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Missouri Elementary Teacher Certification Programs and the Education Provided on How Boys and Girls Learn Differently

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A dissertation submitted to the Education Faculty of Lindenwood University

in partial fulfillment of the requirements for the degree of

Doctor of Education

School of Education

DECLARATION OF ORIGINALITY

I do hereby declare and attest to the fact that this is an original study based solely upon my own scholarly work here at Lindenwood University and that I have not submitted it for any other college or university course or degree here or elsewhere.

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MISSOURI ELEMENTARY TEACHER CERTIFICATION PROGRAMS AND THE EDUCATION PROVIDED ON HOW BOYS AND GIRLS LEARN DIFFERENTLY

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This dissertation has been approved as partial fulfillment of the requirements for the degree of
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Abstract

Teacher education programs, professional development, and higher education should provide educators with the information needed to address the ways that boys and girls learn differently. This mixed-methods study discovered the amount of education provided to teachers during their Teacher Education Programs in regards to how girls and boys learn. This study focused on a purposeful sample of five school districts within a chosen region in Missouri. Data were collected from elementary schools within these districts in the fall of 2008. The subjects included a purposeful sample of elementary teachers throughout these districts. In addition, twelve elementary teachers within this region were interviewed to develop a deeper understanding of how this knowledge has impacted their teaching. Overall, the Missouri elementary teachers sampled have had effective training in their Missouri Teacher Certification Program concerning how boys and girls learn differently. Over fifty-percent of the teachers stated that they were effectively taught in concepts related to how boys and girls learn differently (Questions #1-#9) in seven out of the nine questions. Out of the twelve interviews, two teachers remembered being taught how boys and girls learn differently during their Missouri Teaching Certification Program. Ideally, the Missouri Department of Elementary and Secondary Education (MDESE) will review their Certification Requirements for Elementary (Grades 1-6) to ensure that teachers are receiving the needed information and training to effectively facilitate learning for all students, regardless of gender. In addition, school districts will begin or continue to support professional development in research-based methods to sustain and strengthen skills in differentiated instruction.

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CHAPTER I

INTRODUCTION

Since 1981, when the United States Department of Education began keeping complete statistics, there has been an increasing gender gap in student achievement. Boys and girls learn differently. Scientific research explains the differences between boys and girls, including the actual development of the student's brain and the developmental differences between the way a boy's brain and a girl's brain works. Many believe most of our schools are failing the boy population. In general, our schools are "not sufficiently hospitable environments for boys and are not doing what they could do to address boys' unique social, academic, and emotional needs" (Pollack, 1998, p. 231).

The 2000 National Assessment of Educational Progress (NAEP) found boys 1.5 grade levels behind girls in reading and writing ("National Center," 2000a). Beginning the first days of school, an "average boy is already developmentally two years behind the girls in reading and writing" (Colin, 2003, p. 2). However, boys and girls have the same learning expectations. "From kindergarten to graduate school, boys are becoming the second sex" (Colin, 2003, p. 1). At the college level, girls have a much higher enrollment. Females represent about sixty percent of the student population in colleges (Gurian, Henley, & Trueman, 2001). Even more striking, "boys earn 70 percent of Ds and Fs and fewer than half of the A's, account for two-thirds of learning disability diagnoses, represent 90 percent of discipline referrals, and dominate such brain-related learning disorders as attention deficit disorder " (Gurian & Stevens, 2004, p. 23). Within the United States, boys are more than ten times more likely to be diagnosed with attention deficit disorder, than girls (Pollack, 1998). Currently, millions of boys in school are medicated for such

disorders. There are more than one million children taking Ritalin (a very strong stimulant medication for attention deficit disorder), and "three quarters of them are boys" (Pollack, 1998, p. 254). Most of the behavior that may be diagnosed as attention deficit disorder or hyperactivity disorder is just the "externalization, through action, of boyhood emotions" (Pollack, 1998, p. 255).

Statement of the Problem

Over the last few decades, studies on gender achievement gaps have flooded the news and other types of media. About thirty years ago, girls were the focus of concern, which sparked the women's rights movement. State tests and curriculum have been modified so that reading and writing have a heavier weight in primary schools. Since the late nineties, society seems to be focused on the trouble with boys. When Gardner's book, *Frames of Mind: The Theory of Multiple Intelligences* (1983) was published, it seemed to assist new and experienced teachers in meeting the different learning styles of their students. The theory of multiple intelligences gave educators and administrators a way to understand how students responded in different ways to a variety of teaching styles. The scientific research demonstrated there are biological differences between girls and boys that affect learning (Gurian, Henley, & Trueman, 2001). The use of teaching strategies such as cooperative learning, differentiated instruction, and brain-based learning has channeled into schools' professional development plans. However, are Missouri teacher education programs providing the needed instruction and information to help teachers provide effective instruction to all students, boys and girls? "The quality of our schools may make all the difference for the academic and emotional success of our boys" (Pollack, 1998, p. 233).

Purpose of the Study

The purpose of this study was to determine elementary teachers' preparedness to meet the different learning styles of both boys and girls. This research will be shared with various practitioners, educators, parents, and the community on how important it is to understand the learning differences of boys and girls. Ideally, the Missouri Department of Elementary and Secondary Education (MDESE) will review their Certification Requirements for Elementary (Grades 1-6) to ensure that teachers are receiving the needed information and training to effectively facilitate learning for all students, regardless of gender. In addition, school districts will begin or continue to support professional development in research-based methods to sustain and strengthen skills in differentiated instruction and brain based learning to meet the learning needs of all students.

Hypotheses

Null Hypothesis #1. Missouri elementary teachers sampled have had little to no training in their Missouri Teacher Certification Program concerning how boys and girls learn differently.

Null Hypothesis #2. Missouri elementary teachers sampled have had little to no effective training in research-based best practices, i.e., cooperative learning, differentiated instruction, and brain-based learning.

Design of the Study

Through a mixed-methods study, data were collected and analyzed from a paper and pencil questionnaire. A questionnaire was selected as a direct-data quantitative measure, the aim of which was to reveal the status of some phenomenon within an identified

organization (Thomas & Brubaker, 2000). A questionnaire was distributed and collected from a purposeful sample of elementary teachers within a region of Missouri. When identifying a population for sample for the descriptive portion of the study, the researcher selected participants who were able to contribute additional knowledge to further inform the study (Creswell, 2003; Yin, 2004). Through a purposeful sample, five districts were selected within a regional area that demonstrated varied enrollment, socio-economic, and approaches to teacher practices according to the Department of Elementary and Secondary Education's website. These questionnaires revealed their training in how boys and girls learn differently during their teacher certification education program. Through a purposeful sample, twelve elementary teachers with varying experience and from varying colleges were selected to be interviewed within one of the chosen districts. The interview was composed of four questions to determine if they were taught how boys and girls learn differently during the Missouri Teacher Certification Program; if they had noticed differences in how boys and girls learn differently within their own classroom; how that knowledge helped them; and what information would have benefited their instruction and/or classroom management regarding how boys and girls learn differently (see Appendix D). The participants in the interviews were selected so that there were an equal number of the various years of experience subgroups (zero to five, six to ten, and eleven or more). Administrators within four different elementary schools identified three participants each within these criteria and who completed their teaching certificate through a Missouri college or university. Within each interview, the participants (elementary teachers) submitted their written answers to the researcher to enhance credibility and reliability of the collected data.

Limitations of the Study

The limitations to this study were relative to the geographical area and designs used by the researcher, and are indicated as follows:

1. Study (questionnaire) was limited to a region of Missouri. Five districts were selected within this region.
2. Data were obtained from elementary school teachers, ranging from kindergarten through sixth grade.
3. It was assumed that participants were honest in their responses and interpreted the questionnaire instrument and interview protocol as intended.
4. It was assumed that participants based their responses upon their own experiences.
5. Participants' responses on the questionnaire are their perceptions to the training that was provided to them.
6. Participants may have received the training or information, but do not recall it.
7. Participants may have been trained in the identified information on the questionnaire, but may not implement the strategies in their classroom.
8. This study took place in the fall of 2008.
9. Questionnaire and interview questions were developed by the researcher.
10. Validity of questionnaire was not verified.

Definition of Terms

The key terms and definitions, specific to this study, are provided:

Attention Deficit Hyperactivity Disorder (ADHD). An individual who has a problem with inattentiveness, over-activity, impulsivity, or a combination may have

ADHD. For these problems to be diagnosed as ADHD, they must be out of the normal range for the individual's age and development (Pliszka, 2007).

Brain-based learning. "Brain-based learning is the purposeful engagement of strategies based on neuroscience. Brain-based learning is the application of a meaningful group of principles that represent researchers' understanding of how the brain works in the context of education," (Jensen, 2009, p. 1). "Brain-based learning involves using approaches to schooling that rely on recent brain research to support and develop improved teaching strategies," (McBrien, J., & Brandt, R., 1997, p. 89).

Cooperative learning. Based on Dr. Spencer Kagan's research program, the concept of Cooperative Learning was developed in 1968. He created simple structures that allowed teachers to guide the interaction of students to increase student achievement and engage the range of multiple intelligences. More than two hundred Kagan Structures have been developed by Spencer Kagan and his team. They are simple teaching techniques or instructional strategies to guide the interaction of student with each other, the curriculum, and the teacher (Kagan, 1994).

Differentiated instruction. Differentiated instruction is an approach to teaching essential content in ways that address the varied learning needs of students with the goal of maximizing the possibilities of each learner (Tomlinson, 1994).

Effective training. Effective training entails individuals being given the research-based knowledge, resources, and training in an identified area. With this training, the individual has the tools to incorporate the knowledge, resources, and information to accomplish the related goal, objective, or task (Smittle, 2003).

Multiple intelligences. Multiple intelligences refers to a theory of intelligence developed in the mid-1980s by Howard Gardner, a professor of education at Harvard University. Intelligence is the ability to solve problems or fashion products that are valued in at least one culture. Gardner originally identified seven intelligences: linguistic, logical-mathematical, musical, spatial, bodily-kinesthetic, interpersonal, and intrapersonal. Every person has these intelligences in varying proportions (Gardner, 1983).

School culture and climate. The sum of the values, cultures, safety practices, and organizational structures within a school that cause it to function and react in particular ways is considered a school's culture. School climate "refers mostly to the school's effect on students, while school culture refers more to the way teachers and other staff members work together" (McBrien, J. & Brandt, R., 1997, p. 199).

Summary

Identifying the education and training of how girls and boys learn provided to Missouri teachers is a crucial component in providing an effective classroom for all students. Through brain-based research, there is scientific evidence that boys and girls learn differently (Gurian, Henley, & Trueman, 2001; Jensen, 2000). Teacher education programs, professional development, and higher education should provide educators with the information needed to address the ways that boys and girls learn differently. Understanding how the brain works and how students learn is essential to address the needs of all learners. If educators understood the differences between boys and girls, then the amount of discipline referrals would decrease; a variety of teaching strategies would be utilized; and students would not be over-diagnosed with ADD (Gurian et al., 2001).

Most importantly, all students would strive in a healthy environment where they can all be successful learners. This study explored the education provided to teachers from five districts during their Teacher Education Programs in regards to how girls and boys learn. Quantitative and qualitative data were collected from elementary schools within these districts in the fall of 2008. The purpose of this study was to show the Missouri Department of Elementary and Secondary Education, Districts, and educators the purpose of knowing how boys and girls learn differently and why.

CHAPTER II

REVIEW OF RELEVANT LITERATURE

Background of the Study

Over the last few decades, gender equity concerns focused on the female population. Advocacy groups revealed to the public how girls were struggling in school and developed ways to ensure their successfulness. In 1972, Title IX "forced schools to provide equal opportunities for girls in the classroom" (Tyre, 2006, ¶ 6). Since then, over a billion dollars have been allocated to help raise achievement levels among girls. Educational experts wanted to help girls to decrease their weaknesses in math and science, and to build self esteem (Conlin, 2003). Assessments evolved from composing of primarily multiple choice questions to essay questions. Typically, females perform better on assessments which comprise of essay and short answer questions (Gurian, Henley, & Trueman, 2001). Therefore, females began achieving higher assessment scores than males.

After more than thirty years, it seems as though there has been a shift from the world focusing on girls lagging behind in school, to boys having difficulty in school and society. Some of the evidence of their struggles are that "boys earn 70 percent of Ds and Fs and fewer than half of the A's, account for two-thirds of learning disability diagnoses, represent 90 percent of discipline referrals, and dominate such brain-related learning disorders as attention deficit disorder " (Gurian & Stevens, 2004, p. 23). In addition, over eighty percent of those who have dropped out of high school are males. Males make up fewer than 40 percent of college students. (Gurian et al., 2001). According to a study out

of the University of Michigan, “the number of boys who said they didn’t like school rose 71 percent between 1980 and 2001 (Tyre, 2006, ¶ 3).

There is also a large gender gap in disciplinary issues. According to the National Center for Education Statistics (2000), there were a total of 3,053,449 students in the United States suspended or expelled in the elementary and secondary public school setting (“National Center,” 2000b). Within that total, 2,182,273 of the students were boys while only 871,176 were girls. The gender gap in Missouri was also evident that same year. Out of a total of 55,889 students suspended or expelled, 40,747 were boys (“National Center”).

Gender in the Brain

In order to understand how the educational system can assist both boys and girls in their learning process, it is vital to understand how the brain works. Human nature is “hardwired into our brains in three biological stages: genetics research, endocrinological research, and psychosocial research” (Gurian & Stevens, 2006, p. 88). In the first stage, “chromosome markers for gender are included in the genomes of girls and boys during conception” (p. 88). These chromosome markers are built into the fetal brain for development of a male and a female. During the second stage, the “chromosome markers compel surges of male and female hormones in the womb that format XX brains (female) and XY brains (male)” (p. 88). During the birth of the child, which is considered the third stage, nonverbal and verbal cues are sent to parents and to those surrounding the child. Gender is inborn and then becomes socialized by the different cultures (Gurian & Stevens).

Differences in the Brain

Many differences exist between the male and female brain. First, "girls' brains mature earlier than boys" (Gurian et al., 2001, p. 19). Myelin, "which allows electrical impulses to travel down a nerve fact and efficiently" (p. 26), continues to grow in all brains until individuals are in their early twenties. In young women, it is completed earlier than in young men. Therefore, "girls can acquire their complex, verbal skills as much as a year earlier than boys" (p. 26). In most cases, a young girl can read faster, use better grammar, and has a larger vocabulary than her male counterpart. Usually, the female brain develops faster than the male brain. In infants, brain development is often "most pronounced in the right hemisphere and gradually moves to the left" (p. 27). This movement begins earlier in females than in males. The connecting bundle of tissues between hemispheres, called the corpus callosum, is on average, larger in a girl than a boy's- up to 25 percent larger by adolescence (Gurian et al.). This connection "enables more cross talk between hemispheres in the female brain" (Gurian & Stevens, 2004, p. 22). The neural connectors, located in the temporal lobes, tend to be much stronger in girls than boys. Stronger listening skills and better, more detailed memory storage are benefits from these connectors. Strong neural connectors also lead to better discrimination among the different voice tones (Gurian & Stevens). Another memory storage area, called the hippocampus, tends to be quite larger in the female brain compared to a male's brain. Therefore, girls have an increased learning advantage in the subject of language arts. They also take in more sensory data than boys. Overall, girls have better verbal communication abilities while boys often rely on nonverbal communication. The prefrontal cortex in a girl's brain "is generally more active than boys' and develops at

earlier ages" (p. 22). Therefore, "girls tend to make fewer impulsive decisions than boys do" (p. 22). Boys' brains have a lower level of blood flow than girls. In addition, their brains are structured in a way that they compartmentalize their learning (Gurian et al.). Girls often multi-task more effectively than boys and have fewer attention span problems (Havers, 1995). In school, students are expected to quickly transition from one subject to another. The brain development in girls makes this easier for them to accomplish (Havers). Boys want to be more mobile and use objects because of their brain's spatial-mechanical functioning.

Chemical and hormonal differences exist between boys and girls. There are higher levels of serotonin in girls' bloodstream than boys. This allows girls to be less fidgety and less impulsive than boys (Gurian et al., 2001). Girls also have substantial differences in vasopressin and oxytocin. Oxytocin, a brain chemical, is more constantly stimulated in females, making the female capable of quick and immediate empathetic responses to others' pain and suffering (Gurian et al.). When a baby cries, the female brain secretes a much higher degree of oxytocin than in the male brain. "Girls generally use more cortical areas of their brains for verbal and emotive functioning" (Gurian & Stevens, 2004, p. 23). These areas are used more for mechanical and spatial functioning by boys (Moir & Jessel, 1989; Rich, 2000). Due to the lesser amount of serotonin, boys are more likely to be physically impulsive. It is very hard for them to sit still and listen to long lessons. Testosterone is the male growth hormone that also controls aggression and sex-drive (Gurian et al.). Testosterone does fluctuate. When it is high, males tend to "perform better on spatial exams, but worse on verbal tests" (p. 29). Some boys are low in testosterone-which makes them more sensitive, have softer face features, and a kinder manner. Boys

who have a higher level of testosterone tend to be very aggressive, socially ambitious, strive for dominance, heavy in muscle mass, or a combination of these conditions (Gurian et al.).

