DISSERTATION

IDENTIFICATION, UNDERSTANDING, AND PERCEPTIONS OF LEARNING STYLES: NATIONAL BOARD CERTIFIED TEACHERS

Submitted by

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WE HEREBY RECOMMEND THAT THE DISSERTATION PREPARED UNDER OUR SUPERVISION BY PATRICIA W. NELSON ENTITLED IDENTIFICATION, UNDERSTANDING, AND PERCEPTIONS OF LEARNING STYLES: NATIONAL BOARD CERTIFIED TEACHERS BE ACCEPTED AS FULFILLING IN PART REQUIREMENTS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY.

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ABSTRACT OF DISSERTATION

IDENTIFICATION, UNDERSTANDING, AND PERCEPTIONS OF LEARNING STYLES: NATIONAL BOARD CERTIFIED TEACHERS

The purpose of this study is to examine what teachers describe as being important in their identification, understanding, and perceptions of learning and teaching styles. When teachers can accurately identify their own learning and teaching styles, they can identify the learning styles of their students. When a teacher can identify learning styles they have a greater potential of teaching to them. When a teacher adapts his/her teaching style to match a student's learning style, significant improvement in student understanding, achievement, and retention occurs.

The learning style research component of this study was based on the Dunn and Dunn learning style preferences model. Using this basis, a series of structured and unstructured questions were formulated for the qualitative research.

National Board Certified teachers were chosen as the sample group. Nine teachers in the state of Colorado were identified and interviewed. These teachers were chosen because of their continuing education of post licensure studies and their commitment to higher education. The NBPTS believes the single most important action this country can take to improve schools and student learning is to strengthen teaching. With its leadership NBPTS is making teaching a profession dedicated to student learning

and high standards for professional NBPTS performance. The NBPTS has raised the standards for teachers, strengthened their educational preparation through the standards, and created performance-based assessments that demonstrate accomplished application of the standards (National Board for Professional Teaching Standards, 2002b). The National Board Certificate (NBC) measures a teacher's practice against high rigorous standards.

After analyzing the data obtained from the interview process, 13 identified emergent themes were critically examined. As a result of the examination, I determined that a distinct gap exists between teacher's learning style identification and teaching style implementation. It seems as though the teachers did not specifically identify student's learning styles to formulate their teaching strategies; instead, the focus was more on the way the teacher's learn.

This study provides a basis for future research that should determine ways to implement learning style identification as a more important component of teacher and student education. The research shows a significant increase of student comprehension and retention when teachers are able to teach to multiple learning styles.

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DEDICATION

I would like to dedicate my dissertation to two of the most important people in my life: my mom and my husband.

My mom, Eileen Wills, has supported and encouraged me to be a life long learner. As a child who had learning difficulties, before learning style identification became well known, she was the link that allowed me to survive in a traditional education system. It was because of her unfailing belief in my abilities that I pursued higher education. The traditional education system tracked me as "non-college bound," but my mom ignored this and encouraged me to believe in myself.

My husband, Dave Nelson, is the only other person to have "lived" with this dissertation. You never tired of my need for constant input, brainstorming sessions, editing, whining, and emotional support. Thank you for being my best friend! I love you very much!

ACKNOWLEDGMENTS

I feel fortunate to have had the support, guidance, and assistance throughout the course of this study from my family, colleagues, and friends. I first want to thank my committee: Carole Makela, Terry Deniston, Barb Wallner, and Frank Vattano, a group which supported me and gave me the direction and energy to keep going.

The chair of my committee, Carole Makela, has been my academic rock. After switching topics and committee members numerous times, Carole provided direction and support every step of the way. One of the best qualities about Carole is her ability to adapt her teaching style to my learning style. She knows that I am an emotional learner who needed a lot of encouragement in step-by-step chunks. Meeting with me weekly to go over work and set out a plan for the next week ensured my success. Carole was always available to me and worked around my travel schedule. Her editing skills also amazed me. Carole, you are an inspiration, and CSU is fortunate to have you on staff.

Terry Deniston emits the love of teaching and shows great kindness for her fellow teachers. She is a warm, welcoming person, and most importantly compassionate about teaching. I knew from that moment on, I wanted this lady to serve on my committee to provide me with wisdom and guidance. Terry has been my cheerleader, always encouraging me when I felt overwhelmed or side tracked. She displayed faith in me when I needed it most. At our meetings, Terry would regularly be there with her notebook to take very specific notes. Thank you, Terry, for your "human" element.

My emotional support came from Barb Wallner. You are an amazing woman. Regardless how busy your schedule was, you carved out time to listen to how I was doing and where I was heading. We shared many laughs and tears in your office. Your words of encouragement were timely and appreciated. Thank you for your perspective on what is important in life. When I was struggling with my quantitative exams, you were there to support me, thank you.

I felt fortunate to have Frank Vattano sit on my committee as my outside member. Frank is a warm gracious man who was on my committee because he genuinely was interested in my work. Thank you for believing in what I did. I appreciate your wisdom and your expertise.

I was also fortunate to have many friends (my mini cohort) from CSU to help me through this process. Jean Radin, Katie Armstrong, Kieran Coleman, and Eric Trujillo, thank you for your friendship, scholarly input, and support.

Finally, I am grateful for the loving support from my family, Dave, Cooper, Mom, W.A., Cathy, and Jeff. You have all been instrumental in some aspect for my ability to finish this program and reach my personal goal.

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CHAPTER ONE

Introduction

Tell me, and I will forget.
Show me, and I may remember.
Involve me, and I will understand.
Confucius (around 450 BC)

Do teachers know how they learn? Do teachers know how their students learn best? This research study will identify factors teachers specify as being important to their identification, understanding, and perception of learning styles. If teachers understand how they learn, how their students learn, and can teach to various learning styles, there will be an increase in learning in the classroom. Consequently, the learning will be memorable and stored in long-term memory. As John Dewey states, "There is an intimate and necessary relationship between a process of actual experience and education" (1938, p. 12).

Learning style theory actually began with Carl Jung in the 1920s, who noted major differences how people perceived the way they made decisions, and how active or reflective they were while interacting. Jung published a major work, *The Theory of Psychological Type,* in which he explained the relationship between the conscious and unconscious and proposed the now well-known personality types, extrovert and introvert (1927). Recently Burns (1998) identified several researchers who have presented different models of learning styles and teaching styles--Dunn and Dunn, Gardner, Gregorc, Kolb, McCarthy, and Myers and Briggs. After reviewing a number of learning

styles, Dunn and Dunn have been selected because of their frequent references to kindergarten -12th grade (K-12) education as the framework for this study.

Rita Dunn and Kenneth Dunn are considered authorities on learning styles. They describe learning style in terms of individual reactions to 21 elements in five basic strands that include each person's environmental, emotional, sociological, physiological, and psychological processing preferences (Dunn & Dunn, 1978). They have been administering their *Learning Style Inventory* to students since 1972 (Shaughnessy, 1998). The Dunn and Dunn learning style theory will be described in detail in Chapter 2.

Teachers were first students and developed their own learning style. Their own learning style was the foundation on which they developed their teaching style (Kaplan, 1995). Teaching style consists of a teacher's personal behaviors and the media used to transmit information to or receive it from learners. The teacher is perceived as a facilitator of learning. Teachers need to be willing to invest time to gain the knowledge and training to broaden their teaching style repertoire in three areas. These areas are: their role as classroom teacher, instructional skills and strategies, and learning styles (Kaplan, 1995). Educators understand that their delivery of instruction to students with varied learning styles gives them a variety of teaching tools to reach a diverse audience.

Research in neuroscience supports the idea that educators are the key to increasing student achievement. Achievement occurs when students understand what they learn. Students understand what they learn when they are taught in a manner that builds upon and reinforces their individual learning style. Educators need to teach so that they enable the learner to increase the "strength of connections between neurons that participate in the encoding experience because these are the experiences that have a high

likelihood of being understood subsequently" (Brandt, 2000, p. 2). An international education consultant on brain research, Sousa, believes in order for information to be applied, it must make sense and have meaning (2001). Today's educators are teaching at a very exciting time, as they can learn much from neuroscientists and apply the new information on how the brain learns. If teachers understand how they learn and how their students learn, more effective learning takes place, which consequently will shift meaning to understanding and ultimately raise student achievement.

Research shows when teaching style matches learning style, there is a significant increase in student motivation and an improvement in student achievement (Allen & Butler, 1996; Barbe & Swassing, 1979; Dunn & Carbo, 1981; Dunn & Dunn, 1978). The most effective teachers respond to differences in students' learning styles by adjusting their teaching styles (Dunn & Dunn, 1979). Therefore, effective teachers make a conscious effort to design instruction that incorporates a broad variety of learning styles different from their own (Hall & Hyle, 1996). In essence, a teacher needs a variety of teaching styles to meet the diversity of learners.

Assessing learning styles and teaching styles provides classroom teachers with a new direction to take toward developing more personalized forms of instruction. This assessment, along with application/implementation of appropriate teaching styles, provides the basis for greater improvement in student learning (Kaplan, 1995).

Significance of the Study

Can teachers identify how they learn? Can teachers identify various learning styles? Do teachers teach to various learning styles? Research reveals that the closer the match between students' learning styles and their teachers' teaching styles, the higher the

grade point average (Dunn, Griggs, Olsen, Gorman, & Beasley, 1995). If teachers could be more in touch with their own style of learning, they could create individual learning opportunities for their students. Unlike teachers who teach an entire class in the same way with the same methods, learning style teachers actually teach different children differently (Shaughnessy, 1998). How important will learning styles be in the 21st century? Given the statistically higher reading and mathematics standardized achievement test scores of previously failing and poorly achieving students in the United States after learning styles were addressed, learning styles are likely to become a mandated prerequisite for schooling within the next decade (Shaughnessy, 1998).

There has been much research in educational practices and the way the brain learns. Neuroscientists use magnetoencephalography (MEG) to measure tiny magnetic fields outside the head created by electrical activity occurring inside the working brain. The MEG allows scientists to see brain activity in both time and space. This means that not only can we see the area of activity, we can now see the sequence of these activities. For the first time ever, we can watch the actual processing of brain activity almost neuron by neuron (Nunley, 2002b). There is a gap in applying the neuroscience research on how the brain learns to the educational research on how teachers teach. There needs to be a marriage of the two entities. Only when this merging of information occurs will we have teachers who understand the way in which they learn and the way in which their students learn. This will provide students with real individual learning that will lay the foundation of life long learning, that has meaning and purpose.

Statement of Research Purpose

The purpose of this study is to examine what teachers describe as being important in their identification, understanding, and perceptions of learning and teaching styles. When teachers can accurately identify their own learning and teaching styles, they can identify the learning styles of their students. When a teacher can identify learning styles they have a greater potential of teaching to them. When a teacher adapts his/her teaching style to match a student's learning style, significant improvement in student understanding, achievement, and retention occurs.

Research Questions

What factors do teachers identify as being important to their identification, understanding, and perceptions of learning styles? Other questions that align with this research include:

1. How do teachers describe their own learning style?
2. How do teachers characterize other learning styles?
3. How do teachers describe their teaching style?
4. Do teachers understand the cognitive reasons for teaching to a student's learning style?
5. Using Dunn and Dunn's five basic learning style strands, how do teachers facilitate learning?
    - *a.* What constitutes an enriched environment?
    - *b.* What are the emotional components involved in student learning?
    - *c.* What are the sociological components of individual learning styles?

d. What are the physiological components of individual learning styles?

e. What are the psychological components of individual learning styles?

Assumptions

For the purpose of this study, the following assumptions will apply.

1. The more teachers learn about learning styles the greater the likelihood they use varied teaching styles.
2. Teachers tend to teach per their learning style.
3. Teachers can identify a few basic learning styles using their own terminology.

Definition of Terms

For the purposes of this study, the following definitions will apply.

1. Accountability – Holding students and teachers responsible for information to be learned or taught.
2. Brain-Based Learning – Learning in accordance with the way the brain is naturally designed to learn (Jensen, 2000, p. 6).
3. Emotional Experience – An experience that creates joy or fear for an individual. Emotions are triggered by the brain's chemistry and tag the learning as important. If the information is personal, we feel deeply about it, and it makes sense, chances are we will find it meaningful (Jensen, 2000, p. 346).

4. Emotionality – A personal experience that either strengthens or inhibits learning through motivation, persistence, responsibility, and structure (Dunn & Dunn, 1992, p. 5).

5. Enriched Environment – An environment that has many positive elements to facilitate learning which includes visual climate, temperature, plants, aromas, music, and movement (Jensen, 2000).

6. Environmental – Students respond differently and have individualized preferences for sound, light, temperature and room/furniture design as they learn new and difficult academic content (Dunn, 1992, p. 5).

7. Hands-On Learning – Using hands, bodies, or personal interest to make a connection with learning activities.

8. Learning Style – The way in which a person learns.

9. National Board Certificate (NBC) - Voluntary national teaching credential that measures a teacher's practice against high and rigorous standards.

10. National Board for Professional Teaching Standards (NBPTS) - Advances the quality of teaching and learning by establishing high and rigorous advanced standards for experienced teachers to demonstrate accomplished practice and administers the NBC.

11. Natural Learning Style – The natural way in which a person learns.

12. Physiological – Learning that relies upon hearing (auditory), seeing (visual), manipulating items with the hands (tactile), and moving (kinesthetic). Other factors may be preferences for time the day and

activity level (perceptual, intake, time, and mobility) (Dunn & Dunn, 1992, p. 5). Use of or exploration with the senses.

13. Psychological – How students process challenging academic information: Global (want an overview of the whole -- holistic) or analytic (learn facts step-by-step--sequential). Hemisphericity (right brain--left brain) Impulsive (draw conclusions quickly) or reflective (use think time and are evaluative) (Dunn & Dunn, 1992, p. 5).

14. Sociological – Are human relations settings conducive to learning whether alone, in pairs, with peers, in teams, with an adult, or varied (Dunn & Dunn, 1992, p. 5).

Study Delimitations

The study is delimited to the following characteristics:

1. National Board Certification teachers in Colorado.
2. All NBC teachers will have the choice to participate.
3. Interviews, used to obtain data, are qualitative and generalizability is not intended.

Researcher's Perspective

I have been involved in public education for the past 17 years. During that time I have been a classroom teacher, an administrator, a parent, a board member, and a student. I am passionate about learning and teaching. While working full time and raising a family, I dedicated much of my free time to pursuing advanced degrees.

It has always amazed me that throughout my entire academic career I rarely had a teacher that made a difference in my learning or taught me in a way that was specific for me. I experienced very few real learning moments. The first one I had was not until I was in high school as a teaching assistant for a first grade teacher at an elementary school. I went to the first grade classroom every day for two hours for the entire school year. This was the only learning event in my K–12 education that I view as real, having meaning, and that I actually remember clearly. I often ask myself, "What was it about that experience that affected me and why didn't it happen in other classes?" I knew I wanted to work with kids and I had an immediate emotional connection with going to the elementary school and working with the first graders. I felt comfortable with the content the first graders were learning and felt I could help students that didn't understand a concept to understand it by teaching it in a different way. I got to know the kids, what they liked and disliked, then related real life meaning to the content they were trying to learn. Not only was I able to help the first grade students, this learning event gave me direction and a purpose to my education. I was able to realize that I could transfer the information that I learned in the first grade classroom to the real world and that determined what I wanted to do for a career. Jensen believes that applying knowledge is strongly related to real-life survival skills and by teaching students to think and learn authentically, you also provide them with a framework to be productive and successful in the real world outside of school (2000).

I knew I had a unique learning style and most teachers were not equipped to teach to different learning styles when I attended school. I was a product of the 1960s and 1970s traditional textbook education focused on the teacher telling you something and

you spitting it back to them in a test format. Newmann and Wehlage define this as lower order thinking when students are asked to recite factual information where the knowledge is shallow and unconnected (1993). My teachers did not check for understanding, connecting the learning with real life events, applying previous knowledge, and have me explaining it to another student, or demonstrating knowledge. There was nothing to make it real! I needed to have meaning and purpose for my learning to be real and memorable.

When I became a teacher, I vowed that I would provide a classroom experience where all students could be successful using their own style of learning. Even before individual learning styles and hands-on-learning were considered good teaching strategies, I was practicing these important teaching strategies in my classroom. I believe every teacher can make learning real, fun, and memorable.

I later became a principal and continued my advocacy for teaching students using individual learning styles. Most recently I was able to teach in a teacher licensure program, teaching future teachers. I had the opportunity to share current research, put theory into practice, and try to figure out what characteristics make a teacher learn. Then in turn, if teachers understand how they learn and how students learn, they will be able to teach so their students will learn. It was while teaching future teachers at a university that I realized my dissertation needed to be about individual learning styles.

I am interested in how teachers identify their own learning style. Are teachers able to identify other learning styles? Can teachers teach to a variety of learning styles? I want to help teachers be aware of the many different learning styles their students might

have as well as provide teaching strategies for teachers to incorporate into their lesson plans that promote learning.

