS MY PACING RIGHT? ARE THE KIDS WITH ME?

Driven by Ongoing Reflection

Figure 13. Mattie moves through these stages as she learns about differentiation.

(Figure continues)

After practice she....

DETERMINES STUDENT REPONSE TO DIFFERENTIATION

She begins to...

DOUBT IS MY LESSON DESIGN CLEAR? ARE THE KIDS ON TASK? AM I MEETING THEIR NEEDS CORRECTLY?

Student response enables her to....

DISCARD WHAT DOESN'T WORK AND REFINE

Refining and improving she...

DOES, DETERMINES, AND DISCARDS again and again...

Increasing competence and positive student response sometimes reveal....

DATA THAT SURPRISE HER, BUILD HER CONFIDENCE

Increasing confidence and competence make her...

DECIDE THAT DIFFERENTIATION WORKS AND SHE WILL USE IT

Driven by Ongoing Reflection

Novice | **Advanced Beginner** | **Competent** | **Proficient** | **Reflectively Adept** | **Expert**

Mattie Moves Among These Points on the Understanding and Practice Continuum

Figure 13 (continued).

Chapter Five

Conclusions and Recommendations

If, as Ducette, Sewell, and Shapiro (1996) maintain, all teachers should match instruction to students' strengths and preferences, then all classrooms should be differentiated. The current study focused on one such classroom, Katherine's students who "need a lot of love." If all classrooms are differentiated, then students would most likely expect and even demand instruction that addresses and celebrates their unique abilities, interests, and strengths. This poses a serious challenge for student teachers who are placed in differentiated classrooms. The current study follows Mattie, a student teacher placed in Katherine's fully differentiated class and analyzes the content, context, and process as the preservice and inservice teacher make sense of responsive teaching. The findings of the study offer insights into the stages preservice and inservice teachers travel through as they progress toward expertise in differentiation. Results of time and motion studies completed as part of the investigation indicate trends in differentiated lessons and provide a means for monitoring differentiation in action. In addition, analysis of Katherine and Mattie's lived experience within the context of each stage of development, (Erickson, 1986), brings to light several suggestions for reducing the challenge of differentiation for preservice and inservice teachers. These insights and suggestions could be critical in maintaining the momentum of preservice and inservice teachers like Mattie and Katherine as they learn to teach responsively.

Stages of Learning Differentiation

The gulf that separates Katherine and Mattie as they move through the stages of understanding and practicing differentiation can be explained by the following factors:

1. Katherine's entry into the first stage is quite different from Mattie's. Katherine enters the learning process with an intuitive belief about the need for differentiation, although she has no "vocabulary" to attach to the vision. Conversely, Mattie has no vision of differentiation and learns the vocabulary first. The situation of this learning context makes the contrast significant (Lave & Wenger, 1991). Katherine's vision of differentiation develops within a context of meaningful personal experiences while Mattie's vocabulary of differentiation is presented in a largely context-free college classroom. Katherine's introduction to the vocabulary of differentiation comes at about the same time as Mattie's, during college. It appears, however, that Katherine's already developed schemata about the special needs of students provides fuel to accelerate her understanding and practice of differentiation (Bransford, Brown, & Cocking, 2000). Without an existing schema, Mattie's progress is slower.

2. Katherine is an identified self-regulator according to Connell and Wellborn (1991); her autonomy is founded on well articulated goals, intrinsic motivation, and self-teaching. Mattie's self-regulation is introjected; she is only partially autonomous because her goals and learning are to a great degree extrinsically motivated. These self-system processes maintain the gulf between Mattie and Katherine, even as Mattie gains speed.

3. Katherine has the advantage of nearly two years of teaching and enacting differentiation in the authentic context of a diverse classroom. While Mattie has field experiences in every teacher preparation course, her Methods course is the only one focused on teaching differentiated lessons. In addition, this course is the only one modeling differentiation in class.

4. Because of the differences in their content knowledge and contextual practice, the stages of learning differentiation are not the same for Katherine and Mattie. Katherine moves through the entire process, retracing her steps over time -- weekly, monthly, yearly -- gaining momentum as student engagement, autonomy, and achievement are produced. Mattie moves through similar stages but is plagued by lingering doubts. Because she has a harder time predicting student outcomes (Berliner, 1988), Mattie does not go in search of confirming data but is surprised, relieved, and strengthened when she sees her differentiation works.

5. Reflection moves Katherine and Mattie from one stage to another in the process of learning differentiation. Their ongoing critical inquiry (Anderson & Herr, 1999) helps them analyze their actions and the reactions of students and propels them forward on their journey to expertise.

Time and Motion Studies

Time and motion studies in the current investigation yield quantitative measurements of differentiated learning experiences. By recording interactions between the teacher and individuals or groups of students, it is possible to track the frequency of differentiation in a given lesson. Applying coding procedures within each study makes it possible to document the frequency of specific interactions such as positive feedback. If positive feedback is considered an essential component of community building, then results of time and motion studies of positive feedback might be used to set goals for building student autonomy and conferring status. Codes such as clarifying directions or pushing thinking provide a means for identifying the degree of match between the planned differentiation and the response of students.

The Lived Experience of Differentiation

The challenges of differentiating for a diverse class of learners are considerable for Katherine and immense for Mattie and they present certain problems that cause frustration and discouragement for both. To some degree Mattie and Katherine find themselves trying to open new doors into learning differentiation with only a partial set of keys. Describing the keys that they need may open the doors for others and make their journey toward expertise in differentiation more manageable:

1. Mattie needs keys for managing the learning community, teaching content, and designing best practice lessons and they are missing or do not fit.

2. Katherine and Mattie together need a key for co-teaching and co-planning within the student teaching placement; that key is only partly made and will not open the door.

3. Mattie is overwhelmed by the task of creating differentiated lessons aligned to content standards; she needs keys to resources for differentiated lessons that are user-friendly for preservice teachers.

4. Katherine struggles in her role as a mentor and tries to find a key to more resources and time for coaching Mattie in differentiation and best practice curriculum design.

Implications for Further Study

This study is limited to the lived experience of one preservice and one inservice teacher. It is important to recognize that Mattie's teacher preparation is specific to the context of Blue Mountain College and that Katherine's teaching environment is specific to Redlands Elementary School. Mattie and Katherine's individual histories and personal characteristics also influence their thinking and actions together. Consequently, while results of this research might be generalized to preservice and inservice teachers like

Mattie and Katherine, the findings of the study also suggest a number of issues for future investigation in a broader context. In particular, at least five issues warrant additional inquiry: (a) teacher preparation and differentiation; (b) support structures to make learning differentiation manageable; (c) evaluation of the content, context, and process stages of learning to differentiate; (d) the use of time and motion studies for reflective practice; and (e) longitudinal studies of preservice and inservice teachers as they progress on their journey to expertise in differentiation.

Teacher Preparation and Learning Differentiation. The current study finds Mattie's path to competence in differentiation blocked by several key factors related to her teacher preparation program. While Mattie seems comfortable with the content in language arts and social studies, her knowledge of math, science, and technology is limited. Even with Katherine's help Mattie devotes much of her planning time to teaching herself probability, statistics, weather, and spreadsheets. This is time consuming and confusing; she often has difficulty even locating content material correlated to state standards. As a result she makes several dramatic mistakes during instruction, which confuse students, puncture her self-confidence, and slow her progress.

Mattie struggles with designing appropriately differentiated lessons that target essential understandings linked to larger concepts. Her experience designing lessons within this framework is cursory. Katherine finds herself more often teaching lesson design than coaching Mattie. As Mattie becomes overwhelmed she and Katherine attempt to co-teach and co-plan, but she is unsure of this solution. With no clear structure in place, Mattie worries that what she is doing is too different from her peers and that her

student teaching portfolio will not present a clear, convincing picture of her ability to teach on her own.

Mattie's teacher preparation courses pay only peripheral attention to management before student teaching begins, the role of the learning community in effective differentiation is largely unexplored, and modeling of differentiation in class is almost non-existent. Her teacher preparation program is lacking the "conceptual coherence" Howey and Zimpher (1994, p. 156) recommend. Having no clearly defined philosophy about learning communities, Mattie falters, indecisive about developing the context for her own teaching. Taking random advice from friends and family, she grasps for quick solutions to complex problems and encounters roadblocks when her modifications in the learning community conflict with differentiation.

Katherine and Mattie work hard to fit the context of the differentiated classroom to the timeframe of Mattie's student teaching placement. They are given permission to extend Mattie's placement to 12 weeks because they realize six weeks will not give her the time she needs to assess for effective differentiation. This time factor impacts Mattie's pacing, her sense of belonging, her understanding of Katherine's differentiated management, and her faith in co-teaching/co-planning.