Males and females also differ considerably in how the brain uses its cell and blood activity. Girls tend to use the left hemisphere, as boys tend to use the right hemisphere more (Gurian et al., 2001). According to Ruben Gur (2000), who has used positron emission tomography (PET) scans and magnetic resonance imaging (MRI), and other brain imaging techniques at the University of Pennsylvania, the "resting female brain is as active as the activated male brain" (Gurian et al., p. 29). Advancements in brain research make an obvious case for the differences between the learning development of boys and girls.

Differences in Learning Styles

Gurian et al. (2001) identified "ten areas that brain-based research has been able to track around the world in the last two decades that explain the areas of learning-style differences between boys and girls" (p. 44). They included: deductive and inductive reasoning, abstract and concrete reasoning, use of language, logic and evidence, the likelihood of boredom, use of space, movement, sensitivity and group dynamics, use of symbolism, and use of learning teams (Gurian et al.). Boys tend to use deductive reasoning. Boys begin their reasoning process from a general principle and apply it to individual situations. Girls tend to favor inductive thinking, which begin with concrete examples. This is the rationale as to why boys do better of multiple-choice tests than girls. On assessments where students have to give an example or complete an essay question, girls achieve higher scores. Boys tend to be able to calculate things without

seeing or touching them while girls do better being taught with manipulatives and objects (Gurian et al.). On average, females produce more words than males, and prefer to have things conceptualized in usable, everyday language. Gurian et al. found that "boys tend to find jargon and coded language more interesting" (p. 46). Girls tend to be better listeners in conversations than boys. While girls feel comfortable conversing with others, boys typically request clear evidence to support what is being stated. In the classroom, girls' level of engagement is consistently higher, while "boys tend to get bored more easily" (p. 46). Boredom usually results in behavior problems. To keep students engaged, visuals, and hands on activities help decrease class disruptions or behavior concerns.

According to Gurian et al., "boys tend to need more physical space to learn, especially at younger ages" (p. 47). Movement seems to help boys keep their brains stimulated while decreasing impulsive behavior. On the other hand, girls do not generally need to move as much while learning. While cooperative learning is good for all children (Kagan, 1994), it is often more difficult for boys to interact with each other. They are more task-oriented than sensitive to social interactions. Both genders benefit from learning teams and group work; although boys tend to form more controlled teams while the girls prefer looser organizations.

Society's Perceptions of Gender

Stereotypes are integrated into our culture and social norms. When an individual looks through magazines or watches television, he will notice that "girls are encouraged to be thin, pretty caregivers; while their male peers are encouraged to be strong, brave, silent, and macho" (Gunzelmann & Connell, 2006, p. 95). According to William Pollack (1998), there is a Boy Code. The Boy Code is societal beliefs and stereotypes regarding how boys

should behave and think (Gunzelmann & Connell; Pollack, 1998). Boys begin to learn the Boy Code as infants through the interactions with their parents or guardians. Mothers respond to their infant's emotions differently, depending on whether it is a boy or girl. During painful states of expression, "mothers responded only twenty-two percent of the time" to their infant daughters, "but when their sons showed negative feelings, they ignored them altogether" (Pollack, p. 41) Beginning in childhood, the Boy Code expects boys to act tough and suppress their feelings. It is "unintentionally reinforced by parents, teachers, coaches, peers, and the media" (Gunzelmann & Connell, p. 95). Some of the common phrases that are associated with the Boy Code are: you throw like a girl, crying is for sissies, be a man, and toughen up.

In the classroom, many studies have shown that female students participate less in class than their male counterparts (Bailey, 1988; Biklen & Pollard, 1993; Sadker & Sadker, 1994; Sadker, Sadker, & Steindam, 1989). Studies have also revealed that teachers contribute to this pattern. More attention and specific feedback were likely to be given to males. In addition, they received praise for their intellectual content of their answers. Unintentionally, teachers reward aggressive male students when they do not wait for more than five seconds for students to respond to their questions (Glasgow, McNary, & Hicks, 2006). Most of the time, teachers may not realize their own teaching techniques or behaviors nor that they are discriminatory. "Teachers may not believe they are responsible for bias in their classroom and may blame society or the students themselves for inequity" (Glasgow et al., 2006, p. 73).

Teachers need to reflect on their own instructional practices and understand that gender bias does exist. They should address it as part of their instructional design process.

In order for a teacher to better understand some of their own gender biases, they could have another educator observe or videotape them. After the observation or video, the teacher can better address areas in need of improvement in this area. Depending on the student population, the teacher might decide to discuss gender equity as a class discussion (Glasgow et al., 2006).

Teachers tend to provide greater opportunities to their male students to expand ideas and be animated than they do females (Good & Brophy, 1987). Furthermore, teachers tend to reinforce males for general responses more often that they do females (Glasgow et al., 2006). Teachers early in their careers tend to provide better more feedback to males than to females (Sadker & Sadker, 1994). Teachers should allow all students equal opportunities to engage in different learning styles even though studies have shown that boys learn better through competition and girls through cooperative groups (Fennema & Peterson, 1987).

"Title IX of the Education Amendments of 1972 forbids discrimination or segregation of students by gender in school programs, courses, and activities" (Glasgow et al., 2006, p. 76). Although most people familiar with Title IX think it specifically relates to equal opportunities for girls in sports, it is much broader in that it provides equal opportunities for girls and boys at school. With this in mind, it is crucial that educators "examine their own biases with regard to gender differences and the ways this attitude might impact their teaching" (p. 76).

Eric Jensen (2000, p. 97) stated that there are "several things that educators can do in the co-educational school setting to support gender differences in the learning environment." Educators need to "be aware of how gender differences may impact

learners" (p. 36). Educators need to "be patient with learners who may not show the same brain development that others do (especially with boys who usually learn language skills one to two years later than girls; or girls who are not as skilled in the spatial or physical tasks as early)" (p. 36). In addition, educators need to "respect differences and appreciate each learner's uniqueness" (p. 36). They can use differences as an opportunity to teach about respecting their own and other developmental timelines. They should refrain from labeling students regarding their academic levels or behaviors.

Special Education Referrals

The gender gap is also evident in the numbers of special education referrals between boys and girls. The Boys Project, an official project at the University of Alaska Fairbanks, College of Liberal Arts Department, provided the following statistics of special education diagnoses for girls compared to boys (Mortenson, 2006, p. 1).

- For every 100 girls diagnosed with a special education disability 217 boys are diagnosed with a special education disability.
- For every 100 girls diagnosed with a learning disability 276 boys are diagnosed with a learning disability.
- For every 100 girls diagnosed with emotional disturbance 324 boys are diagnosed with emotional disturbance.
- For every 100 girls diagnosed with a speech impairment 147 boys are similarly diagnosed.
- For every 100 girls diagnosed with mental retardation 138 boys are diagnosed as mentally retarded.

- For every 100 girls diagnosed with visual impairment 125 boys are visually impaired.
- For every 100 girls diagnosed with hearing impairment 108 boys are diagnosed as hearing impaired.
- For every 100 girls diagnosed with deafness 120 boys have deafness.
- For every 100 girls with orthopedic impairment 118 boys have orthopedic impairment.
- For every 100 girls with other health impairment 127 boys have other health impairment.
- For every 100 girls with multiple disabilities 189 boys have multiple disabilities.
- For every 100 girls that are deaf/blind 98 boys are deaf/blind.

In the educational field, there has been much debate about special education programming. The increasing number of students diagnosed with emotional or behavior disorders has been criticized (Caseau, Luckasson, & Kroth, 1994). The majority of the students being referred for special education for behavior disturbances are male. Some critics believe that male students are being over-identified due to inherent tendencies to display behavior that may be seen as disruptive. Female students are "less likely to act out, but often exhibit internalized difficulties that are not always apparent to teachers" (DeMarco & Deretich, 2006, p. 3). Within special education, "the category of emotional disturbance is the most disproportionate with males comprising 76.4% of all identified students" (p. 4). According to many researchers, boys are often mistakenly labeled emotionally or behaviorally disordered because of educators' lack of understanding of the gender differences in development. Many special education referrals occur because of

cross-gender misunderstandings and stereotypes (McIntyre & Tong, 1998). In their research, they concluded that "female teachers do not relate to the male style of communication, and consider it unacceptable" (DeMarco & Deretich, p. 5). Female students with emotional disturbances go undetected because boys' behavior attracts the teacher's attention (Wehmeyer & Schwartz, 2001).

"Teaching all students about disabilities to facilitate the social acceptance of students with special needs is what successful teachers do" (Glasgow et al., 2006, p. 34). When regular education classrooms incorporate inclusion of students with mild to severe disabilities, students begin to understand and accept each other. This understanding leads to a greater acceptance in society. In addition, better social and academic opportunities are awarded to students with special needs. Unfortunately, students with moderate and severe disabilities are often socially excluded from interactions with their peers, particularly during adolescence (Glasgow, et al.). Social acceptance is important in order to have a quality of life for all people, including those with disabilities (Sparling, 2002).

Sparling's study (2002) determined the barriers students with disabilities felt amongst their peers. Issues that affect inclusion are: the student's disability, social and cultural influences, and teacher attitude and modeling, as well as adolescent psychology and peer pressure. Sparling's survey (2002) results found that the social inclusion of students is hampered by five main factors. First, there appears to be a general lack of knowledge for the different disabilities. This lack of knowledge leads to individuals unsure of how to interact with students with disabilities. Secondly, students felt discouraged to interact with students with disabilities because of peer pressure. Thirdly, a school community tends to heavily focus on high achievement and success. Fourthly, depending on the type

of disability, some students may lack appropriate social interaction techniques, which interferes with appropriate social interaction. Lastly, a teacher's attitude towards disabilities really sets the tone of whether or not students accept each other.

Providing education and encouragement to create an atmosphere of acceptance would improve the successfulness of inclusion. "Knowledge decreases fear and diminishes the stereotypes associated with people with moderate and severe disabilities and facilitates their social inclusion" (Glasgow et al., 2006, p. 17). Everyone benefits when receiving specific knowledge about the different disabilities. Increasing the level of knowledge among the teachers would result in better education provided for students with disabilities. Sparling's study (2002) revealed that most teachers express a positive attitude towards the idea of inclusion. Overall, teachers probably feel that they treat everyone equally, no matter if they have a disability or not. However, they need to increase their knowledge by receiving effective training to effectively teach all students (Glasgow et al.; Sparling).

Attention Deficit Diagnoses

Most of what is being called ADD today would not have been called ADD fifteen or twenty years ago, and much of it would have fallen within the range of normal boy behavior (Kindlon & Thompson, 1999). ADHD is one of the most identified disorders among children. This disorder "occurs two to four times more commonly in boys than girls (male to female ratio 4:1 for the predominantly hyperactive type vs. 2:1 for the predominantly inattentive type)" (Mersch & Phillips, 2008, ¶ 2). It is believed that some symptoms of ADD or ADHD will decrease by the end of childhood, while others

experience them their whole life. These symptoms can affect their personal and professional life.

A chronic disorder that "initially manifests in childhood and is characterized by hyperactivity, impulsivity, and/or inattention is a form of ADD, called ADHD" (Mersch & Phillips, 2008, ¶ 1). Not everyone who is affected by this diagnosis exhibit all of the behavioral categories. Those who are affected by ADD or ADHD often experience academic, social functioning, or emotional difficulty. In many cases, individuals who have been diagnosed with another disability may have ADD or ADHD associated with it. For instance, an individual may have a learning disability in reading as well as ADD. Other disabilities associated with ADD or ADHD are developmental/learning disabilities, neurological, or significant behavior (such as emotionally disturbed). Physicians may prescribe medication, behavior therapy, or changes in daily routine to help. Within the United States, "approximately 8%-10% of children satisfy diagnostic criteria for ADHD" (¶ 2).

To find a complete list of criteria that is used to diagnose ADHD, an individual should reference the *Diagnostic and Statistical Manual of Mental Health*, 4th edition (*DSM*-IV). In order to consider this diagnosis, individuals must have the consistent symptoms of impulsivity, inattentiveness, and hyperactivity for over six months. These symptoms also have to adversely affect the developmental and educational level of the child (Mersch & Phillips, 2008). Some of the inattention symptoms are that the child: fails to maintain close attention to direction or details in and outside of school; has difficulty staying engaged in tasks or fun activities; lacks listening skills when directly spoken to; unintentionally fails to complete given tasks at home, school, or at work; avoids tasks that

require intentional thinking; has a very difficult time accounting for belongs; is easily distracted; and appears to have a short memory span (Mersch & Phillips). Hyperactivity symptoms of a child may include: restless body parts while at their desk; has a hard time staying in his or her seat; struggles with quietly engaging in fun activities; and excessively talks to others. Some of the impulsivity symptoms may include: speaking out of turn or before questions have been given; displaying a lack of patience while waiting for his or her turn; and interrupting others (Mersch & Phillips).

The symptoms of inattentiveness typically become apparent at about eight years old. In many cases, they last the child's entire life (Mersch & Phillips, 2008). Symptoms of hyperactivity are normally obvious by the age of five. They may become more severe by the age of eight. However, as the child matures, hyperactivity behaviors eventually decline and disappear by adolescence. Unfortunately, impulsivity behaviors tend to be consistent well into adulthood. Adolescents who show impulsivity are more likely to fall victim to drug abuse, sexual activity, and other dangerous activities (Mersch & Phillilps).

Boys are more often diagnosed with ADD than girls in grade school. Often, adults have unrealistic expectations about boys, such as sitting still and being quiet all day, when they desperately need to exert some energy. "Learning disabilities, especially verbal ones, are common among boys labeled ADD" (Gallagher, 2006, ¶ 9). There is a misconception that boys and girls should be reading at the same levels. Because of this, many boys are being mislabeled. "Boys are more likely than girls to be diagnosed as ADHD, because they show more hyperactive, impulsive and inattentive behavior" ("ADHD Fact and Fiction," 2009, p. 5). There are gender differences within the symptoms of boys and girls with ADHD. Girls have the characteristics of being more

withdrawn from groups and worry about things they cannot control. On the other hand, boys tend to be more aggressive. As boys with ADHD become teenagers, many of them will have a behavior conduct disorder due to their defiant and aggressive behaviors. As girls with ADHD become teenagers, they are more likely to suffer from chronic stomach problems and headaches ("ADHD Fact and Fiction").

Kindlon and Thompson (1999) found the following:

> From kindergarten through sixth grade, a boy spends more than a thousand hours a year in school, and his experiences and the attitudes of the teachers and other adults he encounters are profoundly shaping. The average boy faces a special struggle to meet the developmental and academic expectations of an elementary school curriculum that emphasizes reading, writing, and verbal ability- cognitive skills that normally develop more slowly in boys than in girls. Some boys are ahead of the others on the developmental curve, and some girls lag behind, but when we compare the average boy with the average girl the average boy is developmentally disadvantaged in the early school environment. (p. 23)

According to Edelman (2009), president of the North Carolina School Psychology Association and school psychologist for Cumberland County Schools in Fayetteville, North Carolina, there are four main reasons why males are far more diagnosed with ADHD than females: the social maturity factor, the differences between male and female brains, reading developmental levels, and the concentration factor. "Failing to take into account gender differences in the way the brain functions could lead to gender bias in the diagnosis of ADD/ADHD" (Edleman, ¶ 10). Medications should be the last resort.

A new clinical practice guideline for the treatment of school-aged children (six to 12 years) with attention-deficit/ hyperactivity disorder (ADHD) has been developed by The Committee on Quality Improvement and the Subcommittee on Attention-Deficit/Hyperactivity Disorder of the American Academy of Pediatrics (AAP). It was published in the October 2001 issue of *Pediatrics,* and represents the second in a series of AAP policies on ADHD. It is intended for the use of physicians who work with children with ADHD. The first set of guidelines, published in the May 2000 issue of *Pediatrics*, focused on the accurate diagnosis of ADHD (Chatfield, 2002). It is crucial that physicians connect with the family they serve about ADHD and provide them with resources, information, and recommend any other health services needed (Chatfield). In addition, physicians should "foster a partnership with the family, child, teachers, nurses, psychologists, and counselors is critical in providing long-term care, along with the development of child-specific treatment plans and goals, including plans for follow-up" (¶ 4). When everyone who is involved with that child's home and education life collaborate, specific goals to guide management should be set to benefit the child. Three to six goals are desirable. These realistic and measurable goals our outcomes may "include improvements in relationships, self-esteem, and school performance, and a decrease in disruptive behaviors" (¶ 6).

A study within the United Kingdom found that "two-thirds of primary school teachers struggle to understand and manage ADHD behavior because of a lack of training" (Nauert, 2008, ¶ 1). This study was based on teachers who were surveyed within six elementary schools in Plymouth. The results indicated that there was a lack of comprehension among teachers regarding medication use to treat ADHD and whether or

not children are being over-diagnosed with ADHD. In addition, training in managing or understanding behaviors associated with ADHD had only been given to approximately thirty-five percent of the teachers. Students spend about seven hours a day with teachers during the school year. Often, teachers' input is considered when diagnosing a child. According to Matte & Bolaski (1998), "It is the school's role to document behavior and recommend an evaluation when a pattern of ADHD symptoms are present in an academic setting. This documentation is very important in the diagnostic process" (¶ 6). In addition, they are expected to manage students with ADHD every day. To ensure that all students are engaged and receiving a quality education, teachers may have to implement interventions specific to their needs (Matte & Bolaski, 1998). Teachers need to be trained to ensure the successfulness of students with these diagnoses.