Due to the exploratory nature of the research question and the complexity of the issue, a qualitative research design will be employed. I enjoy working with people, listening to their stories, and building relationships.

CHAPTER TWO

Review of the Literature

The following review of literature is comprised of five major areas. First, an overview of the National Board of Professional Teaching Standards (NBPTS), the National Board Certificate (NBC), and the five core propositions the NBPTS seeks to identify and recognize in teachers. Second, the literature will focus on learning styles. It will begin with a brief history of learning styles then move to the specific model of Dunn and Dunn. Their five strands will be discussed in detail while bringing in other related research. Third, the literature will focus on teaching styles. Fourth, the literature will focus on application and outcomes of learning styles in the classroom. Lastly, the literature will focus on teacher education.

The National Board for Professional Teaching Standards (NBPTS)

In 1983, public concern about the state of American education was heightened by the publication of a federal report titled *A Nation at Risk* (The National Commission on Excellence in Education, 1983). The report produced education initiatives that encompassed the entire educational community. Three years after *A Nation at Risk,* the Carnegie Task Force on Teaching as a Profession issued a pivotal report, *A Nation Prepared: Teachers for the 21st Century* (National Center on Education and the Economy, 1986). Its leading recommendation called for the establishment of a National

Board for Professional Teaching Standards. In 1997, this unique institution of American education was born (NBPTS, 2002a).

The NBPTS is leading the way in making teaching a profession dedicated to student learning and to upholding high standards for professional performance (NBPTS, 2002b). Five Core Propositions describe the National Board's values and beliefs that should be honored in teaching. Using the core propositions as a foundation, NBPTS further details what constitutes accomplished teaching for all subjects. The NBPTS seeks to identify and recognize teachers who effectively enhance student learning and demonstrate high levels of knowledge, skills, abilities and commitments reflected in five core propositions (2002b).

1) Teachers are committed to students and their learning.

Accomplished teachers:

1. are dedicated to making knowledge accessible to all students.
2. act on the belief that all students can learn.
3. treat all students equitably, recognizing individual differences that differentiate one student from another and using those differences in their practices.
4. adjust their practice based on observation and knowledge of their students' interests, abilities, skills, knowledge, family circumstances and peer relationships.
5. recognize individual differences in their students and adjust their practice accordingly.
6. know many things about the particular students they teach.
7. have an understanding of how students develop and learn.
8. use their understanding of individual and social learning theory, and of child and adolescent development theory, to form their decisions about how to teach.
9. are familiar with the concepts generated by social and cognitive scientists that apply to teaching and learning.
10. treat students equitably.
11. are vigilant in ensuring that all pupils receive their fair share of attention, and that biases on real or perceived differences do not distort relationships between themselves and their students.

12. are concerned with their students' self-concept, with their motivation, with the effects of learning on peer relationships, and with the development of character, aspiration and civic virtues (NBPTS, 2002b. p. 8-9).

2) Teachers know the subjects they teach and how to teach those subjects to students.

Accomplished teachers:

1. have a rich understanding of the subject they teach and appreciate how knowledge in their subject is created, organized, linked to other disciplines and applied to real-world settings.
2. command specialized knowledge of how to convey and reveal subject matter to students.
3. create multiple paths to the subjects they teach, and they are skilled at teaching students how to pose and solve their own problems.
4. appreciate how knowledge in their subjects is created, organized, and linked to other disciplines.
5. have command of their subject and understand its substance, factual information as well as its central organizing concepts, focusing on skill development as they work to help moderately and profoundly handicapped students achieve maximum independence in managing their lives.
6. command specialized knowledge of how to convey a subject to students.
7. possess pedagogical content knowledge. Such understanding is the combination of wisdom about teaching, learning, students, and content. It includes knowledge of the most appropriate ways to present the subject matter to students.
8. generate multiple paths to knowledge.
9. are aware there is value in both structured and inductive learning.
10. help students learn to pose problems and work through alternative solutions, in addition to teaching them about the answers that others have found to similar problems (NBPTS, 2002b, p. 10-12).

3) Teachers are responsible for managing and monitoring student learning.

Accomplished teachers:

1. create, enrich, maintain, and alter instructional settings to capture and sustain the interest of their students and to make the most effective use of time.
2. are skillful at engaging students and adults to assist their teaching and at recruiting their colleagues' knowledge and expertise to complement their own.
3. know how to engage groups of students to ensure a disciplined learning environment and how to organize instruction to allow the students to meet the schools' goals.
4. orchestrate learning in group settings.

5. have developed systems for overseeing their classrooms so that students and teachers can focus on learning, not discipline. Discipline and management techniques vary, and no one system has been proven most effective; therefore, proficient teachers consider the desired outcome, their knowledge of their students and the social context, and their own prior experience in selecting management strategies.
6. place a premium on student engagement.
7. understand the ways in which students can be motivated and have strategies to monitor student engagement. The teacher's role in building upon student interests and in sparking new passions is central to building bridges between what students know and can do and what they are capable of learning.
8. regularly assess student progress.
9. can judge the success of the activities they design. They can track what students are learning (or not learning), as well as what they, as teachers, are learning.
10. help their students to engage in self-assessment, instilling in them a sense of responsibility for monitoring their own learning (NBPTS, 2002b, p. 13-15).

4) Teachers think systematically about their practice and learn from experience.

Accomplished teachers:

1. are models of educated persons.
2. draw on their knowledge of human development, subject matter and instruction, and their understanding of their students to make judgments about sound practice.
3. strive to strengthen their teaching by critically examining their practices, expand their teaching strategies, deepen their knowledge, sharpen their judgment, and adapt their teaching to new findings, ideas, and theories.
4. are continually making difficult choices that test their judgment. The demands of teaching present stiff challenges that do not lend themselves to simple solutions and sometimes, teachers face choices that force them to sacrifice one goal for another. Such circumstances call on teachers to employ their professional knowledge of what makes for sound practice, with the interest of their students given paramount consideration.
5. seek the advice of others and draw on educational research and scholarship to improve their practice.
6. develop specialized ways to listen to their students, colleagues and administrators, and reflect on their teaching in order to improve their practice.
7. exemplify the virtues they seek to impart to students (NBPTS, 2002b, p. 16-17).

5) Teachers are members of learning communities.

Accomplished teachers:

1. contribute to the effectiveness of the school by working collaboratively with other professionals on instructional policy, curriculum development, and staff development.
2. find ways to work creatively with parents, engaging them productively in the work of the school.
3. contribute to school effectiveness by collaborating with other professionals. The National Board advocates a proactive and creative role for teachers: engaging them in analysis and construction of curriculum, in the coordination of instruction, in the professional development of staff, and in many other school-site policy decisions fundamental to the creation of highly productive learning communities.
4. collaborate in planning the instructional program of the school to assure continuity of learning experiences for students while being aware of the learning goals and objectives established by state and local authorities.
5. work collaboratively with parents.
6. communicate regularly with parents, listening to their concerns and respecting their perspective, enlisting their support in fostering learning and good habits, informing them of their child's accomplishments and successes, and educating them about school programs. In the best of all worlds, teachers and parents are mutually reinforcing partners in the education of the students.
7. take advantage of community resources. Any community can be a laboratory for learning under the guidance of an effective teacher. Within all communities there are valuable resources such as other teachers and students, senior citizens, parents, business people, and local organizations that teachers can engage to assist, enhance, and supplement their work with students (NBPTS, 2002b, p. 18-20).

History of Learning Styles

Carl Jung's (1875-1961) work in the 1920s noted major differences in how people perceived the way they made decisions, and how active or reflective they were while making decisions. Jung was a Swiss psychiatrist who was influenced by Sigmund Freud's work. Jung broadened Freud's psychoanalytic approach by interpreting mental and emotional disturbances as an attempt to find personal and spiritual wholeness. Jung went on to explain the relationship between the conscious and unconscious mind and proposed the now well-known personality types, extrovert and introvert (1927).

Beginning in the early 1940s, Isabel Myers and Katherine Briggs extended Jung's model with the initial development of the *Myers-Briggs Type Indicator* (Personality Pathways, 2003). The 126 item *Myers-Briggs Type Indicator* (*MBTI*) is an educational tool for assessing learning styles for students 14 years old and older. The *MBTI* provides data on four sets of preferences. Analyzing these preferences results in identifying 16 learning styles or learning types. A type is a combination of the four preferences (Brightman, 2003). "Knowing your own preferences and learning about other people's can help you understand what your strengths are, what kinds of work you might enjoy, and how people with different preferences can relate to one another and contribute to society" (Myers & Briggs, 1998, p.1).

Rita Dunn and Kenneth Dunn are considered authorities on learning styles. They describe learning style in terms of 21 elements in five basic strands that include each person's environmental, emotional, sociological, physiological, and psychological processing preferences. They have been administering their *Learning Style Inventory* to students since 1972. The *Learning Style Inventory* originally described 18 elements and used the first four strands. The psychological strand was added in 1985 (Shaughnessy, 1998). Qualified analysis of a student's *Learning Style Inventory* printout "identifies those elements that are crucial to the student's learning style. Further, the instrument aids in prescribing the type of environment, instructional resources, social groupings, and motivation factors that maximize personal achievement" (Dunn & Dunn, 1993, p. 34).

Anthony Gregorc is a phenomenological researcher. He is internationally recognized for pioneering work in learning, teaching, and administering the *Styles Delineator* instrument which began in 1969 with the introduction of his *Energic Models*

of Styles. This seminar evolved into the *Mind Styles Model* published in 1984 (Gregorc, 2003). Gregorc's style delineator approach is based on studies into the function of the left and right brain hemispheres. His system of learning takes into account the different ways of perceiving and ordering information and forms four categories of learning styles: Concrete-Sequential, Concrete-Random, Abstract-Sequential, and Abstract-Random (Gregorc, 2002).

Another professional educator working with learning styles is Bernice McCarthy. She created the *4MAT System* in 1979. The *4MAT* is a natural cycle for identifying the diversity of learners and for enhancing communication, teaming, and problem solving. The *4MAT* model explains learning in terms of the ways people perceive and process information (McCarthy, 1997).

In the late 1970s Howard Gardner, a developmental psychologist, was interested in children and brain-damaged adults. His interest grew into viewing thinking on a broader and more comprehensive scale, and he developed the theory of multiple intelligences. Gardner defined the first seven intelligences: verbal-linguistic, mathematical-logical, musical, visual-spatial, bodily-kinesthetic, interpersonal, and intrapersonal in *Frames of Mind* (1983). He added the naturalist and existential intelligences in *Intelligence Reframed* (1999). Gardner claims that all human beings have multiple intelligences. These multiple intelligences can be nurtured and strengthened or ignored and weakened (Gardner, 2002).

A contemporary advocate of experiential learning, David Kolb, developed the *Learning Styles Inventory (LSI)* (Kolb, 1984). He theorized that people develop preferences for different styles of learning in the same way that they develop other sorts

of style. Kolb found that the four combinations of perceiving and processing information determine four learning styles: Activist, Reflector, Theorist, and Pragmatist (Clark, 2000).

Dunn and Dunn Model

After reviewing the aforementioned learning style models, the Dunn and Dunn model was selected as a framework for this study because of their frequent references to K-12 education, teaching styles, and learning styles. In 1967 Rita Dunn was asked by the New York State Department of Education to help design and direct a program that would improve the effectiveness of instruction for students who were not demonstrating appropriate progress in academic achievement (Dunn & Dunn, 1978). The Dunn and Dunn model was developed from this concern for the lack of achievement of educationally disadvantaged students. Since that time research has been conducted at more than 90 institutions (Burns, 1998). Originally designed to be used at the middle school and high school levels, the Dunn and Dunn Learning Styles model is being used at all grade levels. The instruments are divided into three categories for students: K-2, 3-4, and 5-12. Learning style is described in terms of individual preferences to 21 elements (See Table 1) in five basic strands that include:

Strand 1: Environmental (sound, light, temperature, design)

Strand 2: Emotional (motivation, persistence, responsibility, structure)

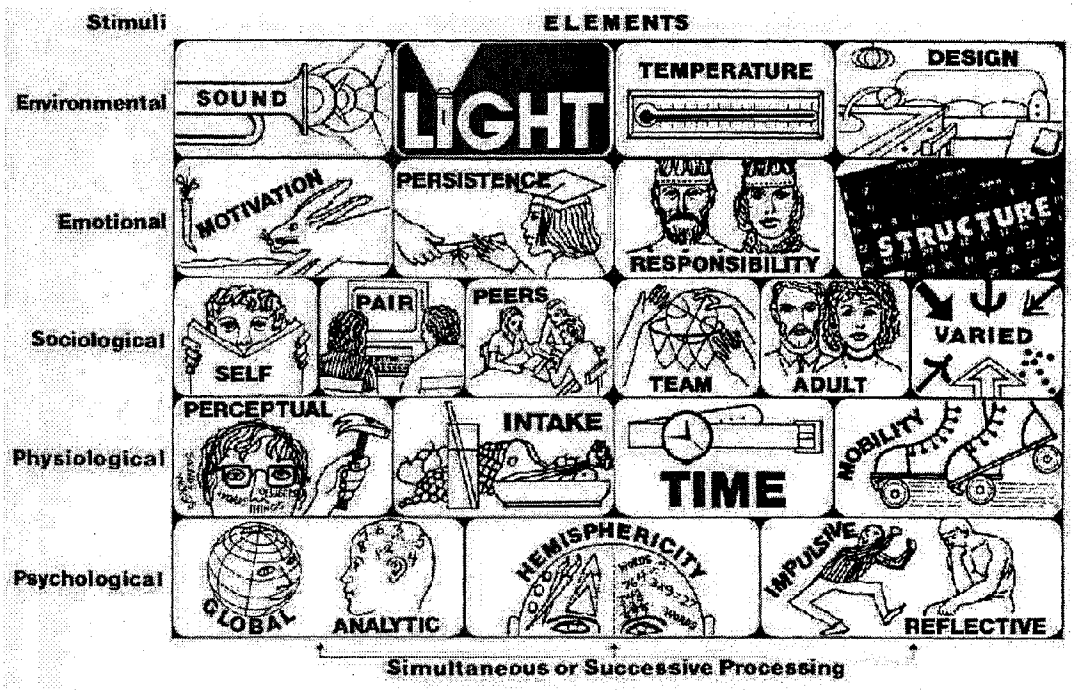
Strand 3: Sociological (self, pair, peers, team, adult, varied)

Strand 4: Physiological (perceptual, intake, time, mobility)

Strand 5: Psychological (global/analytic, hemisphericity, impulsive/reflective (Dunn, Dunn, & Price, 1985).

Table 1

Dunn and Dunn Learning Style Preferences (Dunn & Dunn, 1992, p.23)



Environmental

According to Dunn and Dunn, the environmental strand is divided into four elements - sound, light, temperature, and design (2002).

Table 2

Dunn and Dunn Environmental Strand

Strand	Element	Preferences
Environmental	Sound	Background sound Level (loudness) Type (music)
	Light	Level (dim-bright) Type (natural-artificial)
	Temperature	Level (cool-hot) Type (fresh-recirculated)
	Design	Level (traditional-modern) Type (couches, hard chairs, pillows, carpet) surface for seating/work Spatial arrangements (fixed-flexible)

In exploring research related to the environmental strand and its elements, many situations affect learning. Loud noise impairs intellectual performance on complex tasks. Children in elementary schools beneath the flight path for Los Angeles International Airport (noise level above 95dB) were compared with children in quieter classrooms. The two groups were matched in age, ethnicity, race, hearing loss, and social class. Children in noisy schools had higher blood pressures, were more distractible, and had more difficulty with complex puzzles and math problems than children in quieter schools (National Clearinghouse for Educational Facilities, 2003).

Although loud noise can impair learning, Sousa feels, "Listening to music in the classroom can promote student focus and productivity at all grade levels (Sousa, 2001, p. 234). Rhythm (beats per minute) can affect heart rate, blood pressure, and emotional mood, so the awareness and selection of number of beats per minute in the music is very important. It has been recommended that beats per minute relate to the tempo of the activity. If you are using music in the background to facilitate student learning, choose music that plays at about 60 beats per minute (the average heart rate). If the music is accompanying a fast paced activity or a transition period, then choose 80 to 90 beats per minute. To calm down a noisy group after recess or in the cafeteria, choose music 40 to 50 beats per minute (Sousa, 2001).

Not only does loud noise affect a student's learning ability, it can also cause permanent hearing loss. According to the American Academy of Otolaryngology, three million children under the age of 18 have some kind of hearing loss. A study by Judy Montgomery in 1990 found that 7% of second-graders, 15% of eighth-graders, and 13% of twelfth-graders who played in a band had measurable hearing losses. In 1996, the League for the Hard of Hearing found that 10% of ninth-graders failed a hearing screening and had not before been identified as having hearing difficulties. Their teachers reported these students exhibited learning and behavior problems in class (League for the Hard of Hearing, 2002). The National Hearing Conservation Association reported in a survey of 110 children, ages 6 to 14, the average noise level during the day was 90 decibels, about that of city traffic. On the playground, it reached 115 decibels, similar to that of a noisy subway or rock music (League for the Hard of Hearing, 200). The Acoustical Society of America has established guidelines for all school settings.

