

University of Mississippi

eGrove

Electronic Theses and Dissertations

Graduate School

2011

The Relationship Between the Learning Styles of Middle School Students and the Teaching and Learning Styles of Middle School Teachers and the Effects on Student Achievement of Students' Learning Styles and Teachers' Learning and Teaching Styles

Vanessa Mae Morrow

Follow this and additional works at: <https://egrove.olemiss.edu/etd>



Part of the [Education Commons](#)

Recommended Citation

Morrow, Vanessa Mae, "The Relationship Between the Learning Styles of Middle School Students and the Teaching and Learning Styles of Middle School Teachers and the Effects on Student Achievement of Students' Learning Styles and Teachers' Learning and Teaching Styles" (2011). *Electronic Theses and Dissertations*. 203.

<https://egrove.olemiss.edu/etd/203>

This Dissertation is brought to you for free and open access by the Graduate School at eGrove. It has been accepted for inclusion in Electronic Theses and Dissertations by an authorized administrator of eGrove. For more information, please contact egrove@olemiss.edu.

THE RELATIONSHIP BETWEEN THE LEARNING STYLES OF MIDDLE SCHOOL
STUDENTS AND THE TEACHING AND LEARNING STYLES OF MIDDLE SCHOOL
TEACHERS AND THE EFFECTS ON STUDENT ACHIEVEMENT OF STUDENTS'
LEARNING STYLES AND TEACHERS' LEARNING AND TEACHING STYLES

A DISSERTATION PRESENTED FOR THE
DOCTORATE OF EDUCATION DEGREE
THE UNIVERSITY OF MISSISSIPPI

VANESSA M. MORROW

MAY 2011

Copyright by Vanessa M. Morrow, University of Mississippi, May, 2011. Email:

vmmorrow@olemiss.edu

ABSTRACT

This case study of a rural West Tennessee school district examines the relationship of the learning styles of middle school students and the learning and teaching styles of middle school teachers and the effects on student achievement. With the use of the Index of Learning Style Survey (ILS), the Paragon Learning Style Inventory (PLSI), and the Survey of Teaching Styles Questionnaire, 577 students and 30 teachers were surveyed to explore if there is a relationship between the learning and teaching styles of teachers, as well as, determining if students' learning styles impact their achievement.

The study finds that there is a significant relationship among 1) teachers' learning styles and students' learning styles; and 2) teachers' teaching styles and students learning styles. Results show that there is no significant relationship between student achievement and students' learning or between students' achievement score and the teaching and learning styles of teachers. Seventh grade English was the only time a significant difference was found in student achievement when teacher's had different styles of learning.

DEDICATION

To my husband, Alec for his support, patience, and positive attitude. Thank you for the late night cups of tea and encouragement while I was working diligently on my paper and being a sounding block when I felt discouraged.

To my great friend, LaJuana Hamer for all the kind words and encouraging pick me ups during this journey. She provided those listening ears for me during this entire process.

To my family for their continued support of my academic dream.

ACKNOWLEDGEMENTS

I would like to acknowledge the University of Mississippi for the opportunity to fulfill my academic dream. My advisor, Dr. Bobbie Smothers-Jones for her continued support and my dissertation committee, Dr. Larry Hanshaw, Dr. Lori Wolff and Dr. Nichelle Boyd. Without your dedication and hard work in helping me to accomplish this great task, this would never have been a possibility.

TABLE OF CONTENTS

ABSTRACT.....	ii
DEDICATION PAGE.....	iii
ACKNOWLEDGEMENTS.....	iv
LIST OF TABLES.....	viii
I. INTRODUCTION.....	1
Purpose of the Study.....	7
Hypotheses.....	7
Significance of the Study.....	8
Limitations of the Study.....	8
Definitions of Terms.....	9
Organization of the Study.....	9
II. THE REVIEW OF LITERATURE.....	10
Introduction.....	10
Learning Styles of Students.....	10
Learning and Teaching Styles of Teachers.....	16
Teaching and Learning Styles of Middle School Teachers and the Effects on Student Achievement.....	20
Experimental Studies on Teaching and Learning Styles of Middle School Teachers and Unconscious Bias.....	28
Conclusion.....	34

III. METHODOLOGY	37
Introduction.....	37
Participants.....	37
Instruments.....	38
Procedure.	39
Design and Data Analysis.....	40
Summary.....	43
IV. RESULTS OF THE STUDY.....	44
Introduction.....	44
Results and Hypotheses Testing.	44
Hypothesis 1.....	44
Hypothesis 2.....	46
Hypothesis 3.....	48
Hypothesis 4.....	50
Hypothesis 5.....	51
Discussion of Instrument Findings.	52
Summary.....	70
V. CONCLUSIONS, DISCUSSION AND RECOMMENDATIONS FOR FURTHER RESEARCH.....	71
Purpose of the Study.	71
Conclusions.....	71
Discussion.....	73
Recommendations.....	75

References.....	76
Vita.....	80

LIST OF TABLES

Table		Page
1	Factors Used in the Delivery of Information (Teaching Styles) in a Classroom.....	54
2	Five Most Dominant Students' Learning Styles.....	56
3	Students' Learning Styles in Relation to Teachers' Learning Styles.....	59
4	Teachers' Learning Styles as Indicated by Grade.....	61
5	Students' Learning Styles by Grade.....	65
6	Teachers' Learning Styles in Relation to Students' Learning Styles by Grade.....	66
7	Students' Learning Styles by Subject and Grade.....	68
8	Summary of Variables and Hypothesis Testing.....	69

Chapter I

INTRODUCTION

History has shown how the power of words shapes human thought and actions (Damon, 2007). Similarly, teachers definitely can shape the minds and actions of children in a day to day setting in the classroom. According to Baron and Byrne (2004), the teachers' positive actions and thoughts can cause students to perform at a level above and beyond the estimated outcome. However, with a teacher's negative actions and thoughts, although it may be an unconscious behavior, students can perform at a level below the intended outcome. The negative actions such as consistently calling on a student to answer questions in class when the teacher feels that the student is not on task or very inattentive, can cause students to "shut down." This can cause resentment toward the teacher because the student is ashamed for not knowing the answer or not participating in class discussion for being off task.

For example, Steiner, Holley, Gerdes, and Campbell (2006) reviewed several instructional formats in a recent study that dealt with student evaluation of teaching (i.e., SET scores). "Of the seven instructional formats [they reviewed] four predicted SET scores were statistically significant when expected grade was included in their analysis" (2006, p. 364). The four predictors that produced significant scores were videos and guest speakers, extra credit opportunities, percent of time lecturing, and percent of time actively engaged in learning. The remaining three instructional formats that did not produce statistically significant SET scores were PowerPoint, computer-related technology, and review sessions before exams (Steiner et al., 2006). Because these factors are suspected to operate in middle school classes as well,

determining the extent of the relationships between all seven factors and student learning is an important consideration for this present study. For purposes of clarity, this study will not involve student evaluation of teaching. However, this study will utilize research findings to show what a teacher does in class (i.e., components that makeup instructional formats like those mentioned above) are important considerations that may help define the relationships between student learning and teaching styles.