Trying to control an average class size of twenty students with varying disabilities is a very difficult task for a teacher. The behaviors of ADHD contrast greatly with behavior expectations at school. There are many different accommodation and intervention suggestions to assist in managing students with ADHD in the classroom. Before a teacher determines which accommodation or intervention is best, the teacher should build a professional relationship with that student. In a discussion, the teacher should have the student think about his or her behaviors that interfere with the learning process (Kirby & Kirby, 1994). Having the student involved is the key to producing a behavior intervention plan. Because many students with ADHD receive a large amount of negative feedback from their teachers and peers, it is crucial that positive feedback and reinforcements are integrated into the plan (Kirby & Kirby). Academic work that requires high levels of engagement and attention should be scheduled in the mornings. When possible, recesses

or special activities should be scheduled in the afternoon, as "most students with ADHD are better able to control attention during the first half of the school day" (Matte & Bolaski, 1998, ¶ 9). This may result in less frustration for students and teachers.

Two of the primary issues for students with ADHD are discipline and behavior. It is important that teachers understand that students with ADHD do not intend on behaving they way they do. There is a large difference between students with ADHD and those with an oppositional defiance disorder, where individuals can control their behavior, but choose not to. Some educators remain skeptical that sometimes students with ADHD can control their behavior and choose not to. For short amounts of time, some students with ADHD are capable of staying on task and managing their behavior (Kirby & Kirby, 1994). Therefore, educators tend to think that "if the student put more effort into paying attention and controlling impulsive behavior then he or she will become a much better student" (Matte & Bolaski, 1998, ¶ 10).

The Child Development Institute provided the following ideas for educators when working with students who have symptoms or a diagnosis of ADHD ("Suggested Classroom," 1998-2008, p. 1).

1. Pause and create suspense by looking around before asking questions.
2. Randomly pick reciters so the children cannot time their attention.
3. Signal that someone is going to have to answer a question about what is being said.
4. Use the child's name in a question or in the material being covered.
5. Ask a simple question (not even related to the topic at hand) to a child whose attention is beginning to wander.

6. Develop a private running joke between you and the child that can be invoked to re-involve you with the child.
7. Stand close to an inattentive child and touch him or her on the shoulder as you are teaching.
8. Walk around the classroom as the lesson is progressing and tap the place in the child's book that is currently being read or discussed.
9. Decrease the length of assignments or lessons.
10. Alternate physical and mental activities.
11. Increase the novelty of lessons by using films, tapes, flash cards, or small group work or by having a child call on others.
12. Incorporate the children's interests into a lesson plan.
13. Structure in some guided daydreaming time.
14. Give simple, concrete instructions, once.
15. Investigate the use of simple mechanical devices that indicate attention versus inattention.
16. Teach children self monitoring strategies.
17. Use a soft voice to give direction.
18. Employ peers or older students or volunteer parents as tutors.

For many children, staying on task in the classroom is very difficult. Their body language and verbal communication signals to the teacher that they are not following directions. To assist these students to increase their level of engagement and academic success, there are many strategies teachers can provide. The Child Development Institute has given the following strategies for cognitively impulsive children ("Suggested

Classroom," 1998-2008, pp. 1-2).

1. Provide as much positive attention and recognition as possible.
2. Clarify the social rules and external demands of the classroom.
3. Establish a cue between teacher and child.
4. Spend personal discussion times with these children emphasizing the similarities between the teacher and child.
5. Get in a habit of pausing 10 to 16 seconds before answering.
6. Probe irrelevant responses for possible connections to the question.
7. Have children repeat questions before answering.
8. Choose a student to be the question keeper.
9. Using a well known story, have the class orally recite it as a chain story.
10. When introducing a new topic in any academic area, have the children generate questions about it before providing them with much information.
11. Distinguish between reality and fantasy by telling stories with a mix of fact and fiction and asking the children to critique them.
12. Assign a written project that is to contain elements that are true, could happen but didn't, and pretend, but cannot happen.
13. Do not confront lying by making children admit they have been untruthful.
14. Play attention and listening games.
15. Remove unneeded stimulation from the classroom.
16. Keep assignments short.
17. Communicate the value of accuracy over speed.
18. Evaluate your own tempo as teacher.

19. Using the wall clock, tell children how long they are to work on an assignment.
20. Require that children keep a file of their completed work.
21. Teach children self talk.
22. Encourage planning by frequently using lists, calendars, charts, pictures, and finished products in the classroom.

The Ultimate Elementary Classroom for Boys and Girls

In Boys and Girls Learn Differently, Gurian et al. (2001) has identified some key components for teachers and administrators of boy and girl-friendly classrooms. The *ultimate classroom*, is a "gentle place during elementary school, but intense as well, and infused with the charge to teach not children but boys and girls (p. 198)." The table below represented their findings that will resolve conflicts, leave no child behind, and move teachers behind their hidden prejudices against boys or girls. For the benefit of both boys and girls, teachers should be trained in brain development to better understand learning needs of both genders. (pp. 196-198)

Table 1.

The Ultimate Classroom

For Boys	*For Girls*
Give boys lots of things to touch and otherwise sense, especially when reading and writing are being taught.	Teach math by manipulative and objects; teach higher levels of math through graphs, charts, and written material on paper (as well as on the blackboard).
Enjoy and navigate male energy toward academic and good character.	Provide concrete manipulatives- especially when science is taught.
Pay attention to the more sensitive, less competitive or aggressive males in the classroom.	Tell stories and use images of competent mature girls and women.
Advocate boys' issues in the school and community.	Give special access to technology, computers, and the Internet. Give a little extra encouragement to use technology. Note: intense computer use before age nine may be hazardous to brain development.
Allow physical movement, as well as engaging physical activity, from hugs and touch when appropriate to getting down and dirty at recess once in a while.	Math and science lesson with journal writing expression. Girls can use their writing strengths to help them process math calculations and science data.
Be sure there are male role models in the boy's educational life.	Encourage healthy competitive learning.
Never allow chairs to be kept in a row or nailed down.	Provide healthy and constant feedback-so girls get encouragement and have high expectations from teachers.
Offer lots of storytelling and myth making in the classroom to help the male brain develop its imaginative and verbal skills through story making.	
Give lots of things to touch and otherwise sense, especially when reading and writing are being taught.	

Cooperative Learning

Over the years, teaching has evolved from many traditional methods, such as direct instruction, to research-based methods such as Cooperative Learning. Cooperative learning is good for both "male and female brains" (Gurian et al., 2001, p. 192). Brain-based research has revealed that cooperative learning should be integrated into classroom instruction. "In cooperative learning environments, students interact in purposely structured heterogeneous groups to support the learning of oneself and others in the same group" ("Cooperative Learning," 2008, ¶ 1). During cooperative learning, students work together in small groups to achieve shared goals as directed by the teacher (Johnson & Johnson, 1997). Students are given the responsibilities to ensure that everyone learns the objectives, including themselves (Johnson & Johnson, 1994). Cooperative learning may be incorporated into any subject of content. During direct instruction or lectures, it can ensure that students are actively thinking about the information given. Once a teacher has received effective training in cooperative learning, they may use it for almost any age group or lesson (Johnson & Johnson, 1997).

Cooperative learning has been well researched. "The results show that students who have opportunities to work collaboratively, learn faster and more efficiently, have greater retention, and feel more positive about the learning experience" (Muir, 2006, p. 1). In order to be successful, thorough instructions and teacher support must be provided. Cooperative learning is not placing students in a group and expecting them to complete a project together. Specific directions are given to ensure their successfulness. While in teams during cooperative learning, students learn important interpersonal skills which will help them in the real world. It also gives them the ability to work with a diverse

group of people in a collaborative effort ("Cooperative Learning," 2005). Working as a team is now a skill that is in great demand in the workplace. Students take turns with different assigned roles such as facilitator, reporter, and recorder. Everyone is responsible for themselves while working together as a team. The success of the team is dependent on the successful work of every individual on the team ("Cooperative Learning").

"Cooperative learning is effective in inclusive classrooms because it builds upon heterogeneity and formalizes and encourages peer support and connection" (Johnson & Johnson, 1994, p. 13). Children with and without disabilities benefit from cooperative learning. Some educators have challenged cooperative learning as they have believed that gifted students become resentful tutors to the less performing in the classrooms. If cooperative learning is effectively and thoughtfully implemented, this does not happen. Instead, all students get the opportunity as being the teacher and the learner. All students should be able to get an effective education in an environment where their strengths are celebrated and their weaknesses are improved. All students will flourish in a supportive environment where they feel safe to take risks (Johnson & Johnson).

In today's classroom, many educators would associate cooperative learning with the work of Dr. Spencer Kagan. Beginning in 1968, Dr. Spencer Kagan began his research on cooperative learning and led a team of experts reach all children's learning styles. When given certain opportunities, Dr. Kagan and his associates discovered all children became more cooperative ("About Kagan," 2008). It was then that he began applying his research to the classroom. Dr. Kagan has compiled his research into over 200 different publications. One of the most popular comprehensive books by Dr. Kagan is *Cooperative* Learning, published in 1992. Dr. Kagan is known for his simple "structures" that instruct

teachers step by step how to provide interaction among their students. “Kagan's structures not only lead to greater cooperativeness; they have proven positive results in many areas, including greater academic achievement, improved ethnic relations, enhanced self-esteem, harmonious classroom climate, and the development of social skills and character virtues” (¶ 1). Kagan Structures reaches the different multiple intelligences and encompasses brain based learning. Some of Kagan’s most popular structures include Numbered Heads Together, Timed Pair Share, RallyRobin, Pairs Compare, Kinesthetic Symbols, and Lyrical Lessons. When implemented correctly, Kagan Structures make cooperative learning easy. They do not require special materials, as a lot of them are given through verbal or written direction. “Cooperative Learning is a relationship in a group of students that requires positive interdependence (a sense of sink or swim together), individual accountability (each of us has to contribute and learn), interpersonal skills (communication, trust, leadership, decision making, and conflict resolution), face-to-face promotive interaction, and processing” (Johnson & Johnson, 1994, ¶ 1). The benefits of his structures spring from a major change in the way teachers teach with interaction being one of the dominant keys to success. His work is now evident world-wide, from public schools to universities.

Kagan has developed “brain-based structures that provide opportunities for activating the social brain, engaging emotions to boost attention and retention, using novelty to wake up the brain and maximizing higher-level thinking” (Daniels, 2004, ¶ 8). With their multiple intelligences, students are unique and smart in different ways. Therefore, a variety of instructional strategies should be utilized so all students will succeed. Kagan's

Structures has developed different strategies to reach all of the multiple intelligences. They also provide opportunities to match teaching to how students learn best.

Cooperative learning is a teaching arrangement that refers to small, heterogeneous groups of students working together to achieve a common goal (Kagan, 1994). While working together to learn, students are responsible for their teammates' learning as well as their own. The basic elements are: positive interdependence (occurs when gains of individuals or teams are positively correlated), individual accountability (occurs when all students in a group are held accountable for doing a share of the work and for mastery of the material to be learned), equal participation (occurs when each member of the group is afforded equal shares of responsibility and input), and simultaneous interaction (Kagan).

Integrating cooperative learning into daily instruction results in a change of positive educational outcomes. “Not only do the structures align instruction with what is known about how students best learn and retain information, but does so by correlating how the brain best learns with the philosophies and methods of cooperative learning and multiple intelligences” (Daniels, 2004, ¶ 9). Cooperative interaction is the basis for the different activities and structures. Some of the positive results for the students involved in these interactions are meditational, listening, and leadership skills. Students’ comprehension of the term teamwork is better. As future employees, these skills will greatly benefit them in being successful and valuable in the work setting. To dramatically increase student achievement and improve social skills while reducing discipline problems, Cooperative learning should be implemented (Daniels). All students, in all grade levels, benefit from these best practices that increase active engagement. “New brain studies have made it clear that how one teaches, the strategies you use on a moment-to-moment basis, more

than anything else, will determine how much will be learned and more importantly retained" (¶ 10).

Brain-based Learning

"Brain-based learning involves using approaches to schooling that rely on recent brain research to support and develop improved teaching strategies" ("The Definition of", 2008, ¶ 1). The human brain is constantly active to in "searching for meaning and seeking patterns and connections" (¶ 1). Neuroscience research has been the foundation for the comprehensive approach of brain-based learning. The brain is more effective in making connections and retaining new information when the learning situations are real and genuine. "Brain-based education emphasizes how the brain learns naturally, and is based on what we currently know about the actual structure and function of the human brain at varying developmental stages" (Wilson, 2007, ¶ 1). Instructional techniques, that compliment how the brain and body works, provide a better learning environment for students. Caine and Caine (1991) found that "we do not simply learn. What we learn is influenced and organized by emotions and mind sets based on expectancy, personal biases and prejudices, degree of self-esteem, and the need for social interaction" (p. 82). Brain-based learning also helps explain recurring learning behaviors. Instructional methods related to brain-based learning allow educators to connect the learning to their students' personal experiences. These types of effective instructional methods include concepts such as mastery learning, experiential learning, learning styles, multiple intelligences, cooperative learning, practical simulations, experiential learning, problem-based learning, movement education (Wilson, 2007).

Children of all learning styles can benefit from brain-based learning. In fact, children

with a variety of learning disabilities find that brain-based learning helps them apply what they know to what is being learned in class in non-traditional ways (Jensen, 1998). They are able to take the same information and use it in a way that is benefiting to them. Without the constraints of pencil and paper only, students are allowed to express and freely exchange ideas with other students. Brain-based learning encourages students as well as provides successful experiences.

Also receiving benefits from brain-based learning is the gifted student. The gifted student also sees things in different ways. They desire the opportunity to explore and accomplish tasks in non-traditional forms. Students who are considered gifted, may become easily bored which often leads to discipline problems. Teachers have been known to external rewards with students in order for them to complete unfavorable tasks. Students, no matter their learning styles, are not generally motivated by extrinsic motivation. Generally, they show less long term interest in the activity than those who are intrinsically motivated (Collins, 2008).

Brain-based learning can be considered a combination of brain science and common sense. Hart (1983) called the brain "the organ of learning" (p. xiv). In order to design effective learning environments, he advocated learning more about the brain. Caine and Caine (1991) originally developed twelve principles which incorporate the research linked to how the brain works to teaching and learning. Their work encompasses a variety of disciplines and should be considered a framework for teaching and learning methodology. They did not use the principles to prescribe any single teaching method. The purpose of the principles is to provide a framework for "selecting the methodologies that will maximize learning and make teaching more effective and fulfilling" (p. 88).

Ideally, teachers will use their work to implement research-based teaching practices that are compatible with how the brain works. Caine and Caine (1994) identified the following twelve principles for learning (pp. 88-95):

1. The brain is a complex adaptive system.
2. The brain is a social brain.
3. The search for meaning is innate.
4. The search for meaning occurs through patterning.
5. Emotions are critical to patterning.
6. Every brain simultaneously perceives and creates parts and wholes.
7. Learning involves both focused attention and peripheral attention.
8. Learning always involves conscious and unconscious processes.
9. We have at least two ways of organizing memory.
10. Learning is developmental.
11. Complex learning is enhanced by challenge and inhibited by threat.
12. Every brain is uniquely organized.

The research on natural learning shows that effective teaching depends upon the integration of the three elements of relaxed alertness, orchestrated immersion, and active processing ("How to Teach," 2008; Caine & Caine, 1991; Caine & Caine, 1994). When the mind of the learner feels little to no threat and is ready for a challenge, this is considered having a relaxed alertness. During this time, the learner feels self confidence and is motivated to learn. A teacher can provide an environment of relaxed alertness by playing instrumental music and ensuring the lighting is ideal for learning. Orchestrated immersion is a multiple, complex, authentic experience. This occurs when the learner is

in the most optimal environment with positive social interactions and the content standards are embedded. A higher order of thinking happens because the learner is fully engaged by the instruction and activities taking place. A learner is active processing when there are developing a deeper understanding of the knowledge they are receiving. The teacher can intrigue active processing by connecting the learning to students' prior knowledge at the beginning of the lesson. It is an ongoing process that leads to mastering the content and improving the learners' capacity of remembering the information.

One of the most important tasks educators do every year is to set up the classroom and plan instruction to benefit all students. Teachers' number one priority should be to create an environment where all students can learn and thrive. Teachers should incorporate brain based research into their classrooms and into the learning process (Prigge, 2002). There are many teaching strategies that can enhance brain-based learning. Teachers should include hands on manipulatives or objects to provide visual stimulation. Going on educational field trips where students are given a purpose and task to complete are very beneficial to the learning process. Guest speakers, used in relation to the curriculum, give students a real life example of the content learned. Technology allows students to use many learning styles and multiple intelligences. When an interdisciplinary curriculum or integrated learning is in place, it reinforces brain-based learning. The human brain can better make connections when material is presented in an integrated way, rather than as isolated bits of information (McBrien & Brandt, 1997).