They recommend, "A good guideline is that the noise level in a classroom should not exceed 35 decibels" (2000, p. 5).

What effect does lighting have on student achievement? Lighting in the classroom is a factor in student achievement. Natural light, desk and floor lamps, or track lighting provide illumination that is most conducive to learning. Traditional fluorescent ceiling panels are generally too bright for many students' comfort levels and also excite or agitate students with Attention Deficit Hyperactive Disorder characteristics (Butler, 1999).

A study was conducted to obtain student performance data from three elementary school districts that varied in the amount of daylight (natural) each student received. Test scores were analyzed from three districts located in Orange County, CA, Seattle, WA and Fort Collins, CO. Controlling for all other influences and using 21,000 test scores, the study found that students with the most daylight in their classrooms progressed 20% more on math tests and 26% on reading tests in one year than those with the least. Similarly, students with the largest window areas were found to progress 15% more than average in math and 23% more than average in reading than those with the least amount of windows. The study showed consistently positive and highly significant effects. This consistency persuasively argues that there is a valid and predictable effect of daylight on student performance (Heschone, 2003).

Temperature in a student's learning environment and teacher's teaching environment plays a significant role in learning. The brain's optimal physical learning environment includes a temperature near 70 degrees F. and a humidity level near 70%. Too much or too little heat and humidity produces stress (Jensen, 1999). Students from

Bitterne Park Secondary School in Southampton, UK, were asked to describe their best room for learning. Students had specific preferences. A positive response was a temperature controlled room and a negative response identified rooms that were too hot and stuffy (Johnson, 2003).

The design of the learning environment is linked to issues that are important in the process of learning, transfer, and achievement (Bransford, 1999). These may include the spatial utilization and furnishings within the setting. Allowing student choice in alternative seating—bean bags, floor pillows, rockers, sofas, recliners, mats, size of chairs—not only creates a comfortable home-like environment and lowers stress, but allows students to go to areas of the room which reflect their learning style (Butler, 1999). Another researcher found that students who preferred "informal" seating arrangements performed significantly better on English comprehension tests when provided with their seating of choice. Another group scored much higher in mathematics when they were taught and tested in their preferred seating type (Hodges, 1985).

Emotional

According to Dunn and Dunn, the emotional strand is divided into four elements—motivation, persistence, responsibility, and structure (2002).

Table 3

Dunn and Dunn Emotional Strand

Strand	Element	Preference
Emotional	Motivation	Self-motivated (intrinsic) Adult feedback
	Persistence	Attention span Ability to stay on task Single task – multiple tasks
	Responsibility	Level of supervision, guidance, or feedback Work independently
	Structure	Told exactly what to do or be given an objective and left alone

Student motivation increases as control and accountability increase. Motivation also increases when students are relating to real-world experiences. The brain thrives on feedback and feedback increases motivation (Jensen, 2000). Jensen states, "The best feedback is immediate, positive, and dramatic" (2000, p. 156). To become motivated to learn, a student must experience a need to learn (Leamnson, 1999). Intrinsic motivation kicks in as we move toward reducing stress. When the body is under stress, motivation decreases. When a learning environment provides a balanced amount of challenge and stress with empowerment and support, you get an ideal situation for intrinsic motivation (Jensen, 2000). Emotions can motivate and reward as well as punish. Emotions can be the deciding factor of what students will remember (Lock, 2002).

The level of persistence or attention students apply to a learning situation is determined by their perception of its value. Teachers have the ability to create environments where learners have the flexibility to focus their attention on content that is personally important to them. As students absorb so much information unconsciously, downtime is necessary to allow them to process the new information. When students have "stopped paying attention," they might be doing something equally important in their learning -- processing information. Students can only "take in" so much information before they reach an overwhelmed level or information overload and can no longer pay attention to new material. Teachers need to plan downtime activities after each new learning session. Such activities might include a walk, music, snack, stretching, or discussion with a partner (Jensen, 2000).

According to Rogers and Freiberg, "the learning which takes place from choices is processed faster and at a deeper level than in the traditional classroom. When students have the responsibility in choosing aspects of their learning, students are more competent as directors of their own future" (1994, p. 212). The authors also feel that teachers need to develop an action plan to reduce stress and increase student responsibility (1994). A simple example illustrates this. What parent has not asked their child, "What did you learn in school today?" Parents are trying to show interest in children at school. But this approach takes the responsibility away from the child. Instead, if the child's responsible, they will tell what they did, how things went, and any problems or concerns they have (Cummings, 2000).

Building a structured classroom is a developmental process. To provide the best possible learning environment, teachers need to balance internal and external structures

for the students. Internal structure is more motivating, self-empowering, and has a feeling of ownership. It places emphasis and value on the individual as an independent, self-controlled part of the learning community. External structure is more focused and definite for the teacher, the teacher feels in control, and the work has a specific outcome. External structure recognizes the importance of an authority figure and places a high value on compliance and product (Northern Arizona University, 2002).

Sociological

According to Dunn and Dunn, the sociological strand is divided into six elements. They are self, pairs, teams/peers, adults, and varied (2002).

Table 4

Dunn and Dunn Sociological Strand

Strand	Element	Preference
Sociological	Self	Working by yourself
	Pairs	Working with one other student
	Team/Peers	Working as a member of a team with peers
	Adults	Interaction and guidance with an adult
	Varied	Variety of tasks

"As human beings, we rely on one another and learn from each other. In fact, our very survival depends upon our relationships with others" (Jensen, 2000, p. 328). So why are so many classrooms characterized with lectures and with little interaction?

Brain based instruction suggests, students like to spend time learning with their peers. Spending time with others increases the brain's oxytocin and opioid levels. This

causes students to feel good and feel more comfortable with those in their classroom which in turn will develop trust (Panksepp, 1998). The effectiveness of learning in groups is well established from research. Learning in groups is a valuable strategy for helping students attain high academic standards and have positive effects on student achievement (Slavin, 1990). Yackel, Cobb, and Wood report 72% of group learning studies showed higher achievement for students than individual learning. Group learning structures provide many opportunities that do not typically occur in a traditional classroom including problem solving and conflict resolution (1991).

Students from Bitterne Park Secondary School in Southampton, UK, were also asked if they prefer learning on their own, with another student, or in a group. The majority of them preferred learning in a pair or group, although it did depend on the activity. The students felt they could generate more ideas and help each other develop understanding of important concepts while working with another student or in groups (Johnson, 2003).

Adult assisted learning provides one-to-one attention, increases time on task, is individualized and interactive, and also provides immediate support, modeling, monitoring, and feedback. Adult assisted learning may be modeled as that of tutor, mentor, or a Big Brother/Big Sister (BBBS). As students progress into middle school, adult support will take on the role of encouraging and prompting rather than modeling (Topping, 2002). "The addition of a Big Brother/Big Sister to a young person's life for one year dramatically reduced first-time drug use, school absenteeism, and violent behavior by 30 to 50%. And these results held true, regardless of race, for both boys and girls" (Big Brothers Big Sisters of America, 2003, p. 1)

Since young adolescents change rapidly, more than at any stage of development, this creates a challenge for middle school teachers in being able to differentiate or adapt instruction to respond to learners at various stages. A class is not differentiated when assignments are the same for all of the learners. A variety of grouping is consistently used. In a differentiated class, students work in many groupings. Sometimes they work alone, sometimes in pairs, sometimes in groups. These choices provide students ownership of their learning, and it also facilitates the important adolescent learning goal of independence (Tomlinson, 1995).

Physiological

According to Dunn and Dunn, the physiological strand has four elements. They are perceptual, intake, time, and mobility (2002).

Table 5

Dunn and Dunn Physiological Strand

Strand	Element	Preference
Physiological	Perceptual	Visual, auditory, tactile, or kinesthetic
	Intake	Sustenance: Eat or drink while studying
	Time	Best time to learn, energy level, alertness: Early morning - evening
	Mobility	Move around – sit still

Educators need to understand the perceptual strengths of students. Visual learners remember 75% of what they read or see. Forty percent of the population is visual with the percentage varying at different ages. Auditory learners remember 75% of what they hear. Thirty percent of the population is auditory. This is the most difficult way for

people to learn and remember new and difficult information. Tactile learners remember what they write, and kinesthetic learners remember best the things they experience. Children tend to be highly tactual or kinesthetic (Dunn & Dunn, 1993).

Neuroscientists can use brain-imaging scans to show sensory preferences in the brain. Using a magnetoencephalography (MEG), neuroscientists measure tiny magnetic fields outside the head created by the electrical activity occurring inside the brain. At the University of Utah's Center for Advanced Medical Technology (CAMT), clinical researchers were able to see how students process new information. For example, in one study, a 16 year old male student was given information visually on a screen and orally through headphones at the same time (Nunley, 2002a). "The MEG picture showed high brain activity in the occipital region (visual area) but no activity whatsoever in the temporal region (auditory)" (Nunley, 2002a, p. 54). When receiving information from both eyes and ears, this student's brain did not process the auditory information at all, only the visual. So the brain showed a preference for visual information (Nunley, 2002a).

Understanding chemistry of the body and brain allows teachers to connect their teaching with students' chemical reactions. Glucose, the primary fuel for the brain, is consumed quickly during intense concentration; this and other chemical reactions dehydrate the brain. Students need to be allowed and encouraged to drink frequently during the day for optimum learning. Serotonin, another chemical critical for optimum learning, is replenished by allowing and encouraging the intake of nutritional snacks during instructional activities. Many students learn and process information better if allowed to drink and eat while learning new material (Butler, 1999). Zeannah agrees

with Butler by saying, "Research has indicated the need for frequent water and nutritional snacks at all times throughout the day, as well as encouraging students to drink water while completing class work" (1999, p. 28).

Time of day preference has a direct effect on student learning and teacher's teaching. Sleep researcher William Dement from Stanford University tested a group of 10-12 years olds to determine when they learn best. Overwhelmingly, the students felt they learn better mid-morning because they are wide awake. They said they are tired after lunch (1999). This is because adolescents are not getting enough sleep. Sleep deprivation is common among adolescents and affects their ability to retain and store information. The normal adolescent "alert cycle" peaks from 9:00 a.m. until noon, and then has a sharp decline from noon until 2:00 p.m. which is followed by a semi-alert period from 2:00 p.m. until 10:00 p.m. Some schools are listening to sleep researchers and changing school times to better meet the needs of students (Sousa, 2001). In a highly debated issue, the Eagle County Board of Education in Colorado compromised on a schedule for the 2003 – 2004 school year. All district elementary schools will begin their school day at 8:00 a.m. (used to be 9:00 a.m.) and all middle and high schools will begin their school day at 8:30 a.m. (used to be 7:30 a.m.) (Ramunno, 2003).

Another critical element to learning is the ability to be able to move around a classroom. Integrating movement into learning activities increases circulation and oxygen flow to the brain, which can increase student attention. "Plan your class activities so movement is built in (e.g., use manipulatives); have students change their location in the classroom; encourage clapping, dancing, stretching; help students monitor and manage their own movement in the classroom" (Lock, 2002, p. 238). Motion and

movement activities or taking students on a short walk are excellent ways of creating fuel for the brain. The most effective time for academic focus is immediately after physical exertion (Butler, 1999).

Psychological

According to Dunn and Dunn, the psychological strand has three elements. They are global/analytic, hemisphericity, and impulse/reflective (2002).

Table 6

Dunn and Dunn Psychological Strand

Strand	Element	Preference
Psychological	Global/Analytic	Holistic - sequential
	Hemisphericity	Right brain – left brain
	Impulse/Reflective	Speed of decision making Quickly – time to think

The left hemisphere is the logical hemisphere, involved with speech, reading and writing. It is the analytical hemisphere that evaluates factual material in a rational way and that understands the literal interpretation of words. Left hemisphere dominant individuals, more typically females, tend to be more verbal, more analytical, and better problem solvers. The right hemisphere is the intuitive, creative hemisphere. It can also be characterized as the global or holistic hemisphere. It gathers information from images rather than by words. Right hemisphere dominant individuals, more typically males, paint and draw well, are good at math, and deal with the visual world more easily than the verbal. Learning has been left hemisphere oriented where left hemisphere dominant students, mostly girls, feel more comfortable than right hemisphere students, mostly boys

(Sousa, 2001). Educators need to recognize that boys and girls may have different hemisphere learning preferences, but the hemispheres work as an integrated whole.

The speed at which decisions are made is another learning preference. Decisions made quickly are called impulsive and if made after much thought are called reflective. A skilled decision-maker combines impulsive and reflective decision making strategies depending on the situation. The overly impulsive decision-maker is likely to make decisions too quickly without sufficient thought about long range implications. The overly reflective decision maker is likely to be fearful of being wrong and may miss many opportunities due to indecisiveness or delay of response (Epsilon Consulting, 2002).

Teaching Styles

Classroom teachers need to be aware of their teaching styles. Teaching style consists of personal behaviors and preferences to the way information is received and transmitted (Kaplan, 1995). The Center for Occupational Research and Development (CORD) developed the Teaching Styles Inventory. The inventory was designed to examine teachers' effective learning goals for their students and teaching methods used to support their learning goals. The potential value of the Teaching Styles Inventory is its ability to measure a wide variety in teaching styles. "If teaching styles for particular teachers are tracked with their students' scores on standardized tests, it may be possible to quantify the teaching styles that are most effective in helping certain types of students learn" (CORD, 2001, p.1). Dunn and Dunn have also developed a Teaching Style Inventory. Their inventory is based on nine major components: instructional planning, teaching methods, student groupings, room design, teaching environment, evaluation

techniques, educational philosophy, teaching characteristics, and student preference. The Dunn and Dunn Teaching Style Inventory is "An instrument to identify the way in which a teacher actually functions so as to form grouping on the basis of complementary student and teacher styles" (Dunn & Dunn, 1992, p. 461). This Teaching Style Inventory uses application and outcomes to determine what learning style is necessary at a specific time in the classroom.

Application and Outcomes of Learning Styles in the Classroom

Teachers have recognized the need for alternative instructional approaches to meet the needs of the diversity of students in classrooms. Often, teachers feel frustrated by not meeting the needs of some of the students. One reason is the failure to recognize and accommodate the individual and unique learning styles of students. Recognizing and defining the styles by which a person learns best is an important component to the learning process. Learning style consists of distinctive and observable behaviors that provide clues about each student. Learning styles emerge naturally. They need to be recognized, encouraged, and developed (Kaplan, 1995). Thinking about learning styles can lead a teacher to think about different ways of teaching. An effective teacher needs to alter instructional techniques and have a variety of teaching methods and learning activities to draw on to facilitate optimal learning for as many students as possible (McKeachie, 1995).

There are also several external factors that affect the application and outcomes of learning styles. Some of these external factors are physical classroom size, student population, and transient population. The National Clearinghouse for Educational Facilities recommends 50 square feet per student in kindergarten classrooms and 30

square feet per student in 1–6 grades. Specific classrooms for 7–12 grades differ from class to class. For example, Art recommends 44 square feet per student, Drama recommends 72 square feet per student, and Physical Education recommends 60 square feet per student (2000).

There is a continual debate on optimal class size. "...a multiyear study of 79 schools in Tennessee showed that 17 students is the optimum classroom size" (Myers, 1997, p.1). That information included all sizes of districts, in rural, urban, and suburban areas (Myers, 1997). Douglas County, Colorado, bases their average class size on 20 students for kindergarten and 27 students for 1–6 grades (Douglas County, 2001). Another issue that continues to affect the application and outcomes of learning styles in the classroom is the portion of transient students. "Transient students are students who have attended three or more schools in a 12 month period" (Lee, 1999, p. 1). There is a negative relationship between student mobility and academic performance. Also, economically disadvantaged children had a higher rate of mobility. This mobility which is unwelcome and undesirable for a student is more likely to bring undue stress and associated adjustment problems. To help this adjustment problem, specifically adapted support for children who change schools frequently, in partnership with their families, could significantly improve the children's success at school (Lee, 2000).

Teacher Education

In the 1996 report, *What Matters Most: Teaching for America's Future*, the National Commission on Teaching and America's Future (NCTAF) developed a blueprint for recruiting, preparing, and supporting excellent teachers in all of America's schools (The National Commission on Teaching and America's Future, 1997). Many

reforms such as new curriculum standards and increased accountability measures are unlikely to be successful without major investments in teaching. The demands of new subject matter and the ever increasing diversity of the student body require deeper content knowledge, more sophisticated pedagogical and diagnostic skills, and a broader variety of teaching strategies (Darling-Hammond, 2000). New educational reforms on learning styles are being implemented in Florida. In 2002, the Florida Assembly passed legislation requiring teachers to "use teaching and learning strategies that include consideration of each student's learning styles, needs, and backgrounds" (Florida Statutes, 2003, 1012.52 (i)).