Relative to teaching styles and student learning, Felder and Spurlin (2005) indicate that “when the learning styles of most students in a class and the teaching style of the professor are seriously mismatched, the students are likely to become bored and inattentive in class, do poorly on tests, get discouraged about courses, the curriculum, and themselves, and, in some cases, change to other curricula or drop out of school” (p. 103). In a study conducted by Felder (2006), he stated that not only is achievement affected by different learning styles, but the cognitive and psychological aspects of students are also in jeopardy. Felder contends “that students have different levels of motivation, different attitudes about teaching and learning, and different responses to specific classroom environments and instructional practices, but the more thoroughly instructors understand the differences, the better chance they have of meeting the diverse learning needs of all their students” (2006, p. 57). Although the aforementioned findings relate to college age populations, there is an equal concern that the relationship between the learning styles of middle school students and middle school teachers should be explored.

Other researchers point out that “a teacher’s classroom behavior is constantly under scrutiny by students; and as a result, students learn a great deal from a teacher’s nonverbal behavior as well as their verbal behavior. Additionally, students are aware of how teachers’ attitudes toward them affect them emotionally, and how such attitudes influence their success in

the classroom” (Teven & McCroskey, 2007, p. 167). Teven and McCroskey (2007) suggest that the importance of the learning environment in the classroom is for teachers to learn to communicate so that the students will perceive that teachers genuinely care about their success. It is not the caring that counts; it is the perception of caring that is critical.

Additionally, Wentzel (2002) asserts “that boys and girls receive many different messages in schools even while they are in the same classroom with the same teacher using the same textbook and these silent messages are part of the many complex and interactive factors in our schools that can negatively influence the academic achievement of boys and girls” (p. 289). The social learning style of male students seems to be the style that is displayed in many classrooms. For example, according to Ouazad (2008), teachers focus more on the male student to make them more successful than the female students in the classroom, no matter what the nationality of the female.

Aforementioned, subtle biases are often present in the classroom, but teachers and preservice teachers may not notice it, at least not on a conscious level. This observation seems to underscore the definition of biases given by Moule. Moule indicated that “biases are rooted in stereotypes and prejudices. A stereotype is a simplistic image or distorted truth about a person or group based on a prejudgment habits, traits, abilities, or expectations” (2009, pp. 321-322). Moreover, Kosmerl (2003) indicated that teachers have little or no time to reflect on the time spent with the boys or girls in the classroom.

Similarly, Merrigan and White (2010) point out that “unconscious bias exhibited by teachers has a lasting effect on student achievement” (p. 24). These researchers also indicate that a factor such as a body stance, a gaze, and an unwarranted stare has strong consequences on student achievement. In a general way, therefore, it is reasonable to deduce that teaching styles include

positive and negative thoughts and behaviors as well as how teachers may unconsciously display biases that influence student learning. These biases extend to and are operative within the styles of teaching employed in classrooms. Most teachers have some degree of unconscious bias, according to social scientists, because it stems from natural tendencies to make associations to help them organize their social worlds (Corrice, 2009).

A study conducted by Zhang (2008), explored whether teachers' teaching styles were consistent with their thinking styles. The purpose of this study was to determine whether teachers' teaching styles when related to factors such as age, gender, and length of teaching experience were statistically predictable from their thinking styles. Participants in this study included 194 (85 males, 109 females) high school and university teachers from Shanghai, China. The participants responded to the Thinking Styles Teacher Inventory (Grigorenko & Sternberg, 1993) and the Thinking Styles Inventory-Revised (Steinberg & Zhang, 2003).

Data for the above study was collected from a convenience sample of teachers serving in four different educational institutions—two high schools (n=96) and two universities (n= 98) in Shanghai, China. The high schools were recognized as the two best high schools; whereas the universities were representative of large public universities in mainland China. High school participants were recruited through the high school principals and the university participants through heads of participating departments. Questionnaires were distributed at the end of staff meeting to teachers and all teachers were informed that participation was voluntary (Zhang, 2008).

According to Zhang (2008), teachers' intellectual styles and the match or mismatch of teachers' and students' intellectual styles make a difference in teaching and learning in schools. In this study, Zhang (2008) relayed that Saracho (1991) investigated the effects of second- and

fifth-grade teachers' cognitive styles on their students' academic achievement. Saracho (1991) found that students taught by field independent teachers (teachers who tend to focus on cognitive restructuring) obtained significantly higher achievement gains on the Comprehensive Tests of Basic Skills than did students taught by field-dependent teachers (teachers who tend to focus on the social aspect of teaching and learning). In the same study, Saracho discovered that field independent teachers had higher expectations for students than did the field-dependent teachers.

Zhang (2008) found that two problems existed with the students. First, all teaching behaviors examined have been instructional behaviors (e.g., the number of individual interactions with students, types of questions asked). Second, the theory addresses only one dimension of cognitive styles. Although, according to Zhang, researchers should not underestimate the contribution of these studies to understanding the relation of teachers' and students' intellectual styles to teaching and learning, researchers should also see that more problems exist in continuing to research by using traditional theories of style such as field dependence-independence theory.

Results for the study show that the alpha coefficients for the seven TSI-R (Teaching Styles Inventory-Revised) scales were .81. These factors were similar in magnitude to those reported in previous works in which this same instrument was used. The alpha coefficients for the TSTI (Teaching Styles in Teaching Inventory) were .80, which was similar to previous studies using the same instrument. The validity of the TSI-R, with two factors: Type I thinking styles (including for legislative global, liberal and judicial styles) and Type II thinking styles (including executive, local and conservative styles), accounted for 68% of the variance in the data (Zhang, 2008).

Zhang (2008) concluded that both partial correlations and regression analysis generally supported his idea that teachers' teaching styles were consistent with their thinking styles. (i.e., teachers whose thinking styles were predominately Type I would use Type I teaching styles and teachers whose thinking styles were predominately Type II would tend to use Type II teaching styles). He also concluded that his study could benefit both high school and university administrators and suggest that teacher's thinking styles are a good indicator of teachers' teaching styles, even after background variables are taken into account.

Chiou (2008) investigated whether college students' role models (technical teachers versus lecturing teachers) and preferred learning styles (experience-driven mode versus theory-driven mode) in collaborative teaching courses would be moderated by their cognitive development (absolute thinking) versus (relativistic thinking) and examined whether academic achievement of students would be contingent upon their preferred learning style. Two hundred forty-four college students (132 females and 112 males, ages 19 – 24 years) who have taken the technical courses with collaborative teaching participated in the study.

The Social Paradigm Belief Inventory (SPBI) (1992) was applied to evaluate cognitive developmental levels of participants. The Learning Style Preference Scale (LSPS) (2006) was given to assess preferred learning styles of participants. Regarding the moderate role of cognitive development on academic achievement, participants' weighted mean scores of academic achievement in technical ($M=80.14$, $SD = 5.86$) and general courses ($M= 77.39$, $SD = 6.94$) were submitted to the conditions of academic achievement at a rate of 2 (this being the highest rating on the indicators of these means). A significant two way interaction was observed, $p < .01$. This finding indicated that the achievement differences technical courses and general courses were moderated by cognitive development of participants. However, relativistic thinkers did not

perform significantly different in two kinds of courses, $p > .05$. The relativistic thinkers ($M=80.46$) did perform better than the absolute thinkers ($M=77.75$) in overall achievement (Chiou, 2008, p. 136). As aforementioned, the studies showed that significant or unrelated relationships existed between the variables that were investigated and conclusions were evident from these findings. These same types of relationships may or may not exist in the following statements used for this study.