Each student should consider their classroom as a safe place to be, so it should be a safe place. An environment that is free of fear and anxiety is determined best for maximized learning in a brain-based classroom (McBrien & Brandt, 1997). Physical

safety should be a top priority in the classroom. It is crucial that educators not tolerate bullying, threats, or fighting. Instead, educators should encourage learners to use their words and communicate verbally rather than physically. “By eliminating social and emotional distress, educators can make it a safe environment for students to make mistakes without embarrassment” (Jensen, 2000, p. 319). Jensen (2000) believes there should be little to no threat in a brain-based classroom. Educators should provide frequent, non-judgmental feedback. The focus should be on learning. According to Jensen, “educators must moderate stress” (p. 328). A little stress is good; but too much is unhealthy for an optimal learning environment. Stress levels influence learner states. Educators should monitor the tension in their class and adjust it accordingly. Using humor, movement, games, and quiet time are good ways to lower stress. The brain performs better in a positive emotional state. Students must feel physically and emotionally safe before their brains are ready to learn. Teachers can create a positive environment by encouraging and praising their students’ efforts.

In a brain-based learning classroom, the teacher will need to change classroom management styles from traditional teaching to becoming the facilitator. The students' perception of who is responsible for their learning shifts the empowerment from the teacher to the student. In the brain-based learning classroom, the students need to make their own learning decisions. This is often difficult for many teachers because it is uneasy to hand over control to their learners. Usually, this can be accomplished by offering an assortment of learning activities for homework. For example, in spelling homework, one student may choose to write a story incorporating their spelling words. Another student may choose to create a game or rap song. In a brain-based classroom,

students may sometimes use their bodies to form letters of the words they are spelling. They can say them out loud, spell them, and say the word out loud again. Assessments need to change as the classroom changes. The shift is from rote memorization to having the students relate the content into their own life. When students are allowed to share with each other what they have learned, they are able to connect it to real world concepts (Jensen, 1998; Jensen 2000). Student projects or assignments should include a variety of instructional methods to reach all of the diverse learners. A teacher may assign or have students choose to make a poster, complete a book report, construct a model, or design a power point to present what they have learned. So students know what is exactly expected of them, teachers should provide rubrics. Jensen (2000) does warn that "there is a fine line between too little and too much choice; and the balance is related to other factors as well, such as trust, rapport, and past experiences" (p. 321). When an educator provides a brain-friendly learning environment, learners feel empowered. When they feel empowered, it is not necessary for them to have a choice in everything because they will trust their teacher to have their best interest at heart. The key element is perception.

Students should be involved in their own assessment practices and daily learning (Jensen, 2000). For instance, teachers should have their students create a class rubric. This places responsibility back on the students. Not only can a student use a rubric to evaluate themselves, but a rubric may be used to evaluate each other. When a paper or project is complete, a teacher can hold individual or class discussions regarding how is scored compared to the specific guidelines in the rubric. Some students may have some hesitation in evaluating one another. However, if the teacher effectively taught the students specifically what to look for and how to critique it without causing hurt feelings,

the students will be more confident in this task. It is very crucial that the teacher does provide effective instructions so that the evaluation of others can be done positively.

According to Audrey Prince, M.Ed. (2005, ¶ 1), "knowing how the brain works best allows educators to create an environment that gives the student a higher probability of success in learning." Students learn in different ways, but three of the learning styles are most evident in many learners. Visual learners represent fifty percent of all learners, and prefer pictures, charts, and written text over lectures. Representing thirty percent of learners, kinesthetic learners need more tactile and movement-based activities. The last twenty percent of learners are auditory learners, and they do best when they talk about what they have learned (Gardner, 1983).

There are suggested brain-based learning principles that can increase student performance in the classroom. The brain learns new information in chunks. Brain-research states that children between the ages of five and thirteen learn best when given chunks of two to four pieces of information. Children ages fourteen and older can learn up to seven chunks at a time. Teachers should plan for these limits and teach material in small chunks. The brain also works on a time schedule. Children ages five to thirteen learn best in five to ten minute increments. Children, fourteen and older, learn in increments up to ten to twenty minutes. Sometimes, teachers may extend time limits through positive reinforcement. Children learn best if new material is taught first and previously learned material is reviewed at the end of instruction. It is best for teachers to teach in short units (one to two segments at a time) and then provide a student led activity time. Students need time to practice the skills they are learning. Students need a moment to "rest their brain" from a task (Jensen, 1998). Allowing off-task time between lesson

segments often increases a student's focus. For example, allow students to take time to stand up a stretch, provide a two minute talk break, etc. By providing these moments the brain will be more ready to stay on task and store information.

The brain is energy inefficient. It is about two percent of the body's adult weight, but it "consumes about twenty percent of the body's energy" (Jensen, 1998, p. 10). The brain gets its energy from blood to learn. The blood provides the brain with valuable nutrients such as glucose, protein, trace elements, and oxygen (Jensen). Water is needed for proper functioning. Teachers should allow students to drink water during the school day to maintain energy levels. When a person becomes dehydrated, salt levels increase in the blood, which could raise their blood pressure and stress level. A decrease in attentiveness and increase in lethargy is a result of dehydration (Hannaford, 1995). In order to stay hydrated, students need to have six to eight glasses of water a day to be properly hydrated (Prince, 2005).

During the school day, there is a high-low energy level cycle that occurs (Jensen, 1998; Prince, 2005). To get the most production out of the school day, teachers should take advantage of students' high energy time. Lower energy levels for adolescence tend to occur in the morning. After lunch, they tend to have higher energy levels. Attention levels correlate with energy levels. If strategically planned, teachers can effectively teach important material during the high energy times.

Brain-based principles also include the gift of space and time. Providing adequate personal space for students helps the student to feel more comfortable in his or her environment. To reduce stress for a learner, teachers should ensure that students have enough space to work and from each other. Throughout a lesson and especially at the

end, teachers need to provide time for students to reflect about what they have learned. Furthermore, they should discuss their learning to help embed the information they have obtained. Comprehension may not be apparent until later. Allowing time for students to process the information obtained is crucial in comprehension (Prince, 2005).

Differentiated Instruction

One of the biggest challenges for effective teachers is to attempt to respond to an increasingly broad spectrum of student needs, backgrounds, and learning styles. "Differentiated instruction is a way of teaching and learning" (Heacox, 2002, p. 1). It is an approach to teaching essential content in ways that address the varied learning needs of students with the goal of maximizing the possibilities of each learner (Tomlinson, 1994). It is a collection of strategies that help the teacher better identify and address the multiple learning styles and needs within the classroom. Differentiated instruction has evolved over the years. It utilizes some of the best practices in education to meet student needs. Instruction and learning is focused on the students' needs. Teachers take into account every child's needs when planning for instruction (Heacox, 2002). By involving students in activities that address their specific learning needs, strengths, and preferences, differentiated instruction enhances learning for all students. The goals of differentiated instruction are to "develop challenging and engaging tasks for each learner; to develop instructional activities based on essential topics and concept, significant processes and skills, and multiple ways to display learning; to provide flexible approaches to content, instruction, and products; to respond to students' readiness, instructional needs, interests, and learning preferences; to provide opportunities for students to work in varied instructional formats; to meet curriculum standards and requirements for each learner;

and to establish learner-responsive, teacher facilitated classrooms (p. 1).

According to Heacox (2002), "Differentiating instruction means changing the pace, level, or kind of instruction you provide in response to individual learners' needs, styles, or interests" (p. 5). Teachers address what students already know and what they still need to learn. The instruction is driven by the students' progress. Identifying how each child learns best and then driving the instruction on their strengths and weaknesses is the key to differentiated instruction. Students of the same age may be on different academic or intellectual levels. For instance, some six-year olds might be able to identify sound-letter recognition while others can read first grade books. Therefore, to effectively teach all students, differentiated instruction should be used. Because of these academic and intellectual differences, children cannot be taught the same curriculum in the same way at the same time. This type of instruction also benefits the children who are considered gifted or very bright.

Differentiated instruction is rigorous, relevant, flexible and varied, and complex (Heacox, 2002). The teacher challenges all students by encouraging them to do their best. Teachers identify every student's needs and sets goals for their learning based on the student's capabilities. Essential learning is the basis for differentiated instruction. It is not busy work or fun activities to fill time. Differentiated instruction allows students to choose their topic or interest of learning within the curriculum and objective needs. Sometimes, the teacher may provide a list of topics for the student to research. If implemented correctly, Reader's and Writer's Workshop incorporate differentiated instruction concepts. Differentiated instruction is complex as the teacher increases the level of engagement by keeping the students active in their learning.

In Heacox's book, *Differentiating Instruction in the Regular Classroom* (2002), differentiated Instruction is…(p. 17, Figure 1)

- Recognizing the learning diversity represented in today's classrooms.
- Affirming that students have different learning needs, strengths, styles, interests, and preferences.
- Maintaining a commitment to curriculum standards and learning goals for all students.
- Increasing the variety in teaching, learning, and assessment in order to reach more students and respond to their preferences, styles, interests, and strengths.
- Providing high levels of challenge and active engagement in rigorous, relevant, and significant learning.
- Acknowledging what students already know and can do.
- Recognizing that students do not all need to do the same work in the same way.
- Diagnosing student needs and prescribing tasks that create better matches between students and their learning needs, styles, and/or preferences.
- Nurturing students' ability to make appropriate choices about how to learn and how to best present what they have learned.
- Designing differentiated (tiered) assignments to better respond to students' specific learning needs.
- Using flexible instructional grouping to provide opportunities for students to learn with others who have similar needs, styles, or preferences.
- Affirming the purpose and value of all students' work.

- Creating fair and equitable processes of revaluating student learning and assigning grades.

"A differentiated classroom offers a variety of learning options designed to tap into different readiness levels, interests, and learning profiles" (Tomlinson, 1995, ¶ 5). In a differentiated class, the teacher utilizes multiple teaching methods for students to learn the objectives within the curriculum. The teacher provides activities that allow students to comprehend and have ownership in the information. Students may demonstrate their learning through a variety of activities (Tomlinson, 2003).

There are some misconceptions of differentiated instruction. "Differentiation can reinforce status, or differentiation can liberate students from stereotypical expectations" (Tomlinson, 2008, p. 11). Differentiated instruction is not adjusting the level of difficulty for different students. It is not grading the papers tougher on higher achieving students than lower achieving students. When students finish early, it is not allowing them to pursue enrichment activities. Higher achieving students should not be assigned longer assignments. When teachers do these types of things to students, they may begin to resent the work (Tomlinson, 1995).

To provide equity and promote academic excellence among all learners, educators should follow six principles of differentiated instruction developed by Tomlinson & Eidson (2003). First, educators must implement a good curriculum. It must be enjoyable and thoroughly aligned to required student objectives. Second, all tasks should respect each other. The lessons or assignments must be meaningful and contain targeted skills. Students should enjoy the work and interest them. Higher level of thinking skills should be used. Third, educators should teach a little bit above a student's comfort level. The

instruction should stretch the learner without feeling overwhelmed. A pyramid of interventions should be in place to support every student's success. Fourthly, flexible grouping should be used. Students should have the opportunity to work in cooperative learning groups, in pairs, or individually. Keeping the groups varied should eliminate students feeling negative about their capabilities. Fifthly, data and assessment need to be used frequently and ongoing. Assessment can be comprised of written or verbal data, benchmarks, projects, or portfolios. It should be used to drive instruction. Lastly, students' growth should be reflected in their grades. As long as a child is trying their hardest to succeed, their progress needs to be reported and celebrated.

Differentiated Instruction in Teacher Preparation Programs

Teachers must use a variety of teaching methods to meet the needs of all of their students (Tomlinson, 2003). Before a teacher begins their educational career, their teacher preparation program should provide them with knowledge of how to differentiate instruction. In addition, brain based learning, cooperative learning, and how to work with students who have special needs should encompass their learning opportunities. With experience and continued training of best practices, teachers should be able to perfect these instructional methods. The lack of instruction and support on differentiated instruction by cooperating teachers, principals, college supervisors, and college professors inhibit educators from differentiating in the classroom (Gould, 2004). A study was completed by Tony Manson (1999) to discover how much teacher preparation programs prepared teachers to teach a classroom of diverse learners. The study revealed that many teachers expressed a need for improvement in their preparation to teach their diverse group of students.

"Research tells us that teach-to-the-middle instruction still prevails in our schools and that few veteran teachers are predisposed to differentiate instruction (that is, to modify what and how they teach) for students who differ significantly from the norm" (Tomlinson, 1996, ¶ 1). Beginning teachers are confused about the meaning of differentiation and did not know how to relate it to the classroom (Gould, 2004). A project, entitled Preservice Teacher Preparation in Meeting the Needs of Diverse Learners, was completed through The University of Virginia site of The National Research Center on the Gifted and Talented (Tomlinson, 1996). It studied the growth in novice teachers in their early years of meeting the needs of students with varying needs and disabilities in the regular classroom. According to Tomlinson's review of the study, the novice teachers "reported that they received little encouragement to differentiate instruction for academically diverse learners from their teacher education programs, university supervisors, or cooperating teachers" (¶ 5). In addition, the courses they took on meeting the needs of different learners involved little experience implementing them in the classroom. The novice teachers also received conflicting views from their cooperative teachers as they instructed them to ensure all students were together on the objectives mastered. (Tomlinson, 1996). Tomlinson (1999) found that:

> Once in their own classrooms, the undertow for new teachers to "teach to the middle" is profound, both because of the complexity of teaching and because of peer pressure to conform to the "the way we do school here." The few novice teachers who had master teachers who differentiated instruction were far more likely to do this in their first teaching placement than their classmates. (p. 115)

Due to the lack of leadership and support to differentiate, teachers find differentiating the instruction difficult. If teachers have not been exposed to differentiated instruction, it is not realistic for them to effectively address the learning needs of every student. The information gathered from research should be used to support our instruction in teacher preparation programs. In many teacher preparation programs, much time and emphasis is placed on class management and curriculum development for the average student instead of differentiating ways to meet the needs of all students. Therefore, many teacher preparation programs do less than an adequate job in assisting novices adapt curriculum and instruction to address learner needs effectively (Gould, 2004).

To improve the training for new teachers, universities need to review their teacher preparation program. It is crucial that universities have professors in place that understand differentiated instruction and advocate it. That knowledge should be shared through their learner expectations. “College professors can assess pre-service teachers' readiness levels, interests, and learning profiles within their college classes” (Gould, 2004, ¶ 8). Then, professors can model differentiated instruction by providing a variety of objectives, activities, and resources based on their needs. To effectively communicate how college professors differentiate instruction, they should thoroughly communicate their thinking process and explain their method of thinking (Brimijoin, 2002; Gould). By walking pre-service teachers step by step on how to differentiate, pre-service teachers will develop a better understanding of how to differentiate instruction.

Providing teachers with specific examples of how to differentiate instruction is vital. Classroom experience should not be at the end of obtaining a teaching degree. Instead, pre-service teachers need to be exposed to the classroom environment as soon as

possible. This will allow them to witness the large amount of diversity within one classroom. They can accomplish this through practicum experiences or student teaching assignments. Then, they need to identify local teachers who effectively differentiate instruction within their own classrooms. Whenever possible, they should place their pre-service teachers in field experiences and student teaching with a cooperating teacher trained in differentiation (Brimijoin, 2002). Students need to teach and videotape differentiated lessons in order to receive helpful feedback and coaching from the cooperating teacher and the college professor (Gould, 2004) Professors may use videos on differentiated instruction, read specific examples of lesson plans, observe a teacher who differentiates in her classroom, or conduct mock situations in the class. The opportunities are endless. By focusing on the learner differences at the earliest stages of teacher development, "pre-service teachers can internalize the rationale for differentiation" (¶ 10). When education professors model differentiation, teach how to differentiate, and place pre-service teachers with trained cooperating teachers and trained mentors support first year teachers in an effort to differentiate, new teachers can differentiate instruction.

The Missouri Department of Elementary and Secondary Education

Article IX of the Missouri Constitution delegates the State Board of Education to have the overall authority for supervision of instruction in the public schools. They oversee all educational programs and services that serve citizens of Missouri from preschool age children to adults. The main role of the State Board of Education is to "provide leadership and advocacy for the improvement of Missouri's public education system" ("Department of Elementary," n.d., p. 417).

According to "Facts About," 2008,

> The Missouri Department of Elementary and Secondary Education is the administrative arm of the State Board of Education. It is primarily a service agency that works with educators, legislators, government agencies and citizens to maintain a strong public education system. Through its statewide school-improvement activities and regulatory functions, the Department strives to assure that all citizens have access to high-quality public education. DESE does not regulate, monitor or accredit private, parochial or home schools. The Department's responsibilities range from early childhood to adult education services. The Department employs about 1,900 people throughout the state and has a total budget of about $5.3 billion. About 95 percent of the budget consists of state and federal funds that are distributed to local school districts and other agencies. (¶ 1)

Commissioners are assigned to head each department. According to the official handbook of Missouri, "the Commissioner of Education directs the Department of Elementary and Secondary Education and fulfills other duties as prescribed by law (Section 161.122, RSMo)," ("Department of Elementary," n.d., p. 418). The Commissioner ensures that all public schools have high standards and effective instruction throughout the state. A deputy commissioner, five assistant commissioners, and one associate commissioner, assist the Commissioner of Education, and lead six main divisions ("Facts About," 2008).