The traditional style of teacher education needs to be replaced with an education that gives teachers a thorough understanding of teaching and learning styles to enable teachers to deliver a unique and individualized learning experience for all students. An important contribution for improving education would be providing more funding to strengthen teacher licensure programs. This would provide the kinds of preparation teachers need to meet the changing needs of students and offer classes that teach about learning styles. A departure from the traditional note taking classroom where the teacher is talking and the student is listening or reading needs to take place. Research on cognition and learning suggests this kind of teaching does not help most students learn and apply new information.

> Students learn best when new ideas are connected to what they already know and have experienced; when they use real-world problems to apply and test their knowledge; when they are given clear, high goals with much practice in reaching them; when they can build on what they have learned; and when their own interests and strengths are a springboard for learning (Darling-Hammond, 1997, p. 17).

CHAPTER THREE

Methods

The purpose of this study is to determine factors selected teachers describe as being important to their identification, understanding, and perception of learning styles. Chapter 3 will describe the design and procedures to be used in the study.

Research Design

This study is a qualitative exploratory study. Qualitative exploratory research is "to investigate little understood phenomena, to identify and discover important variables, and to generate hypotheses for further research" (Marshall & Rossman, 1995, p. 41). Qualitative researchers in education ask questions of the people they are learning from to discover, "what they are experiencing, how they interpret their experiences, and how they themselves structure the social world in which they live" (Bogdan & Biklen, 1998, p. 7). Qualitative researchers set up strategies and procedures to enable them to consider experiences from participants' perceptions (Bogdan & Biklen, 1998).

Participants and Site

The NBPTS believes the single most important action this country can take to improve schools and student learning is to strengthen teaching. With its leadership NBPTS is making teaching a profession dedicated to student learning and high standards for professional NBPTS performance. The NBPTS has raised the standards for teachers, strengthened their educational preparation through the standards, and created

performance-based assessments that demonstrate accomplished application of the standards (National Board for Professional Teaching Standards, 2002b). The National Board Certificate (NBC) measures a teacher's practice against high rigorous standards.

Though relatively recent, the impact of NBPTS is beginning to be reflected, as teachers who have participated in NBC have stated it is the most powerful professional development experience of their careers. They say the experience changes them as professionals and through the process they deepen their content knowledge and develop, master, and reflect on new approaches to working with students (National Board for Professional Teaching Standards, 2002b).

The NBC process measures a teacher's practice against high and rigorous standards. The NBC is voluntary and open to all teachers who have a baccalaureate degree and three years of classroom experience. There are 25 different areas in which to receive a certificate ranging from Early Childhood/Generalist to Adolescence and Young Adulthood/Science. The certificate is valid for 10 years, after which a teacher must seek renewal.

In Colorado, the fee for the NCB is $2,300. State departments of education are offsetting the cost of the NBC to teachers through the Colorado Education Finance Bill. For example, the 2002 legislature appropriated $60,000 to match federal subsidy monies of $83,000 to offset the application cost for candidates seeking NBC beginning July 1, 2002 (NBPTS, 2002a). Approximately $10 million was earmarked for the National Board to support candidate fees. A formula, which included the number of teachers in each state, was used to determine the federal subsidy to each state. The National Board Denver Regional Office worked with the Colorado Department of Education to give

$1,000 scholarships to candidates. "The $60,000 was gone in three weeks and paid $1,000 for 60 candidates. The total candidate count for Colorado in 2002 was 75. Because of state budget shortfalls, there is no state money for 2003" (N. Shakowski, personal communication, June 24, 2003).

The Colorado Education Association (CEA) has used a $10,000 grant from the National Education Association to Colorado for NBC. CEA has developed eight resource centers for NBC across the state. As of 2003, 12 school districts across Colorado financially reward NBC teachers. The rewards are anywhere from a one time $1,000 stipend to a $5,000 stipend and a salary increase. As of 2003, Colorado has 135 NBC teachers (N. Shakowski, personal communication, May 16, 2003).

Data Collection

I began my qualitative research by contacting Nancy Shakowski, who is the Colorado program administrator for the National Board for Professional Teaching Standards. I asked her to suggest National Board Certified Teachers that would be willing to participate in an interview. She emailed all of the National Board Certified Teachers in Colorado and asked if any were willing to participate.

The Informed Consent Form (appendix A) describes my project, procedures, risks, benefits and confidentiality used for this study. I conducted taped interviews with nine teachers. Some of the interview questions were:

1. Can you describe how you best learn?
2. When you recently had to learn something challenging, what did you do to help you learn the information?
3. How do you meet the unique needs of your students?

4. Describe a positive teaching experience (appendix B).

The interviews took place in the teacher's classroom after school hours to ensure little background noise and few distractions.

In many forms of qualitative research, most of the data is collected through interviews. "The most common form of interview is the person-to-person encounter in which one person elicits information from another" (Merriam, 2001, p. 71). There are three types of interviews: highly structured, semi-structured, and unstructured" (Merriam, 2001). I used a semi-structured approach that is a mix of highly structured questions and unstructured questions. Highly structured questions are, "wording of questions predetermined, order of questions predetermined, oral form of survey" (Merriam, 2001, p. 73). I used a short questionnaire that asked specific information such as:

1. How long have you had a NBC teacher?
2. Which National Board Certificate do you hold?
3. How long have you taught at the school you are currently working?
4. How long have you taught? (appendix C)

Unstructured questions are "open-ended questions, flexible, exploratory, more like a conversation" (Merriam, 2001, p. 73). Examples of open-ended questions might be: describe how you best learn. When you recently had to learn something challenging, what did you do to gain the desired knowledge? Interview questions are in the interview schedule (appendix B).

Another data collection technique is observation. Observation entails the systematic noting and recording of events, behaviors, and artifacts (objects) in the social setting chosen for study. Through observation, the researcher learns about behaviors and

the meanings attached to those behaviors (Marshall & Rossman, 1995). I noted observable behaviors and mannerisms during my interview. If the participant happened to bring anything for me to use, this would be considered an artifact and it was described in the field notes. What is written down or recorded from a period of observations becomes the raw data from which a study's findings eventually emerge. "This written account of the observation constitutes field notes, which are analogous to the interview transcript" (Merriam, 2001, p. 104).

Data Analysis

I contacted nine teachers from the National Board Certification and conducted taped interviews with each teacher in their classroom. After the interviews were conducted, the data was transcribed. I analyzed the data, using HyperRESEARCH 2.6, looking for common themes within each question and then categorized my themes. HyperRESEARCH is a software package to use when analyzing qualitative data analysis.

Data analysis is the process of systematically reading, making meaning, and arranging the interview transcripts, field notes (observations and/or artifacts), portfolio content analysis and other material the researcher collects to increase understanding of the information and then to present the information to other people (Bogdan & Biklen, 1998). Sorting and categorizing are part of my data analysis. Categories are conceptual elements that cover or span many individual examples of the category. Once you have established your categories from the data, the categories can be fleshed out and made stronger by searching through the data for more and better units of relevant information (Merriam, 2001) and examined in relation to the elements identified by Dunn and Dunn.

CHAPTER FOUR

Findings

The presentation of qualitative data is the focus for this chapter. The purpose of this study was to examine what National Board Certified Teachers (NBC) identified as being important to their identification, understanding, and perceptions of learning and teaching styles. I interviewed nine teachers from throughout the state of Colorado who hold a NBC. I had the opportunity to travel to rural towns, small cities, and large metropolitan areas to conduct my interviews. The teachers I met were each unique and had diverse teaching experiences to share. Prior to the presentation of my data, I will provide a brief biography of each participant. All participants agreed that I use their real names instead of using pseudonyms.

Julie has been teaching for 21 years, the past six years at Northglenn Middle School in Adams 12 School District, Northglenn (a large metropolitan city). She received her first NBC in 1994 for Early Adolescent Generalist and her second NBC in 2002 for Early Adolescent Mathematics. Julie is currently teaching 8th grade mathematics. Julie felt the NBC gave her an opportunity to learn more about herself as a teacher. "This is a chance for me to reflect by looking at myself the way the students would look at me."

The following three teachers all teach in Westcliffe. Westcliffe (Custer County School District) has the highest percentage of teachers holding a NBC in the state. Five

of their approximately 25 certified teachers hold a NBC. This is compared to one teacher holding a NBC in Poudre School District in Fort Collins and one teacher in Colorado Springs School District 11 in Colorado Springs.

"The most significant professional development experience of my career," is the way Barb describes her NBC process. Barb has taught in Westcliffe (a rural town) for 30 years. In 2000, Barb received her NBC in Early Adolescent Language Arts. She teaches 6th to 8th grade Language Arts at Custer High School in Custer County School District.

Janet has also been teaching preschool for 15 years in Westcliffe (a rural town). Besides being stressful, Janet said, "The NBC process taught me a lot about curriculum development and really trying to figure out what kids are supposed to be learning." Janet also found the process of her NBC, "...to be personally enlightening". Janet received her certificate in 2002 as an Early Childhood Generalist.

Tom, possibly the only agriculture teacher in the state of Colorado with a NBC, takes great pride in his accomplishment. He, too, teaches at Custer High School. Tom has been teaching vocational agriculture classes for 20 years. "First and foremost, I learned I was a better teacher than I thought. It also gave me an opportunity to step back from myself and try to view myself in front of my class as if I were sitting in that class." Tom received his NBC in 2002 for Career and Technical Education.

After 19 years of teaching 6th to 8th grade at Kepner Middle School in Denver Public Schools (an inner city school in a large metropolitan city), Carrie said, "The NBC process was the most reflective investigation of my own teaching." Carrie received her NBC in 1999 as a Middle Childhood Generalist.

As the only teacher in Fort Collins (a large school district) to hold a NBC, Sylvia said, "I really like the philosophy behind the NBC and the reflective practice piece. I find myself doing that a lot more; it has become part of how I teach." Sylvia currently teaches 9th grade Science at Preston Middle School in Poudre R-1 School District. She has taught a variety of grades in various states over the past 16 years. She received her certificate in 2001 in Early Adolescent Science.

"I think NBC is the most important learning experience that I have had and the most beneficial. That has helped me grow so much in teaching and to confirm, to me, what I do for kids is good, but also to help me grow deeper in my thinking and reflection." Judy is the only NBC teacher in Colorado Springs (the second largest city in Colorado). Judy has taught for 25 years and holds a Middle School Generalist certificate. She teaches 8th grade English at East Middle School, Colorado Springs School District 11. This was an exceptionally positive interview to conduct as I attended East Middle School in the early 1970s. When I interviewed Judy, it was the first time I had been in the building since I had graduated.

The next two teachers, Mary and Laura, team-teach 8th grade Language Arts at Grand Junction High School in Mesa Valley 51 School District. Mary has taught for 22 years. She received her NBC in 1995 in Early Adolescence/English Language Arts. Wanting to meet the standards of an accomplished teacher, Mary chose to participate in the rigorous program of the NBC. "I found that I gained a much deeper understanding of my teaching practice and how I could help my students to be far more successful."

Laura has taught in the same junior high as Mary for the past 21 years. She also received her NBC in 1995 in Early Adolescence/English Language Arts. Laura said,

"The NBC was the most rewarding and rigorous professional experience I have ever had. Reflection has become an integral part of my teaching on a daily basis."

I have placed the interviewees' demographics in a table to make the information easier to compare. The table includes the interviewees' names, the grade and subject they teach, the name of the school and school district where they currently are working, and the name of the town or city in which they work.

Table 7

Interviewees' Demographics

Teachers	Grade	Subject	School	District	Town/City
Julie	8th	Mathematics	Northglenn Middle School	Adams 12	Northglenn
Barb	$6^{th} - 8^{th}$	Language Arts	Custer High School	Custer Co.	Westcliffe
Janet	Preschool	Preschool	Custer County Elementary	Custer Co.	Westcliffe
Tom	$9^{th} - 12^{th}$	Vocational Agriculture	Custer High School	Custer Co.	Westcliffe
Carrie	$6^{th} - 8^{th}$	Social Studies	Kepner Middle School	Denver Public Schools	Denver
Sylvia	9^{th}	Science	Preston Junior High School	Poudre R-1	Fort Collins
Judy	8^{th}	English	East Middle School	Colorado Springs School District 11	Colorado Springs
Laura	8^{th}	Language Arts	Grand Junction High School	Mesa Valley 51	Grand Junction
Mary	8^{th}	Language Arts	Grand Junction High School	Mesa Valley 51	Grand Junction

In analyzing the data from my interviews, I identified 13 themes. Each theme is described through direct quotes from the participants to substantiate my findings. A summary of the research questions and the associated themes are provided in Table 8.

Table 8

Emergent Themes

Research Questions	Emergent Themes
How do teachers describe their own learning styles?	• How I learn • Challenging new material • Favorite way to study • Positive learning experience
How do teachers characterize other learning styles?	• Unique needs of students
How do teachers describe their teaching style?	• Positive teaching experiences • Most rewarding students • Frustrating teaching experiences • Most challenging students
How do teachers facilitate learning?	• Look and feel of classroom • Typical day or class
Do teachers understand the cognitive reasons for teaching to a student's learning style?	• Important teacher preparation class • Learned from the NBC process

Each of us has spent considerable time as a learner. We have a variety of experiences that can be described variously from as long forgotten to highly memorable. The following four themes emerged from the first question, how do teachers describe their own learning styles? The four themes are: how I learn, challenging new material, favorite way to study, and positive learning experience.

How I Learn

Just like students, all teachers learn differently. One teacher may best learn visually, by reading information to understand a concept. Another teacher may best learn auditorily, when hearing the new information and having it explained. While yet another may best learn through experience and be a hands-on learner. Some teachers may have one or a combination of learning preferences. When asked, "Can you identify how you best learn?" each teacher's personal learning preference is described in the following comments. Most teachers, that I interviewed, spoke of a combination of learning preferences to have new information be understood.

> I need a combination of visual and auditory; I need to see it but I also need to hear it (Barb).
>
> Just like Barb, Carrie needs a
>
> ... combination of visual and auditory (Carrie).
>
> I think I am probably an auditory [learner] and secondly a visual [learner]; I am certainly not a hands-on type of person (Janet).
>
> I learn kinetically and visually (Judy).
>
> I use acronyms when I am trying to learn something. I will come up with a saying, or letters; I have to have a connection. I have to connect it with something else that I know or a way to remember it. I try lots and lots of different ways to do things until I get to a way that I really understand it. If I am working a math problem I do it several ways, and another good thing that I always explain to my husband what I have done. It's easier for me to remember myself (Julie).

> I am primarily an experiential learner. I like to get my hands into stuff; that's how I learn best. I can also learn by visual and auditory input, but it doesn't stick around as long (Sylvia).
>
> I guess I learn best by doing. It's one of the models of my teaching area; learning to do and doing to learn; and I feel the same way. If I could actually get up and do something, then I do a pretty good job of learning it. Sitting down reading something hardly soaks in. So I am a doer. I like to get up and do things; obviously that's the way I teach. I also try to connect new learning with something else that I already know. I would try to get a pretty good grasp on what it is I am going to do with whatever it is I am going to learn, and that seems to help me learn it easier also (Tom).
>
> I am the type who has to reinforce my learning with an immediate practice session. Believe it or not, I have not decided yet whether I am an auditory learner or a visual learner. In some situations I need to see the information, and in others I would rather hear the information (Mary).
>
> I learn best by a verbal and/or visual explanation followed by independent practice (Laura).

Clearly, teachers, just as students, learn in many different ways. Eight of the nine participants related more than one learning style to their acquisition of new information.

The following chart shows each teacher's learning style.

Table 9

Learning Styles of Interviewees

Name	Visual	Auditory	Experiential Hands-on
Julie	X	X	X
Barb	X	X	
Janet	X	X	
Tom			X
Carrie	X	X	
Sylvia	X	X	X
Judy	X		X
Laura	X	X	X
Mary	X	X	X

Challenging New Material

I asked all of the participants, "When you recently had to learn something challenging, what did you do to help you learn the information?" Once again, their answers varied considerably, but were synchronized with the way they best learn. The participants described how they prefer to learn challenging material.

Barb, Carrie, and Janet are each auditory and visual learners. Here is how they learn challenging material.

> I always read it orally to myself, that way I can hear--but my eyes are also looking. I do a lot of transcribing of the material (Barb).

> I read a lot of books, and I talk with different people (Carrie).

> Hopefully I have heard an explanation first. Otherwise, I have to read it and read it and read it and then if it is some kind of a problem, like a math problem, work it through step by step and if necessary draw it out (Janet).

Judy, on the other hand, is an experiential and visual learner. This is how she learns challenging material.

> ...probably, take notes, write things down, draw pictures, and act it out. If it's appropriate, I actually do it.

Julie needs to make a connection when learning new material. If she doesn't understand it one way, she challenges the teacher to teach her another way. This continues until Julie can make a connection.

> I remember growing up, I always sat at the dining table with my mother and I would say, "Mom, tell me another way to do it" and then she would show me another way to do it. She would show me a bunch of different ways, and then I would decide which way I liked best. With my student, I call that the Burger King method, they can choose their way.