Purpose of the Study

The primary purpose of this study was to investigate the relationship between middle school students' learning styles and the teaching and learning styles of middle school teachers in a rural Tennessee school district. A secondary purpose of this study investigated affects on student achievement and its relationship to (1) students' learning styles, (2) styles of learning among middle school teachers, and (3) different styles of teaching among middle school teachers.

Hypotheses

1. There is no significant relationship between the teaching styles of middle school teachers and learning styles of middle school students.
2. There is no significant relationship between the learning styles of middle school teachers and the learning styles of middle school students.
3. There is no significant difference in student achievement for middle school students with different styles of learning.
4. There is no significant difference in student achievement for middle school students whose teachers have different styles of learning.

5. There is no significant difference in student achievement for middle school students whose teachers have different styles of teaching.

Significance of the Study

Studies report that many different learning styles exist, but many issues have not been adequately addressed (Kang & Banaji, 2006). These issues include students having more than one learning style, students not knowing what their learning style is, and how this learning style affects their academic success. The researchers found that “these factors placed a definite hardship on students when it came to learning” (Kang & Banaji, 2006, p.1066). Several researchers have examined learning styles of students to align them with academic success and the factors that relate to the teaching and learning styles of teachers, but none have determined that one particular learning style affects the academic outcome of every student (Tenenbaum & Ruck, 2007). Therefore, additional studies are needed to make teachers aware of their specific learning and teaching styles so that teachers can better prepare for those students that have learning styles that differ from their own. Learning styles of teachers may have a significant influence on student academic achievement regardless of grade level.

Limitations of the Study

The findings of this study are limited to a small, rural town which may not be indicative of all seventh and eighth grade students in all English, math and science classes. The results of this study may be used to interpret the learning styles of students and how they relate to the teaching and learning styles of teachers, but may not reflect the actual academic achievement in other subjects other than the ones in this study. This study will help to make teachers more aware of their learning and teaching styles so that they can adapt their teaching methods to make all students successful, no matter what the students’ learning style may be.

Definition of Terms

Bias: indicates that “biases are rooted in stereotypes and prejudices” (Moule, 2009).

Learning styles: the psychological and cognitive characteristics that determine the way a person learns (Felder, 2006).

Teaching styles: modeling, motivation and communicating lessons to an attentive audience (Corrice, 2009).

Unconscious bias: refers to social stereotypes about certain individuals that individuals form outside of their own conscious awareness (Corrice, 2009).

Organization of the Study

The study is organized into five chapters. Chapter I introduces the study, the purpose of the study, hypotheses, significance of the study, limitations of the study and definition of terms. Chapter II provides a review of relevant literature, Chapter III outlines methodology, including participants, instruments, procedures for data collection and analysis, and the research design. Chapter IV includes the results of the study, while Chapter V presents conclusions, discussion, recommendations, and implications for further research.

Chapter 2

LITERATURE REVIEW

Introduction

The primary purpose of this study was to investigate the relationship between middle school students' learning styles and the teaching and learning styles of middle school teachers in a rural Tennessee school district. A secondary purpose of this study investigated affects on student achievement and relationships to (1) students' learning styles, (2) styles of learning among middle school teachers, and (3) different styles of teaching among middle school teachers.

The literature review will be outlined as follows: (1) learning styles of students, (2) learning and teaching styles of teachers, (3) teaching and learning styles of middle school teachers and the effects on student achievement, and (4) experimental studies on learning and teaching styles of teachers and unconscious bias.

Learning Styles of Students

According to Merrigan and White (2010), everyone has a preferred learning style. Through identification of students' learning styles, teachers will be able to determine most of the students' individual strengths and assess their academic accomplishment. Although these researchers reveal that everyone has a preferred learning style, there is not a specific learning style with which every student can identify, (Glenn, 2009) or to which students are limited. Manochehr (2004) defined learning styles as "an individual's inherited foundation, particularly

past life experience, and the demands of the present environment that emphasize some learning ability over others” (p. 11). Several different learning styles have been noted by researchers to identify the basic learning style of students. The learning styles include: visual, aural, verbal, physical, logical, social, and solitary. Students may display more than one of these learning styles throughout their educational process, but mostly have one preferred style (Felder, 2006).

The visual learning style or spatial learning style is referenced in using maps, pictures, colors, and images to arrange information for ones’ understanding. Students that plan, draw, doodle and scribble are often categorized as visual learners (Corrice, 2009). Corrice contend that “students need to have a connection to the information being shared by the teacher and expressions of drawing and portraying these notes and communication gives them an edge that prepare them with the strategy to interpret the data being given to them”(2009, p. 12).

Tenenbaum and Ruck (2007) suggest that teachers listen for phrases such as “see how this works”, “can you draw it on the board”, or “I never forget it if it is written down.” Although teachers cannot assess the learning styles of students as being the visual learning style, according to these researchers, teachers can definitely interpret some behaviors as leaning toward the visual learning style. Findings from these researchers indicate that about twenty-percent of students are assessed as visual style learners. Tenenbaum and Ruck (2007) conducted a study using the Grasha’s Learning Style Index (1996) and based on the finding, the visual learners scored within the range of KV (Kinesthetic-Visual) learner as outlined in the 17 - 19 point range.

Aural learning style commonly referred to as auditory, musical and rhythmic learning style encompasses movement, sound, and music. Students that portray this learning style are always beating on the desks, tapping their feet, humming or singing to themselves (Damon, 2007). Teachers often see them listening more for the tone and pitch of their voices when

delivering information and are often noticed as saying “that sounds right”, “that is clear as a bell”, or “the information is coming through loud and clear” (Tenenbaum & Ruck, 2007). Along with the auditory and musical factors, aural style learners use recording to revisit the information so that they can retain more data (Damon, 2007). He attests that the students set the information to music and then sing, hum or tap out the information. Students’, who scored 14 – 16 on Gresha’s Learning Style Index (1996), were determined to share the aural learning style. Next to the visual learning style, the aural learning style is shared by more than eighteen percent of students (Tenenbaum & Ruck, 2007).

Verbal style learners are natural born talkers (Rimm-Kaufman, Storm, Sawyer, Planta & LaParo, 2006). These researchers reveal that students talk out the information so that it is immediately remembered and stored. Spelling out the information, talking with their classmates, and not fully agreeing with the information being delivered are some factors that identify the verbal learner. Referred to as linguistic style learning, researchers reveal that students can very easily express themselves in any setting. Students feel at ease when displaying this learning style. Tongue twisters, limericks and word games are some of the elements that verbal learners enjoy. Claims are noted that mnemonics are friends to these students; memorization is the students’ best defense for successfully accomplishing academic excellence, and students in the verbal style category of learners’ make-up twenty-one percent of student learners (Zhenhui, 2001).