These findings call for additional research in several areas and should interest educators concerned about preparing preservice teachers for diverse classrooms. It would be helpful to pilot and evaluate a sequence of teacher preparation courses designed to teach as well as model best practice, differentiated curriculum and instruction. There is a need to create opportunities for prospective elementary teachers to learn state and national standards aligned content and supporting pedagogy. It could be important to

measure the outcomes of such restructured courses and pilot programs to consider their effect on student teaching placements. Research to pinpoint resources best suited to provide optimum modeling and support for preservice teachers learning about differentiation may provide valuable guidelines for colleges and universities considering a new scope and sequence of courses. It may be helpful to more clearly define the relationship between a student-centered learning community and effective differentiation and determine how this definition would fit as a centerpiece in a new sequence of teacher preparation courses. Issues related to management and learning communities suggest it might be wise to study a full-year placement for preservice teachers learning to differentiate. It could be valuable to evaluate such a placement in terms of content, context, and process to further define the stages that novices negotiate as they learn about differentiation. Analysis of the resulting data could lead to the creation of new support structures that might prevent the deconstruction of process, community, and confidence that Mattie experiences.

The findings also point to the need for additional research on alternative schedules for solo student teaching in a differentiated classroom. We need choices of tested, effective co-teaching plans that could provide the scaffolding Mattie needs.

Support Structures to Make Learning Differentiation Manageable. Katherine spends dozens of non-contract hours coaching Mattie on planning. Time during the school day is minimal and before and after school is filled with student, parent, and school-related obligations. Katherine becomes frustrated, not knowing if her mentoring is effective. She has the full support of her principal, but most other teachers in her school are suspicious of her innovations and success. Katherine searches for ideas and strategies

that might help Mattie and make the learning of differentiation more manageable for them both.

Although wary of the recipe approach of most teacher manuals, Katherine decides that they might supply the structure and scripting Mattie needs. Katherine's ability to synthesize, her content knowledge, and an intuitive sense making of best practice curriculum design allow her to draw from multiple sources to map out a week's lessons. This task is nearly impossible for Mattie and Katherine encourages her to use teacher manuals in science, social studies, and math as she takes on a full teaching load. Mattie quickly finds, however, she must redesign the textbook lessons to meet the range of needs in this class.

Given these findings, it might be valuable to explore elementary school scheduling options that would build in time for planning differentiated curriculum and instruction. These findings also suggest that training in differentiation for mentors might be supportive of clinical instructors and student teachers alike. A study of the effectiveness of such training programs might lead educators to new ways of bringing inservice teachers together for ongoing support and reduce the kind of professional isolation Katherine experiences.

This study also suggests a need for more research and development focused on resources for inservice and preservice teachers. These resources should be correlated to state and national standards, specify the "know, understand, and do," be concept-based and interdisciplinary, and offer multiple options for differentiation, well beyond the typical "remedial, grade level, extension" activities. There is a critical need to pilot such

resources with preservice and inservice teachers to measure their effectiveness in expediting advancement toward comptence in differentiation.

Evaluation of the Content, Context, and Process of Learning Differentiation. Katherine closely monitors her students' performance relative to differentiation each year. Last year her students made large gains in reading, the only subject she differentiated consistently all year. While her students tend to grow in all areas because she is a strong teacher, Katherine credited the gains in reading to differentiation. Katherine's confidence level rose due to student growth in reading and this led her to set a specific goal: she would differentiate curriculum in all subjects by the end of the second six weeks this year. Her students' growth convinces her that differentiation is not only working, but is the prime factor producing the gains.

Laura Hooper, Redlands' principal, gives Katherine support and encouragement for her careful data analysis to assess the effects of differentiation and agrees to exempt her from the parallel block schedule. Fortunately, Ms. Hooper is trained in differentiation and can give Katherine valuable feedback after observations. In many schools the leaders are at the beginning stages of learning differentiation and can offer little assistance or scaffolding to their teachers. Ms. Hooper's advice and encouragement help to counterbalance the lack of support Katherine has from other teachers in her school.

For Mattie, assessing her process of learning differentiation is difficult on several levels. Her 12-week placement does not allow the opportunity for long-term data comparisons. Difficulties with predicting outcomes are common for novices as Lidstone and Hollingsworth (1992) attest and shift Mattie's attention to short-term results. Katherine's emphasis on the importance of assessment and reflection forces Mattie to

focus as often as possible on her gains or losses in learning to differentiate. Mattie's evaluation by the Redlands' principal also provides important feedback. Mattie's supervisor from Blue Mountain College encourages Mattie but operates at the novice level of understanding differentiation and can offer little real support.

The current study suggests the need for fair and informative evaluation instruments for facilitating the progress of learners like Mattie and Katherine as they learn to teach responsively. There is a critical need to explore options for moving principals and college supervisors through the content, context, and process of learning to differentiate and to study the effects their training would have on preservice and inservice teachers' efforts to address diverse needs in the classroom. At the same time, these findings call for additional study of the parallel block schedule and its effects on differentiation. Considering that all of Jefferson County's elementary schools are adopting some form of this schedule, there is a need for evaluation of how the parallel block may affect the learning community and a teacher's efforts to differentiate.

These findings also point to the need for more research on the effect of differentiation on standards testing. Researchers might analyze the influence of student engagement, autonomy, and achievement on standards testing performance. It is possible that the results of such research could influence the construction of standards tests for diverse student populations. In addition, the current study suggests that more research on the correlation between degree of differentiation and student achievement might help sustain and even accelerate teachers' progress through the stages of learning to respond to student variance.

Time and Motion Studies for Reflective Practice. Time and motion studies of Katherine and Mattie enacting differentiation document when and how specific interactions occur during instructional activities. Studies over time show that positive feedback constitutes the highest proportion of Katherine's interactions. In contrast, Mattie gives positive feedback less often and less consistently. Time and motion studies also show that Mattie makes fewer management interventions in the latter weeks of her student teaching. By coding interactions for "pushing thinking" it is possible to measure the degree that Katherine "differentiates on the fly" by "kicking it up a notch" or making other on-the-spot adjustments in differentiation.

These findings suggest more research with time and motion studies of differentiation might illuminate the effectiveness of differentiation in terms of individual response to readiness, interest, and learning profile modifications. It is also possible that further research on time and motion studies could lead to an investigation of their potential as evaluation instruments for principals and supervisors. The current findings also point to a need to explore how time and motion studies might expedite reflection as peer assessment tools. Measuring the effects of time and motion studies as evaluation and reflection frameworks could lead to new support structures for preservice and inservice teachers learning to differentiate.

Longitudinal Studies of Preservice and Inservice Teachers. The study of Katherine and Mattie's lived experience in learning to differentiate calls for long-term investigation of the subsequent stages of the preservice teacher's journey. Such an investigation may determine additional factors that accelerate or impede progress in learning to differentiate as the beginning teacher works in a diverse postmodern

community of learners. Novices appear to struggle with issues of content and management regardless of whether or not they are placed in fully differentiated classrooms like Katherine's. Therefore, it might be helpful to study the effects of forced maturation when preservice students begin their teaching by addressing the learning needs of students as Mattie did. Long-term studies should help us understand the influence of self-system processes such as confidence, control, and autonomy on preservice and inservice teachers as they attempt to refine their knowledge and practice of differentiation. We need to expand the existing study to hear from many more preservice and inservice teachers who are learning to differentiate across a wider range of settings and thus augment the coaching and modeling ideas that Katherine uses with Mattie. We need to refine existing definitions of the stages that preservice and inservice teachers cycle through as their understanding and practice of differentiation mature. We need to know what factors will sustain an inservice teacher like Katherine as she searches for her "Camelot" school and confirmation that she is mastering the craft of responsive teaching. And we need to discover the means for providing a preservice teacher like Mattie with more coherent preparation, stronger support structures, and more effective resources to remove roadblocks and accelerate her progress as she defies the odds and begins her career by responding to student needs.

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APPENDIX A

Glossary of Differentiation Strategies

Compacting	Using results of informal and formal assessment and pre-assessment to identify areas of student strength in order to provide opportunities for "buying time" to offer more challenging curriculum or accelerating the pace of instruction. Reference: Renzulli, J. & Reis, S. (1994)
Cry for Help	Cooperative learning strategy for review or reinforcement: a team representative is sent to a chart to record essential information on cue and decides whether or not to give up points by "crying for help" to teammates. Reference: Unknown
RAFT	Method for differentiating tasks based on interests, learning profile, and/or readiness: students must understand and assume a key **R**ole related to content (such as a blood cell), communicate with a key **A**udience (such as the heart), utilize a specific **F**ormat (such as writing a travelogue), and respond to a specific **T**opic (such as "Where I go after I leave you"). Reference: Nancy Vandervanter, an English teacher, developed the RAFT as part of the Montana Writing Project (Project CRISS: Creating Independence through Student-owned Strategies: Kendall/Hunt Publishing Co., Dubuque, Iowa)
Five Finger Test	An informal self-assessment for independent reading in which the student reads a full page of a selection and holds one finger up for each word he/she is unable to decode; if five or less fingers are up the book should be suitable and if more than five fingers are up the student should find another book and try the test again until the difficulty of text matches the independent reading level Reference: Similar strategies can be found in books by Fountas & Pinnell and J. David Cooper
ThinkDOTS	An instructional strategy similar to cubing for differentiating by interest, learning profile, or readiness. Six tasks for each level or category of differentiation are printed on a master page, each task is marked on the back of the page with a dot corresponding to the dots on a die, the tasks are cut apart and laminated, holes are punched through all six, and they are placed on a ring. The student rolls a die, flips to the corresponding ThinkDOT card, and completes the activity. Can be used for review, extension, or as an assessment.