Sylvia is an experiential learner. Recently, when she was in a technology class, she needed to rebuild a computer. Her hands-on approach worked well.

> I had to learn something difficult today on a piece of technology that I was totally unfamiliar with and I did a lot of trial and error. I put a piece here or there to see if it fit or worked. I also asked questions to the people around me and asked the instructor for help. I needed to get help, because it was not easy, and it was interesting because I got to feel like my students feel sometimes.

Another experiential learner, Tom, learns challenging content best by doing.

> I guess my favorite way to learn something new, again I sound repetitive, but I actually try it and do it. I learn by trial and error, and I try to allow some of that in my classroom too, just go try it, experience learning is the best way to go about that.

Mary needs immediate practice when learning new and challenging material.

> The greatest learning challenge for me was when I pursued a master's degree in technology. Learning to take apart a computer, programming and graphing techniques was somewhat difficult for me. Again, once I could practice the skills repeatedly, I gained more confidence.

As a visual and experiential learner, Laura needs to be shown how to do something new and then practice how to do it.

> I first decide which particular area I did not understand. Then I sought out a person who knew how to do this already and had them show me through demonstration. Then she worked with me as I attempted the task.

Favorite Way to Study

In my study there was a high correlation between the way people learn new things and the way they study. When asked, "Recount what you remember as your favorite way to study or learn new information," the participants shared the following comments:

Being a visual and auditory learner, Barb also learns new information in the same manner.

> My favorite way to study would be by myself so that I could read the material out loud. Then I would take extensive notes (Barb).

Carrie is also a visual and auditory learner, but finds most success by working with others when asked to learn new information.

My favorite way to study or learn something new is to work with others (Carrie).

Janet too is a visual and auditory learner, but she prefers lectures as her favorite way to gain new information.

> I like a good lecturer who can keep me awake. To study, you have your books, so I would read them, and read them, read them and read them and answer the questions and write down my notes, and oh that's always, painful (Janet).

Judy remains true to her learning style when it comes to new information. She likes to see the information and manipulate the information until it makes sense.

> In order to understand information that I was reading, I like to make charts or graphic organizers for me...take all that information and make sense of it (Judy).

Sylvia is a visual and hands-on learner. This is very apparent when she needs to learn new information.

> My favorite way to learn new information is to get my hands literally into something, and it probably is why I choose to study science where I could touch things and pull things apart and art, especially 3 dimensional art, and I have a minor in fine art and sculpture which really let me get my hands dirty. For some reason just the touching and the feeling and putting my hands around something makes the learning easier for me. I can just figure it out better and also feel it deeper (Sylvia).

Once I practice the skills repeatedly, I gained more confidence (Mary).

Laura is another teacher that learns best while doing:

I loved it when I learned about physiology by dissecting an animal (Laura).

During my teacher prep training, I really enjoyed being able to create my own lesson plans to apply whatever concept we were learning (Laura).

Positive Learning Experience

I think that good teachers are life-long learners. Life-long learning creates a huge sense of personal gratification and fulfillment. Teachers are continually learning about new teaching strategies and content matter, and they stay abreast of current research

either out of desire or because they need re-certification credits. Regardless of the motivation, good teachers are passionate about learning on a daily basis. When asked to, "Describe a positive learning experience (not necessarily in the classroom)," the first eight participants shared the following stories that all describe "doing" as important strategy for learning:

> One of the most positive learning experiences in the last few years occurred when I was invited to play in a flute quintet. I was definitely a weaker player than the others who were real pro's. The director, an internationally known flutist, coached me through the process, and I improved greatly (Mary).
>
> I earned my masters degree in computer technology after receiving my NBC. I loved the program because every application class allowed me to have the flexibility to adapt the learning for my own classroom work. It was invigorating to discover new approaches for teaching middle school students reading and language arts using technology (Laura).
>
> A positive learning experience that I have had was when I was working with Denver Public Schools. We were being trained in a new literacy model and we attended an institute in the summer. Then we put the model into practice during the year and meet with people and other colleagues during the year. We also read several books and were given a professional library. We had the in-service training, then we meet with others; that's been very positive (Carrie).
>
> I thought learning to drive was a big positive experience. I also think learning how to ski (Judy).
>
> I took a few math classes from Ruth Parker (she is a Marilyn Burns person). The first one algebra, and then the following year I took one on statistics and probability, and then one on geometry. It was all exploratory learning. We had teachers from K-10 there, and we did a lot of exploring with manipulatives; a lot of connecting everything. It was the best professional development I have ever had. I went back the following year and paid for the classes myself and took two more. I came back and changed my whole classroom just based on the classes with Parker (Julie).
>
> There are many, that's why I am in the learning and teaching game. I remember one of the earliest positive learning experiences was with my mom...I think I was about four and she gave me a potato and a dull paring knife and said cut out a shape that sticks out, and I did and she gave me a little bowl of paint. She taught me how to stamp. I was busy for hours, it was very clever of her, but it was just so neat that I could make all these different ones. By the end of the day, I had

> gone through seven potatoes, and stamped sheets and sheets of paper, it was just a ball (Sylvia).

> A positive learning experience outside the classroom was when I spent two years not teaching and working in the open pit gold mines in Nevada and the learning curve was just huge. Because I had never done any kind of thing like that before and ended up being a foreman of a crew of about 20 people...so, I just told my boss, look, you have to explain that to me differently because I don't get it. If I have to explain it to my people, I need to understand it and so we went along the lines excavating a hundred feet and then pick an object and see whether that object is above or below where my feet are and guess how many feet that is above or below and convert that to percent. So, I guess trying to come at it in a different direction, trying to make it a little more applicable or tangible; something that I could see and get an idea of and get some estimation about it (Tom).

> About 20 years ago, our district was involved in a five-year research project to improve education. I attended monthly in-services with another district; we had to do an extensive amount of research. It was data based research, and I also got to make several trips to Washington, DC (Barb).

The only participant that didn't describe a positive learning experience by "doing" was Janet. She flourishes when listening to a lecture.

> Well, right now we have a really good principal, and that principal knows how to do in-services, and of course he talks, and I listen and I love it (Janet).

Eight of the nine positive learning experiences included experiential learning ("doing"). Whether it was learning to play the flute, put a new learning model into place, driving, teaching mathematics with manipulatives, learning to be creative, open pit mining, or active research, all of the teachers were describing a positive learning experience when they were actually doing activities (experiential learning)

Unique Needs of Students

Students' unique needs emerged as the theme from the second research question, how do teachers characterize other learning styles? All students are unique, different, and learn at different rates and in different ways. I asked the participants, "How do you meet the unique needs of your students?" I was looking for ways in which the teachers

differentiate instruction to meet individual learning needs of each student. Here are the responses.

> Well, I get to know them [students] by talking with them. I also talk to parents. Parents know their kids pretty well, and so I like to hear from them. And you can give them learning style surveys (Judy).

> I bet the number one way is to get to know the children, to find out what's important to them, what is motivating for them to come to school....I get to know that part of them, then I see how my instruction fits, what's interesting to them. For boys interested in cars, I need to get more car magazines or books in my class. Girls, if they are interested in popular culture good or bad, I might bring some teen people into the classroom...things like that is one thing I do to meet the unique needs of the children. I figure out who they are as people, and then I figure out where they are academically. I use lots of formal assessments and informal assessments...called kid watching--also parent contact, I really believe in a lot. I need to know the parents. I need to make some contact in the beginning of the year just to call to say, I am so glad your child is in my classroom (Carrie).

> I have a lot of diversity in my classes because I teach advanced level math classes, and basic level classes. My basic level classes have just about every kind of exceptionality, I have (Learning disability) LD, (Educationally Delayed) ED, (English as a Second Language) ESL sections, and students with physical disabilities...I can spend some time with a lot of those kids individually, the advanced kids although they are a lot more independent learners, and don't need so much individual or differentiated help still have their own quirks and challenges. So just getting to know your kids, getting to know what they need, and getting them connected with the curriculum (Sylvia).

All teachers focused on getting to know their students on an individual basis and viewed building relationships as being the most effective tool for meeting the needs of students. Once a teacher knows a student, they can individualize to meet the special academic, social, or physical needs. Regardless of the number of students in a classroom, teachers felt it very important to have daily individual contact with each student.

Some teachers spoke of the most important teaching strategy as getting to know your students and their parents on a personal level. Teachers feel if they get to know a student, the content of new material can be more meaningful with teachers

individualizing instruction and providing more pertinent information about instructional materials to students.

The sub theme that continually arose out of the unique needs of student's theme was that of individualizing instruction. Whether the teacher conferenced one-on-one with a student or did small group instruction, the teachers wanted to make individual contact with each student every day.

> I spend most of my teaching time with the children by working with small groups or in individual conferencing situations about their writing, so my program's totally individualized. Every child is progressing at a very individualized pace. (Barb).

> I team-teach with another NBC teacher. Our teaming setup allows us to group the students, when necessary, to give some of the students extra help. We sometimes offer, in addition, choice in the selection of literature; for example, one group may read a contemporary play while other students choose to read a Shakespeare play (Mary).

> I prefer to individualize for students through evaluative feedback. For example, when I grade a student's writing, I mark errors using a set of codes that identify the type of error, but not actually fixing or identifying the exact error. SP would mean that somewhere on that line of text there is a spelling error. COM could mean that a comma needs to added or one needs to be eliminated. The students then need to find the error and fix it. I then meet with the students individually to confer on their corrections. This allows me to conduct many one-on-one mini lessons that are appropriate to the students' needs. I also differentiate through providing a menu of choices for completing large projects, such as quarterly book critiques (Laura).

> I teach my students the way I learn. I need to have auditory, visual, and hands-on experiences...all those different stimulants to get me to learn. I try to have manipulatives for them to demonstrate to let them explore and learn. I give them very precise notes with how thing happen; I question them a lot. I feel like I can get to every student sometimes in an oral way (Julie).

Another popular strategy in meeting the unique needs of students is to provide a variety of learning opportunities. This way, each child can find a way to learn that meets his/her learning style.

> I think probably one of the most important factors in pre-school is to set up your environment so that students can learn in many different ways. We do spend some time in listening activities like stories and giving directions, but we also have many things around the room for them to look at and play with, to explore, to feel, to touch all of those things. We do music and movement so we can involve our bodies so I think that we try to hit on all areas and it's really the way we set the room up, and the scheduled things that we have (Janet).

> I teach in a vocational program. It's an elective program and students are in there because they want to be. It doesn't mean that always bright students are in there because they want to be. Mostly just the opposite, I get a lot of lower end, lower achieving students because it is a hands-on program. It's up out of your seat activity based education. I try to approach those special learning needs, just like life is going to approach those special learning needs. Not every kid is going to get hired for a job based on their ability to answer 10 questions on Friday. I don't care if you can write it, I don't care if you can tell it to me from memory, but can you do it? Show me that you can do it (Tom).

Positive Teaching Experiences

In my third research question, how do teachers describe their own teaching style, four themes emerged. The four themes are: positive teaching experience, most rewarding students, frustrating teaching experience, and most challenging students.

As a teacher, you experience hundreds of feelings every day on how you felt a lesson went or how you felt about an interaction with a student. I asked the participants to describe a positive teaching experience. I wanted to see if the positive teaching experience was in balance with the teacher's own teaching/learning style. The stories were very lengthy so I abridged their discussion.

The following story shares the power of being a teacher.

> I had an incredible experience one year ago, which will impact the rest of my teaching career; I had a child, a girl who was in my classroom for 6th, 7th and 8th grade. She was a very difficult student to teach; she was chatter and talked non-stop. I had a very hard time helping her learn to focus and be personally responsible. She had a difficult time in the initial part of my classroom because she didn't want to write. She just wanted to visit and be here socially. We worked together and developed a strong, strong relationship...they write for a full quarter and keep a portfolio. The portfolio has many, many lessons of reflection

> about who they are significant memories and past experiences in their life, who they want to become, and they spend the whole quarter putting this all about me that is not the title of it but project that they do together. Brianna really flourished in that project; she got very excited about it did a great job on the project, I had asked her at graduation to present one of the pieces that she had written from her portfolio. I got a telephone call early Sunday morning, July 15, last summer and Brianna had very unexpectedly and very suddenly passed away that morning, as I went to Brianna's house and I drove up, her mother was sitting on their patio with the people that had come and her mother was holding her portfolio against her chest. I realized then that I had helped create a most important memory for this family and what Brianna had written. Then I find out the next day, as they had gone on the computer, that only a couple of days before Brianna had passed away, she had written her final poem on the computer, she had become a writer, and I had helped in that process (Barb).

Sometimes, when you least expect it, challenging students do listen and hear what you have to say. When this happens, the reward is tremendous.

> In the last few weeks, I have been working with a student who is constantly a behavior problem, who has recently been removed from his home, and who was not doing much of his homework (understandable!) I have been talking with him about how if he enjoys academic success at school, and takes advantage of our caring school community, it might make him feel better. He has responded well and, in fact, turned in an extraordinary essay last week (Mary).

Someone once said a fish would grow only as big as the fish bowl in which he lives. Students, as well, will grow to their potential by setting clear and high expectations. Mutual high expectations and respect are tools that good teachers use in their daily repertoire of tricks. The following two stories talk about setting high expectations.

> An earlier teaching experience that comes to mind, was when I introduced a new poetry unit I had developed. The work was more challenging and involved the students developing a rather sophisticated understanding of figurative language. All of the students, even the special ed. kids, rose to the occasion and demonstrated a complex understanding of the poetry, including the extensive use of symbolism in the poem (Mary).

> I took my 8th graders to Europe. It was an amazing and wonderful because when we got there we were traveling with a high school group as well. My kids had a binder about that size of a book that I had written about 70 pages of things we

> thought would be important and questions and my 8th graders from inner-city Denver standing in Amsterdam with these books reading things and taking notes and the high schoolers are like what are these little kids doing, and I was so proud of them. I like to empower children so they can show other people how smart they are. I think a lot of people have preconceived notions about inner-city Hispanic kids from Denver, and I am so proud of their knowledge base that they really had learned all of these little details about the countries...watching them travel, leave their little safe environment here, and go somewhere else and then to have the knowledge base to understand what they are seeing to be able to put it into perspective (Carrie).

Not all students learn the same way. By acknowledging and acting on this you can create a safe and fun learning environment.

> Recently, I worked with a group of students who were having difficulty with vocabulary. Using a deep-processing technique, my partner and I created visualization stories for twenty identified vocabulary words. We had fun hamming it up, and the kids absolutely love it. The final assessment showed almost all of our students had mastered the usage of these words. Now the students are using these words in their own speaking and writing. Truly, this is an indication of the students' learning (Laura).

Whenever you can connect or transfer classroom learning with the world outside of school, learning has actually taken place. Educators call this transfer of learning. A student can take information learned in the classroom and enhance or expand their knowledge by extending the activity at home or by applying the same concept to a different situation. Janet's preschoolers did an excellent job connecting school and home connection as described in the following story:

> Currently, we are working on trees and the seasons. We are going to follow the trees throughout the year. We are starting with summer and going into fall. That is like our science project. We are also reading books, going on field trips, doing bark rubbing and things like that. That is a positive teaching experience because I have found, that parents are coming to me and saying, my child is noticing the changing leaves in our area and she wants to bring some in. They do bring them in, and we try to identify some of the local leaves. They have also been bringing in some of the bugs and insects, because we have talked about some of the animals that need trees whether they live in them or eat them. I have found that they are bringing in some of the things, ants that they have found crawling on them and they tell me all about what they think the ants need to get from those

> trees, or what the ladybugs and occasional butterfly. So, I feel like what we are doing with the tree project, is not just teaching them here at school but also going out into the home (Janet).

School is an ideal place to expose students to many different cultures and languages. Julie, a middle school math teacher, incorporates Spanish into her daily math lessons. She teaches at a large middle school with a diverse student population. It must be comforting to students to have teachers who view differences as important.

> I was introducing integers to the kids...this year and we are looking up words in their glossary and somebody reads it in Spanish, and somebody reads it in English to reinforce the Spanish language. It will also broaden my horizons a little bit. This is the 1st year that we have done that and the whole math department is doing it and so the kids. I can tell when they are thinking in Spanish, or thinking in English, because they read the number line for the definition they say positive three, positive two or negative three and I would say its *menos tres*. We have had some good experiences with that, but also when the kids brought up I thought that a negative and negative is a positive, and we were adding integers, I said well what did you see in your beans? All of a sudden they see that they can do it without mixing up rules (Julie).

Julie shares another positive teaching experience by giving students many choices.

> Another thing that I will be doing later on is what I call "menu". I post about six or seven problems around the room. The kids get to choose which one they do first and how they do it. They can work by themselves or they can work in pairs, and there are manipulatives for them to use. It's amazing how the kids can really get into a problem, and do lots of different thinking and expand their thinking (Julie).

Technology is a terrific way to enhance student learning if used appropriately. A teacher from Fort Collins developed her own web site as a communication vehicle for her students. She originally thought it wasn't successful, but she quickly found out that many students used and needed the website to check homework assignments and to read the explanation of the math problems.