Unlike the visual, aural and verbal learning styles, students that are assessed as physical learners are more responsive to the sense of touch and the physical world around them. They align themselves with the ‘jump right in attitude’ when trying to learn something new because it allows the students to have a ‘hands-on’ tactic to retain the new information (Zhenhui, 2001).

Students are unreceptive to lecture type presentations and tire easily. Students who are physical learners are more apt to tune teachers out about half way through the lecturer's information session and try ways to physically align the information lecture session to adjust it to their learning style. Students who are assessed as physical learners want to work closely with the teacher, so therefore they want to get up and move or ask to be moved to be near the teacher. They need that sense of security (Smith, Bridge, & Clarke, 2002).

Along with physical learners being more responsive to the physical surrounding, they are equally assessed as walkers. According to Opdenaker and Damme (2006), students need to walk to feel that they are actually part of the classroom. These researchers also contend that they are the most disciplined style of learners because of their awareness of the physical surrounding and their environment. Assessed at about eighteen percent, physical style learners are more likely to enjoy career placements in general physical work, such as mowing the lawn; mechanics, such as airplane mechanics; sports, and dancing. These students score between 9 – 11 on the Gresha's Learning Style Index (1996) (Tenenbaum & Ruck, 2007).

Logical learning styles referred to as the mathematical learning style are assessed as using the brain for reasoning and understanding (Opdenaker & Damme, 2006). Categorized as 'nerds' these learners are more difficult for teachers in the classroom. According to Richardson (2005), students want the information to be more logical and follow a process or procedure in order for them to obtain the information. Richardson claimed "that most teachers are not as structured as the logical learner wants them to be and, therefore the student sometimes suffers academically" (2005, p. 389).

Along with Richardson, researchers Opdenaker and Damme (2006) also focus on the fact that "although many students are academically challenged when they are logical learners; there

are steps that help them to obtain success when the teacher realizes that they are having problems with the curriculum” (p. 12). It is suggested that teachers help students to design lists for structure, make notes using key points, use other statistical data to analyze the information, and help students look at the smaller picture in order to associate it with the bigger picture. Logical style learners, also labeled as ‘curious’ make up about twelve percent of the student learners, scoring between 6 - 9 on the Gresha’s Learning Style Index (Tenenbaum & Ruck, 2007).

Social or ‘jittery’ learners are very much aligned with the verbal style learner. Students who are assessed as social style learners tend to move in line with the verbal learner (Merrigan & White, 2010). Typically learning in groups or teams, the social learner prefers to stay around and move around other students to discuss and examine the learning opportunities, and to obtain the information with the least amount of work effort.

They want to be around anyone in class and tend to move constantly in class. Although the social style learner is not as vocal as the verbal style learner, students that are assessed as more social learners tend to perform at a higher rate than their verbal style counterparts. Approximately at a rate of two to one, the social learner spends more one-on-one time with the instructor. One-on-one time provides the student with a heightened learning advantage than the verbal learner (Kang & Banaji, 2006). Social learners are more apt to choose careers in sales, politics, human resources, counseling, and even teaching. Students assessed as social style learners make up eight percent of the student learners (Tenenbaum & Ruck, 2007).

Although the solitary style learner makes up only about three percent of our student learning styles, scoring 17 - 19 on the Gresha’s Learning Style Index (1996), Tenenbaum and Ruck (2007) reveal that these learners are thirty-three percent more advanced in subjects such as math and science because of this solitary style. Student are assessed as learning best by working

alone, individualized projects, self-paced instruction and having their own space. More students, according to Kang and Banaji (2006), are trying to obtain or grasp the solitary style of learning to achieve maximum academic success. Students reveal in this study that the socialization of the classroom is a constant distraction to them and this style will offer them a better chance at academic success. When students are assessed as solitary learners, teachers must be aware that their silence is not a lack of interest, but a form of communication that best fits their individualized learning style (Corrice, 2009), therefore, he suggests teachers adjust their style of teaching to make sure that all students have an equal opportunity to interact in the learning process so that they will become academically successful, no matter what learning style they (the student) possess. According to Kang and Banaji (2006), students will be more successful in the upper grades when they are assessed as having this learning style.

The Paragon Learning Style Inventory (PLSI) (2004) used in this study does not score the learning styles obtained by students, but are grouped in learning style by preferences. The learning styles listed in this inventory consist of the following sixteen combinations. In the concrete/reflective: ISTJ (Introvert/Sensitive/Thinker/Judger), ISFJ (Introvert/Sensitive/Feeler/Judger), ISTP (Introvert/Sensitive/Thinker/Perceiver), and ISFP (Introvert/Sensitive/Feeler/Perceiver); the abstract reflective: INFJ (Introvert/Intuitive/Feeler/Judger), INTJ (Introvert/Intuitive/Thinker/Judger), INFP (Introvert/Intuitive/Feeler/Perceiver), and INTP (Introvert/Intuitive/Thinker/Perceiver). The concrete experimental: ESTP (Extrovert/Sensitive/Thinker/Perceiver), ESFP (Extrovert/Sensitive/Feeler/Perceiver), ESTP (Extrovert/Sensitive/Thinker/Perceiver), and ESFJ (Extrovert/Sensitive/Feeler/Judger). ENFP (Extrovert/Intuitive/Feeler/Perceiver), ENTP (Extrovert/Intuitive/Thinker/Perceiver), ENFJ (Extrovert/Intuitive/Feeler/

Judger), and ENTJ (Extrovert/Intuitive/Thinker/Judger) make up the abstract experimental. In this framework used, it aligns itself to the aforementioned learning styles. Introvert = Reflective, Extrovert = Experimental, Concrete = Sensate, and Abstract = Intuitive.

Student's ineffective learning strategies are linked to poor metacognition, revealing that struggling learners have not developed the practical 'figure it out skill' to succeed in academic challenges (Joseph, 2006). Students should be able to reflect on their learning process and use practical guidance to assimilate the information into their schema. According to Joseph, "many students have tried to obtain a definite type of learning style, but most have used more than one style to become academically successful" (2006, p. 102). Joseph (2006) contends that many students have the cognitive skills to recognize when they are doing well and when they are going in the wrong direction, and working independently these students use metacognition to plan, regulate, and assess their learning; however, many other students lack the practical intelligence and accompanying confidence that comes with well-developed learning skills. These students are then unable to reflect or explore upon their learning skills.

Learning and Teaching Styles of Teachers

Teaching styles of teachers differ in every classroom. Researchers have given advice to teachers to align their learning and teaching styles to that of their students. Other researchers contend that this not necessary for students to be academically successful in the classroom (Glenn, 2009). Glenn contends that there is no strong evidence to support the "aligning" idea. Although this aligning idea may be relevant to evaluate the learning and teaching styles of teachers, there may be a definitive argument that teachers are more likely to instruct and teach the students based on their own learning style or technique. Consequently, researchers Rim-Kaufman and Sawyer (2006), assert that teachers have many other factors that reflect their style

of teaching and styles in which they learn. These factors include unrewarding career opportunities, the different learning abilities present in the classroom among students, increased pressures of accountability and, the one that ranked first in a survey of teachers, salaries. These researchers indicate that teachers spend more time worrying about these factors than planning for their classes on a daily basis. They also show that teachers really do not plan for lessons for their classes but rely on past lessons to guide them through their daily instructional practices.