The Division of School Improvement has the main function to manage the Missouri School Improvement Program (MSIP), the state's accreditation system for public school districts ("Facts About," 2008). They help local educators with the development of

curriculum and student assessments, including the Missouri Assessment Program (MAP). This division also oversees the Missouri Virtual Instruction Program. It controls federal and state grant programs which provide money to local schools. Some of these are Title 1, A+Schools, and Parents as Teachers that assist schools in need. Also within this division, is The Leadership Academy, which provides educators throughout Missouri excellent professional development programs and opportunities ("Facts About").

The focus of the Division of Special Education is to "improve achievement of children and students with disabilities" ("Facts About," 2008, ¶ 8). Schools receive funding from federal and state sources for adults and students with disabilities through this division. Three school systems administered by the State Board of Education are included in this division: the Missouri School for the Blind (St. Louis), the Missouri School for the Deaf (Fulton), and the Missouri Schools for the Severely Disabled (35 facilities across the state). Children whom have severe disabilities benefit from the services provided by these schools. This division also coordinates the First Steps program. This program collaborates with public schools to provide appropriate services for children with disabilities. The staff coordinates the First Steps program, which works with infants and toddlers who have disabilities, to provide early interventions. Approved Sheltered Workshops also receive monetary support from this division ("Facts About").

The Division of Teacher Quality and Urban Education "is responsible for evaluating teacher-training programs offered by Missouri's higher education institutions and for issuing certificates (licenses) to all professional personnel who work in the public school system" ("Department of Elementary," n.d., p. 421). To help provide a safe environment in the public schools, this division works with the Highway Patrol and FBI to complete

criminal background checks on all public school employees. Career ladder and scholarship programs for those pursuing a career in education are managed through this division ("Facts About," 2008). All universities, colleges, and community colleges with educational programs are evaluated by the Educator Preparation Section of this division. They use the Missouri Standards for Teacher Education Programs MoSTEP) to evaluate certification programs within these sites. This information is shared with the State Board of Education for accountability purposes. Decisions on whether or not a program will be approved are based on the information collected. The Directory of Approved Professional Education Programs in Missouri lists all of the professional education programs and institutions whom have been approved. Information and data collected from colleges and universities to report to the U.S. Department of Education for Title II is completed by The Section. "The Section oversees the standard setting procedures for the assessment of candidates for entry into professional education programs (C-BASE) and for the assessments required for the certification of school personnel (Praxis II)" ("Educator Preparation," 2008, ¶ 1).

Elementary Education Certification Requirements

The Missouri Department of Elementary and Secondary Education have certification requirements for all elementary teachers (Grades 1-6). They were revised in April of 2005 (see Appendix A). According to this document on the DESE website (http://dese.mo.gov), the certification requirements do not specifically include any courses on gender differences in learning or in the brain. They do not specifically include any 'best practices' such as Brain-based Learning, Cooperative Learning, or Differentiated Instruction.

Conclusion

There is scientific research that explains the differences between boys and girls including the actual development of the student's brain and the development differences between the way a boy's brain and a girl's brain works (Gurian et al., 2001). In addition, there are many differences between the male and female brain (Jensen, 1998). There are chemical and hormonal differences in boys and girls. Males and females also differ considerably in how the brain uses its cell and blood activity. The majority of the students being referred for special education for behavior disturbances are male (Mortenson, 2006, n. d.). Some critics believe that male students are being over-identified due to inherent tendencies to display behavior that may be seen as disruptive. Adults often have unrealistic expectations about boys, such as: sitting still and being quiet all day, when they desperately need to exert some energy, which has resulted in the over and misdiagnosis of ADHD. Gurian et al. has identified some key components for teachers and administrators of boy and girl-friendly classrooms. The *ultimate classroom*, is a "gentle place during elementary school, but intense as well, and infused with the charge to teach not children but boys and girls (Gurian et al.)." Gurian et al.'s findings, if followed, will resolve conflicts, leave no child behind, and move teachers behind their hidden prejudices against boys or girls.

To meet the needs of these different learning styles, brain-based learning, cooperative learning, and differentiated instruction should be incorporated into instruction. Learning how to effectively teach with gender differences in mind could be a focus for pre-teacher service training. A differentiated classroom offers a variety of learning options designed to tap into different readiness levels, interests, and learning

profiles. In a differentiated class, the teacher uses a "variety of ways for students to explore curriculum content (Tomlinson, 1995, p. 1)". One of the biggest challenges for effective teachers is to attempt to respond to an increasingly broad spectrum of student needs, backgrounds, and learning styles. "Differentiated instruction is a way of teaching and learning" (Heacox, 2002, p. 1). It is a collection of strategies that help the teacher "better address and manage the variety of learning needs in the classroom" (p. 1). Every state has a Department of Education that should take this knowledge into consideration when reviewing their teacher certification requirements.

The Missouri Department of Elementary and Secondary Education has certification requirements for all elementary teachers. It is each college and university's responsibility to prepare pre-service teachers for the classroom. Educators should continue learning and perfecting their teaching methods to reach the learning styles of all students. Chapters Three and Four determined if teachers received this knowledge and training during their teacher preparation courses in Missouri.

CHAPTER III

METHOD

Introduction

Turabian (2007) determined that the "best research will begin with a question that you want to answer" (p. 3). The success of a researcher depends not just on how well the data is gathered and analyzed, but how clearly the researcher reports his or her reasoning. Experienced researchers know that it is crucial to do more than convince others that their answer is sound. They must also prove to others why their questions were worth asking, and how its answer helps others understand some bigger issue in a new way. Gender achievement gaps have sparked the interest of many researchers and educators. There are shocking facts that illustrates a picture that educators are not reaching the needs of all students. Some experts believe teachers are not being instructed on how to meet the needs of their future diverse learners during their teacher preparation courses. Understanding the differences of how boys and girls learn is crucial to effective teaching. How can we reach the needs of all students if we do not know how to address the different learning styles? The purpose of this study was to determine elementary teachers' preparedness to meet the different learning styles of both boys and girls.

In Chapter 3, the methodology and design of the study is included. A mixed-methods design was utilized to obtain information from current practicing elementary teachers through a questionnaire and interview data. A mixed-method design was chosen by the researcher as it utilized both qualitative and quantitative data to provide more information regarding the identified topic than just one piece of data (Fraenkel & Wallen, 2006). The review of literature contained research regarding the lack of training provided for

teachers in ways to meet the learning needs of their students. The questionnaire and interview data was pursued to help determine if the elementary teachers sampled have had little to no training in their Missouri Teacher Certification Program concerning how boys and girls learn differently or in research based best practices such as cooperative learning, differentiated instruction, and brain-based learning. Combined, this data determined the result in the acceptance or rejection of the null hypotheses that guided this research.

Subjects

The subjects that were utilized for this study were teachers who currently teach in elementary schools in Missouri. These school districts were purposely sampled within one region of Missouri. Approximately two hundred and fifty questionnaires were distributed among the identified elementary school teachers within five regional school districts. Within one of these school districts, twelve elementary teachers were purposefully sampled by their administrator to participate in an interview. The district was purposefully chosen as it was the largest of the five schools involved in the research and contained elementary schools with varying demographics. Three teachers from four different elementary schools participated in the interview data collection process. These teachers were purposefully sampled, but with the criteria that they had received their teacher certificate through a Missouri college or university. In addition, the selected teachers from each elementary school had to equally represent the three categories of teaching experience (zero to five years, six to ten years, and eleven or more years of teaching experience). This selection process provided the researcher four teachers within each experience level for a total of twelve participants.

Sampling Procedure

The sampling procedure used within this study was purposeful sampling. According to Crewswell (2006):

> The concept of purposeful sampling is used in qualitative research. This means that the inquirer selects individuals and sites for study because they can purposefully inform an understanding of the research problem and central phenomenon in the study. Decisions need to be made about who or what should be sampled, what form the sampling will take, and how many people or sites need to be sampled. (p. 131)

A paper questionnaire was distributed and collected from a purposeful sample of elementary teachers in five selected districts within a region of Missouri. An administrator from each school district was personally contacted by the researcher in person to assist in administering and collecting the questionnaires. Each district was given approximately fifty questionnaires to randomly distribute among elementary school teachers within their district who taught grades one through six. Teachers completed the questionnaire on a voluntary basis. From the two hundred and fifty questionnaires that were distributed, one hundred and fifteen were completed and returned. Twelve elementary teachers were selected through a purposeful sample to be interviewed within one of the chosen districts. The participants in the interviews were selected so that there were an equal number of the various years of experience subgroups (zero to five, six to ten, and eleven or more). Administrators within four different elementary schools identified three participants each within these criteria. Within each interview, the participants (elementary teachers) submitted their written answers to the researcher to enhance credibility and reliability of the collected data.

Instrumentation

Through a mixed-methods study, data were collected and analyzed from a paper and pencil questionnaire and interviews. The questionnaire and cover letter used in this study was developed by the researcher of this paper (see Appendices B & C). The questionnaire was written to determine the teachers' education on how boys and girls learn differently during their Missouri Teacher Certification Education Program. In addition, close ended questions were composed to determine if the subjects received effective training in research-based best practices, i.e., cooperative learning, differentiated instruction, and brain-based learning during their Teacher Certification Program. The elementary teacher questionnaire was composed to determine if the subjects were effectively taught how boys and girls learn differently through a series of nine questions. Five additional questions assessed their level of education in brain-based learning, cooperative learning, differentiated instruction, accommodating students with ADHD and ADD, and meeting the learning styles of both boys and girls during their Missouri teacher certification courses (see Appendix C). The questions are listed below with justification of its use by the researcher.

Years of teaching experience: _____ 0-5 years _____ 6-10 years _____ 11+ years

Teachers were asked to share the number of years they have been teaching to help determine the population of the subjects represented in the quantitative data.

<u>During my Missouri teacher certification courses</u>, I was effectively taught that:

1. *Boys and girls learn differently.* The scientific research shows there are biological differences between girls and boys that affect learning (Gurian, Henley, &

Trueman, 2001). Through brain-based research, there is scientific evidence that boys and girls learn differently (Gurian et al., 2001); Jensen, 2000).

2. *Boys' and girls' brain structures are different.* Gurian et al. (pp. 19-26) deeply compared many differences between the female and male brain that affect learning, including structural differences.
3. *Girls take in more sensory data than boys (hear, smell, etc.).* According to Gurian et al., (p. 27), "Girls take in more sensory data than boys. On average, they hear better, smell better, and take in more information through fingertips and skin." This is due to the fact that there is more development in females' prefrontal lobes than males, which affect sensory processing.
4. *Boys get bored more easily than girls.* Gurian et al. found that "boys get bored more easily than girls, which quite often requires more and varying stimulants to keep them attentive" (p. 46). During classroom instruction or while engaged in learning activities, "girls are better at self-managing boredom" (p. 46). Boredom in students may lead to behavior problems (Gurian et al.).
5. *Boys tend to use more space when they learn, especially at younger ages.* It is important to know this, as this natural tendency may affect psychosocial dynamics (Gurian et al.). "Unaware of how necessary it is for many boys to use space, teachers inadvertently consider the boys impolite, rude, or out of control" (p. 47). Boys are often just responding in the manner that their spatial brains learn.
6. *Although males and females both possess all of the human hormones, the degree of dominance differs.* Estrogen and progesterone are more profound in females, testosterone in males. Hormones may affect students' learning performances and

mood swings. In addition, they greatly affect their behavior in and out of the classroom. “Whereas a girl may be likely to bond first and ask questions later, where a boy might be aggressive first and ask questions later” (Gurian et al., p. 28).

7. *Boys tend to favor deductive reasoning, while girls tend to be inductive thinkers.* This is the rationale for why boys perform better on quick, multiple-choice tests. The better a person is at making a quick decision, the better he or she does on the test that relies on these skills. Girls “tend to favor inductive thinking, adding more and more to their base of conceptualization” Gurian et al., p. 44). Girls begin with concrete examples and then build general theory. This would be crucial to understand so that educators create balanced assessments to meet the learning styles of both boys and girls.
8. *With proper stimulation, female and male brains can get better at all multiple intelligences.* Differences between boys and girls surface as educators observe their intelligence styles. “One gender’s dominance in an intelligence style often grows in part from the other gender’s brain hiding its ability to flourish in that style” (Gurian et al., p. 52).
9. *In the classroom, boys tend to be louder, more physically aggressive, and more prone to attention-getting devices than girls, resulting in more teacher attention going to boys.* Gurian et al. emphasized that teachers need to become familiar with the differences in how boys and girls learn to provide a classroom environment where both receive effective instruction. If teachers are not equipped

with strategies to address the different behaviors, boys tend to receive much of the teacher's time and energy.

<u>During my Missouri teacher certification courses</u>, I was effectively taught and trained in:

10. *Brain-based learning*
11. *Cooperative Learning*
12. *Differentiated Instruction*
13. *The traits of ADHD and ADD and how to accommodate students with these symptoms or diagnoses.*
14. *How to meet the learning styles of both boys and girls.*

The last five questions were incorporated into the questionnaire to determine if the teachers sampled had received this knowledge or training to help address the learning differences between boys and girls. The review of literature addressed these best practices and information that teachers would benefit from by incorporating them into their daily instruction.

Participants submitted their answers on the questionnaire using a Likert scale. A Likert scale is a type of question where respondents are asked to rate the level at which they agree or disagree with a statement. The scale used for this questionnaire had participants rate their responses from "strongly agree" to "strongly disagree." A numerical value was assigned to each potential choice and a mean figure for all the responses was computed at the completion of the questionnaires. For confidentiality purposes, the questionnaires were not marked or labeled with individual names or school districts. All of the data were collected as a whole, and was not disaggregated. A description of the confidentiality was explained to the subjects on the cover letter of the

questionnaire (see Appendix B).

Qualitative data was collected through the use of interview questions developed by the researcher. They were composed of four questions to determine if the participants were taught how boys and girls learn differently during the Missouri Teacher Certification Program; if they had noticed differences in how boys and girls learn differently within their own classroom; how that knowledge helped them; and what information would have benefited their instruction and/or classroom management regarding how boys and girls learn differently (see Appendix D). The questions were developed by the researcher and the responses were written by the participants for a higher level of accuracy. Three were typed and faxed to the researcher. Four were handwritten and mailed to the researcher. The remaining five were typed and emailed to the researcher. For confidentiality purposes, names of the participants and their schools were not listed or coded in Excel.

Research Design and Procedures

The research design of this study is considered to be a mix-methods study. It was chosen because Fraenkel and Wallen (2006) believed that:

> There is no question that mixed-methods studies have some definite strengths. Since they include both qualitative and quantitative data, they provide a more complete picture of a situation than would either type of data by itself. (p. 443)

The researcher desired to obtain quantitative results from teachers regarding the education provided during their teacher certification program on how boys and girls learn differently. In addition, the researcher was interested in discovering how that knowledge was or is being used in their classroom, if the information regarding how boys and girls

learn differently was taught. Therefore, four interview questions were developed inquiring this information, which is considered qualitative data. “Methodological triangulation is the use of at least two methods, usually qualitative and quantitative to address the same research problem” (Creswell & Plano Clark, 2006, p. 152). According to Creswell and Plano Clark (2006), “The researcher mixes quantitative and qualitative data approaches to research throughout the study. Both qualitative and quantitative questions are posed, both forms of data are collected and analyzed, and a quantitative and qualitative interpretation is made” (p. 11).

Data were collected and analyzed from one paper and pencil questionnaire designed by the researcher. This questionnaire was distributed and collected from a purposeful sample of approximately two hundred-fifty elementary teachers. An Institutional Review Board (IRB): Review of Research Proposal Involving Human Subjects was approved through Lindenwood University. Permission was granted by administrators within each school district. District administrators were given a manila envelope with questionnaires that were distributed among their elementary teacher during the month of September of 2008. The completed questionnaires were given back to the researcher by October 1, 2008. The twelve elementary teacher participants in the interviews were purposefully chosen with the assistance of their building administrator who approved their participation. The twelve participants were given an overview of the study and rationale for the interviews. They voluntarily participated by answering the four written questions (see Appendix D), which were forwarded to them by email by their administrator. For confidentiality purposes, the name of their school of employment, district, and personal information were not identified. They provided their answers in writing for clarity and

increased accuracy.

Statistical Treatment of the Data

A cover letter attached to the questionnaire reviewed the security and confidentiality of the answers they provided on the questionnaire for the researcher (see Appendix B). One hundred and fifteen questionnaire results were entered manually into the Microsoft Excel program by the researcher. The percentage of each response was configured based on the number of participants and answers given. When entering the data, the answers were coded in the following way to determine frequency percentages: Strongly Agree- 5, Agree- 4, Neutral- 3, Disagree- 2, and Strongly Disagree- 1. The categorical data representing the participants' education on how boys and girls learn differently are presented in tables in Chapter Four. The data collected from the teacher interviews are recorded in Chapter Four. To analyze the interview data compared to the questionnaire results, a constant comparative method was utilized to discover themes among the data (Creswell, 2003). The interview data were categorized by question, then by common strands of response and concluding by theme. The null hypotheses determinations were based on the statistical results of the questionnaire and participants' responses to the interview questions. The results were discussed in Chapters Four and Five.