> I have been putting a website together so kids can go and get their homework and other classroom information off of my website. I was thinking that I wasn't being very effective with it...I had briefly mentioned my website in class, and three kids yelled out we love your website, we use it all the time. That was a pretty positive affirmation right there as a teaching tool that they don't use when I am in front of them but when they are on their own. So it was exciting to hear that it's starting to pick up in popularity. I know parents love it and that's been a positive teaching tip. Other than that, just having humor and having a good time in a classroom and lucky enough to be in front of the kids everyday (Sylvia).

A typical "catch phrase" for school districts, is to say, "We won't let students fall through the cracks." This is a very ambitious comment. Rarely do you have an opportunity to give an example where a teacher clearly did not let one of his students fall through the cracks.

> I have a student that has a severe speech impediment. She is in the 9th grade and has gone through eight grades in our school system and most people can't understand her. Unfortunately one of our big tasks in her class is a public speaking experience in front of the public. She has to get up and recite this five-paragraph paper that she will have memorized. There are 15 to 20 words you can't understand. The word "year", if you didn't know the context, you would have no clue what she is talking about...I just told her it's time that we get real about this thing and we are not just going to glaze it over and I am not going to send you on out of here. We are going to learn how to speak or something is going to happen. Something has to change and so just in the last two weeks, it's just been amazing. I am not a speech therapist but I went to our therapist and said can you give me some general directions or ideas and she did. Because, I think everybody has felt like this particular student is so emotionally sensitive nobody wanted to address it. I got her up in front of the classroom and here is what we are going to do. You are going to say these words and we are going to work on it. The class and I are going to help you until we get it and so we are actually working on the word "year". We have a long way to go, and in just two weeks she got that word pronounced. I just thought that was a positive experience for me because I had to keep telling this student that I am not doing this to embarrass you. I am not doing this to make you feel worthless, I am doing this so that I and all your fellow students in this classroom can help you because we don't want to see you fail when you stand up in front of 200 people and recite this creed (Tom).

Teaching can be a life-altering and rewarding experience. The hope of every good teacher is to have a positive and lasting effect on as many students as possible. Setting high expectations, providing students with a variety of teaching styles, getting to know

students and allowing time for students to process information and opportunities to make connections are all positive teaching strategies.

Most Rewarding Students

Most of the teachers felt the most rewarding students were the more challenging to teach. Whether their issues were educational, social, or behavioral, teachers felt more empowered by teaching when these students would understand the new information. This information is displayed in Table 10 followed by quotes from the teachers.

Table 10

Most Rewarding Students Identified

Teacher	Most Rewarding Students
Barb	Academic and behavioral growth over time
Mary	At Risk Advanced
Laura	Show a joy of learning
Carrie	Students that travel with me
Janet	See academic growth on assessments
Julie	Special needs kids
Judy	Personal and academic growth
Sylvia	Kids that finally "get it"
Tom	Special Ed. kids

> Well I have a real exciting opportunity in my program because I get to have the same children for three years in a row. They come to me as 6th graders, and I spent all of 6th, 7th and 8th grade with them. To watch a student who comes to me as a 6th grader, afraid to write, the reluctant who have had poor experiences in the past with trying to articulate their feelings and thoughts on paper and then watch them grow and develop and leave their fears and develop an excitement about what they are doing (Barb).

> Two groups of students are particularly rewarding to me. One group would be those who are "at risk" and who generally get into trouble at school. I love to try to reach these kids and make a difference in their lives. A second group would be those who are advanced. I enjoy the challenge of encouraging them to take school seriously and not coasting, and watching them grow in ways even they would not have expected (Mary).

The most rewarding students are those who find the joy in learning. These are often not the highest academically, but they embrace knowledge with a passion and their enthusiasm is contagious (Laura).

They are all rewarding, I can't think of one, of course the ones who sit at the front of the classroom and know everything are fun but not as interesting as the ones that are in trouble with other teachers. I think the children who begin to respond and start to do something that changes their academic life based on things that they have learned...I also get to know students really, really well; I travel with them. I teach an elective on going to Washington, DC and an elective on going to Europe and so those kids are really rewarding to me because I get to know them so personally because we fundraise and then obviously we travel. In fact I hadn't cried in my classroom in 18 years until this past year with my Europe group, because they were just so moving, it was such a deep relationship that we had formed but the other kids that I have worked with, they are my favorites, too. There is not one that stands out (Carrie).

At the beginning of the year I do a lot of assessing and I always feel probably most rewarded toward the end of the year when I see how much growth the students who come in with delay and how much they have grown over the year, so that is really exciting (Janet).

The most rewarding are the ones that come to me that have Attention Deficit Disorder (ADD) problems and they are on all kinds of medication and they are out of control. They can't do this and they can't do that and are unmotivated. By the end of the year, that's the most rewarding thing, is that these kids know they can do it and they can control themselves. In most cases it's just self-fulfilling prophecy that they have a special need or special ed problem and they did it and they can do far more than that and just to help them realize that. It is so rewarding and to see them grow and to be little birds and start flying. It is so exciting (Judy).

ESL and Special Ed are the most rewarding for me because I see those light bulbs go on. I get just as excited about them learning it as they get about learning it (Julie).

Kids, I like the little light bulbs because they are just a quick feedback when they are oh, I get it or they jump out of their seat, we call it the jiffy pop effect...the immediate daily rewards the daily affirmations that you get, okay somebody learned something, somebody's brain grew today. Somebody made a new connection and that's a lot of fun (Sylvia).

The students that are most rewarding, I have said a lot of times anybody can teach those 4.0 kids, you don't have to be a professional educator to teach those kids, anybody can do that. You take a kid that has a bad speech problem or learning disability and they test you, they test your ability to be a professional educator. If

> you can make progress with those kids, that's where my rewards come from. Those high achiever kids can make you feel good but its kind of a shallow victory with them; it's those kids that are really tough that keep me going (Tom).

Frustrating Teaching Experiences

Just as there are many positive teaching experiences, there are many frustrating experiences. I was curious if frustrating teaching experiences conflicted directly with the teachers' teaching/learning styles. The frustrating experiences can be generalized into the following categories: the student's lack of concern, student's behavior disabilities or issues, student's lack of basic skills, and the teacher's ability to manage time.

The biggest frustration for a teacher is to have a student who doesn't care. You can encourage, provide positive feedback, teach to his/her learning styles, get to know them as individuals, but you can't make them care.

> I have been coaching a student for weeks, helping him to get organized, giving him new folders, complimenting him when appropriate and giving him consequences for inappropriate behavior, or for coming to class unprepared. Our entire team is frustrated with this student, because he continues to do almost nothing. We have put him on a core contract in hopes it will help (Mary).

> Students that either just don't care or they have this apparent attitude of I [student] am too cool for this, or my students find the cooler they try to be the more redneck I am going to be. I will continue that downward spiral until they [students] say alright, alright, enough! I [student] am not that cool...those things frustrate me because I just want to scream at them, "Hey, we aren't here to be cool, we are here to get an education. We are here to try to learn, to try and prepare ourselves for the future. You can slump down in your chair and act as cool as you want, but you are cheating yourself." You are not cheating me, I am educated already and you are cheating yourself. That inability to see the opportunities frustrate me. It just makes me crazy (Tom)!

> A recent frustrating experience is order of operations for me...the kids generally have the acronyms down, and the sentence down but to get them to think left to right in add and subtract or multiply and divide and then add and subtract is frustrating for me because they got it, they go back and look it up in their notes, and its just something that they need to do over and over again and they need to see problems that are done correctly and incorrectly so that they know that they get different answers, we do that using the calculator and doing it on paper (Julie).

Some teachers view students with behavior disabilities or issues as frustrating. One disruptive student can change the makeup of an entire group of students. One student may demand 80% of a teacher's time leaving only 20% for the rest of the class. Parents, students, and teachers find disruptive students frustrating.

> It was discovered that one of our new students had been homeless and living on the streets for the past year and a half. During that time, she and her younger sister did not attend school. Having found housing, she entered our school, shy and timid, but eager to learn. She came to school everyday and seemed to be thriving. Then she missed three days. We found out they had been evicted. The mother had left the girls with a neighbor and they had not seen or heard from her since. As a school, we bought clothes and toiletries for each girl. The mother did return, but now they were going to live 15 miles away. We secured a public bus pass for both girls so they could continue to attend our school. Unfortunately, this move created a whole new set of problems. My student began to cut herself, verbally and physically abuse other students, and ditch classes. As a school we contacted social services, but nothing was done about their home situation. Her behavior escalated, and on a Monday she was notified she would no longer be able to attend our school and would have to attend the middle school in her own attendance area (Laura).

> Frustrating teaching experiences tend to come when I expect more of a child than he is developmentally ready to do. That might be like one of my ADD kids; hoping that he would sit down and do a coloring sheet or something like that and finding that he is just scribbling across it and ready to go on to the next thing. Not ever listening to the direction or knowing why we were doing that particular thing; he's finished before he ever heard what we are doing (Janet).

> I have a student aide that I had all last year. He is a wound up kid; he is not ADD, or Attention Deficit Hyperactive Disorder (ADHD) because when I had him as a Teaching Assistant (TA) he was totally focused, quiet, and productive. When he is in class he gets very distracted and it has been very, very frustrating. I know he can be real successful but he lacks control issues especially when he is around really hyper kids. So this is a student who is an absolute angel in the morning, by later that same day he is falling apart, and I have had to refer him to the office. It is really frustrating, called parents, called administrators, who had the talk, sit down, the whole things, he really feels bad about it but it happens over and over again and we are still working that one through. What can we do to make this child successful? He runs about C/B as a grade but his behavior is holding him back from being that "A" student. So we are still trying different things to keep his control and that is real frustrating, just one child, but just one that's near and

> dear and just trying to do different things to see what will work and so far not yet (Sylvia).

Teachers often wonder how a student can continue to be passed on to the next grade level when they haven't mastered basic skills. Teachers are frustrated when they are trying to teach a concept and they need to teach basic concepts before they can teach their lesson.

> The other thing that frustrates me, as a high school teacher, is how uneducated those kids are. Kids come to me in the 9th grade and have no clue about fractions, how to read a tape measure, or what is half of a board that measures 13 ft and 6 ½ inches long? 80% of my students struggle with that. So that's frustrating, because then I have to stop and take time out of my curriculum to go back. Not re-teach but honestly teach that subject. One, I am not proficient at it or I would be a math teacher and so I find that a continual source of frustration. I think we [scores] are getting better in our school district at least our CSAP scores say we are. But CSAP doesn't come in here and try to teach these kids how to measure a board and cut it in half either. That's frustrating (Tom)!

> An earlier frustrating a teaching experience would be getting when I grade with rubrics. They go home with the rubric and then they come in and self-grade on the rubric...I got a 2 in communication and 2 in math understanding and a 2 in presentation, and an 2 in accuracy, and they turn it in that way. They know what that grade means but they don't go back and improve their score. It's terribly frustrating because I just want them to do their best, and I do a lot of redo work because that's really important but if I can't get them to do it and if I can't get them to come in then that hurts me (Julie).

There is never enough time in a teacher's day due to expectations placed on them and expectations they place on themselves. Whether correcting papers, talking to parents, helping students outside of class time, or planning lessons, your "planning period" is rarely available for planning. Teachers are also asked to serve on committees, handle discipline issues, cover a class for a teacher that is absent, or attend extracurricular events after school hours. Often, teachers are pulled in many directions simultaneously. Managing time with realistic expectations, is important so every night or entire weekends are not spent working on class plans or grading papers.

> The other biggest frustration I have is the lack of time to do what I need to do. A teacher is constantly juggling, engaging in many tasks at once. I often spend my planning time with parents and colleagues, both valuable, but I find I have little time for myself. I spend a great deal of time grading papers on weekends. I guess that just goes with the territory; however, I wouldn't change my job for the world (Mary).

> It seems funny, but early on in my career my greatest frustration came from just keeping up with the workload. I am the type of teacher that can't do things halfway, so I would work around the clock to give my students 100% effort every single day. I still strive to do this, but I have learned how to manage my time more effectively and that I don't have to do everything for the students. It is my job to facilitate their learning, not do it for them (Laura).

Repeatedly, the most common frustrations revolved around lack of student motivation, lack of student's self-control, lack of student's basic skills, and a teacher's ability to manage time realistically.

The Most Challenging Students

Along with the frustrated teaching experiences come the most challenging students. The teachers were asked to tell me about students that are the most challenging to them. The answers fell into a category of apathy. Whether students felt school was a "waste of time," had no "buy in" to school, were unmotivated, or simply didn't care, these were the types of students the teachers felt were the most challenging to teach. The following table states each teacher's most challenging type of student.

Table 11

Most Challenging Students Identified

Teacher	Most Challenging Students
Barb	School is a "waste of time"
Mary	No "buy in" to school
Laura	Given up
Carrie	Attrition
Janet	ADD
Judy	Unmotivated
Julie	Gifted and talented
Sylvia	Learning resistant
Tom	Don't want to try

The most challenging learners are children who have already predetermined that what I am asking them to do and the way that I am asking to do it is unnecessary, that they will never need to know this. They already know that this is a waste of their time (Barb).

The most challenging learners are those who have never bought into school or who have moved so often that they have huge learning gaps. It is so difficult to try to move these students forward when you are building on a fragile foundation (Mary).

I find the most challenging students to be those who have given up. By eighth grade it is difficult to undo years of failure and lack of success. Often these students are in crisis at home and our system does not allow for the type of intervention that would make a long-term difference. It is hard to convince a student that learning to write a well-developed essay and reading powerful literature can make a difference in their futures and provide a way to break out of the cycle (Laura).

The ones who leave, its so hard, I think probably for me because of the type of students that I teach, the population that I have, I have a lot of undocumented students in my classroom, for example, last year my 8th grade English language acquisition class started out with 34 to 36 kids. By Christmas we were down to 12. They all were thinking they would get jobs, and then they left by Christmas when they realized the economy was bad. Starting in January, I got back up to 16 or 17 students but that's where I was all the way to May. At the end of May I was back up to 25 students (Carrie).

The children with ADD are my most challenging children. It's so hard for them to focus on one activity, and so they are constantly running round, getting up, pulling out toys and things, and just leaving them, and running on to the next

activity. I find that distracting for me and for the other students and I have a hard time keeping them calm and get them to do anything (Janet).

Probably the most challenging one is the student who is unmotivated. Trying to motivate them to believe in themselves and that they can do this, and keeping them motivated is very difficult. That's what the National Boards did for my students when I went through it. It motivated them because they were excited because they were helping me to reach my goal and I will tell you just on the side, the class that I used that I was working with when I went through NB was my lowest group of students. That was so exciting. I think in most cases their lives changed because they realized that oh, I can do really great in school (Judy).

Students that are the most challenging for me are the gifted and talented. If I had my choice, I would let the other teacher do that. I would much rather work with the Special Education students, English Language Learners (ELL), and the average learner. Now why gifted and talented is the most challenging, for me is because I don't get the rewards in teaching them that I get from teaching the other students. I like to see the light bulbs go on.
(Julie).

The most challenging students are the learning resistant kids. They have a whole different agenda when they come to school and I am still working on, that's my biggest challenge right now. Kids who are slow, but want to learn are a piece of cake compare to learning resistant kids (Sylvia).

I guess the ones that are most challenging are the kids that just don't want to try. They just make me crazy. Or that don't care and the first thing we have to do as an educator is get those kids to the point where they do care or at least appear that they do care, look like they care. I think we will know when that happens because they will start doing a better job about learning. That really is it for me, the ones that just have that apathetic attitude. They are pretty tough (Tom).

Look and Feel of Classroom

After spending only a few minutes in a classroom, you have a pretty clear picture of not only what a classroom looks like, but also how it feels. Are the desks arranged in traditional rows, or are there small groupings? What is the light like? What is the mood? How is learning taking place? The following two themes emerged for the research question, how do teachers facilitate learning?

All of the teachers described their rooms (which I saw) as "homey" places with desks arranged in groups of two, three, or four for cooperative learning. None of the teachers arranged their classroom in a traditional row format. Comments revolved around centers, self-discovery, and hands-on learning. The following comments portray how each classroom looks and/or feels:

> I hope it [classroom] looks like home, because my children and I both spend more time here than we really do in our homes in a typical week, and so I try to decorate with "homey" items. I have taught for 29 years, and so I have many, many momentos and gifts displayed. I had a bulletin board, that I designate to any news stories or anything that had been printed about us about our classroom, I do my conferencing on a couch, the desks are in study groups, they are only required to be in those study groups when we are doing our mini lesson assignment, other than that they can spend time wherever they want in the classroom. Our school has a bank of 10 computers, which are always in use for the whole day. I have been accused of having busy walls. (Barb).
>
> Since we team-teach, our class size is approximately 50 to 60 students for each 88 minute block. We have two adjoining classrooms that share an acoustical curtain that can be closed and opened. When open, the classroom is a long rectangular shape. The student desks are arranged in pairs to allow for easy collaboration and editing tasks. For oral reading and small group discussion, we usually close the curtain for a smaller feel. It is interesting to note that the students prefer to have the curtain stay open (Laura).
>
> My partner and I both feel that the use of humor sets a positive tone for the class. Our students see us having fun with one another, but also know that respect and tolerance for individual differences are paramount in our classroom (Laura).
>
> I like to have a literature rich environment. I don't know if you know about the 40 rule in Denver; you can only have 40% of your walls covered with paper things, which include the floor and roof and bulletin boards and any doors, so I can spend 40% on meaningful print (Carrie).
>
> A lot of people say my classroom feels "homey". My kids don't sit in rows, we take, even if I had to work in classrooms where there were rows the past year, we learned real quickly how to slide those around and within 30 seconds...and they are facing each other in groups of three or four (Carrie).
>
> My classroom has centers where kids can go to explore and enrich themselves. A lot of comfort places, lighting and comfort and friendly and working in groups, kids working in groups, standards are posted, study lessons with standards and

what we are going to be doing in the lesson and for the day would be real clear standards (Judy).