Selected teaching styles of teachers include teachers who have a formal authority teaching style that focus on content that is generally teacher-centered, where the teacher feels responsible for providing and controlling the flow of content and the student is expected to receive the content (Evans, Harkins & Young, 2008). A teacher with this teaching style is not as concerned with building relationships with their students, and it is not important that their students form relationships with other students and therefore, this type of teacher does not usually require much student participation in class (Evans et al., 2008).

Teachers who have a demonstrator or personal model teaching style tend to run teacher-centered classes with an emphasis on demonstration and modeling. These types of teachers act as a role model by demonstrating skills and procedures and as a coach to guide in helping students develop and apply these skills and knowledge (Evans et al., 2008). According to Evans et al., “teachers with this type of teaching style might comment: “I show my students how to properly analyze a task or work through a problem and then I will help them master the task or problem solution”, and also important to the teacher is for each student to independently solve similar problems by using and adapting demonstrated methods (2006, p. 575). Instructors with this teaching style are interested in encouraging student’s participation and adapting their

presentation to include various learning styles. Students are expected to take responsibility for learning what they need to know and for asking for help when they do not understand.

Teachers who have a facilitator model teaching style tend to focus on activities. This teaching style emphasizes student-centered learning and there is much more responsibility placed on the students to take the initiative for meeting the demands of various learning tasks (Evans et al., 2008). This type of teaching style works best for students who are comfortable with independent learning and who can actively participate and collaborate with other students. Teachers typically design group activities which necessitate active learning, student-to-student collaboration and problem solving. Moreover, according to Glenn (2009), this type of teacher will often try to design learning situations and activities that require student processing and application of course content in creative and original ways.

Teachers who have a delegated teaching style tend to place more control and responsibility for learning on individuals or groups of students, and will often give students a choice designing and implementing their own complex learning projects and will act in a consultative role (Evans, et al., 2008). Students are often asked to work independently or in groups and must be able to maintain motivation and focus for complex projects. Students working in this type of setting learn more than just course specific topics as they also must be able to effectively work in group situations.

Although teachers have developed their learning styles throughout their educational process, they develop one style that is the strongest and exhibit other styles in any given situation. Learning styles of teachers are labeled as visual, auditory and kinesthetic. Although they fall in line with the learning styles of students, teachers are more aware of their own

learning style and can sense the styles of students based on students' preferred styles (Evans, et al., 2008).

The visual learner, as aforementioned in the students' learning style, works best with written material and instructions, diagrams, posters, and demonstrations. The information which the visual learner takes in is translated into and stored as pictures or images in their brains. These learners are usually neat and well organized. They may use statements with visual cues such as 'I get the picture' (Evans, et al., 2008). Teachers that possess this type of learning style, have more successful students who also possess visual, social, and physical styles of learning. Therefore, students' interact with the teacher to enhance the learning style that they both share (i.e. both the student and teacher are visual learners).

Teachers that are assessed as auditory learners learn best if there is an oral component to the material being presented. Verbal instructions, taped lectures, and face to face instruction work best. Student learners filter the information they hear and store the relevant data but do not necessarily form pictures around it. When in the process of problem solving, auditory learners prefer to 'talk it out'. While talking, they may use phrases which relate to how they learn such as 'I hear you.' Unnecessary noise can be a distraction for the auditory learner (Ouazad, 2008). Students that possess social, physical, verbal, and sometimes visual learning styles, perform very well in these types of classrooms (Felder, 2006).

Tactile/Kinesthetic learners learn best when they can touch or feel what they are learning. Touching is very important to these learners so therefore, hands-on projects work best for them. Students that fall into this category of learners do not always have a good sense of time, order or neatness because they become totally engaged in the learning activity. "They often live for the moment and do not have a vision of the future" (Glenn, 2009, p. 27). Kinesthetic learners will

often speak of their learning in terms of feelings, prefacing statements with 'I feel.' People with this learning style will have a tendency to move around while trying to focus on solving a problem. Students with physical, verbal, social and visual style learning can obtain an eighty-percent success rate in this type of classroom.

The solitary learner has a difficult time in this type of environment because of the movement and physical activities that are occurring in the classroom. The noise is very disturbing for this type of learner. It tends to distract and find the learner off task and it is very hard for them to focus on the information when these disturbances are happening. The learner, therefore, may experience a slight academic decline in the classroom setting (Felder & Spurlin, 2005). In matching the learning styles of students and teaching and learning styles of teachers, it is shown that student's learning styles were statistically significant for knowledge performance (Manochehr, 2004). In addition to determining the learning and teaching styles of middle school teachers and the learning styles of middle school students, significant emphasis must be placed on how these attributes affect student achievement (Vaughn & Baker, 2008).

Teaching and Learning Styles of Middle School Teachers and the Effects on Student Achievement

If the middle school teachers teach exclusively in a manner that favors their students' less affective learning style modes, the students' discomfort level may be great enough to interfere with their learning. On the other hand, if middle school teachers teach exclusively in their students' preferred modes, the students may not develop the mental dexterity they need to reach their potential for achievement in school (Corrice, 2009). However, in the teacher-learner dyad, learner difference is only one variable. Effective teachers are adaptable and flexible in providing

a variety of practices in their teaching activities. They aim to match their manipulation of the teaching and learning environment to the needs of the learner.

In assessing student achievement when paired with learning styles, Vaughn and Baker (2008) compared the teaching styles of college professors and the academic achievement of 150 first year medical students after the first grading term. It was determined that teachers with the facilitator type teaching and the independent type learning style of the student scored in the 90th percentile of grading. The students that possessed the solitary learning style with the same instructor, scored in the seventy-ninth percentile. Vaughn and Baker indicate that “the TS (Teaching Style) should be matched with the LS (Learning Style) to get a greater percentage of students achieving maximum success” (2008, p. 247).

Nevertheless, middle school teachers should know what type of activities they are more effective at presenting. Consideration about how middle school teachers can implement what is known about best practice in teaching and how they can maximize the advantage to be gained from playing to one’s own innate strengths and characteristics suggests more research is needed regarding instructional formats and how they relate to student learning at different educational levels (Baron & Bryne, 2004). Furthermore, just as mismatched learning styles can cause dysfunctional learning situations, one of the causes of stress for middle school teachers, can be incongruence between the type of activities they are good at carrying out and external expectations of ‘good teaching’.

Balhan (2007) conducted a study with middle-school Kuwaiti children to assess the effectiveness of student learning styles in predicting students’ academic performance in Mathematics. A group of middle school students who had received first quarter grades and enrolled in an after-school tutoring program were studied, with half of the students in a

traditional tutoring program and the other half in a Markova learning style-learning program. The purpose of this study was to determine how accommodating students' learning styles affected middle school student academic performance in mathematics. The population for the study was middle school students who were referred to a learning and developmental institute (Early Learning Institute) due to difficulties in learning Mathematics. Students, both male (87) and female (n=48), for a total of 135 were participants in this study. From the government school (control group), there are 39 students and from the private school (experimental group), 96 students. Eighty four are urban district and 51 are suburban district students, respectively. The secondary school comprises four grade levels; there are 18 first year students, 39 second year students, 51 third year students, and 27 fourth year students (Balhan, 2007).