APPENDIX B

Confirmability: Uncoded and Coded Data

According to Erickson (1986) it is the responsibility of the qualitative researcher to persuade the reader that an adequate evidentiary warrant exists to support the major assertions made in the study. Erickson considers the research process as a "search for falsification" (p. 153) and that this problem-solving process must be documented for the audience. This documentation provides an account of the researcher's openness to identifying, recording, and reflecting on evidence that may disconfirm any preconceived notions about the data. Documents that may assist the reader in confirming the existence of an adequate evidentiary warrant include samples of particular and general description, analytic memos, and the methodological journal.

In the first stages of data collection I used a coding process (Patton, 1990) to classify particular description as a set of categories or themes emerged. I developed a system of color-coding to facilitate location of specific data within categories. At the outset these categories were: beliefs held by Katherine, Mattie, and the students about differentiation and the learning community; knowledge, skills, and attitudes about differentiation; studies of interactions within specific differentiated instruction time periods; and growth and support needed to differentiate effectively. As analysis progressed, some concepts embedded within categories became themes themselves. For example, it became obvious that assessment was such a significant aspect of differentiation for Katherine and Mattie that it became a separate category. In the same way "self-system processes" subsumed the category of "attitudes" for Katherine and

Mattie, and the learning community became a stand-alone code because of the strong role it played as analysis evolved.

Lincoln and Guba (1985) recommended triangulation as a technique for increasing the probability that findings would be considered credible. Below are samples of data from Mattie and Katherine within major coded categories across interviews, observations, and reflection journals.

Samples of Particular Description of Katherine with Coding Categories Indicated

Learning Community

Interview (K: #1, p. 10).

K: When I was in college they said I had to have a philosophy of education. I had to have rules. I had to have a very few number of rules that covered a lot of things. I have three rules. One is: we respect everyone and everything. Another is there's always something to do. That's just something we've always done. When they're done it's their choice what they go to and I just remind them to always make a good choice about where they're going. For the most part they do. Everything in my room is about choices. You have a choice to do or a choice not to do and then consequences. They do a lot with choice/consequences and direct responsibility. Everyone in the room is responsible for their learning. it keeps me from having to be a policeman too much.

Observation (K: 5/3/01).

(This is an observation of Katherine during a differentiated segment of the reading block.)

Katherine asks those on the rug to read the next paragraph silently in their brains. Then she goes over to the rug by the book corner and checks on the girls there. [ON: All the

girls who are reading are on the rug, except for Pebble who chooses to sit at her desk.] Katherine stops to see Michael's log on the way back to the front rug. She tells him he needs to make better choices because he's not working through the tasks assigned during reading. Then she checks on Nathaniel's work and encourages him to find more unfamiliar words. [ON: Katherine says "I really like the way the group on the floor has been reading silently, searching for fact and opinion words."] Travis asks to go to the bathroom and Katherine tells him she'd like to wait and excuse everyone after this activity unless it's an emergency. Everyone in the room is totally on task for about the next 6-8 minutes, reading, concentrating, it's completely quiet. [OC: I am very aware of these moments. It strikes me that this is quite uncommon – that an entire classroom of students is this focused for this length of time during the school day. Not only that, it is obvious that, rather than being uncomfortable with this silence that is so unusual in school, they are very comfortable with it and used to it.]

Reflection Journal (K: 4/2/01, pp. 2-3).

K: The environment was created before the differentiation happened effectively. They go hand in hand; especially with the "bugs, glass, mud" thing. They can only say they are "clear as mud" if the environment is non-threatening (no one will tease them, they won't get a BAD grade). Students have to feel it is ok to make a mistake and to persevere to handle task cards independently. Students need to have a lot of team building and modeling before they can work effectively in groups, again, this sets the environment to differentiate. If the students feel threatened or "unsafe," as they did at times with the student teacher, they go into "self preservation mode." They get defensive. They tend to buck when they are asked to do things.

Self-system Processes

Interview (K: #5, pp. 11-12).

K: Confidence is a big thing. The thing about first year teachers you come into a situation and you come into a grade level that is pretty firmly entrenched. There is all that wanting to be a part of the group and to do what everyone else is doing. Peer pressure. You come in with a lot of ideas and you meet with a lot of discouragement so you start doubting. I did. I started to doubt. You know in college they said that this was really the best way to go, but everybody else is doing it this way so I had to really find myself last year. I mean the first year of teaching is hard because you have to pull it all together and I think by the end of the year I had the confidence to say doggone it what I'm believing and what I am doing is actually working... I think I was really worried too before they took the test. I had sat down with the principal and said I know you think that I'm just doing gangbusters, but I hope there is data to support it because I'm really very into data...I came in this year going okay I might be a little different, but what I am doing is working, and I've got the numbers to prove it and I've gotten a lot less sensitive to the criticism and the jokes you know from my colleagues about the way our room works.

Observation (K: 5/10/01, pp. 2-3).

(This is an observation of Katherine reviewing math for the standards testing. I believe these field notes reveal the sense of confidence Katherine alluded to in the interview excerpt above.)

Katherine then asks them to take out their math journals and make a graph of how they shine in each of these areas. She explains that there is a purpose in this – she will use this information next week to pair "experts" with those who need extra teaching. She tells

them that the information they provide on their graphs will help her see where each of them needs a little more and where their strengths are so that they could serve as an expert. Nathaniel asks to add negative numbers as an area [ON: N. feels like an expert in this area because he finally "got" it.] Katherine tells everyone to add another area she might have left off. Everyone gets to work on his or her graphs.

Then Katherine asks everyone to get out their math books and tells them she wants them to find problems they're good at...She has prepared task cards for this part of the lesson. The cards are designed to help students locate specific pages and/or problems where they shine or where they need help. Students who need more scaffolding must locate only the pages, where more independent students have to locate specific problems they can teach or that they know they aren't confident completing. Katherine explains to the class that this task will help her to set up groups and "clinics" the following week.

Reflection Journal (K: 4/8/01).

Mattie is done this week and I need to know if I should ever have another student teacher. Part of me feels a bit responsible for this...maybe I do deserve some "blame"...Did I assume too much? Did I go too fast for her? I feel like I have been Mrs. Accommodation and Professionality. Maybe I am too much of a perfectionist to have a student teacher. Maybe I am too much of an "outlier" as Hooper (the principal) thinks.

Assessment

Interview (K: #2, p. 3-4).

K: But all of the students are at different points. Not even literally, but in three dimensions. If you looked in the whole room they'd be scattered four feet off the ground, two feet off the ground, eight inches away, eight feet away. Somehow it's more of a

blanket she's got to picture and not a straight path. To get them where they've got to go has a lot to do with where they started. Realistically they are not all going to get to the same point "X" we want them to get to. So then we have to set up some kind of incremental goal we want them to get to. Maybe they're not going to be able to do double-digit long division. You know, with eight digits in the dividend. Maybe our goal for that student might be to do single digit long division. The destinations are all the same and so it's not really a straight path. I think that's the difference that I'm seeing. Mattie wants to go from point A to point B where none of my students really exists at point A. Hopefully half of them will get to point B, but that's not where they're all going to get. Some of them are going to get to "Z" and some aren't going to get to "A". I don't know if that makes sense, but I think she wants to go straight there in one movement when there has to be multiple destinations because there are multiple entries.

Observation (K: 2/9/01, pp. 3-4).

Katherine begins the math lesson. She starts with a reminder that they had been working on Greatest Common Factors, and reviews briefly the key ideas. She asks "How many people are clear as glass?" Quite a few hands go up. "How many have some bugs on the windshield?" Two hands go up. "Is there any mud today?" Nobody puts hand up on this one.

She asks the class to remind her what the big concepts are that they are focusing on this year. One student responds: Change, Patterns, and Beauty. "Which of our big concepts helps us tell when to stop or when we've gone far enough in searching for a common factor?" One student says Patterns.

... Then Katherine says that today they're going to take pairs and find the Greatest Common Factor (GCF). She asks Eric to come up to the board since they were

working on this very idea at the back table during the spelling test. "I'm going to get Eric to help me because he's steady." Then she asks Eric to demonstrate his technique for finding the GCF. Then she demonstrates the same process using the Venn diagram. She asks for feedback and confirmation that everyone is with her, specifically targeting C. because "I haven't heard from you this morning." [ON: K uses a lot of "think alouds" to comment on student involvement, assess how things are going, and keep the kids on track.]

At this point, Katherine then asks again: "How many are clear as glass? Buggy? Any mud?" There are no mud, 2 bugs, and everyone else says clear as glass.

Reflection Journal (K: 5/7/01).