Summary

The research design and methodology were presented in Chapter Three. The rationale of the research was presented in the introduction. The subjects and sampling procedures were described and verified. The instrumentation use of a questionnaire and twelve interview data were justified. The purpose of this study was to determine elementary teachers' preparedness to meet the different learning styles of both boys and girls. A

questionnaire was distributed and collected from a purposeful sample of elementary teachers in five districts within an unidentified region of Missouri. Twelve elementary teachers were purposely chosen to participate in an interview to gather a deeper understanding of the education they received during their Missouri Teacher Certification program. The decision to use a mixed-method study was explained in the research design and procedures. The statistical treatment of the data followed. Within Chapter Four the data analysis and research findings were presented.

CHAPTER IV

RESULTS

Introduction

The purpose of this study was to determine elementary teachers' preparedness to meet the different learning styles of both boys and girls. A questionnaire was distributed and collected from a purposeful sample of elementary teachers within five districts of various demographic in a region of Missouri. The questionnaire was written within the domains of determining their education on how boys and girls learn differently during their Missouri Teacher Certification Education Program. In addition, questions were composed to determine if the subjects received effective training in research-based best practices, i.e., cooperative learning, differentiated instruction, and brain-based learning during their Teacher Certification Program. The elementary teacher questionnaire was composed to determine the following information: years of teaching experience and if the subjects were effectively taught how boys and girls learn differently through a series of nine questions. Five additional questions assessed their level of education in brain-based learning, cooperative learning, differentiated instruction, accommodating students with ADHD and ADD, and meeting the learning styles of both boys and girls during their Missouri teacher certification courses.

One hundred and fifteen questionnaires' results are shown using the Microsoft Excel program. When entering the data, the answers were coded in the following way to determine frequency percentages: Strongly Agree- 5, Agree- 4, Neutral- 3, Disagree- 2, and Strongly Disagree- 1. In addition, twelve elementary teachers were purposefully sampled to be interviewed within one of the districts. The interview was composed of

four questions to determine if they were taught how boys and girls learn differently during the Missouri Teacher Certification Program; if they had noticed differences in how boys and girls learn differently within their own classroom; how that knowledge helped them; and what information would have benefited their instruction and/or classroom management regarding how boys and girls learn differently (see Appendix D). The participants in the interviews were selected so that there were an equal number of the various years of experience subgroups (zero to five, six to ten, and eleven or more). Administrators within four different elementary schools identified four participants each within these criteria. Within each interview, the participants (elementary teachers) submitted their written answers to the researcher to enhance credibility and reliability of the collected data.

Results and Data Analysis

The tables below show the results from the Teacher Questionnaire which was conducted in fall of 2008. Each table revealed how each question was answered by the subjects in this research. All of the subjects were currently teaching in a public school district and had obtained their teaching degree in a Missouri Teaching Certification Program.

A review of the descriptive data revealed that the subjects had a diverse amount of teaching experience and had obtained a teaching certificate at a Missouri Teacher Certification Programs within one to eleven or more years of each other. The largest group (51.30% of the participants) in this study had 11+ years of teaching experience. In conclusion, they most likely completed their certification program in the late 1990's or earlier. The symbol "N" represents the total number of teachers in this sample.

Table 2

Years of Teaching Experience

Years of Experience	Frequency	Percent
0-5 Years	35	30.40%
6-10 Years	21	18.26%
11+ Years	59	51.30%

N= 115

An investigation of this data revealed that 85.87% of the participants in this study did learn that boys and girls learn differently in their Missouri Teacher Certification program. However, 13.67% either were neutral or didn't receive that information.

Table 3

Boys and Girls Learn Differently

Response	Survey Counts	Percent
Strongly Agree	125	28.47%
Agree	252	57.40%
Neutral	30	6.83%
Disagree	28	6.38%
Strongly Disagree	4	0.91%

N=115

Within their Teacher Certification program, 78.5% of the participants in this study recalled learning that boys' and girls' brain structures are different.

Table 4

Boys' and Girls' Brain Structures

Response	Survey Counts	Percent
Strongly Agree	85	20.53%
Agree	240	57.97%
Neutral	48	11.59%
Disagree	36	8.70%
Strongly Disagree	5	1.21%

N= 115

In review of this data, only 37.39% of the participants remembered being taught that girls take in more sensory data than boys.

Table 5

Sensory Data

Response	Frequency	Percent
Strongly Agree	8	6.96%
Agree	35	30.43%
Neutral	37	32.17%
Disagree	30	26.09%
Strongly Disagree	5	4.35%

N= 115

The data revealed that 67.27% agreed or strongly agreed that boys get bored more easily than girls. According to Gurian, Henley, & Trueman (2001), “boys get bored more easily than girls, which quite often requires more and varying stimulants to keep them attentive” (p. 46). During classroom instruction or while engaged in learning activities, “girls are better at self-managing boredom” (p. 46). Boredom in students may lead to behavior problems (Gurian et al., 2001).

Table 6

Boredom

Response	Frequency	Percent
Strongly Agree	55	14.07%
Agree	208	53.20%
Neutral	75	19.18%
Disagree	50	12.79%
Strongly Disagree	3	0.77%

N= 115

A review of the descriptive data revealed that 74.39% of the participants remembered being taught that boys tend to use more space when they learn. It is important to know this, as this natural tendency may affect psychosocial dynamics (Gurian et al., 2001). "Unaware of how necessary it is for many boys to use space, teachers inadvertently consider the boys impolite, rude, or out of control" (p. 47). Boys are often just responding in the manner that their spatial brains learn.

Table 7

The Use of Space

Response	Frequency	Percent
Strongly Agree	85	20.73%
Agree	220	53.66%
Neutral	60	14.63%
Disagree	220	10.24%
Strongly Disagree	85	0.73%

N= 115

The data from this questionnaire revealed that 70.42% of the participants in this study (19.56% “strongly agreed” while 50.86% “agreed”) were taught that although males and females both possess all of the human hormones, the dominance level differs. This is supported by Gurian et al.’s research (2001).

Table 8

Hormone Dominance

Response	Frequency	Percent
Strongly Agree	80	19.56%
Agree	208	50.86%
Neutral	84	20.54%
Disagree	34	8.31%
Strongly Disagree	3	0.73%

N= 115

According to the descriptive data, only 45.22% of the participants learned that boys tend to favor deductive reasoning, while girls tend to be inductive thinkers. This is the rationale for why boys perform better on quick, multiple-choice tests. The better a person is at making a quick deduction, the better he or she does on the test that relies on this skills. Girls "tend to favor inductive thinking, adding more and more to their base of conceptualization" (Gurian et al., 2001, p. 44). Girls begin with concrete examples and then build general theory. This would be crucial to understand so that educators create balanced assessments to meet the learning styles of both boys and girls.

Table 9

Deductive and Inductive Reasoning

Response	Frequency	Percent
Strongly Agree	6	5.22%
Agree	46	40.0%
Neutral	39	33.91%
Disagree	21	18.26%
Strongly Disagree	3	2.61%

N= 115

In conclusion, 88.87% of the participants (38.21% “strongly agreed” and 50.66% “agreed”) were taught that with proper stimulation, female and male brains can get better at all multiple intelligences. Differences between boys and girls become evident as educators observe their intelligence styles. “One gender’s dominance in an intelligence style often grows in part from the other gender’s brain hiding its ability to flourish in that style” (Gurian et al., 2001, p. 52).

Table 10

Multiple Intelligences

Response	Survey Counts	Percent
Strongly Agree	175	38.21%
Agree	232	50.66%
Neutral	24	5.24%
Disagree	24	5.24%
Strongly Disagree	3	0.66%

N= 115

In the classroom, boys tend to be louder, more physically aggressive, and more prone to attention-getting devices than girls, resulting in more teacher attention going to boys. The data from this questionnaire, revealed that 73.62% of the educator participants did receive knowledge during their Teacher Certification Program that boys tend to be louder and more physically aggressive than girls.

Table 11

Teacher Attention

Response	Survey Counts	Percent
Strongly Agree	65	16.33%
Agree	228	57.29%
Neutral	60	15.08%
Disagree	38	9.55%
Strongly Disagree	7	1.76%

N= 115

Respondents were asked if they were effectively taught and trained in brain-based learning during their Missouri Teacher Certification Courses. In response to the 2nd hypothesis statement for this paper, "Missouri elementary teachers sampled have had little to no effective training in research-based best practices, i.e., cooperative learning, differentiated instruction, and brain-based learning," only 42.11% had received brain-based learning.

Table 12

Brain-based Learning

Response	Survey Counts	Percent
Strongly Agree	11	9.65%
Agree	37	32.46%
Neutral	19	16.67%
Disagree	33	28.95%
Strongly Disagree	14	12.28%

N= 115

In response to the 2nd hypothesis statement for this paper, "Missouri elementary teachers sampled have had little to no effective training in research-based best practices, i.e., cooperative learning, differentiated instruction, and brain-based learning," 69.57% were trained in cooperative learning.

Table 13

Cooperative Learning

Response	Survey Counts	Percent
Strongly Agree	26	22.61%
Agree	54	46.96%
Neutral	9	7.83%
Disagree	16	13.91%
Strongly Disagree	10	8.70%

N= 115

In response to the 2nd hypothesis statement for this paper, "Missouri elementary teachers sampled have had little to no effective training in research-based best practices, i.e., cooperative learning, differentiated instruction, and brain-based learning," only 56.52% of the participants (15.65% "strongly agreed" and 40.87% "agreed") received effective training in differentiated instruction.

Table 14

Differentiated Instruction

Response	Survey Counts	Percent
Strongly Agree	18	15.65%
Agree	47	40.87%
Neutral	14	12.17%
Disagree	24	20.87%
Strongly Disagree	12	10.43%

N= 115

The data revealed that a low 31.31% of the educators surveyed received knowledge or training of the traits of ADHD and ADD and how to accommodate students with these symptoms or diagnoses.

Table 15

The Traits of ADHD and ADD

Response	Survey Counts	Percent
Strongly Agree	7	6.09%
Agree	29	25.22%
Neutral	27	23.48%
Disagree	41	35.65%
Strongly Disagree	11	9.57%

N= 115

The final question on the Elementary Teacher Questionnaire revealed whether or not teachers received training in how to meet the learning styles of both boys and girls during their Teacher Certification program. The data showed that only 6.09% “strongly agreed” while 32.17% “agreed” that they had received this training.

Table 16

Learning Styles

Response	Survey Counts	Percent
Strongly Agree	7	6.09%
Agree	37	32.17%
Neutral	20	17.39%
Disagree	38	33.04%
Strongly Disagree	13	11.30%

N= 115

Interview Questions

This study centered on four research questions. Twelve elementary teachers within one district were purposely chosen among four of its elementary schools. Among the twelve participants, there were four teachers whom had zero to five years of experience (Participants 1-4), four teachers with six to ten years of experience (Participants 5-8), and four teachers with eleven or more years of teaching experience (Participants 9-12). Responses to each of the questions were reported independently in order to clearly present the results (see Appendix D). Qualitative data were used to answer the interview questions.

Interview Question 1: In your MO Teaching Certification Program, were you taught how boys and girls learn differently? If so, please explain what you remember.

Out of twelve teachers, two teachers remembered being taught how boys and girls learn differently during their Missouri Teaching Certification Program. The remaining five participants "couldn't remember," three stated "no," and two recalled a little bit of knowledge regarding the subject. Participants 4 and 5 expanded on what they remembered from their program.

Participant 4's response was:

> Yes, I was taught that boys and girls learn differently. Boys need more motion in the classroom and are attracted to cooler colors (silver, black, and blue) and tend to draw more pictures with spaceships, cars, etc. Girls like to draw happy families and bright colors (red, orange, yellow)… and if the teacher speaks in a loud tone, girls interpret as yelling. (See Appendix D, p. 121)

Participant 5 remembered that "boys are more logical and analytical. Girls are more social and linguistic" (see Appendix D, p. 121). Some concepts were recalled by Participant 9 such as: "Boys usually mature at a slower rate. Girls may walk, talk, crawl, etc. sooner than boys. Boys usually have more speech issues than girls" (see Appendix D, p. 122). However, the majority of those interviewed had little to no knowledge.

Interview Question 2: Have you noticed differences in how boys and girls learn differently in your classroom?

All twelve participants responded that they have noticed differences in how boys and girls learn differently in their classroom. Several participants gave specific examples in behaviors that they have observed. Many of the responses correlated with the research given in the review of literature. Six of the participants remarked how boys tend to be active and learn better with hands on activities. Participant 1 stated:

> I have noticed several differences between how boys and girls learn. I have noticed that boys are willing to take chances with answering questions, usually saying the first thing that pops in their head, and girls take a bit longer to come to an answer to share. They are more likely to put more thought into their answers. I have also seen that boys tend to be more willing to participate in class discussions, where girls tend to like asking questions one on one. Boys do not like to ask for help, one on one, from a teacher. I have also noticed when disciplining the students, I can be more direct with boys. They know they are in trouble, can tell me what they did wrong, why it was wrong and are ready for their consequence. With girls, I feel that I need to let them explain themselves, talk about their feelings, explain why their action was inappropriate, and explain why their consequence fits the action. This is not with all

girls and boys, just the majority of them. (See Appendix D, p. 122)

Participant 2 noticed that "boys enjoy being active" (see Appendix D, p. 123). In addition, Participant 4 believed that boys need to move around the classroom because it "enhanced their learning experience" (see Appendix D, p. 123). The difference in maturity levels was mentioned by Participant 10.

> Early in my teaching career with younger children, I quickly determined that boys did not mature as quickly as the girls. A class with many younger boys was the most difficult to teach. It was evident that girls can sit quietly and listen, and can try to imagine they are part of the story. Boys learn by actively moving, acting out rough and tumble stories. In regards to reading levels- when I was assigned a class with older boys, I had as many boys in my top reading groups as I did girls. There was a stark contrast between classes with young boys, and classes with older more "mature" boys. Over the years, I have observed sometimes immaturity can be mistaken for ADHD in active boys. (See Appendix D, p. 124)

Interview Question 3: How has that knowledge helped you in the classroom?

In response to how information and observations regarding how boys and girls learn differently in the classroom, all twelve teachers acknowledged the need to differentiate instruction or provide activities to meet the learning needs of all students. All four of the participants with the least amount of teaching experience stated that they attempt to incorporate different strategies into their lesson plans to address the different types of learners. A couple of the participants confirmed that different classroom management strategies worked for boys and girls. According to Participant 8, the knowledge of how boys and girls learn differently:

> …helps me with planning the physical environment and instruction. I attempt to provide visual, auditory and kinesthetic activities for all learners for every lesson possible. Especially for students that struggle with language issues due to speech or learning difficulties. Boys often struggle with staying seated for long periods of time, many of them need to have opportunities to get up and move around so they can return to their focus. Without this, they often display inappropriate or disruptive behavior choices. Girls often need the opportunity to visit with classmates about their learning. Otherwise, I may be dealing with talking issues. (See Appendix D, p. 125)

Participant 10 concluded that:

> … over the years, I needed to create a brain friendly environment where it is not all lecture, but children actively participate. Experience over the years has taught me that boys and girls learn best when their brains and bodies are fully immersed through stories, songs, rhymes, clapping, tapping, using lots of manipulatives, etc….Engaging the whole body, and performing several activities in patterns increases the opportunities for both boys and girls, and makes the classroom more positive. (See Appendix D, p. 126)

Two participants (11 & 12) did not appear to take a lot of ownership in using the knowledge except for taking initiative in reading books on the subject or recognizing the need to differentiate. These two participants had some of the most teaching experience out of all of the teachers sampled.

Interview Question 4: What information and/or training would have benefited your instruction and/or classroom management regarding how boys and girls learn differently?