The Markova Thinking Patterns Inventory (1992) was administered to assess the preferred learning style of each student. Through a list of eight characteristic behaviors and qualities children encounter through their perceptual channels and state of mind (conscious, subconscious, unconscious), students fell into one of the six categories of learning styles. KAV, KVA, AVK, AKV, VKA, and VAK. K= kinesthetic, A = auditory; and V = visual. The total possible range of scores on the Markova's Thinking Patterns Inventory is 0 to 15. Individuals scoring the highest in an individual category were considered to be that type of learner/thinker. The traditional method of teaching was based on information from the textbook and the teacher's basic background knowledge (Balhan, 2008).

Balhan (2008) performed a t-test and concluded that the type of instructional strategy used by the teacher significantly affected achievement between the means of experimental and control groups for the total number of students tested. When added with the experimental group (45.91), the significance between the groups became higher than the control (43.8) group.

Significant difference ($p < .05$) were also found between the mean of private schools being higher than the government schools for the second grading period: private (10.84), and government (10.23). Findings were that students in the experimental group performed better overall in mathematics than the control group. Statistically significant differences were found for the second, third and fourth grading periods with the experimental group achieving higher levels each time. This coincides with research conducted by Spires (1983) that reports an association between learning styles and academic performance. Spires revealed that implementation of a learning program resulted in significant gains in reading and mathematics achievement on standardized achievement tests. Learning styles have been found to have a positive relationship with academic, as measured by grade point average, performance in courses, and overall success in academics according to Spires (Balhan, 2008).

In a study conducted by Farkas (2003) the need to restructure approaches to traditional versus learning style instruction was addressed. Farkas contends that middle school teachers focus more attention on the traditional style of teaching because it is much easier and gives them more time to concentrate on other matters, such as student participation in class, assessment and discipline. Farkas' purpose was to revisit the goals and emphasize a more humanistic approach in which one of the central tenets is to examine what styles of teaching and learning of the teachers and learning styles of the students, respectively, has a negative effect on student achievement. Also examined are the styles of teaching and learning of teachers and the learning styles of students that portray a positive effect on student achievement. The results showed several factors that lead to many significant variables in the study. Factors such as empathy, achievement, and attitude showed an enormous amount of significance, while factors such as students transferring

into the class and discipline showed little significance on the traditional versus learning style instructions.

In aligning the learning styles of students and the learning and teaching styles of middle school teachers, researchers reveal that this aligning has a definite effect on student achievement. For example, Teven and McCroskey (2007), “suggest that students that possess a different learning style from the teacher are sometimes at a disadvantage for learning because of a presumed caring attitude from the teacher about their academic achievement. It is important that teachers, especially middle school teachers, learn to communicate with their students so that the perception of caring is felt in the classroom, and that the students believe the teacher has their best interest in mind when assessing their academic performance” (p. 170).

Learning styles, according to Drysdale, Ross and Schulz (2001), refers to a “students’ consistent way of responding to and using stimuli in the context of learning” (p. 271). They reported that with academic performance being such a powerful predictor of persistence, many studies focus on the factors that affect overall performance, such as teachers’ learning and teaching styles. With respect to learning style, they concluded that when examined for affective factors such as attitudes of teachers (teachers’ teaching styles) and teachers’ personality, they found that the success rate of at-risk students to be much higher than those found only using high school grades or demographic factors. However, they also found that using a combination of all three measures (high school GPAs, demographics, and affective measures worked best for predicting academic difficulty (success rate = 30.9%).

Shuaibu (2010) reveal that the attitudes of students with a different learning style from their middle school teacher are about fifteen percent more likely to fall behind in their academic performance than their classmates that have a similar learning style of the teacher. He reveals

that if the teacher has a formal type teaching style and the student possesses a logical type learning style, the student will not only block out the teacher, but will ultimately fail to gain the necessary information for success in this type of environment. On the other hand, he discloses that the verbal learner will show increased performance in this classroom.

Students taught with the kinesthetic learning styles of teachers will enjoy their lessons more and will perform better on tests and assessments than the students that are assessed as aural style learners, according to Glenn (2009). He divulges that, although many teaching and learning styles of teachers are conducive to learning, the students will not always be academically successful because the information may be delivered in a manner much different than the learning styles that are present in the classroom for that particular group of students. Furthermore, he contends that “this might encourage teachers to think about how their students learn and what would be the best instructional methods for a particular lesson” (Glenn, 2009, p. 28).

Theall and Franklin (2001) conducted a study on the effect of teacher teaching styles and student rating of teachers. Myth claims that students are not qualified to rate their teachers, but research says yes. The purpose of the study was to determine if students were qualified to rate teachers. Participants in this study were selected from across the nation through random emails from college access lists. Approximately four hundred responses were returned through SurveyMonkey. Students answered questions relating to day to day known practices of their instructors while in the classroom, teacher and student interaction, popularity, gender, years of teaching, and expected or given grades.

Theall and Franklin (2001) claim that “teachers usually over prepare and concentrate on the delivery of information to the students and that they forget to include time for discussion,

questions and other opportunities with students” (p. 49). These results are shown to have a very negative effect on students’ achievement, especially for the verbal and social learner. When assessed as a verbal learner, students have to discuss the information for it to make sense. Therefore, students will have a forty-two percent chance of failure in this type of classroom. Although the lower ratings are accurately reflected in the findings of this study, student dissatisfaction may have been inaccurately interpreted as meaning the teacher did not do a good job in the delivery of the information to the student (Theall & Franklin, 2001).

Theall and Franklin (2001) found that student ratings are only one source of information about teaching, and teaching is only one aspect of faculty performance. Therefore, never make the mistake of judging teaching or overall performance on the basis of ratings alone. Research has given us consistent findings for teacher evaluations, but generalization from one sample to the population does not guarantee that every situation is explained to make a fair and accurate assessment of how teachers are rated. It would be grossly unfair to compare the ratings of someone teaching a graduate seminar with ten students to the one time rating of someone teaching an entry level course with an enrollment of two hundred students. Theall and Franklin (2001) claim that “summative reports should contain information important to understanding the context of the evaluation, ratio of students enrolled in the class to those responding to the evaluation, level of course, and required versus elective status” (p. 52). Conclusions from Theall and Franklin (2001) reveal that student rating and other evaluation data can provide powerful and useful information and good evaluation practices based on a careful approach to achieving the desired results. Evaluation data can shed new light on program and school performance and the opportunity to take advantage of this data should not be overlooked.

As mentioned in Chapter I, student evaluation of teachers is not a focus of this study, but the student evaluation of teachers embodies factors that have influenced the academic success of students based on the teaching style of teachers and the learning styles of students (Steiner et al., 2006). The factors that affect student learning are bias, the students' perceived grade, and teacher effectiveness. These three factors may be perceived by the student to affect their academic success. Steiner et al. (2006) argue that effective teachers teach students more and that these students should expect to receive higher grades. Therefore, teachers should use other means of delivery of information to students, such as online resources, PowerPoint, or other visual aids to enhance the students' academic performance.