I figured out how to graph that weird thing we were talking about a month or two ago! Ok, every kid is a point in space – a 3-D grid – think of each like a spacecraft out in the void. The three axes are readiness levels in math, reading, and writing. I picked those because at elementary level these are what drive the other content areas. Ok, so you could take Stanfords or SOL scores as your basis for the three axes. We could plot Kid X as being 326 Math, 465 Reading and 472 Writing...The level we want them to reach for the state is easy to superimpose. But that number isn't realistic for everyone. We wouldn't want Kid X to go DOWN to that number, right? So we would set individual expectations for growth and improvement...So now we have a kid graphed in space with state and teacher expectations. How do we get him there? Ok this is going to sound really weird. Each kid has booster rockets on his space ship. One rocket is his preferred learning style. If we take advantage of this booster rocket he is going to get more lift and go further. The other booster rocket is his interests...

Conferring Status

Interview (K: #6, pp. 9-10).

K: I think that's where it started and the more the kids started feeling like they had status or a job or a niche in the classroom, they started becoming more responsible. Like Eric (Eric's the math wiz) and if you've got a math question you go to Eric. He was responsible for that and his behavior turned around in other areas because he knew that he was valuable and a contributor to my classroom. Especially the special ed. kids because, from what I've seen just the two years I've been in education, teachers look at them as the kids that kind of bop in and out and are not really a part of the community. Those are the kids I was really worried about – making them feel like they were a piece of the class. I think that when they feel a part of it, the behavior problems go down because they are a part of something they are proud of. Everyone is proud of our class. They don't go around cutting down their friends for the most part. Part of the bigger community is responsibility. I think that giving everyone status in some respect builds the community to the point where we can admit we can't do something because we know we can do other things really well.

Observation (K: 5/3/01, pp. 1-2).

K spent about 10 minutes praising students for their good deeds on the field trip to Richmond yesterday. She found reasons to praise everyone, even if it was just for being a good companion to their partner on the trip, or having brought their interesting parents along. At 9:35 K began going over the morning work on the board – several math problems. [ON: There is "A" work and "B" work – these are obviously differentiated by readiness and are review and distributed practice.] K says: "When I put up A and B math,

don't opt for the easiest because you can do it." With the problem 36.6 + 2.98, she asks why decimals should be in a certain place. Corrie said you have to put things together that go together. Eric said he figured out that tens went with tens and hundreds went with hundreds. [ON: K uses two terms for great work: "kiss your brain" – the kids kiss their fingertips and touch their brains, and "fireworks" and she makes an explosive sound and a similar gesture with her hands and they copy this.] K stopped to recognize that this was a "fireworks" idea by Eric…

Then K asks the class: "Where have you seen patterns?" Corrie says powers of 10 – K says "kiss your brain"; Sally says squares –K: "kiss your brain"; Ann says growing patterns, K says explain, and Ann says 1, 55, 1, 555, 1, 5555 –K: "fireworks"… (the lesson continues)

Reflection Journal (K: 4/17/01).

The things I think are most important in teaching…My number 1 conviction and driver would have to be respect and individuality. That is one of my key beliefs: community, learning environments…I would start with the specialness of each student. Learning styles…profiles…the "get to know them" kind of stuff…This, to me, is more important than even the curriculum component.

Samples of Particular Description of Mattie with Coding Categories Indicated

Management

Interview (M: #5, p. 1).

M: It went well. The math went well, language arts went well. Science started getting a little hairy towards the end of the day and all of the kids were in there. One of the students has some problems - Katina is not doing well. I had introduced the token system

with the tickets and stuff like that. Katina has a lot of things going on I think. Her sister just got finished with surgery and she basically upset everyone in the class.

K: Was this during science?

M: This was during science. The fourth graders came in about the tornado drill and that upset everything. It was hard for me to refocus them. We made it through everything. I took away a lot of tickets. Some of them were just like, whatever. I think it will really show on Friday when some people get treats and some people don't. That's just how it's going to have to go.

Interview (M: #8, p. 3).

M: Well, when "Katherine" wasn't there it was hard because I had to be aware of positioning myself when talking to a group so I could see the rest of the class. It was like I was talking with a group, but at the same time I was looking at what everybody else was doing to make sure that no one got out of control, or whatever. I had to listen to whatever the person was doing and watch them. It was kind of like doing a bunch of things at once. I had to pay attention to what everybody else was doing and then help that individual person, or group. Sometimes I found myself just skimming over a group and moving from one group to the next. It was hard to do all that. But I think it always went better when the task cards were clearer. The language had to be just right.

Observation (M: 4/2/01, p. 3).

(This is an observation of Mattie during the differentiated segment of a math lesson.)

There is a commotion on the rug. Mattie goes over and speaks to M. about having an open juice container. By 10:32 some students are finishing. [OC: Ann is done and is standing around with her hands in her pockets. She goes up to the board and starts writing

on something with the dry erase markers. Ned, Bethany, and Sally join her.] Mattie goes up front and asks the girls what they are doing. Then she tells them to do something but I can't hear what she says. [ON: Eric is ready to leave for special services. Mattie tells him to clean up his space. He says "no" and Mattie repeats her directions. Then he does clean up his stuff.] Mattie claps. The kids ignore her. "Let's try that again" – she claps, more kids clap, but not all. "Let's come to a stopping place." Mattie gets ready to do English as the kids are finishing up – she comes back to the back where I am and begins gathering some things together. She tells the students to get to their seats and begins gathering materials.

Reflection Journal (M: 3/19/01).

Monday went okay, I guess. There were so many things during the math time that I needed to do differently, easy things, like handing out the materials before explaining the directions. I also think that things needed to move a little faster in my direct instruction. Science was kind of crazy. We made rain gauges. The kids were talking too much during the direct instruction. I found myself struggling to keep them quiet as I gave the instructions. I decided that I just needed to be firmer. I also found that I was not as familiar with the material as I would have liked to be.

Support

Interview (M: #4, pp. 3-4).

M: Katherine and I planned the lesson together and on the task cards they had the different instructions for what each group should do - - written out. Instead of asking, "What do we do now, what do we do next," they just read the task cards. They have a person in their group sitting right next to them if they need help working on it. Katherine

has a color printer, so she had printed those out for me. She was sick the day before the lesson. She was at home the entire day so she did the task cards while she was at home.

Observation (M: 3/21/01, pp. 2-3).

(This is the differentiated activity for an English lesson on main idea and supporting details that Mattie was teaching.)

M moves from group to group and hands out materials. One group of 4 by the door is working on the theme of border collies, taking turns reading and then writing notes on index cards. Another group of 2 near the front are working on stormy weather. A group of 3 at the round table by the windows is working on grizzly bears. The group on the rug (2) is working on non-traditional bikes. [ON: M checks with K to consult about how she thinks the process is going. It seems as if K thinks it's going okay. I notice M's need for affirmation and remember she's only had the full day of teaching for 2 days prior to this one.] M moves to the group by the door and asks them questions about what they are finding. K works with the group at the table, helping them talk through the process of locating supporting details. [ON: I notice a big difference between K's and M's work in the groups is the level of questions. K is much better at zinging into the heart of the matter. M's questions are more tentative; she doesn't see the connections between where the kids are with the task and the overall purpose of the lesson as readily as K does. To be expected I think.] M then moves to a pair working on pizza as their topic and asks them to write their thesis in a sentence. Then she helps them find some supporting details. Two girls come over and need to ask M something. [OC: K is now on rug working with 2 boys.]

Reflection Journal (M: 3/16/01).

I spent most of the weekend planning and rewriting, and I met with Katherine on Sunday for two hours showing her the plans that I had made. She was pleased with the new reading lessons, which did give me some relief. She helped me by filling in gaps in the lessons where I was having problems. One example is in the research unit that I will be teaching. I could not decide if I wanted the students to choose topics to research based on the weather unit that we will be studying in science or have them choose their own topics. Katherine helped me to see that it would probably be better to give them wider choice options and to focus on all of the 4th and 5th grade standards in science and social studies as choices. She also helped me in finding activities for groups to do in differentiated lessons. I might have had a differentiated lesson planned, but I was missing an activity for a certain group and Katherine helped me to find an appropriate activity.

Assessment and Planning

Interview (M: #3, p. 1).

M: For word study, first I pre-assessed all the kids at their different levels. The kids that scored pretty high in their levels, I tested them for the next level. All of the kids that I retested moved up a level. And then I looked at the scores in each group and Katherine and I looked at this together, and we saw where they could grow a little bit more in each skill level. So I took words from a skill that they could do better in, and then I took other words from a skill that they had already mastered.

Observation (M: 2/14/01, pp. 2-4).

(In this math lesson on Valentine's Day Mattie was teaching graphing and had assessed students based on readiness and differentiated the process.)

M used the clapping rhythm to get everyone's attention. By this time all students had received a bag of candy hearts (the kind with the words on them) in various colors and a piece of paper. M asked the students to pick a color out of their collection and predict in their minds or on paper how many of that color there would be in the whole class. They went through this with several colors. M then said, "In a few minutes we will be breaking into groups and you will use your graphing knowledge to do special activities." M then called out the names of students assigned to 3 different spots in the room – the computers, the round table near the rug, and the rug in front of Katherine's desk.