I have the desks in pairs and in rows. That way I can work in groups of two or four. I have a really good rapport with my kids (Julie).

We have a lot of centers so there are places where students can get help. The front of the room has planner boards, so every day they know what the learning "du jour" is. It's right there in the front so when they walk in it's pretty apparent. I have areas where crates of files where each kid has its own, his or her own file in the room where I will hand back papers instead of in class where they can pick up when it suits their time. They can also keep notes, notebooks, and things in their file. There is enough room for that. The seats face forward, but in groups, and I like there to be a lot of cooperative learning. It's a really nice room with lots of windows and I was very lucky, and the windows open, so we can get fresh air, which is kind of nice...a lot of color, lots of projects, a lot of student work displayed around the room. It's their [students] room not mine and we [students] do a little pick up at the end too to have some pride and ownership (Sylvia).

Typical Day or Class

Regardless of what type of learning environment is established, all classrooms follow routines. We are creatures of habit and students do better when the routine is clear and consistent. That doesn't mean you have a dull class; it means students need to know what to expect.

I greet the parents as they come in with their children; sign their kids in and then the kids go do some tabletop activities. Such as: coloring, puzzles, or the computer. Then we move to our center time (dress up, movement, music, painting, blocks etc.) Then we usually do sit down and have story time and that most often in two smaller groups rather than in a large group; we come together for music and movement and then we move outside which then ends our day. Then parents can come in and pick up kids from the playground (Janet).

We [students] begin each day with independent reading. We [students] then follow with two or three integrated language arts activities with the focus on reading, writing, speaking, and listening skills. Often, during the free reading time, we confer with our students about their writing. We [teachers] require that students correct all mistakes in conventions in spelling and grammar before writing samples may go into their writing folders as final products (Mary).

I team-teach three 88 minute integrated language arts and reading classes for eighth graders. My teaching partner is also an NBCT. Each class begins with 15

minutes of independent reading by students. This time is set aside for reading fictional novels chosen by the students. During this time, my partner and I can confer with students who have been absent or those who need extra help. After that initial time period, we usually have three to four activities that integrate our subject areas of reading and writing (Laura).

The students would come in, and I have the overhead on with the problem of the day. My kids sit in pairs so they can ask their partner any problem they miss. They can ask their partner how to do it or what they did wrong and then I will answer the questions that couldn't be answered. We [students] will do an exploratory lessons where they will explore with the manipulative and then there is always practice that we do together in class whether it be with manipulatives or practice with numbers, they keep everything in their composition pads, so they can't tear pages out. I don't assign a lot of homework problems…I pick out problems that will teach them or reinforce what we have done in class (Julie).

What is a typical hour? I don't know if there is such a thing. We have a routine in my classes where they walk in, we will take up homework, we will discuss homework, we will go over things, we talk about how their day's going, and then we will do some kind of assessment piece or a quiz. Then we will start something new. It can be starting an activity or it can be from a lecture. When I start a lesson, do something interesting, and then jump-start them on the homework. They like the routine, but there is a lot of variation with it because the material that we cover everyday is different (Sylvia).

Kids are up, I am not always walking around the room, but I may have students in the computer lab working on a computer, a lot of individualized project kind of stuff, record keeping, some students may advance a little quicker than other students so they can get on a computer and work on their records or work on their welding skills out in the shop while I am in the classroom teaching. Sometimes I have students on independent projects, they don't even study while we are studying, they might be in the classroom but they are sitting at a different table and they are doing their thing. One of my philosophies is you just don't always learn sitting on the seat of your pants. So if we learn how to castrate and vaccinate a calf then we haven't learned that until we go and do it. So, I take my class and go out to somebody's farm or ranch and brand, castrate, and vaccinate when the opportunity presents itself (Tom).

Important Teacher Preparation Class

In my research question, "Do teachers understand the cognitive reasons for teaching to a student's learning style?" two themes emerged. I asked the following two

questions: "Recount your most important teacher preparation class, and explain why." "What did you learn from the NBC process?

Without leading questions, I wanted to discover if teachers specified any classes in which learning styles were taught. No one mentioned learning styles as important content in teacher preparation class, but five of the teachers did say that their most important teacher preparation class was when they got into a classroom and did their student teaching. So in a way, they were saying that they can read about students, they can hear about students, but to really understand what it is like to be a teacher, you need to experience students.

> My most important classes were the ones where I actually worked in the classroom with real students. Having to be the teacher and react and adjust and change was by far the most valuable part of my initial training. I was comfortable with my knowledge of the subject matter, but needed the time to practice the art of teaching and establishing classroom rapport (Laura).
>
> The most important teacher prep class was when we went into the classroom. The first couple years we weren't actually allowed in the classroom, we had to get our experience first, and I kept wondering where the children were so I volunteered on my own, but when it was actually incorporated into the state it was wonderful because we were actually working with children. We wanted to be teachers (Carrie).
>
> Probably one of the best things in undergraduate school was I had two different student teaching experiences. The college I went to, we had to do two, one in primary and one in intermediate and because I was being certified in Ohio, which required kindergarten for primary certification. I did six weeks in kindergarten, and then I did eight weeks in 6th grade. I probably remember the learning I did there more than I remember the classes (Julie).
>
> There wasn't a class that was that important to me per say, it was more getting into classrooms and working with teachers, again just experiencing. I learned the most in the actual practicum and teaching situation (Sylvia).
>
> Teacher preparation in college, our last semester was in class on campus, then we went out and student taught for six weeks...my student teaching experience made me a successful teacher, I just learned so much and it had to do with the supervisory teacher (Tom).

The following comments reflect a mixture of classroom management and content.

> Well most of the classes that I would consider significant to my teaching happened after I had my BA, there are three that I can say that were really professionally life changing. The first one was when I went to the Cline - Fay Institute, in Breckenridge, on discipline, love and logic. The second one would be when I had the privilege of taking a three day institute with Harry Wong and his wife on classroom management and then the third most significant was my national board history (Barb).

> The most important class for me was a class in teaching composition. I had an excellent professor and had many opportunities to engage in analyzing my own writing as well as the writing of other students in the class. We also evaluated student writing from local high schools and talked about ways to promote confidence and fluency in writing (Mary).

> Grad school, actually I really, really enjoyed the class where we discovered how people learn their first language and how they learn their second language and how that's different (Carrie).

> Well, again I probably think the things that are helping me that I am getting right now from my principal. My undergrad work was done when open classrooms were in vogue. You could learn what you want and do what you want and so, of course, I didn't pick out the important things. My masters program was good, it gave a lot of theory information and I really like theory, because I like to know why things are going on and so forth, and when it comes down to practical useful information I am going to my principal (Janet).

The NBC Process

This section of the interview process was the most "wow" section. I loved listening to all of the stories, and I related to the stories as a teacher. This section was new for me. I was amazed by how often the interviewees consistently mentioned the importance and value of the reflection component of the NBC process. This was life altering for many teachers as they incorporated reflection into their daily classroom activities.

> It [NBC] gave me a focus for the reflection, for the improvement, and the development of my teaching. It forced me to articulate why I did what I did, how I thought it was working, and what I could do to improve. Having done that for a

full year...it really changed my mindset, going to every classroom, every lesson, in terms of the reflection, making the lessons the best (Barb).

One of the most valuable strategies I learned from this [NBC] process was how to look at individual students as learners and to assess their growth over time. With 160 plus students at a time, it is hard to maintain a focus on them as individuals, but the certification process helped me to do just that. In addition, I became more reflective about my own teaching. I learned to think systematically about what I was doing and why I was doing it (Mary).

Having experienced the power of personal reflection, I now use reflection as part of my own practice for classroom instruction, and I have incorporated the reflective process for the work my students do (Laura).

...I am always tuning into that, and it is so much more reflective on my teaching process. I think back about the standards that they have, and I will pick up my guidebook every now and then just to go through and make sure I am looking; am I integrating technology, am I thinking about all the multi-intelligence, am I accepting as I go, am I giving feedback to the parents and students? I really believe it helped me pull all of my knowledge together and put it into practice. I really enjoyed working on myself harder, how painful and funny it was at the time (Carrie).

I learned a lot about me, and I learned a lot about my students. I took more time to reflect through this process. Teachers many times will teach a lesson, and will go on to the next lesson, and will just go and go and go, but going through the process the first time taught me to reflect, and it taught me to collaborate more (Julie).

It gave me an opportunity to really step back away from myself and try to view myself in front of my class as if I were sitting in that class. It made me more cognasant of my actions, how I faced the board, how I faced my class, and body language (Tom).

I really like the philosophy behind it [NBC] and the reflective practice piece. I find myself doing a lot more reflection. That has become part of how I teach now. The other thing that was nice was just having, getting my teachers license and certificate back in the 70s when we did not videotape. Some of those new things that they do to assess teachers were interesting because I had never experienced that, and that was a real learning experience. I have kept those tapes, just so I can go back and take a look at what that meant and what you see. So that was real interesting, and also just putting together a real comprehensive portfolio because again a newer thing from when I went through school, and so it really made me sit down and look at who am I in the classroom, because I really never had to do that for any of my training (Sylvia).

> The most important things are what I am doing for children...I learn to ask a lot more questions: what am I doing and why am I doing it...having time to reflect on why, which as a teacher there isn't much time. You are busy just getting your job done. The NBC process really helped me to explain to other people, parents, and to my administrator what I am doing and why I am doing what I am doing, why it is good for children, and other benefits. After becoming an NBC teacher and leading others through that process and all the collaboration that happens that we all go through together that I keep learning and I am coaching, and then train five people in the district through the process (Judy).

A close second to the value of reflection component was that of professional validation. Many teachers felt that having the credential of NBC validated their knowledge and provided more new professional opportunities.

> Well, I think it [NBC] had been a very strong professional validation for me...I wasn't interested in going into administration; I wanted to stay in the classroom, but I wanted and needed professional stimulation and positive responses (Barb).

> Holding this certificate means that I have met the standards for accomplished teaching established by leaders in my profession. Receiving the news that I had achieved certification has been one of the highlights of my life (Mary).

> I have never regretted my involvement and participation in the process. It has afforded me numerous professional opportunities (Laura).

> It [NBC] has been interesting. I find people tend to listen to me more because when I first got my certificate there were only eight of us out of 4,000 teachers in Denver Public Schools, who had it, so when I would talk people would realize that I had National Board Certificate oh, so, many times people tend not to listen to teachers, it was sort of what I said before, they really don't care, they don't know a lot...I think it has given me the recognition. I knew I was a good teacher, and I knew what I was talking about, and I knew the children, but they sort of explain it to other people yea she does know what she is talking about. I had to continually say this is what I know. I have been teaching for all these years, so it is important to me. A friend of mine and I are thinking of getting another NBC (Carrie).

> National Board Teaching Certificate to me means that I have taken the time to prove that I am teaching in a way that it is benefiting students. It doesn't necessarily mean I am any better than other teachers who haven't gone through the process, some teachers say it's just that I jumped through the hoops and I believe there are many, many very, very good teachers that are just not willing to go through the process themselves. I know what I am doing is good for the

> students. I know I have proven it with the National Board Standards that what I do is good for the students (Julie).

The NBC is also a huge confidence booster. Teachers know when they are good teachers, but it feels good to have other people recognize their strengths!

> I guess first and foremost I probably learned I was a better teacher than I thought I was. I felt like I was a good teacher, but it just boosted my confidence in that I must be doing something right or I would have never gotten certified. It also reinforced the idea we can do something without having to sit in a class in order to do them. I went through my master's degree and in an outreach off-campus technology and education. I could have done all of that by myself. None of it was rocket science, but I wouldn't have had the motivation, I wouldn't have the structure, well that all had to be in place on this NBTC thing, we forced ourselves for that whole structure thing (Tom).

> It boosts my self-esteem (Janet).

> And now that I have my NBTC, a huge sense of satisfaction, that whole pioneering thing, as far as I know I am the only agricultural teacher in the state of CO that has NBTC. So there is a certain amount of pride that goes along with that and that kind of breaking the ground, and I have encouraged other agricultural teachers to do that, but I don't believe any have (Tom).

> I think it made me better in a lot of little areas, hopefully in those little areas started to compound each other, you know then my teaching will and hopefully had changed since then. The other thing that I learned in the NB process was that if you are a good teacher, you are a good teacher, in an inborn, god given thing, I see teachers that have no business being teachers, and I believe that I am a good teacher, but the thing that I learned through this process was that it just reinforced that (Tom).

The NBC process has a lasting effect on the teachers. One of the teachers is considering getting another certificate. Carries states, "It [NBC] is so important to me that I am actually thinking of getting another certificate."

CHAPTER FIVE

Discussion

The following discussion will be comprised of four different sections: summary of the findings, conclusions, recommendations, and needs for future research.

Summary of the Findings

The purpose of this study was to examine what teachers identified as being important to their identification, understanding, and perceptions of learning and teaching styles. This study was conducted using qualitative research. I used a semi-structured approach in my interviews that were a mix of structured questions and unstructured questions. Eight questions involved the teacher as a learner, three questions were about their students as learners, two questions were regarding the teacher's classroom environment, and the last four questions explored their positive and frustrating teaching experiences.

I conducted interviews with nine NBC teachers throughout Colorado. After analyzing the transcripts obtained from my in-depth interviews, 13 themes emerged. The following sections summarize my findings.

How I Learn

The identified learning styles that emerged from my data were: visual, auditory, and experiential or hands-on. When asked, "Can you identify how you best learn?" the responses were as follows: four teachers identified all three learning styles to learn new

information. One teacher identified experiential or hands-on learning only. That teacher said, "My motto for teaching: is learning to do and doing to learn." Three teachers identified visual and auditory learning, and one teacher identified visual and hands-on learning. All but one of the interviewees identified multiple learning styles to learn new information. According to brain and learning researcher, Green, the brain responds better when as many of its processing centers as possible are involved in the learning process (1999).

Challenging New Material

I asked all of the participants, "When you recently had to learn something challenging, what did you do to help you learn the information?" Their responses concurred with their self-identification of their learning styles. Tom, an experiential learner, put it very simply, "Just try it and do it!" Regardless if the information was challenging or not, all of the participants restated how they learn. The subject, challenging or not, did not affect the interviewee's approach to learning the material.

Favorite Way to Study

In my study there was a direct correlation between the interviewee's ability to learn and how they study. When asked, "Recount what you remember as your favorite way to study or learn new information," their answers reflect back to their previously identified learning styles. If teachers learn best by visual and auditory information, they also like to study using visual and auditory learning techniques. Sylvia, a visual and hands-on learner, reiterates this. "For some reason, just the touching and the feeling make the learning easier for me."

Positive Learning Experiences

The teachers' positive learning experience took place when they were using their self-identified learning styles. The teachers were asked to, "Describe a positive learning experience (not necessarily in the classroom)." Mary described a positive learning experience. "I was invited to play in a flute quintet. I was definitely the weaker player of the group. The director coached me through the process and I improved greatly." Whether it was learning to play the flute, putting a new learning model into place, driving, teaching mathematics with manipulatives, learning to be creative, open pit mining, or active research work, all of the teachers described a positive learning experience when they were learning integrating their own styles.

Unique Needs of Students

I asked the teachers, "How do you meet the unique needs of your students?" Surprisingly, the teachers focused more on personal relationships with their students rather than identifying student learning styles. All of the teachers focused on getting to know their students on an individual basis and viewed building relationships as the most effective tool for meeting needs of students. Julie teaches her students the way she learns. "I am an auditory, kinesthetic (hands-on), and visual learner. I let my students use manipulatives to explore and learn." Once you know a student, you can individualize to meet their special academic, social, or physical needs. Regardless of the number of students you have in a classroom, teachers felt it very important to have daily individual contact with each student to enhance building a relationship.

Positive Teaching Experiences

I asked the teachers to describe a positive teaching experience. Each of the stories were personal and memorable for the teacher. Daily, teachers have many experiences that they view as positive. Carrie likes to empower her students. "I like to show other people how smart my students are...I think a lot of people have negative preconceived notions about Hispanic kids from inner city Denver". Setting high expectations, providing students with a variety of teaching styles, getting to know your students, allowing time for students to process information, and opportunities to make connections, emerged as important positive teaching experiences. Positive teaching experiences for the interviewees allowed them to have a positive and lasting effect on many students.