The participants expressed an interest in a variety of different training that would benefit their instruction or classroom management skills regarding how boys and girls learn differently. Some of the topics included: formal training on the differences between boys and girls, observing different teaching strategies though videos, single sex classrooms, cooperative learning strategies, discipline strategies for boys and girls, effective practicum experiences, Love and Logic training, motor activities, and brain-based learning. Only one participant expressed that they would not benefit from any additional training. Not only did the participants express that this knowledge would have been beneficial, but expressed the desire to pursue learning it. Participant 1 felt that:

> … if I was given tools or tidbits to use in the classroom when dealing with boys and girls would have been beneficial. Undergraduate programs and professional development seminars give teachers tons of ideas when dealing with classroom management and instruction, but not much of it discusses how to manage boys and girls, or how to reach boys and girls with your instruction. Having a "toolbox" to pull from to help reach students would be handy. (See Appendix D, p. 127)

Participant 10 expressed the need to have effective professors in teacher preparation classes that have had classroom experience and provide training in brain-based learning. She also revealed that her student teaching experience was most beneficial due to being placed with an experienced teacher. Participant 10 recalled:

> Thinking back to my instructors in college…many college professors at that time did

not have experience in the classroom. The lectures were out of the book, not from their own experience. Student teaching was probably the most beneficial to me as far as learning the difference between boys' and girls' learning. I was fortunate enough to be with a teacher in an under-privileged school where many types of behaviors were exhibited. This teacher was considered "top-notch" at that time and recognized for her management all over the district. What I learned in those eight weeks was most important for my future career. How much more I would have gained if I had been trained in "Brain Based" learning. I do believe that teachers need to be trained more in brain based classrooms, where children are actively involved in learning. I do believe student teachers would benefit greatly having experience in different types of classrooms, thus experience in several rooms, for shorter amount of times. (See Appendix D, p. 129)

Deductive Conclusions

The Elementary Teacher Questionnaire was composed of fourteen questions to determine the amount of training Missouri elementary teachers in the sample received during their Missouri Teacher Certification Program on how boys and girls learn differently. The twelve interviews gave additional information to help determine individual teachers' experience and knowledge. The two null hypotheses that were the driving force of this research were:

1. Missouri elementary teachers sampled have had little to no training in their Missouri Teacher Certification Program concerning how boys and girls learn differently.

2. Missouri elementary teachers sampled have had little to no effective training in research-based best practices, i.e., cooperative learning, differentiated instruction, and brain-based learning.

Nine questions were based on the brain-based research of Jensen (2000) and Gurian, Henley, and Trueman (2001) that supported how boys and girls learn differently based on biological and social factors. These questions determined the outcome for the first null hypothesis. Five additional questions assessed their level of education in brain-based learning, cooperative learning, differentiated instruction, accommodating students with ADHD and ADD, and meeting the learning styles of both boys and girls during their Missouri teacher certification courses. These questions were the basis for determining the accuracy of the second null hypothesis.

Within the first series of questions, over 50% of the subjects "Strongly Agreed" or "Agreed" that they had been taught that specific concept. Out of the nine knowledge based questions, "Girls Take in More Sensory Data Than Boys" was the lowest taught, with 37.39% of the subjects receiving that information (see Table 5). "Boys Tend to Favor Deductive Reasoning, While Girls Tend to be Inductive Thinkers" was the second lowest ranked question with 45.22% of the subjects "Strongly Agreed" or "Agreed" that they had been taught that specific concept (see Table 9). Therefore, the first null hypothesis was deemed incorrect, and was rejected. However, when interviewing the twelve educators, nine stated that they were not taught how boys and girls learn differently during their Missouri Teaching Certification Program. The three who mentioned that they were taught the differences in how boys and girls learn, could not give very many details of what they remembered. One spoke about how boys need

motion in the classroom (Participant 4). Participant 5 thought that boys were "logical and analytical" while girls were more "social and linguistic." Lastly, Participant 9 learned that boys matured at a slower rate and had more speech issues than girls.

Out of the five questions (questions #10-#14), the highest ranked instructional strategy was cooperative learning, with 22.61% of the subjects indicated that they "Strongly Agreed" and 46.96% "Agreed" (see Table 13) that they were effectively taught and trained. Differentiated instruction was ranked second highest in percentages of subjects strongly agreeing or agreeing (combined percentage of 56.52%) that they were effectively taught or trained in that strategy (see Table 14). Brain-based learning was taught to 42.11% of the subjects in this research (see Table 12). Out of the one hundred and fifteen educators who completed the questionnaire, 38.26% were trained in how to meet the learning styles of both boys and girls (see Table 16). Lastly, only 31.31% of the subjects in this research were taught the traits of ADHD and ADD and how to accommodate students with these symptoms or diagnoses (see Table 15). While interviewing the twelve teachers, none felt that they were taught how to meet the needs of both boys and girls. In addition, it was stated multiple times that this knowledge would have been helpful in meeting the different learning styles in their classroom. Participant 2 has been trained in cooperative learning. Participant 6 remembered knowledge of Howard Gardner's multiple intelligences but stated that there was a lack in training on how to meet those needs. Therefore, the second null hypothesis was deemed correct and accepted.

Summary

Included in Chapter Four were a description and analysis of the data collected to address two research null hypotheses that examined the level of training educators received in teachers sampled have had little to no training in their Missouri Teacher Certification Program concerning how boys and girls learn differently.

This questionnaire was designed because it allowed the researcher to discover the level of education Missouri teachers have received during their Missouri Teacher Certification Program of the learning differences between boys and girls. Scientific research explains the differences between boys and girls including the actual development of the student's brain, and the development differences between the way a boy's brain and a girl's brain works (Gurian, Henley, & Trueman, 2001). Teachers need to be effectively taught how boys and girls learn differently. Research-based instructional strategies, such as cooperative learning, brain-based learning, and differentiated instruction, should be integrated in the classroom to help meet the needs of all students. A differentiated classroom offers a variety of learning options designed to tap into different readiness levels, interests, and learning profiles. In a differentiated class, the teacher uses a "variety of ways for students to explore curriculum content" (Tomlinson, 1995, p. 1). One of the biggest challenges for effective teachers is to attempt to respond to an increasingly broad spectrum of student needs, backgrounds, and learning styles. The Missouri Department of Elementary and Secondary Education has certification requirements for all elementary teachers. It is each college and university's responsibility to prepare pre-service teachers for the classroom. In review of the data that was obtained from the research in this study, it appears that Missouri Teacher

Certification Courses are teaching pre-service teachers some of the basic concepts of how boys and girls learn, but not the instructional strategies to meet those needs.

CHAPTER V

DISCUSSION

Introduction

Failing children and failing schools are an indication of a faulty system, not a faulty brain. "When students are provided with a learning environment that is optimal for learning, graduation rates increase, learning difficulties and discipline problems decrease, a love of learning flourishes, administrators focus on the real issues, and learning organizations thrive" (Jensen, 2000, p. xiii). There is scientific research that explains the differences between boys and girls including the actual development of the student's brain, and the development differences between the way a boy's brain and a girl's brain works (Gurian, Henley, & Trueman, 2001).

The purpose of this study was to determine elementary teachers' preparedness to meet the different learning styles of both boys and girls. The population that was utilized for this study was taken from elementary school teachers within five Missouri public school districts within an identified region with various enrollment and demographic factors. This study used one questionnaire, developed by the researcher. The questionnaire was written to determine if elementary school teachers were given training in how boys and girls learn differently. The questionnaire also inquired their level of training in some identified 'best practices' to meet these needs. One hundred and fifteen questionnaires' results were displayed using the Microsoft Excel Program. This research will be shared with various practitioners, educators, parents, and the community on how important it is to understand the learning differences of boys and girls. Ideally, the Missouri Department of Elementary and Secondary Education (MDESE) will review their Certification

Requirements for Elementary (Grades 1-6) to ensure that teachers are receiving the needed information and training to effectively facilitate learning for all students, regardless of gender. In addition, school districts will begin or continue to support professional development in research-based methods to sustain and strengthen skills in differentiated instruction.

This study attempted to answer the following research null hypotheses:

1. Missouri elementary teachers sampled have had little to no training in their Missouri Teacher Certification Program concerning how boys and girls learn differently.
2. Missouri elementary teachers sampled have had little to no effective training in research-based best practices, i.e., cooperative learning, differentiated instruction, and brain-based learning.

Limitations of the Study

Over the last few decades, mixed-methods research has become more popular and merited by analyzing both quantitative and qualitative data (Creswell, 2003). In this study, teachers involved in the interview and questionnaire data were purposefully selected within one region of the state of Missouri. Responses to the interview questions and questionnaire were voluntary which may indicate that the participants had greater interest in the topic than those who did not participate. In addition, the teachers ranged from one to more than eleven years of teaching experience. Therefore, their training or education received during their Missouri Teacher Certification program may not have been correctly recalled or remembered. This may have skewed the results. In conclusion, the results of this study should not be generalized. The limitations to this study were

relative to the geographical area and designs used by the researcher, and are indicated as follows:

1. Study (questionnaire) was limited to a region of Missouri. Five districts were selected within this region.
2. Data were obtained from elementary school teachers, ranging from kindergarten through sixth grade.
3. It was assumed that participants were honest in their responses and interpreted the questionnaire instrument and interview protocol as intended.
4. It was assumed that participants based their responses upon their own experiences.
5. Participants' responses on the questionnaire are their perceptions to the training that was provided to them.
6. Participants may have received the training or information, but do not recall it.
7. Participants may have been trained in the identified information on the questionnaire, but may not implement the strategies in their classroom.
8. This study took place in the fall of 2008.
9. Questionnaire and interview questions were developed by the researcher.
10. Validity of questionnaire was not verified.

Conclusions

The following conclusions were made based on the analysis of the data presented from the returned questionnaires and interview data:

1. Overall, the Missouri elementary teachers sampled have had effective training in their Missouri Teacher Certification Program concerning how boys and girls learn

differently. Over fifty-percent of the teachers stated that they were effectively taught in concepts related to how boys and girls learn differently (Questions #1-#9) in seven out of the nine questions.

2. The educators surveyed seemed to have a lack of knowledge (thirty-seven percent "Strongly Agreed" or "Agreed") that girls take in more sensory data than boys.
3. Approximately forty-five percent of the educators who participated in this survey were not taught that boys tend to favor deductive reasoning, while girls tend to be inductive thinkers.
4. There could be improvement in effectively training teachers in research based best practices to help meet the learning needs of both boys and girls. Less than fifty percent of the educators in this research had effective training in research-based best practice of brain-based learning.
5. Approximately sixty-nine percent of the educators sampled received effective training in cooperative learning.
6. Differentiated instruction was effectively taught to fifty-six percent of the educators in this study.
7. Only thirty-one percent of the elementary teachers in this research were taught the traits of ADHD and ADD and how to accommodate students with these symptoms or diagnoses.
8. Education on how to meet the learning styles of boys and girl needs to be integrated into Missouri Teacher Certification courses. Thirty-eight percent of the educators in this research were effectively taught and trained in how to meet these needs.

Themes in the Data

Through the collection of the quantitative and qualitative data, a few themes surfaced. However, the researcher did not notice any trends between the newer or more experienced teachers after the interview data was analyzed. The trends that became evident were between the questionnaire and interview data responses. First, the need for training on how to meet the learning styles of both boys and girls during future educator's Teacher Certification programs was revealed. The quantitative data (questionnaire results) demonstrated that 38.26% agreed or strongly agreed that they remembered receiving this training. The qualitative data collected correlated with this need as only two out of twelve participants remembered receiving this training. All but one of the twelve participants in the interview data remarked that they would have benefited from this information and knowledge during their Teacher Certification program.

A second theme that arose during the research was the need for instruction on brain-based learning. According to the quantitative data, 42.11% of respondents had received this training during their Teacher Certification program. Within the interview data, Participant 10 acknowledged that she "needed to create a brain friendly environment where it is not all lecture, but where children actively participate" (see Appendix D, p. 126). This was not taught to her during her teacher preparation courses, but through her "years of experience in the classroom." To assist the teacher in effective instructional practices, Participant 11 wished she "would have received more information on brain-based learning in college" (see Appendix D, p. 129).

The last theme that surfaced through the review of literature and research was the conclusion that boys get bored more easily than girls. According to Gurian, Henley, and Trueman (2001), boys get bored more easily than girls and they often require more and varying stimulants to keep them attentive. Girls are better at self-managing boredom during instruction and all aspects of education. Once the child has become bored, he is likely not only to give up on learning, but also to act out in such a way that class is disrupted and he is labeled a behavior problem. The quantitative data agreed or strongly agreed by 67.27% that they were taught this concept.

In the qualitative data, keeping boys active was often noted. Participant 10 noted that in her classroom management classes, "there was a lot of lecturing on unruly boys, and different types of positive reinforcement for desired behaviors" (see Appendix D, p. 122). In addition, Participant 4 noticed in her classroom that "boys need to be moving around the classroom because it enhances their learning experience. Boys tend to learn better when it involves standing or moving around the classroom" (see Appendix D, p. 123). Participant 8 added that girls "seem to be able to manage their physical behavior better" (see Appendix D, p. 124). She also concluded that "boys often struggle with staying seated for long periods of time, and many of them need to have opportunities to get up and move around so they can return to their focus. Without this, they often display inappropriate or disruptive behavior choices" (see Appendix D, p. 124). Lastly, Participant 6 generally believed that "young boys learn by doing and have a hard time staying confined to a desk with paper/pencil work" (see Appendix D, p. 128). Knowing and understanding that it is

more difficult for boys to stay actively engaged should guide teachers to incorporate hands on activities.

Recommendations

Subsequent to review of the conclusions and analysis of the data in this study, the following recommendations were made:

1. Further study needs to be completed to determine where these educators received their degrees to determine what universities or colleges do not teach how boys and girls learn differently.
2. Further research should be pursued to determine if these concepts and information are currently being taught in Missouri universities and colleges' teacher certification courses.
3. Determine the professional development the districts have available for its educators to decrease the gap in this knowledge, so that they may effectively teach their students.
4. Administer the questionnaire to students exiting a Missouri Teacher Certification program to see how they are currently being trained.
5. Gather research from every Missouri university or college that currently has a Teacher Certification Program to see if their professors have been trained in these best practices.
6. Analyze test scores from teachers who have been trained in how boys and girls learn differently and in the best practices described in this research compared to teachers who have not to review the differences in their students' achievement scores.

Summary

The purpose of this study was to determine elementary teachers' preparedness to meet the different learning styles of both boys and girls. This research will be shared with various practitioners, educators, parents, and the community about the importance to understand the learning differences of boys and girls. Ideally, the Missouri Department of Elementary and Secondary Education will review their Certification Requirements for Elementary (Grades 1-6) to ensure that teachers are receiving the needed information and training to effectively teach their students. In addition, school districts will begin or continue to support professional development in research-based methods to sustain and strengthen these skills. Although the elementary teachers in this research have overall been effectively taught some concepts in how boys and girls learn, there is a great need to effectively teach them in how to meet the learning styles of both boys and girls. There are some best practices that can help meet these needs, such as brain-based learning, cooperative learning, and differentiated instruction. These strategies must be taught to our elementary school teachers to help serve our boys and girls.

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Appendix A

Document

1. Missouri Department of Elementary and Secondary Education Certification……..113

Missouri Department of Elementary and Secondary Education Certification Requirements for Elementary (Grades 1-6)

GENERAL REQUIREMENTS:

A. A baccalaureate degree from a college or university having a teacher education program approved by the Missouri Department of Elementary and Secondary Education or from a college or university having a teacher education program approved by the state education agency in states other than Missouri;

B. Must have recommendation of designated official for teacher education in the college or university;

C. Must have a grade point average of 2.5 on a 4.0 scale overall and in the major area of study;

D. Must complete the content knowledge or specialty area test designated by the State Board of Education with a score equal to or greater than the Missouri qualifying score;

E. Completion of professional requirements, as determined by the recommending college or university, which may exceed these minimum requirements; and

F. Individuals who completed their teacher education program outside of the United States shall provide documentation of completion of course work in the following:

1. English Composition, two (2) courses, each a minimum of two (2) semester hours;
2. U.S. History, three (3) semester hours; and
3. U.S. Government, three (3) semester hours.

II. PROFESSIONAL REQUIREMENTS: A minimum of sixty (60) semester hours of professional preparation. Competency must be demonstrated in each topic listed to the satisfaction of the teacher preparation institution.

A. Foundations for Teaching (Minimum requirement of ten (10) semester hours):

1. Foundations of Education;
2. School Organization and Management;
3. Personalized Teaching Strategies;
4. Self Awareness and Human Relations;
5. *Child Growth and Development;
6. Psychology of Learning;
7. *Psychology and/or Education of the Exceptional Child (including the Gifted); and
8. Behavior Management Techniques (Interpersonal Relationships);

B. Teaching Methods (Minimum requirement of fifteen (15) semester hours):

1. Reading (three (3) courses required, minimum total of eight (8) semester hours);

2. As a minimum, the teaching method competencies shall include:
    a. Children's Literature;
    b. Language Arts;
    c. Math;
    d. Science;
    e. Social Science to include Geography and Economics;
    f. Art;
    g. Music;
    h. Physical Education; and
    i. Microcomputer Applications in Education; and

C. Clinical Experiences (Minimum requirement of ten (10) semester hours):

A minimum of two (2) semester hours of field experiences prior to student teaching and a minimum of eight (8) semester hours of student teaching in elementary grades are required. Teachers meeting certification requirements for Early Childhood or Middle School teaching certificates will be exempt from this clinical experience requirement. A fully certificated secondary teacher with two (2) or more years of secondary teaching experience may satisfy this requirement through the completion of a two (2) or more semester hour practicum at the elementary level (Revised May 2003); and

D. Elementary School Courses:

1. Courses appropriate for Elementary grades:
    a. Mathematics (two (2) courses, minimum total of five (5) semester hours)
    b. Economics;
    c. Geography;
    d. Health; and
    e. Art or Music; and

2. Area of Concentration:

The student must have a total of at least twenty-one (21) semester hours in an area of concentration. (Revised April 2005)

Appendix B

Document

1. Questionnaire Cover Letter ……..116

Questionnaire Cover Letter

Date: September 1, 2008

Dear Elementary School Teacher:

My name is Elizabeth Cooper, and I am working on my Doctorate (Ed.D.) Degree in Educational Administration through Lindenwood University. As part of my research, I am examining the training given to Missouri teachers through their Missouri Teacher Certification Programs concerning how boys and girls learn differently. I would like to determine if you received effective training in research-based best practices, i.e., Cooperative Learning, Differentiated Instruction, and Brain-Based Learning during your Teacher Certification Program.