Each location had a laminated task card in the center. Students took their bags of candy and paper and got settled in their groups. They also got their red, green, and yellow cups for signaling about how they were proceeding. [ON: I'm not sure how they got these; whether they got them themselves or whether Mattie or Katherine gave them to each group.]

I walked around to see what each group was doing. The computer group had 4 students – 2 girls and 2 boys. They were all using Excel to graph the colors of candy in their bags. Their green cup was on top. The two girls were working on one computer and the two boys on the other. Their method was the same – one would count and the other would enter it in the Excel program.

The group on the rug was creating bar graphs with hearts on the paper. There were 6 students there – 1 boy and 5 girls. Their task card was called "Heart (picture) Analysis" and had several steps to complete. They also had graph paper and had to transfer their own personal graph onto graph paper by creating a bar graph like the one M

had done on the board. The last step on the task card called for them to write 3 sentences that would describe/summarize their bar graph.

The group at the round table had a task card that said "Heart Data" with 4 steps. They were sorting their candy by colors, writing the fractions that corresponded to the proportion of color in the whole bag, and transferring this information to graph paper. The two girls in the computer group had finished entering their data and had printed a pie graph, deciding to do something different than the bar graph and receiving lots of praise for this from Katherine and M. Their task card was called "Does Love Compute" and had 4 steps.

Reflection Journal (M: Week of 2/15/01).

The Great Depression simulation got a little noisy. Earlier that day, I had them broken up into groups based on learning profile and personality. They analyzed a website about the Great Depression. Each group had a leader and they used the green, yellow, and red cups...The students worked really well together. They knew the routine because we did a previous activity using an Arthur Ashe website. During the simulation I made all of the kids go back to their seats. They were talking too much and they soon became very quiet after returning to their seats...That next Monday we finished the simulation. They did an excellent job and did pretty well on the assessment cards. I asked them in three different ways (differentiated by readiness) to tell how Virginia helped in the Great Depression.

Knowledge of Content

Interview (M: #6, p. 4).

M: Like the stem and leaf plots that I introduced. I tried to teach myself from the book the best I could. When I got up in front of the class I got some of them mixed up. I didn't mean to and they got into their groups and I realized what I had put on the board was wrong. Then they read the task cards, which were correct, and they couldn't get started; they had to go back.

Observation (M: 2/14/01, p. 2).

M then said, "Let's do another kind of graph. How about a pictograph? And for Valentine's Day let's use hearts for our pictures." She drew a graph on the board with the x and y axes marked and had different colored markers for drawing the hearts. The students were all excited and eager, hands were up everywhere to help. Students went to the board, one by one, and re-drew the M & M's graph with hearts as pictures in place of the bars. M summarized the pictograph and compared it to the bar graph they had already completed. [ON: Mattie seemed to make an effort to call on several students who hadn't been participating much earlier in the lesson.]

Reflection (M: Week of 3/19/01).

On Friday morning I taught the stem and leaf plot. I had never learned this before in school or growing up. Katherine taught it to me and I reviewed it some, but I was not completely confident about it. I had an activity set up where the kids placed the leaves on the plot. I left out some important things when teaching it to the kids. I mixed up the tens and ones places on the plot. I did not realize this until the kids were in their differentiated groups. I was really embarrassed, especially when it was being videotaped, but knew I

had to keep on going. Katherine brought the kids back to their desks and we talked about what was wrong. She had the kids play "Cry for Help" and she made the transition so smoothly. I tried to bounce back, but I felt my confidence draining.

APPENDIX C

Confirmability

Analytic Memos

Erickson (1986) maintains that analytic memos are an important means of tracking changes in the researcher's perspective. I wrote analytic memos immediately following observations and interviews.

Synoptic charts or diagrams can provide additional evidence of the evolution of the research process. I developed a series of synoptic diagrams to make connections among and inferences from data. Below are samples of analytic memos and synoptic diagrams that illustrate data synthesis.

Memo: 3/15/01

I have suddenly seen that one of the factors that may hinder Mattie's growth in practicing differentiation is Katherine's **unwillingness to let go**. And that is **unwillingness to let go of students and instruction**. Regarding students, Katherine has worked very hard to build a strong learning community in this room. She has told me in interviews and reflections "it took a TON of time to develop this community, rules, respect, and ATTITUDE, no shame, no embarrassment, confidence." Katherine has seen some of her students exit special education services because they have grown so much academically and affectively this year; she has several students who were such serious behavior problems that one of them said to her during the first week of school, "You're going to be sending me to the office ALL the time," and they haven't been to the office once. She has worked very hard to build a positive classroom climate. Her students understand differentiation and will often *ask* her to differentiate their assignment or their

homework. Katherine's management system is based on making wise choices, and her students are strong decision-makers. In her reflections she has shared her concerns about being "removed" from her students and from "not instructing." She has indicated that she is most resistant to **letting go** of math. In the math lesson I observed on February 9, it was obvious that Katherine loves this subject. [TN: Both her parents were math professors and she was a math/science major who decided not to go to MIT but is very strong in math/science/technology intelligence.] She has openly stated with Mattie and me that she doesn't really want to give math up to Mattie. This increases Mattie's nervousness about taking that subject on. When Mattie taught math on February 14, she was very nervous, always looking at Katherine for reassurance. Mattie seemed most comfortable when she was doing direct instruction at the board, with the whole class in front of her. [TN: Research on student teacher shows that they must establish whole-class control before they can move to meeting individual needs.]

Mattie didn't seem to be engaging on any more than a superficial level with the small math groups. She hung back, at some distance, from many of the students. Katherine is very at ease moving from group to group. I'm wondering if Katherine's **unwillingness to let go** of math and the students is blocking Mattie's engagement. Mattie seems to be working through the parts of the lesson smoothly, and the design seemed well suited to student needs, but she is holding back. Her need to establish control may not be a reachable goal until Katherine can move out of the way.

Memo: 4/22/01

Yesterday was a break-through day for my thinking on this research. The data has pushed me to develop a concept web for two big ideas: **understanding** and **practice** of

differentiation. But somehow that didn't help push my thinking into any direction that linked well to the raw data. So I messed some more with draft assertions like this: *Understanding how to differentiate instruction can be seen through the thinking and practice of a teacher. Sub-assertions would include: planning, content knowledge, knowing kids, management, and so forth.*

Then I thought some more and decided to revise this to: *From the preservice and inservice teachers' perspective, differentiating instruction is a fundamental belief and a complex practice. Sub-assertions: acknowledging differences, planning, delivery, management, key principles of differentiation, content and SOLS.* But this seemed way too broad and unwieldy. Also, there is another concept or theme that keeps bubbling through the data that doesn't get linked neatly here and that is *view of self.* I don't know what else to call it at this point – but it has to do with the confidence and self-assessment both Katherine and Mattie do about their teaching and its effectiveness. I think this is a big piece because the lack of confidence on Mattie's part seems to influence her delivery and thus the engagement of the students, regardless of how beautifully the lesson is differentiated.

Then I decided to go back and re-read the article by Mary Lee Smith and Lorrie Shepard on *Kindergarten Readiness and Retention.* This reading clarified the assertion-generating process and helped a better set of assertions leap to mind. I'm not 100% sure these are exactly what I'll end up with, but they seem to link well with the data:

Assertion 1: Preservice and inservice teachers' understandings of differentiating instruction are related to the unique characteristics of the classroom.

This makes the following sub-assertions hook on nicely: *The vignettes describing the needs of the students from Katherine, mostly, and Mattie (more from her later on this); a description of the learning community in this classroom – particularly how the kids know and expect differentiation; Katherine's and Mattie's beliefs about differentiation from their own backgrounds.*

Assertion 2: Preservice and inservice teachers' practice of differentiation is related to specific knowledge, skills, and attitudes.

These sub-assertions fit: *Katherine's and Mattie's background technical knowledge in how to differentiate; their content knowledge and how that relates to teaching the SOLs; lesson planning; management; attitude about building a differentiated learning community and about their personal ability to differentiate.*

Assertion 3: A preservice teacher's knowledge of individual students increases when instruction is differentiated.

These sub-assertions fit here: *time and motion studies of the contacts Mattie has with individual students and small groups of students during the differentiated parts of lessons; and this will be a good place to fit a vignette about Mattie's view of the needs of the students in this class.*

Assertion 4: Preservice and inservice teachers' growth in their understanding of differentiated instruction requires support, time, and resources.

Sub-assertions: *phases or stages that Katherine and Mattie worked through to support Mattie's efforts – how they worked and how they didn't; Katherine's and Mattie's reflections on professional growth as they worked through this process; Mattie's and Katherine's views of what would support the novice from teacher education*

preparation; views on supporting the novice from the school principal's interview after observing Mattie; and considerations for future research on the inductive vs. deductive nature of learning to differentiate.

I am excited about these assertions and the key linkages I can make across the data. I have read through all observations, interviews, informals, and reflections several times, making notations in the margins. I am going to color code these 4 assertions and go back and mark quotes and vignette material.

Synoptic Chart

The stages of Katherine and Mattie's learning about differentiation first emerged in the following synoptic chart.