In a study conducted by Smith, Bridge, and Clarke (2002) students with the solitary learning style suffered a twelve percent decline in academic success when the teacher possessed an auditory learning style. The finding revealed that the student "turned-off" or "tuned-out" the teacher approximately ten minutes into the lecture session.

The solitary learner is one that is inclined to work alone and learn more one-on-one with the instructor. The teachers that possess the auditory teaching style deliver the information through oral lectures and video tapes. This, according to these researchers, appears to be an invasion for the solitary learner that prefers to be told one on one what is expected of them and then left to work independently to accomplish the task. This is in direct contrast to Tenebaum and Ruck (2007) who revealed that solitary learners are more accomplished in Math and Science as solitary learners and Smith, Bridge and Clarke (2002) contest that this may occur if the teacher is also a solitary learner.

Felder and Brent (2005) state "that there are no two students who are alike, that teaching methods and the delivery of information must be adapted for the different learning styles of each

student, and that it is equally misguided to imagine that a single one-size-fits-all approach to teaching will meet the needs of every student” (p. 57). Although lecturing has dominated the delivery of information in every classroom, according to these researchers, it definitely goes against every belief that effective instruction is being delivered in the classroom. Moreover, many students are falling behind in the classroom and based on studies conducted, practical learners have the greatest amount of decline in the classroom when measuring the academic success of these students (Felder & Brent, 2005).

In a study conducted by Tennebaum and Ruck (2007), it was revealed that students may be reasonably balanced in a learning style preference; they can be confused on how to grasp information, and use it to associate or assimilate it into their already existing schema. Therefore, students tend to shut down when too much information is required of them and there is a decline in student’s academic performance. In every effort to make every student successful, it is recommended that teachers pay close attention to the academic progress of all students, and adjust their teaching styles so that the students can obtain maximum success in the classroom.

Experimental Studies on Teaching and Learning Styles of Middle School Teachers and Unconscious Bias

The concept of unconscious bias or ‘hidden bias’ has come to the forefront of our schools because the dynamics of diversity is ever changing as we enter the 21st Century. Our traditional paradigm has generally assumed that patterns of discriminatory behavior in organizations are conscious; that people who know better do the right thing, and those who do not cause bias (Evans, et al., 2008).

To keep pace with growth and the growing economy, educational infrastructure must produce an ever increasing number of high skilled students majoring in Business (Gopalan,

Khojasteh, & Cherikh, 2010). In a recent study conducted by these researchers, assessments were made of the roles of the teacher (lecturing/teaching styles) influencing the motivation/learning styles of their students. A 33 item survey instrument based on Herzberg's two factor theory was administered to 452 Business students who were in their third year of completing their B. Com degree in two private colleges in Chennai, India. Factor analysis revealed two factors explained 30.51 percent of variance in the data. The first factor labeled as Lecturer's role (Extrinsic) explained 25.4 percent of the data variance; the second factor labeled as Desire to excel/achieve (Intrinsic) accounted for 5.1 percent of the data variance. Overall, it was noted that business students respond well to a combination of extrinsic and intrinsic factors (Gopalan, Khojasteh, & Cherikh, 2010).

Evans et al. (2008) defines "teaching styles" as "a teacher's personal behavior and media used to transmit data to or receive it from the learner" (p. 568). Although many teachers possess a teaching style, it may have been obtained through biases of which they are not aware. These biases (e.g., cultural, gender, population, language) have a definite impact on students' learning styles.

Tyler, Stevens, and Uqdah (2008) conducted a study to determine if cultural bias had a significant impact on student learning and achievement. They conclude that cultural bias is believed to be salient throughout the instructional practices promoted and executed by school teachers. Cultural beliefs sanction as appropriate certain forms of classroom behavior, including the manner in which a student is to perform and learn during class. These results were evident when results from culturally biased beliefs in an in-school cultural socialization process where ethnically and culturally diverse students were exposed to instructional practices and learning activities that did not reflect their cultural-laden modes of learning and knowing. Due to cultural

bias in teaching, there is an apparent adherence to mainstream forms of thinking, learning and behaving for the students. They found that 54% of students that were included in this process were exposed to these practices (Tyler, Stevens, & Uqdah, 2008).

There are 11 different teaching styles that are related to reproducing knowledge and the involvement of the students in the learning process. They include styles such as command, practice, reciprocal, self check, inclusion, guided discovery, convergent discovery divergent production, learner's individual designed program, learner initiated and self teaching. Evans et al. (2006) contends that the impact of command, inclusion and learner initiated teaching styles meet with bias because they are the least likely styles for the teachers to have a controlled environment within the classroom.

Moreover, Opdenakker, and Damme (2006) have examined the impact of bias on student centered learner/inclusion and found that these students scores were slightly lower than those in the command and practice teaching style classrooms. The concept of the unconscious was, of course, Freud's primary gift to the science of the mind; and, while it is not the purpose of this paper to delve too deeply into the esoteric, this concept drove the development of modern psychology. Yet, as behavioral psychology moved into the forefront during the 50s, 60s, and 70s, the study of the unconscious became deemphasized. Recent research, driven largely by our ability to now manage huge quantities of data, and new exploratory techniques, have given us an ability to not only observe the unconscious, but also to track and quantify its impact (Ross, 2008). Where diversity is concerned, unconscious bias creates hundreds of seemingly irrational circumstances every day in which people make choices that seem to make no sense and be driven only by overt prejudice, even when they are not.

Moule (2009) contends that “acknowledging our possible biases and working together openly is essential for developing community in our schools” (p. 321). In his research, Moule, revealed that “unconscious bias affects learning among students and has a dynamic effect on student academic achievement. Middle school teachers must work to uncover these hidden or unconscious biases that may be visible in the middle school classroom” (2009, p. 322). In addition to recognizing the hidden biases or unconscious biases that may exist in the classroom, Moule contends that “while many middle school teachers deny that they are biased, negative aspects of bias will come to the forefront when assigning grades or making other assessment for the middle school students (i.e., when filling out recommendation forms for sports or activities that the student may want to participate in)” (p. 324). Teachers have the ability to change their attitudes and behaviors when dealing with unconscious issues that may exist once they have given it some thought. Moule (2009) argues that we must deliberately try to change the way the attitudes are formed and to erase them from our conscious.

Zhenhui (2001) has revealed that “the teacher gap and learner interpretation are growing at alarming rates within the classroom” (p. 2). He attests that teachers tend to give off negative vibes that they are unconsciously unaware of. Stances, sudden gazes and smirks are a few of the critical factors that students are well aware of and gain a fixation on them in order to obtain the caring attitude perceived from the teacher.

“A third year English major had reenrolled again in school, hoping to pass. Unfortunately things did not look good and she was definitely frustrated. Unfortunately, the teacher was also feeling perplexed by the students’ negative response to her kinesthetic and global style of learning and the teacher was told by the student that her attempts were in opposition to the prevalent teaching styles in Vietnam” (Zhenhui, 2001, p. 1). The statement above is

representative of serious mismatches between the learning styles of students and the teaching styles of instructors, which could be a form of unconscious bias on the teacher's part. To reduce teacher-student style conflicts, learning and teaching must be matched (Zhenhui, 2001).