The following questionnaire will require approximately ten minutes or less to complete. There is no compensation for responding nor is there any known risk. In order to ensure that all information will remain confidential, please *do not* include your name or the name of your district. The data obtained from this questionnaire will not be directly correlated with individual schools or districts. Copies of the dissertation will be provided to Lindenwood University and the five school districts that participated in this research. If you choose to participate in this project, please answer all questions as honestly as possible, and return the completed questionnaires to the identified return envelope in your building's front office by September 30, 2008. Participation is strictly voluntary and you may refuse to participate at any time.

Thank you for taking the time to assist me in my educational endeavors. The data collected will provide useful information regarding the training given to Missouri elementary teachers in their Missouri Teacher Certification Programs concerning how boys and girls learn differently. Completion and return of the questionnaire will indicate your willingness to participate in this study. If you require additional information or have questions, please contact me at the number listed below.

Thank you for your assistance.

Sincerely,

Elizabeth Cooper

Elizabeth Cooper
Springfield Public Schools/Jeffries Elementary
(417) 523-3900

Appendix C

Document

1. Elementary Teacher Questionnaire ……..118-119

Elementary Teacher Questionnaire

Years of teaching experience: _____ 0-5 years _____ 6-10 years _____ 11+ years

During my Missouri teacher certification courses, I was effectively taught that:

15. Boys and girls learn differently.
    _____ Strongly Agree _____ Agree _____ Neutral _____ Disagree _____ Strongly Disagree
16. Boys' and girls' brain structures are different.
    _____ Strongly Agree _____ Agree _____ Neutral _____ Disagree _____ Strongly Disagree
17. Girls take in more sensory data than boys (hear, smell, etc.).
    _____ Strongly Agree _____ Agree _____ Neutral _____ Disagree _____ Strongly Disagree
18. Boys get bored more easily than girls.
    _____ Strongly Agree _____ Agree _____ Neutral _____ Disagree _____ Strongly Disagree
19. Boys tend to use more space when they learn, especially at younger ages.
    _____ Strongly Agree _____ Agree _____ Neutral _____ Disagree _____ Strongly Disagree
20. Although males and females both possess all of the human hormones, the degree of dominance differs.
    _____ Strongly Agree _____ Agree _____ Neutral _____ Disagree _____ Strongly Disagree
21. Boys tend to favor deductive reasoning, while girls tend to be inductive thinkers.
    _____ Strongly Agree _____ Agree _____ Neutral _____ Disagree _____ Strongly Disagree
22. With proper stimulation, female and male brains can get better at all multiple intelligences.
    _____ Strongly Agree _____ Agree _____ Neutral _____ Disagree _____ Strongly Disagree
23. In the classroom, boys tend to be louder, more physically aggressive, and more prone to attention-getting devices than girls, resulting in more teacher attention going to boys.
    _____ Strongly Agree _____ Agree _____ Neutral _____ Disagree _____ Strongly Disagree

<u>During my Missouri teacher certification courses</u>, I was effectively taught and trained in:

24. Brain-based learning
    _____ Strongly Agree _____ Agree _____ Neutral _____ Disagree _____ Strongly Disagree
25. Cooperative Learning
    _____ Strongly Agree _____ Agree _____ Neutral _____ Disagree _____ Strongly Disagree
26. Differentiated Instruction
    _____ Strongly Agree _____ Agree _____ Neutral _____ Disagree _____ Strongly Disagree
27. The traits of ADHD and ADD and how to accommodate students with these symptoms or diagnoses.
    _____ Strongly Agree _____ Agree _____ Neutral _____ Disagree _____ Strongly Disagree
28. How to meet the learning styles of both boys and girls.
    _____ Strongly Agree _____ Agree _____ Neutral _____ Disagree _____ Strongly Disagree

Appendix D

Documents

1. Elementary Teacher Interview Questions ……...121

2. Interview Data ……..122-130

Elementary Teacher Interview Questions
Lindenwood University
Researcher: Elizabeth Cooper

Years of Teaching Experience:

_____ 0-5 yrs. _____ 6-10 yrs. _____11+ yrs.

1. In your MO Teaching Certification Program, were you taught how boys and girls learn differently? If so, please explain what you remember.
2. Have you noticed differences in how boys and girls learn differently in your classroom?
3. How has that knowledge helped you in the classroom?
4. What information and/or training would have benefited your instruction and/or classroom management regarding how boys and girls learn differently?

Interview Data

Interview Question 1: In your MO Teaching Certification Program, were you taught how boys and girls learn differently? If so, please explain what you remember.

Participant 1: *"In my Missouri Teaching Certification Program, I was not taught directly that boys and girls learn differently. We would have short classroom discussions when the topic would arise, but I do not recall ever being taught that boys and girls learn differently and how to address it."*

Participant 2: *"In my Missouri Teaching Certification Program, I was taught in depth about Howard Gardner's Multiple Intelligences and Kagan's Cooperative Learning. We learned that students learn differently and that differentiated instruction needs to occur in the classroom. However, little to nothing was said about the researched learning styles differences between boys and girls."*

Participant 3: *"I remember covering that topic in class or two, but I do not really remember anything about it."*

Participant 4: *"Yes, I was taught that boys and girls learn differently. Boys need more motion in the classroom and are attracted to cooler colors (silver, black, and blue) and tend to draw more pictures with spaceships, cars, etc. Girls like to draw happy families and bright colors (red, orange, yellow)… and if the teacher speaks in a loud tone, girls interpret as yelling."*

Participant 5: *"Yes. I was taught that boys are more logical and analytical. Girls are more social and linguistic."*

Participant 6: *"No."*

Participant 7: *"Not that I remember."*

Participant 8: *"No. Twenty years ago, it didn't seem to be so prominent in the training to view male and female learners differently. I do not recall learning styles being a large focus of our training."*

Participant 9: *"Boys usually mature at a slower rate. Girls may walk, talk, crawl, etc. sooner than boys. Boys usually have more speech issues than girls."*

Participant 10: *"I graduated in 1974 and I do not remember any emphasis or studies on boys and girls learning differently. I do recollect an emphasis on types of reading books, and books needing to be selected about things boys are interested in….or motivation for reading can be lost. In my classroom management classes, there was a lot of lecturing on unruly boys, and different types of positive reinforcement for desired behaviors."*

Participant 11: *"I do not recall being taught about how boys and girls learn differently in my Missouri Teaching Certification Program."*

Participant 12: *"No."*

Interview Question 2: Have you noticed differences in how boys and girls learn differently in your classroom?

Participant 1: *"I have noticed several differences between how boys and girls learn. I have noticed that boys are willing to take chances with answering questions, usually saying the first thing that pops in their head, and girls take a bit longer to come to an answer to share. They are more likely to put more thought into their answers. I have also seen that boys tend to be more willing to participate in class discussions, where girls tend to like asking questions one on one. Boys do not like to ask for help, one on one, from a teacher. I have also noticed when disciplining the students, I can be more direct with boys. They know they are in trouble, can tell me what they did wrong, why it was wrong*

and are ready for their consequence. With girls, I feel that I need to let them explain themselves, talk about their feelings, explain why their action was inappropriate, and explain why their consequence fits the action. This is not with all girls and boys, just the majority of them."

Participant 2: *"Yes. Boys and girls do tend to learn differently. Of course there are exceptions, but from my observations, I have noticed that boys enjoy being active. They also enjoy subjects like math and science. Girls, on the other hand, seem to be more interested in details. They enjoy reading and writing."*

Participant 3: *"Yes. In my room, I have to be more straightforward and keep things simpler with the boys. The girls are more open to having the conversation veer of course occasionally."*

Participant 4: "*I have noticed differences in how boys and girls learn differently. I have noticed that girls work well in circles, facing each other. I use descriptive phrases and lots of color on the overhead projector on the chalkboard to get their attention. Boys need to be moving around the classroom because it enhances their learning experience. Boys tend to learn better when it involves standing or moving around the classroom."*

Participant 5: *"Somewhat, some of the teaching methods I use greatly influence the girls' thinking skills. They tend to catch on quickly. Of course, me being male, I think probably attributes to this."*

Participant 6: *"Yes."*

Participant 7: *"Yes."*

Participant 8: *"Very much so. Boys are very kinesthetic learners. They need manipulatives and the physical activities integrated into instruction, guided practice, and*

independent practice. Girls are more verbal learners and language based. They often want to answer questions aloud and seem to be able to manage their physical behavior better. My highest math learners are usually boys."

Participant 9: *"Boys learn better when a large motor activity can be tied to it. They are usually better developed in the large motor area. Girls are usually better at small motor areas and enjoy the writing and coloring more."*

Participant 10: *"Early in my teaching career with younger children, I quickly determined that boys did not "mature" as quickly as the girls. A class with many younger boys was the most difficult to teach. It was evident that girls can sit quietly and listen, and can try to imagine they are part of the story. Boys learn by actively moving, acting out rough and tumble stories. In regards to reading levels- when I was assigned a class with older boys, I had as many boys in my top reading groups as I did girls. There was a stark contrast between classes with young boys, and classes with older more "mature" boys. Over the years, I have observed sometimes immaturity can be mistaken for ADHD in active boys."*

Participant 11: *"Yes, I have noticed differences in how boys and girls learn differently in my classroom."*

Participant 12: *"I have noticed general trends with boys and girls, but not absolutes."*

Interview Question 3: How has that knowledge helped you in the classroom?

Participant 1: *"When planning my lessons, I try to address the different types of learners. I use class discussion, give one on one time, and let the students share if they want. I try to manage my time with teaching the lesson, to give the boys a chance to feel confident in the new content as well as the girls. I try to reach my students in their comfort zone, to ensure they will feel confident to discuss the content and ask questions."*

Participant 2: *"That knowledge has helped me prepare my lessons and try to meet the specific needs of all of my students."*

Participant 3: *"I try to plan activities and lesson that would appeal to both learners. I do my best to say certain things directly to the boys or the girls when needed. I will sometimes teach the boys and girls separately depending on their needs. I differentiate my teaching of material to fit both learning types. I also have to try different classroom management strategies with boys and girls because their problems are also different."*

Participant 4: *"Knowing that boys and girls learn differently helps you as a teacher better understand your classroom. It helps you plan your lessons so that everybody gets the best learning experience from your lesson. You can incorporate so many things into a lesson that fits both boys and girls, so that they can both learn, just in different ways."*

Participant 5: *"I know that in order to teach my girls, I need to relate to their linguistic side, and the same with the boys."*

Participant 6: *"I differentiate my teaching of material to fit both learning styles. I also have to try different classroom management strategies with boys and girls because their problems are also different."*

Participant 7: *"I try to plan activities and lesson that would appeal to both learners. I differentiate my teaching of material to fit both learning types. I also have to try different classroom management strategies with boys and girls because their problems are also different."*

Participant 8: *"It helps me with planning the physical environment and instruction. I attempt to provide visual, auditory and kinesthetic activities for all learners for every lesson possible. Especially for students that struggle with language issues due to speech*

or learning difficulties. Boys often struggle with staying seated for long periods of time, many of them need to have opportunities to get up and move around so they can return to their focus. Without this, they often display inappropriate or disruptive behavior choices. Girls often need the opportunity to visit with classmates about their learning. Otherwise, I may be dealing with talking issues."

Participant 9: *"Be sure that the lesson we do incorporate some large and small motor. Also, be sure that every few minutes do just do some type of whole body movement."*

Participant 10: *"I do not have the power to change when parents decide to send their children to school. I have found that over the years, I needed to create a brain friendly environment where it is not all lecture, but children actively participate. Experience over the years has taught me that boys and girls learn best when their brains and bodies are fully immersed through stories, songs, rhymes, clapping, tapping, using lots of manipulatives, etc….Engaging the whole body, and performing several activities in patterns increases the opportunities for both boys and girls, and makes the classroom more positive."*

Participant 11: *"I have read several books on the subject recently, and I have restructured my classroom to include more opportunities for movement and active involvement."*

Participant 12: "*I recognize the necessity to differentiate and address multiple learning styles."*

Interview Question 4: What information and/or training would have benefited your instruction and/or classroom management regarding how boys and girls learn differently?

Participant 1: "*I feel that if I was given tools or tidbits to use in the classroom when dealing with boys and girls would have been beneficial. Undergraduate programs and Professional Development seminars give teachers tons of ideas when dealing with classroom management and instruction, but not much of it discusses how to manage boys and girls, or how to reach boys and girls with your instruction. Having a "toolbox" to pull from to help reach students would be handy."*

Participant 2: *"I would have loved to have more formal training on the differences between boys and girls. I would still like to have formal training on these differences. I believe it would only continue to help with specific differentiated instruction and prevention of behavior issues."*

Participant 3: *"I am always interested in video of other teachers trying new strategies with different students."*

Participant 4: *"The information and/or training that would have benefited my instruction or classroom management regarding how boys and girls learn differently would to have been in place in two different schools, one where boys and girls were allowed in the same classroom and another where boys and girls were allowed in the same school, but when it came time for learning, two different classrooms. I think this would help just for comparing purposes and to really see the differences."*

Participant 5: "*None that I can think of."*

Participant 6: *"I received a lot of training on Gardner's Multiple Intelligences, but zero on other ways to differ instruction. I would have benefitted from learning more about the differences between verbal, visual and kinesthetic learning as well as cooperative learning strategies. I think generally young boys learn by doing and have a hard time staying confined to a desk with paper/pencil work. Girls do not seem to struggle with sitting at their desk as much and I noticed a lot more conversations take place. I think it would be helpful to also talk about the different problems that boys and girls have. Boys usually fight physically and are then over it. Girls tend to fight verbally and are usually more secretive about it. I personally think it's harder to stop girl bullying because it's not pure physical. I am still actively looking for strategies to deal with this problem."*

Participant 7: *"I think more than one time class discussion would have helped. If it would have been a topic during my practicum to look into or even monitor and compare classroom learning behaviors between boys and girls, I would have been better prepared. I think this one of those things I just picked up by experiencing it."*

Participant 8: *"I finished my undergraduate degree during the whole language approach, wherein the belief was children will absorb language if provided with a literature rich environment. This is true to an extent, but we now value the purpose of direct instruction and skill building to develop reading, writing, spelling, and math skills. Not every boy or girl will learn the same, so we have the responsibility to provide different learning opportunities to serve them best as unique learners. I wish that I would had more training in Kagan activities, for some reason all of that bypassed me, and I also wish that I would have had more training with Love and Logic at the time. I do not think it was offered at the time. Differentiated learning has come into focus and it's important to learners is*

making an impact on children who do not learn in traditional ways. Fortunately all these holes in my training have been filled due to excellent professional development opportunities and collaboration with staff."

Participant 9: *"More discussion of large/small motor differences and ideas to incorporate large motor skills in some of our small motor activities."*

Participant 10: *"Thinking back to my instructors in college…many college professors at that time did not have experience in the classroom. The lectures were out of the book, not from their own experience. Student teaching was probably the most beneficial to me as far as learning the difference between boys' and girls' learning. I was fortunate enough to be with a teacher in an under-privileged school where many types of behaviors were exhibited. This teacher was considered "top-notch" at that time and recognized for her management all over the district. What I learned in those eight weeks was most important for my future career. How much more I would have gained if I had been trained in "Brain Based" learning. I do believe that teachers need to be trained more in brain based classrooms, where children are actively involved in learning. I do believe student teachers would benefit greatly having experience in different types of classrooms, thus experience in several rooms, for shorter amount of times."*

Participant 11: *"I wish I would have received more training on the differences between how boys and girls learn. I wish I would have received more information on brain-based learning in college."*

Participant 12: *"I would have benefited from the modeling of strategies that address different learning styles. Also, I would have benefited from having access to current brain-based research and its application."*

VITA

Elizabeth A. Cooper was born April 19, 1979, in Kansas City, Missouri, the second child of Lawrence and Deborah Anthes. She attended public school in Grandview, Missouri, before graduation from Grandview High School in Grandview, Missouri, in 1997. She earned a B.S. in Elementary Education from Missouri State University (2001), a M.Ed. in Education Administration from Missouri State University (2004), and an Ed.S. in Education from Lindenwood University (2007). As part of the first Southwest Missouri Lindenwood cohort group, she completed the Ed.D. in Educational Administration (2009). Elizabeth with husband, Casey, are proud parents of a daughter named Isabella. Elizabeth was a third grade teacher at Espy Elementary in Nixa, Missouri, for three years, before accepting an Assistant to the Principal position at the new Wilson's Creek Intermediate School in Springfield, Missouri (2005). Since 2006, she has served as the principal at Jeffries Elementary within Springfield Public Schools in Springfield, Missouri.