Development of Beliefs and Understandings About Differentiation:
A Continuum of Interactions with Learning and Learners

Not seeing D or the need	Seeing the need for DI but not seeing it	Seeing the need & learning DI	Seeing the need, learning DI & living it through practice	Seeing the need, living it through practice & refining to expertise
Mattie (K-12)	Katherine (K-college)	Katherine (Student Teaching) Mattie (Arrival at College)	Katherine as Beginning Teacher Mattie in Teacher Prep Courses	Katherine as Mentor

APPENDIX D

Confirmability

Samples of Researcher's Methodological Log Entries

Because, as Erickson (1986) says, the research process is the "search for falsification," it is important for the reader to see details of the researcher's efforts to reflect on possible disconfirming evidence and to understand how interpretation has evolved (p. 152). A narrative account of the inquiry process as data collection is carried out is a helpful way of presenting such evidence.

Below are two sample entries from my methodological journal:

3/17/01

I got 3 reflections from Mattie by email today; daily ones come from Katherine. The ones from Mattie are pretty much reporting – kind of dry really. But embedded in there I see some big thoughts that need analysis. She talks about her nervousness in teaching math and I'm wondering if that has to do with Katherine's adeptness in math. Katherine is still teaching most of the math lessons and doesn't seem to want to let go of that instruction. I'm getting the feeling this may be true as well with the management. I wrote an analytic memo day before yesterday to document this in more detail.

Katherine's reflections have evolved this week from crisis to resolution. She reacted negatively to my short, restrained response to her last long email. She wants more feedback and got pretty curt with me in the email on Wednesday, asking for an appointment when I get back. I wrestled with it all night. But, being here in Boston with Carol working made it quite convenient to quiz my advisor about what I should do. She encouraged me to email or call Katherine and talk with her directly about the roadblock

that seemed to be building. I couldn't call her – didn't have her home phone – and so I emailed a long message which I'll include in my documentation. I suggested that we were both working through the tough role of not knowing how to be a 1) mentor, 2) researcher, and that we were trying those roles on for size. I shared some research findings with her and gave her positive feedback for what she's trying to do. The next email I got from her said that frustrations had eased. I can see this is another sub-theme at least – Katherine is spending lots of extra time coaching and isn't seeing the outcomes improving at this point.

7/18/01

Having read and re-read data so many times over this past week as I wrote the case report, I am so totally immersed in the data I can't get away from it even in my sleep. I was struck with a new view of the passage Katherine and Mattie have taken; in much the same way the creative process strikes at unexpected times. I started jotting down words in a list, beginning with "discover." I guess thinking about differentiation so much has got me stuck in the alphabet on "D." In fact, I think this idea germinated reading an interview excerpt where Katherine said that early on differentiation "drove" her practice. She seemed to be saying that her belief in differentiation was strong and it compelled her to design lessons with kids' needs in mind, but her knowledge base was limited and she felt more pushed by her beliefs than controlling her progress as a curriculum differentiator. She went on to say that by the end of this year, after two years of building her knowledge, improving her practice, getting confirmation from the kids that what she was doing was working, and gathering data to support this confirmation, she has begun to feel that she is "driving" the practice of differentiation. I took this to mean that through action research,

reflection, adjustment, and data collection she is able to plan and execute her progress toward expertise in differentiation carefully and accurately. It is almost as if she has shifted from a trial and error approach to an assessment-driven model.

Thinking about how all this has played out for Katherine over the past several years, I began to write words: discover, doubt, differentiate, determine, ditch, differentiate, determine, ditch (I saw this as a mini-cycle within the larger steps of development, repeating itself many times), dig, decide, define, and, finally, drive. I started working with these more and moving things around to challenge the position each stage had assumed. Some things began to move. For example, I decided that after the doubt stage is when teachers search for more knowledge about differentiation and so I inserted another stage – derive. I also decided to split differentiate – where the differentiation begins "driving" the teacher into a separate stage and singled out a "do" stage for applying theory in practice. Then the "mini-cycle" became "do, determine, discard" – I decided to ditch "ditch."

In order to test my theory here I decided to run Mattie through these same stages to see if in fact her passage had followed this kind of path. It didn't pass the test completely. Doubt recurs a lot for her and she doesn't get much beyond the do-determine-discard point. She certainly was not at the point where she was driving the differentiation. The "decide" stage was there, but the "define" stage is sketchy. This seems to capture the process pretty well.

APPENDIX E

Credibility

Peer Debriefing

Lincoln and Guba (1985) suggest that the researcher provide evidence that the findings are credible. They specify the following strategies to prove credibility: persistent observation, prolonged engagement, and triangulation. I have explained the application of these strategies in detail in Chapter 2. There are examples of triangulation throughout the final report. I spent over four months observing and interviewing the participants; the details of those visits are presented in Chapter 2. Lincoln and Guba (1985) also suggest that the researcher archive the study's data. I have archived all raw and coded data, analytic memos, methodological log entries, synoptic charts and diagrams, documentation of lesson plans, and videotapes of lessons.

In addition, Lincoln and Guba (1985) recommend the use of peer debriefing to create an analytic dialogue with someone who understands the framework of the study and the paradigm for interpretation. Catherine Brighton, a fellow doctoral student in gifted education with a thorough understanding of differentiation, served as my peer debriefer. Catherine asked important questions to push my thinking, provided clarification, and shared insights as I framed assertions. Her perspective was particularly helpful in addressing issues I originally called "attitude" that became "self-system processes" after reading the Connell and Wellborn (1991) article.

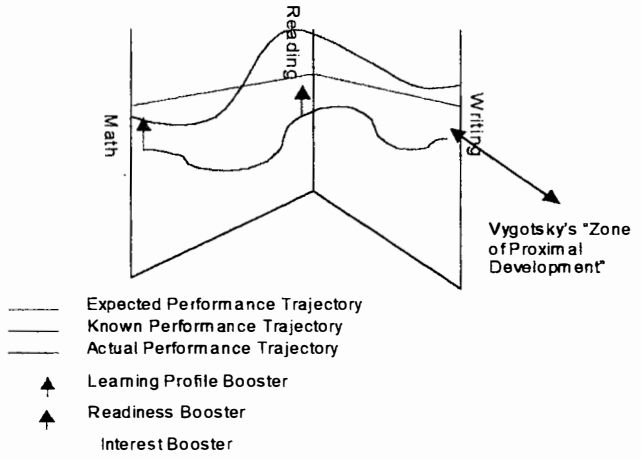
Peer Debriefing Samples

Methodological Log Entry: 4/2/01. Catherine asked some tough questions that we talked through and crystallization began! For example, she pointed out that Katherine

appears to be an intuitive thinker and Mattie a concrete thinker and she asked what influence that had on their co-planning and co-teaching approach to differentiation. This reinforced the importance of examining what I decided to refer to as attitude and then I knew the self-concept and self-assessment stuff could hook there. Our discussion also led to the realization that there is a technical level of differentiation and an affective level – again this would hook to attitude. It also became apparent in our discussion that using the stories both Katherine and Mattie have shared in interviews about the strengths and weaknesses of students in this class would make perfect vignettes from each of their perspectives – inservice and preservice. Importantly, I saw that it's not just about the teacher knowing the kids; it's also about the kids knowing the teacher. That leads to a two-way bond that influences the building of trust necessary for the differentiated classroom community, which in turn influences the ability to engage the students and challenge them appropriately, and in turn influences the ability to differentiate. Catherine wondered if this community issue might be bigger than I had originally thought. Catherine asked me a really critical question: how does Katherine's teaching style, which is inductive, work with a student teacher? In other words, does it work for the mentor to force the student teacher to *discover* the best way to plan concept-based, differentiated lessons, or does it need to be more concrete? That emphasized the importance of generating an assertion that is specifically focused on the scaffolding and support that mentors must provide for novices who are taking on the difficult job of designing differentiated lessons.

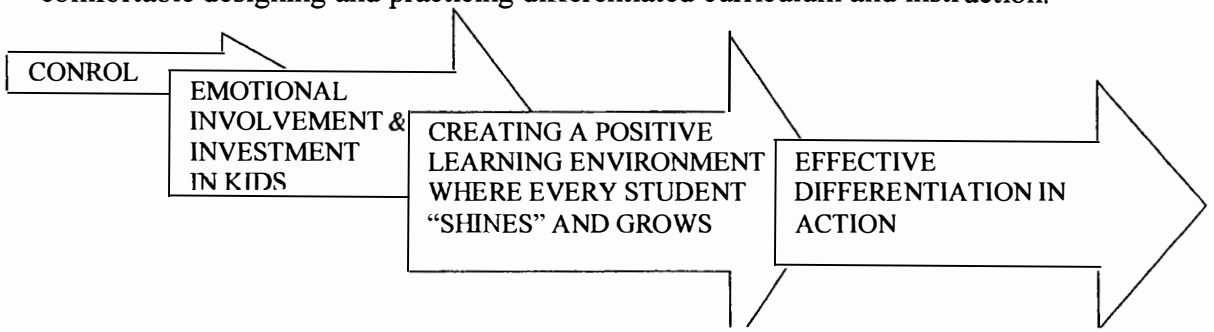
Analytic Memo after Debriefing Session: 6/8/01. Tuesday, June 5, I spent a couple of hours with Catherine in a debriefing session. She had taken my Qual II paper

with her to the beach and read it. She gave me lots of helpful ideas and suggestions for how to work that material back into the dissertation. We talked at length about the 3-D model that Katherine and I have been grappling with for depicting student needs. Catherine suggested that the "booster rockets" of interest, learning profiles or readiness were really the "scaffolding" that Vygotsky was talking about. This is certainly a new perspective!! She emphasized the importance of making really clear the expected and actual performance levels. She liked the model in general and thought it would be helpful to teachers to see it in a more 3-dimensional representation.