Most Rewarding Students

Teachers were asked to tell a story about a rewarding student. Most of the teachers felt that rewarding students were the students who were more challenging to teach. Whether the students' issues were educational, social, or behavioral, teachers felt more empowered by teaching when these type of students would understand the new information. Tom felt, "It's the students that are most rewarding; I have said a lot of times anybody can teach those 4.0 kids..."

Frustrating Teaching Experiences

The frustrating experiences of the teachers seem to fall into the following categories: students' lack of concern, students with behavior disabilities or issues, students' lack of basic skills, and the teacher's ability to manage time.

The biggest frustration is to have a student who doesn't care. Tom explains this by saying, "Students that either don't care or they have this apparent attitude of being too

cool." You can encourage, provide positive feedback, teach to his/her learning styles, get to know them as individuals, but you can't make them care. Some teachers view students' disruptive behavior or issues as another frustration. One student can change the interaction of an entire group of students.

Teachers also are frustrated when they are trying to teach a concept and they need to teach basic concepts before they can teach their intended lesson. Mary, who teaches on a team, shared her frustration. "Our entire team is frustrated with a student because he continues to do almost nothing while the entire team is helping him become a successful student."

Finally, there is never enough time in a teacher's day. Whether correcting papers, talking to parents, helping students outside of class time, or planning lessons, it is difficult to meet all the expectations of being a teacher. "I find I have little time for myself. I spend a great deal of time grading papers on the weekend (Mary)." You are also asked to serve on committees, handle discipline issues, cover a class for a teacher that is absent, or attend extra curricular events after school hours. Often, you are pulled in many directions simultaneously. Managing your time with realistic expectations is important.

The Most Challenging Students

Along with the frustrating teaching experiences come the most challenging students. The teachers were asked to tell me about students who are the most challenging to them. According to Judy, "Probably the most challenging student is the one who is unmotivated. You try to motivate them, believe in themselves, and keep them motivated." Whether students felt school was a "waste of time," had no "buy in" to

school, were unmotivated, or simply didn't care, apathetic students, according to the teachers, were the most challenging to teach.

Look And Feel of Classroom

Classrooms provide the setting for learning in our schools. Each classroom has unique characteristics because of the teacher and the students. I asked teachers to help me understand what their classroom looks like and how it feels. All of the teachers described their rooms (which I saw) as "homey" places with desks arranged in groups of two, three, or four for cooperative learning. None of the teachers arranged their classroom in a traditional classroom format. Barb described the look of her classroom as, "I hope it looks like home because my children and I both spend more time here than we really do in our homes...I decorate with "homey" items like lamps, couches, pillows, and framed pictures." The arrangement and feel of the classroom revolved around centers, self-discovery, symmetry, and experiential learning. All the interviewees expressed the importance of the classroom environment for the success of student learning and their ability to teach.

Typical Day or Class

Teachers were asked to portray a typical day in their classroom. Regardless of what type of learning environment is established, all classes follow routines. Humans are creatures of habit and students do better when the routine is clear and consistent. Many of the teachers facilitated active learning. Students would be interacting with other students and/or conferencing with the teacher. There were also many activities where the students would demonstrate knowledge using hands-on application. Judy concurs with the following comment, "We usually have three to four activities that integrate our

subject areas of reading and writing." There was constant communication with students on an academic and personal level from the teachers.

Important Teacher Preparation Class

One of my research questions wanted to discover if teachers understand the cognitive reasons for teaching to students' learning style. To gather information without leading questions, I asked, "Recount your most important teacher preparation class and explain why." Carrie just wanted to get into a classroom and begin working with kids. This is what she says about her student teaching experience. "We were actually working with children...we wanted to be teachers!" Five of the nine teachers said their most important teacher preparation class was when they got into a classroom and did student teaching. So in a way, they were saying they could read about students, they could hear about students, but to really understand what it is like to be a teacher, you need to experience students.

The NBC Process

All of the teachers, when asked, "What did you learn from the NBC process?" consistently mentioned the importance and value of the reflection component of the certification experience. This was a life altering experience for many teachers as they incorporated reflection into their daily classroom activities. Barb states, "It gave me focus and time for reflection which improved and developed my education. The reflection component forced me to articulate why I did what I did."

Conclusions

Based on my comprehensive research, it is obvious that a gap exists between learning style identification and effective teaching style implementation. Research

confirms the significance of identifying learning styles, not only for student comprehension and retention, but also for effective teaching. Even our "best" educated and most experienced teachers do not necessarily identify teaching and learning styles as a part of their teaching repertoire. Even though teachers can describe their own learning style and understand the importance of teaching to a student's natural learning style, the teachers stated they taught using their own learning style. The teachers never mentioned specifically adapting a lesson to meet individual learning styles. Teachers mentioned how they individualize by providing one-on-one instruction or through individualized feedback. I was hoping to have the teachers articulate how students have different learning styles and the teachers tried to meet the different learning styles through the lessons. Although I asked the probing question, "How do you meet the unique needs of your students?" the teachers did not mentioned different learning styles.

I wanted to discover if teachers could identify how they learn. The teachers were able to tell me how they learned identified visual, auditory, and experiential (hands-on learning). Each teacher was very quick to answer the question with specific examples. All of the teachers used a combination of traditional learning styles to learn new information. Do all people need a variety of ways to learn new material? If so, are teachers providing enough opportunities for students to learn in many different styles? Does the subject influence how we learn certain concepts? Does learning specific content lend itself to a learning style or a combination of learning styles? These issues still need to be explored.

I also wanted to discover if teachers could identify various learning styles. Once again, the teachers referred to three basic ways to learn. I went back to my key

researchers on learning styles and deciphered where visual, auditory, and experiential learning styles fit. For example, Carl Jung discussed personality types, extrovert and introvert. Possibly the extrovert would like to experience and talk (auditory) about new learning where as introverts would possibly like to read (visual) about new things with little or no discussion. Myers-Briggs identify personality preferences for learning. Once again, these preferences could fit with the visual, auditory, and experiential learner. Dunn and Dunn describe learning by identifying 21 elements. Their learning style inventory is very extensive which includes many more elements than the basic visual, auditory, and experiential learning. Their learning style elements included things such as temperature of the room, seating configurations (this was mentioned by most of the teachers), time in which a student takes a class, lighting etc. Other specific examples are contained in the review of literature.

In my analysis, I discovered that teachers teach in the way they learn. There was no specific reference to adapting lessons to meet various learning styles, but there was reference to meeting individual needs. Also, the majority of the teachers; however, did refer to personal relationships. As seven out of the nine teachers interviewed taught middle school, maybe, the middle school teachers are focusing on individual needs. Psychologist, Abraham Maslow, believes in the theory of a hierarchy of needs. He feels that certain lower needs are to be satisfied before higher needs can be satisfied (Gwynne, 1997). The teachers are providing the need to belong and be accepted by getting to know the students and developing personal relationships.

The National Board for Professional Standards, which issues the National Board Certificate to teachers, believes their Five Core Propositions should prepare teachers to

effectively enhance student learning (2002). In their Five Core Propositions, which consist of 45 actions and characteristics of accomplished teachers, none directly identified address learning styles. There are a few that discuss individual differences, but not specifically individual learning styles.

Over 100 years ago, Jung began to describe individuals as extrovert and introvert (1927). Over the years, much research has been conducted to support the concept of teaching a student using natural learning style. Since that time key researchers have developed theories regarding the importance of teaching to a student's natural learning style and how the styles are characterized (Dunn & Dunn, 1972; Gardner, 1983; Gregorc, 1969; Kolb, 1984; McCarthy, 1979; Myers & Briggs, 1977). These educators agree that attention to the individual learning styles of a given student holds promise as a technique for improving student and, therefore, school performance (Burns, 1998.)

Recommendations

The purpose of this study was to examine what teachers identified as being important to their identification, understanding, and perceptions of learning and teaching styles. From the data rich interviews, I was able to make recommendations. The recommendations are beneficial to students, teachers, teacher preparation classes, principals, and staff development personnel.

1. Teachers understand the basic types of learning styles such as visual, auditory, and experiential. Teachers need to know there is a variety of other learning style formats. My recommendation is that every teacher preparation program has at least one class devoted to the various learning style theories.

2. Staff development personnel develop and facilitate presentations that illustrate different learning styles for continual reinforcement, understanding, and applications of the concept of individual learning styles. To provide staff development schools need to continue to place appropriate funds for staff development. I also recommend that schools take on the goal of training their entire staff in various learning style models with the objective of attaining lessons and assessments which revolve around individual learning styles.
3. Teachers teach students how to recognize their own learning style, to enhance what they do well, and encourage students to understand other learning styles. Exploration and identification of learning styles should be conducted on an annual basis due to the changing developmental needs of students.
4. All classrooms have a variety of learning areas to meet the individual learning styles of students. This includes, but is not limited to, recommended attention to light, air, sound, furniture, and temperature.
5. Teachers use classroom arrangement for students to work on projects and activities by themselves, in pairs, and in small groups.
6. Teachers build in time for reflection numerous times a day. This reflection time is for students as well as teachers.
7. Teachers should take classes, in their teacher preparation program and staff development, to stay abreast of current research on the implications of educational practices and the way the brain learns.

Needs for Future Research

As a result of this study, several recommendations are made regarding research about what teachers describe as being important in their identification, understanding, and perceptions of learning and teaching styles. The following recommendations are suggestions for future research.

1. This study focused on NBC accomplished teachers only. A similar study should be conducted on any state certified teachers to ascertain their perceptions and the themes evident in their exploration of learning styles and teaching.
2. This study focused on NBC accomplished teachers in the state of Colorado. A similar study should be conducted with NBC accomplished teachers in only one school district, in a state which has numerous NBC teachers in each district, to determine the similarities and differences in their teaching.
3. An extension of this study would be to interview parents of the students of these teachers and see how they would answer the questions.
4. Another extension of this study would be to interview the students of these teachers and listen to their stories on teaching and learning.
5. There is a gap between neuroscience research on how the brain learns and educational research on how teachers teach. Educational research should take the basic and applied research from neuroscience and examine its relevance and exploit its implications in the learning environment.

CHAPTER SIX

Reflection

As I begin the final chapter of my dissertation, I am also concluding the final chapter of a lifetime of "formal" education. I approach this event with numerous emotions: excitement, apprehension, joy, frustration, and a huge sense of pride and accomplishment.

The emotion I try to keep in the forefront is excitement. I am a life long learner and throughout this entire process I have learned so many things. The first component of my Ph.D. program consisted of a variety of leadership classes through which I obtained my Principal's License. The information I acquired enabled me to be a strong and successful administrator. Currently, I can see the light at the end of the tunnel and am excited about completing my studies!

Apprehension, fear, anxiety, uneasiness, and dread, yes, those little words haunted me too throughout this process. Never before in my life had I experienced a level of fear or anxiety that I experienced during my comprehensive research examinations and/or my oral defense. I come across to the general public as confident and intelligent, but on many occasions I was paralyzed by fear and could not function.

The joyful part of this dissertation was conducting my interviews and my new committee members. During my interviews I had the opportunity to meet many great teachers and listen to all of their stories. Another beneficial joy has been my new

committee. They have each taken the time to know me, know how I learn, know what I need, and provide the support that is necessary.

There have been many times during my Ph.D. experience when I felt frustrated. The first frustration was the fact that I did not live in Fort Collins and needed to commute to take classes. I spent seven years commuting and attending summer school. Due to the length of time I was taking to complete my course work, most of my committee members had retired or moved to other positions. There were many times that I wanted to call it quits. The lows were very low, and I did not think I had it in me to persevere. I had changed my dissertation topic more times than I care to think about, and with each change came a change in my committee members. I was thankful that one of my current committee members told me that it was ok to change committee members. She said, not only was it ok, but students did it all of the time. After I realized I was the one to own my topic; I felt empowered.

Last, I have been filled with a huge sense of pride and accomplishment. For the girl that was not tracked into a "college bound" program in high school, I have proved to myself that I am capable to complete and accomplish anything I set my mind to. I get very emotional as I reflect back on the ten-year journey of this program. It has been the hardest thing I have ever done but personally extremely rewarding.

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Appendix A: Informed Consent Form

COLORADO STATE UNIVERSITY
INFORMED CONSENT TO PARTICIPATE IN A RESEARCH PROJECT

TITLE OF PROJECT:
Identification, Understanding, and Perceptions of Learning and Teaching

NAME OF PRINCIPAL INVESTIGATOR:
Carole Makela. Ph.D

NAME OF CO-INVESIGATOR:
Patricia W. Nelson

CONTACT NAME AND PHONE NUMBER FOR QUESTIONS/PROBLEMS:
Patricia W. Nelson, 719-332-7277

PURPOSE OF THE RESEARCH:
The purpose of the research is to examine what teachers describe as being important in their identification, understanding, and perceptions of learning and teaching.

PROCEDURES.METHODS TO BE USED:

The primary method of data collection is through participant interviews. After you have chosen to participate, I will email you the Informed Consent form to read and sign (I will collect at the time of the interview). I will also email you a general information survey. This survey can be emailed back to me or given to me at the time of the interview. I will also email you a list of the interview questions so you will have time to think about your answers ahead of time. I will set up a time to met you in your classroom and conduct a 20 – 30 minute interview. Interviews will be audio taped and later transcribed. After the interview, I may contact you, by phone, for brief follow-up questions for clarification purposes only. Upon completion of the entire interview process (after follow-up if necessary), a $10.00 gift certificate will be given to you.

RISKS INHERENT IN THE PROCEDURES:

It is not possible to identify all potential risks in an experimental procedure, but I have taken reasonable safeguards to minimize any known and potential, but unknown, risks. I will use anonymity and you have the choice to participate and are free to withdraw from my study at any point.

BENEFITS:

Direct benefit to participants is an increased knowledge base on factors important to teachers in their identification, understanding, and perception of learning and teaching.

CONFIDENTIALITY:

I will protect your anonymity in my data collection and analysis by using code names. In transcription, pseudonyms will be assigned to people and schools to maintain anonymity. All consent forms, transcripts, tapes, and notes will be kept for three years in a locked facility. After transcription, the audio tapes will be destroyed. After three years, all other materials will be destroyed.

 Participant's initials _____ Date _____

LIABILITY:
The Colorado Governmental Immunity Act determines and may limit Colorado State University's legal responsibility if an injury happens because of this study. Claims against the University must be filed within 180 days of the injury.

Question about participants' rights may be directed to Celia S. Walker at (970) 491-1563.

PARTICIPATION:

Your participation in this research is voluntary. If you decide to participate in the study, you may withdraw your consent and stop participating at any time without penalty. Participation includes the willingness to be interviewed.

Your signature acknowledges that you have read the information stated and willingly sign this consent form. Your signature also acknowledges that you have received, on the date signed, a copy of this document containing 2 pages.

_____
Participant name (printed)

_____ _____
Participant signature Date

_____ _____
Witness to signature (project staff) Date

❑ I agree to follow-up correspondence of necessary for clarification.

Appendix B: Interview Questions

You as a learner:

Each of us has spent considerable time as a learner. We may have a variety of experiences that could be described from long forgotten (what did I learn) to highly memorable (wow, I did learn a lot). Let's explore some of your learning experiences.

1. How do you best learn? Explain.
2. When you recently had to learn something challenging, what did you do to help you learn?
3. Recount what you remember as your favorite way to study or learn something new? Or new knowledge?
4. Describe a positive learning experience (not necessarily in the classroom) for you.
5. Recount your most important teacher preparation classes and explain why.
6. Explain why you chose to get a National Board Teaching Certificate?
7. What does having a NBTC mean to you?
8. What did you learn from the process?

Your students as learners:

All students are unique and different. They learn at different rates and in different ways.

9. How do you meet the unique learning needs of your students? Give specific examples.
10. Tell me about the learners that are the most challenging to you? Elaborate.
11. Tell me about the students that are the most rewarding to you?

Your classroom:

Classrooms provide the setting for learning in our schools. Each classroom has unique characteristics because of the teacher and the students. How would you describe what I would observe in your classroom?

12. Portray a typical day in your classroom.
13. Help me understand what your classroom looks and feels like. Be specific.

You as a teacher:

As a teacher you experience hundreds of feelings every day on how you felt a lesson went or an interaction with a student.

14. Describe a recent positive teaching experience.
15. Describe an earlier positive teaching experience.
16. Describe a recent frustrating teaching experience.
17. Describe an earlier frustrating teaching experience.

Appendix C: Questionnaire

1. How many years have you taught?

2. What subjects/grades have you taught?

3. How many years have you taught in the school you are currently teaching?

4. When did you receive your NBC?

5. What certificate to you have?

6. Did you receive any state funding to help pay for your certificate?

7. Does your district financially reward teachers with a National Certificate?

8. How would you express the process of the NBC?