This would only be one child. The real challenge would be to figure out how to show more than one at a time in the 3-D box. It's a cool challenge though to think of trying to visualize the ZPD.

Other major "ah ha's" with Catherine were about Mattie's interaction with this particular learning community and the phases she had to go through in order to feel comfortable designing and practicing differentiated curriculum and instruction.



And then Catherine asked a really important question: Can you create a positive learning environment with differentiation as the framework if you aren't emotionally attached to the kids?

Another thought was: management is the fulcrum for the emotional attachment teachers make with their students. With Mattie, it became the battle point with "her against them" after Katherine's positive approach to discipline.

Another really important thing we talked about was how it seems as if to some degree what Mattie accomplished flies in the face of Lidstone & Hollingsworth's research on the stages of teacher development. Catherine suggested that I look at Frances Fuller's *Stages of Concern* because she suggests that there is a different series of phases teachers may go through. This was a crucial revelation, because it allows me to open the door to considering that what Mattie was trying to do – address student needs simultaneously with establishing control is in fact possible and research exists to support this. What a critical point!!

We also talked about my idea of splitting the last assertion from my Qual paper into two: *attitudes and learning environment/attributing status*. Catherine liked this idea and thought that possibly one of the other assertions – the one on differentiation (#2) might be split as well. I'll work on that.

Member Checking

I used informal member checks (Lincoln & Guba, 1985) to get immediate feedback after interview responses and dialogue during lengthy observations. During interviews I often summarized what I had heard and checked to make sure I had understood statements correctly. Member checking also occurred when I used videotapes

of observations to solicit interview responses, although this system did not appeal to the participants and was not used after the first month.

I used three forms of formal member checking with Mattie and Katherine. First, I asked both of them to read transcripts of interviews and make changes in order to ensure the accuracy of the reports. Neither Mattie nor Katherine suggested any changes in any interview transcripts. Katherine did comment that she felt she could have expressed things better sometimes and asked if I would correct certain awkward phrases. Second, as the synoptic charts on the continuum of stages and the 3-D model of assessment took shape I asked both participants to share their thinking about the development of these interpretations. Mattie was interested in the representations and had no suggestions for changes or extensions. Katherine made it quite clear that the continuum was far too confining and limited, and that the original 3-D image was close to her thinking, but did not capture it perfectly. The final graph we developed jointly and although she believes it is much better than the original, she has not yet found a way to represent exactly what she sees in her mind. Third, I developed a draft of my data analysis in late April as part of a requirement for my Advanced Qualitative Analysis class. I asked both participants to read my paper and share their response. Mattie never responded as she was in the midst of graduation, but Katherine gave me a wealth of suggestions that helped me to synthesize and analyze. For example, her suggestion that more emphasis should be placed on the role of the learning community pushed me to create a separate coding category and ultimately a separate assertion for that concept.

Social Studies ... Exports SOL: Social Studies 4.6

Know: Virginia exports Textiles, Agricultural products, including tobacco and poultry. Coal + Ships

Understand: Because transportation + communication grew - VA exports grew. Industries in VA produce goods and services used throughout the U.S.

Do: Gather, classify + interpret info. Draw conclusions and make generalizations about data. Interpret maps. Explain cause + effect relationships.

Materials: large pieces of paper, markers, construction paper

Brainstorming: supermarkets, food, tobacco

- Eastern Shore: corn, wheat, potatoes in Tidewater region — 1 group
- Piedmont region: fruit orchards - apples and peaches, Tobacco — 1 group
- Ridge + Valley Region (Shenandoah Valley): apple growing — 1 group

cattle, hogs, turkeys, sheep, chickens - farming - restaurants, make other food — need visuals

*Technology - computers - eggs, apples, peanuts

Agriculture: science + bus. of raising crops + animals - laboratories - plant + animal nutrition, water to soil

Chesapeake Bay - boats and fishing

Coal - technology advanced coal mining - not as dangerous - Ridge and Valley Region

3 Regions: (Allegheny Appalachian Plateau)

(Ridge and Valley Region): Coal, apple growing

Piedmont: tobacco, poultry, apples, peaches, textiles

Tidewater Region: corn, wheat, potatos, ships (Norfolk, Portsmouth)

Day 1

Have giant map of VA with diff. regions - each student will have at least 2 objects out of paper - apples, peaches, cloth, ship, coal, tobacco, chicken - makes these out on paint shop (label region on them. - as each region is named - of products from students brought to the front + placed on each region.

- ex of China -
- more objects from Virginia all over the place
- how do these things get from VA (change) - transportation
- change through technology - coal p. 254-257 (read last par. 1st) peruse pictures) - class discussion - investigation as a class
- discuss where everything comes from

orally work p. 149 in VA Experience or anchor activity

STEPS: Day 1

Begin with an object that says made in China.

Ask the students individually which region they want to be a part of to create an export map about the exports of each region

1) The exports are what?
2) Where do they come from? What regions in the region
3) How has technology improved how these are accessed? (Concept of change) (ie - mining tech., farming - machinary)
4) What are the exports used for? Scientists
5) Where do they go? ~~Use the map~~ Create a map that shows how the exports get there (draw mode of transportation) - How has technology made it easier for VA to export things?

Every person in group will have a role? roles assigned by readiness and personality

Reader - Investigator - must be able to use an S.S. book as guide - or have one person in charge of each export!

Organizer - listen to key points - layout of project?

in charge of transportation? - Drawing person?

Brainstorm still

choose an export instead of a region?

farming website; NPR, National Pub Radio

Draft

Role: Farmers
Audience: Bankers
Task: ... 3 Reasons why
You need a loan
Role:

Post Assessment: ~~log journaling~~ Export Map - log journaling about ~~ex~~ regions that are not part of their project

Rubric of Project + log

Travel Brochures: Appomattox Courthouse, VA Beach, Williamsburg, [illegible], Busch Gardens, Bull Run National Monument, Jamestown, Norfolk Naval Base, Woodrow Wilson's Birthplace, Quantico Naval base, Mount Vernon, Portsmouth

~~Objective: TSW be able to gather, classify~~

Know: Tourism major part of VA's economy

CONCEPT: Growth & Change

Understand: Advances in Transportation & Communication, Migration - led to economic development in VA.

CAUSE & Effect: B/c of change - tourism grew - transportation

DO: Gather, classify, and interpret info. on a location showing why this place contributes to economy.

Pre-Assessment: Interest Inventory - Choose what they want to study - EXIT cards from previous lesson showing understanding of cause & effect of growth of economy

STEPS

Make a travel brosure

Include: Name of Place
Location

Create a Travel Brochure that includes the following items:

1. Name of Place
2. Location
3. Dates of Operation and Cost
4. 3 Facts about why people visit this location. Put into complete sentences using figurative language. This can be combined with question #8.
5. At least 2 major attractions
6. Illustrations of major attractions
7. Historical Significance (if applicable)
8. Quotes from people who have visited the location (make these up). Use figurative and descriptive language in a persuasive paragraph.
9. Map

about why visit
more writing (para.)
de people to visit
actions (at least 2)
significance
ailable - drapplicable)
ions - of major attractions
operation, cost
Quotes from people who have visited (make them up) - use figurative and descriptive language
Dates of operation
places to stay: lodging
bring into persuasive pie.

Med

Name of Location
Place
History
Map
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hours of operation

Create a Travel Brochure that includes the following items:

1. Name of Place
2. Location
3. Map
4. Hours of Operation and Cost
5. History (if applicable)
6. 3 reasons why people should visit this location (use complete sentences)
7. List 2 major attractions
8. Illustrate the major attractions
9. Give 2 quotes from people who have visited this location. (make them up and use complete sentences)

Low

Name
Place
Map
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& illustrations.

Create a Travel Brochure that includes the following items:

1. Name of Location
2. Place
3. Map
4. Give one sentence about the history.
5. List 3 reasons why people should visit this location.
6. Give 2 illustrations about the location

Grading Rubric for Travel Brochure:

Neatness: 4 3 2 1

Completeness: 4 3 2 1

Accuracy of Information: 4 3 2 1

Usage of Writing Mechanics: 4 3 2 1
(grammar, spelling, punctuation, etc...)

4 = Shows great understanding
3 = Shows some understanding
2 = Shows little understanding
1 = Shows no understanding

Materials: Travel brochures, construction paper, scissors, glue, markers, crayons, computer with internet access, individualized task cards

[illegible] Neatness: Have us to share "See Virginia" out in the hall

Subject and SOL

Math 5.17

Date

3-27

Time Required:

60 minutes

Materials:

Poster board, graph paper, individualized task cards for each student, Anchor: Line graph sheets, silent reading, anemometer, creating a charge to record the humidity for the week, research paper.

Know:

The student will be able to know the characteristics of a stem and leaf plot, a line graph, and a bar graph.

Understand

The student will understand the mathematical communications, problem solving, and mathematical reasoning needed to create a stem and leaf plot, a bar graph, and a line graph.

Do:

The student will be able to correctly construct a stem and leaf plot, a line graph, and a bar-graph, and to tell the difference between them.

Pre-Assessment:

Pre-Test, kid watching

Steps in Lesson:

1. The teacher and the class will review the process involved in creating a bar graph, a line graph, and a stem and leaf plot. The teacher will discuss the material from morning math and place it into a stem and leaf plot. The teacher will place the weekly temperatures into a line graph. The teacher will place other data into a bar graph. The class will discuss the differences between each graph. The class will find the mode, median, and range, and make conclusions about the data.
2. The students will receive task cards according to their level of readiness. The students may only work with those students who have the same task card-or they may work individually.
3. The teacher will walk around the room and work with those students who need clinic with their task cards.
4. The students will also follow the rubric for their task cards and will share what they have done if time allows.

What is differentiated and How?

The task cards (or process) is differentiated by readiness. The students may work in groups if they chose to.

Sharing/Closing Activity:

Share with the class their work if time allows.

Post-Assessment:

Final test and task cards with grading rubric.

Task S

1. Create a bar graph using the following information. You may graph the information on poster board or on notebook paper. The favorite colors of a class of 6th grade students: Color — Frequency Red — 10 Blue — 8 Purple — 6 Orange — 7 Yellow — 3 Green — 4 *Make one conclusion about the data in the graph.	2. Create a line-graph on graphing paper using the data below: The amount of money raised in donut sales by a 5th grade class for a week: Monday $15 Tuesday $10 Wednesday $20 Thursday $5 Friday $25 *On which day did the students raise the most money? On which day did the students raise the least amount of money?	3. Create a stem and leaf plot using the data below. You may graph the information on poster board or on notebook paper. The number of pizzas eaten by a football team over a few months: 22, 33, 44, 55, 12, 13, 23, 33, 24, 46, 56, 58, 32, 18, 35, 36 Find the mode, median, and range.	

Grading Rubric:
1. Accuracy of information, such as the mode, median, and range. 25%
2. Correctly graphed data. 25%
3. Neatness 25%
4. Conclusions about graphed data. 25%

Task J

1. Look at the different groups of data. Decide which data would be best graphed in a line-graph, a double bar-graph, and a stem and leaf plot.

The monthly average for the amount of humidity in the air. January 25% February 33% March 77% April 66% May 55% June 88% July 44%	Sports played by 6th grade students: Softball: Boys 33, Girls 55 Soccer: Boys 45, Girls 35 Swimming: Boys 25, Girls 48 Flag Football: Boys 60, Girls 14 Water polo: Boys 29, Girls 33 Tennis: Boys 50, Girls 53	Number of flies swatted per day in the summertime in Mississippi: 44, 55, 66, 20, 33, 15, 5, 3, 42, 32, 45, 78, 103, 14, 66, 77, 112, 114, 23, 24, 32, 33, 35, 50, 63.

1. Place each group of data into a graph. Graph the line-graph on graphing paper, and graph the stem and leaf plot and the double-bar graph on either poster board or notebook paper. Remember to correctly label each part of the graph.
2. Find the mode, median and range for the stem and leaf plot and for the line-graph.
3. Make 3 conclusions for each graph in complete sentences.
4. Create a pictograph with the data of your choice. Remember to correctly label the graph and make 2 conclusions about the graph in complete sentences.

Grading Rubric:

1. Accuracy of information, such as the mode, median and range: 25%
1. Correctly graphing all of the information: 25%
2. Neatness: 25%
3. Conclusions about graphed data: 25%

APPENDIX G

Auditor's Attestation*

An audit of this dissertation was conducted to ensure that the research process and outcomes were trustworthy. This audit includes four parts: (1) audit sources, (2) an outline of the audit process, (3) related outcomes, and (4) conclusions. An independent auditor examined the researcher's audit trail as presented below and recorded the following observations and notations.

Audit Sources

The auditor focused on four major areas for review: (1) methodology, (2) data collection, (3) data analysis, and (4) debriefing. Sources for audit review included: (1) methodology, (2) data collection, (3) data analysis, and (4) debriefing. Sources for audit review included: (1) researcher journal, (2) raw data, (3) related documents, (4) data analysis notes and records, and (5) a final manuscript.

Audit Process

The auditor systematically examined the researcher's audit trail, which consisted of researcher journal entries, records, hard data, data analysis summaries, and the final manuscript. The process involved a review of each of the following in the order presented:

1. Final manuscript
2. Personal journal (including work schedule, feedback from peer reviewers, correspondence and suggestions from dissertation committee members, and personal reflection)
3. Summary of data analysis

4. Interview transcripts
5. Observation write-ups
6. Participant Reflection Journals
7. Documents (Lesson Plans)
8. Transcribed field notes
9. Videotapes of Observations
10. Audiotapes of interviews

Outcomes of Audit

The audit was conducted in order to attest to the study's general trustworthiness as reflected in its credibility, its applicability, its consistency, and its neutrality in regard to the research content and practice. Because of the nature of qualitative studies, some overlap naturally occurred among the following categories of criteria.

Credibility. In order to ensure credibility, the researcher used both prolonged engagement with and persistent observation of study participants. The data collection period—4.5 months—provided extended opportunities for the researcher to develop trust with study participants, and chronicle their experiences over an extended period of time. Triangulation of data was incorporated to strengthen the study and increase the credibility of the findings. Multiple observers – the researcher, the college supervisor, the clinical instructor, and the school principal - were used to triangulate the data in the study, minimizing potential bias from the researcher 'going native' and increasing the credibility of the findings. The researcher also used multiple sources of data: interviews, observations, instructional documents, participants' reflection journals, and videotapes of classroom performances to reinforce and corroborate trends in the data. Observation and

interview data were collected from field notes and taped sessions (audio and/or video) that were later transcribed by a neutral transcriber, increasing the credibility and fidelity of the data.

Additionally, peer reviewers provided feedback about emerging themes and assertions. The researcher's notes chronicle how the peer reviewers' feedback impacted the formulation and development of synoptic analysis and major assertions in the final manuscript.

Applicability. The thick description of the final manuscript was supported by detailed accounts of the two participants in the study, their lived experience, and external and internal factors that seemed to influence them. The single site and small sample does not suggest transferability. The researcher openly explains the limitations of the investigation, which include the singular focus of one site and the four-month duration of the study.

Consistency. The dependability of the study was affirmed by tracing the major themes found in the final manuscript back to the data analysis, data reduction, and original data. Consistency was found through the researcher's analysis. The research journal reveals that the researcher significantly narrowed and shaped the focus of her research prior to the beginning of data collection. Through the research journal and peer reviewer feedback, the development of the researcher's categories is evident and easy to follow. Additionally, methodological choices were consistent in the study. For instance, for each participant, there were transcribed interviews, field notes, and descriptions that documented similar types of inquiry regarding each school and target teacher.

Coding procedures were systematic across schools and teachers. The logical flow of the researcher's thinking was apparent. She moved from codes to categories to themes to final assertions and from general to particular description, in a manner that could be tracked readily by the auditor. She used the components of interpretive research recommended by Erickson (1986) and demonstrated a thorough search for disconfirming evidence. The conclusions drawn from the data were sound and well supported by the evidence in the researcher's dissertation documents.

Neutrality. The confirmability of the study was supported by the neutrality of the data. The researcher achieved this neutrality by incorporating multiple sources of data, and establishing no potentially biasing personal relationships with participants. In addition, three other observers served as instruments in gathering data. These multiple perspectives helped to decrease potential bias in the study.

Other comments. The researcher has maintained consistent and carefully documented records, cross-referenced and marked for easy access and tracking of hard data. Her analyses include in-depth reflections and an accurate log of her thinking processes as the final assertions emerged from the data.

Conclusion

In summary, the auditor affirms the general trustworthiness of the research study and final manuscript. The researcher's notes, data collection, data analysis, and final manuscript were clear and comprehensive. Evidence of the credibility, applicability, consistency and neutrality of the data and research practice were presented systematically and comprehensively in the researcher's audit trail. The research process matched the

research problems methodologically and theoretically. The study evinced good research theory and practice.

Respectfully submitted,

Catherine Brighton, Ph.D.

* This audit is based on a format created by Mary S. Landrum, Ph.D. for Hunsaker, S.L. (1991). Teacher roles in multiple selection criteria systems for identifying gifted students. Unpublished doctoral dissertation, University of Virginia, Charlottesville.