Examination of each student's learning style can give the teacher knowledge of how to evaluate each student individually. It will give the student a fair chance of academic success. According to Zhenhui (2001) students that speak English will definitely find conflicts with teachers that speak another language when instructing English. Therefore, teachers must become aware or conscious of these factors so that students will have a pleasant and successful classroom experience, and obtain success in achievement.

Students reflected mostly on positive classroom environments when surveyed in a study conducted by Kang and Banaji (2006). It was found that students do not want to remember difficult classroom moments and are aware of the biases that they perceive exist in the classroom. Kang and Banaji make known that "bias, both conscious and unconscious; exists in every classroom with or without the teachers' knowledge that they exist. They indicate that self-awareness on the part of the teacher must be examined and measures taken to review the possibilities they may be spilling over into the academic performance assessment of the students" (2006, p. 1064).

A related phenomenon is stereotype, which is increased performance caused by the awareness that an out-group is positively stereotyped (i.e. white men's performance on a standardized test reveals that they will all be successful based on their race). Although these findings are surprising and disturbing, such biases do not explain the differentials in testing across various social categories. Confrontation of these biases must be made so as to not trigger implicit cognitive processes that interfere with or facilitate problems with academic performance.

Teachers' ability to take fair measures is simple and they can make significant steps to implement these measures into their teaching style (Kang & Banaji, 2006). Learning styles are a part of human behavior, teachers assess their students based on how they feel about the student, sometimes personally; and therefore, teachers make assessments, unaware of the unconscious biases that may be present, but not known to the teacher at the time the assessment is being assigned (Kosmerl, 2003).

Steiner et al., (2006) found "that expected grade is a biasing variable because of simultaneity issues" and "that it is possible that the expected grade affects SET scores, and that it is possible that the effectiveness of instruction affects expected grades" (p. 357). Moreover, a number of variables within the instructors control may influence SET scores. Teachers must be ready to use additional resources and visual aids to enhance the instructional delivery of instruction in the classroom.

In addition, further research must be conducted in order to better understand that unconscious and conscious biases have a definite effect on student achievement (Glenn, 2009; Wolfer & Johnson, 2003). Although these researchers have claimed that gender is not one of the biasing factors, expected grades, level of challenges and how students actually say they learned, instructional approach (teaching styles), use of technology, and the student's learning style are some of the defining factors where bias exist.

Kosmerl (2003) conducted a study to determine how prepared and educated teachers are to notice, prevent, reduce and respond to gender bias. The purpose of this study was to describe the perceptions of teachers and their educational background regarding gender bias as measured by a questionnaire. Recognizing that there has been a significant amount of research conducted

on students' perception of gender bias in the classroom, there is little research available on teacher's perception of gender bias in the classroom.

Kosmerl (2003) outlines seven steps to identify and address unconscious bias. (1) Recognize that you have biases. These can include facial gestures made to male or female students with them being noticed by the male or female students and they talk about them among themselves. (2) Identify what those biases are. These biases are easily noticed as preferential treatment to the male or female students. Things as simple as allowing them to perform tasks in the classroom more than the other, selected seating arrangements for the male or female student, or even allowing the male students to go to the bathroom more than the female students or vice versa. (3) Dissect your biases. Determine what is happening in the classroom that seems to dictate bias and arrange small windows of opportunity to get a hold on them. (4) Decide which of your biases you will address first. In dissecting the biases, this will determine what is to be handled first and the others will generally fall in order of importance. (5) Look for common interest groups. Talk with your co-workers about similarities or differences that are seen in the classroom and come to a decision about how to (6) Eliminate your biases. Slowly alleviate the biases that are noticed or seem to be exhibited in the classroom and (7) be mindful of bias. They can become deterrents to effective teaching. If we ignore them, possible biases that exists in classrooms, may harm the academic success of students (Kang & Banaji, 2006).

Conclusion

Teachers and students should communicate with one another to promote academic success throughout the educational process. To gain a solid foundation for life on earth, everyone must understand that people are our greatest gift; that the human element is one that can never be denied, and our attitudes toward each other may enhance or hinder our time

together. Because attitudes are often based upon what we know and understand, it is therefore critical that teachers and students come together collaboratively to better understand the others. Subsequently, students must come to know their valued place in society and the teachers and must enhance that value through education (Opdenaker & Damme, 2006).

In educating our nation's children, from the school building, to the national level of dealing with educational policy, biases exist in education (Kang & Banaji, 2006). However, Kang and Banaji state that bias is not easily proven, but it does exist. Teachers in many of our schools single out students without just cause and are assigning and evaluating the students on factors other than the assessments from the taught curriculum (Kosmerl, 2003). Kosmerl argues that these types of assessments are present in our schools. Without a doubt, students and teachers should communicate with one another and maintain the promotion of their educational process in order to gain a solid foundation for life on earth. Students must be able to rely on teachers in order for them to be successful in all academic disciplines and to be successful without perceived bias. As a result, everyone must understand that people are our greatest gift; that the human element is one that can never be denied, and our attitudes toward each other may enhance or hinder our time together (Felder & Brent, 2005).

This study is not based on student perceptions of teacher bias, but more research should be conducted on student perception of teacher bias because it will give added in-depth knowledge of the already existing problem (Felder & Brent, 2005). Damon (2007) succinctly reveals that there are many indicators where bias is perceived to exist and how it affects student achievement; therefore it is essential to produce a more rigorous definition of students' perceived bias. With this knowledge of unconscious bias, we will be able to understand why this bias exists

and how it hinders students' academic achievement. Continued research will add to the research that is currently available that address the issue of perceived teacher bias.

Teachers play a definite role in the academic success of students. They must make every possible effort for students to perform at the highest level of achievement. If teaching and learning styles of teachers and the learning styles of students can be studied further, more information will be collected about factors that attribute to student academic success.

Chapter III

Methodology

Introduction

The primary purpose of this study was to investigate the relationship between the learning styles of middle school students and the teaching and learning styles of middle school teachers. This study also sought to determine the effects on student achievement due to the learning styles of middle school student and the teaching and learning styles of middle school teachers. This chapter describes the methodology in several sections. These sections include the research design, participants, the instrument, the procedures, data analysis design, and the summary.

Students were asked to complete one questionnaire to report their respective learning styles, while teachers were asked to complete two questionnaires. Students were asked to complete the Paragon Learning Style Inventory (PLSI) to determine their learning styles and teachers were asked to complete (1) The Index of Learning Styles (ILS) and (2) a Survey of Teaching Styles to determine their learning and teaching styles, respectively.

Participants

Three hundred seventh grade students and two-hundred seventy-seven eighth grade students from four schools in a rural West Tennessee school district were selected as participants for this study. The participants included regular education students, as well as resource students. Students were asked to complete a 52 item survey (i.e. PLSI) (Schindler, 2004), that identified their style of teaching. Teachers (N=30) from the same four schools as student participants were

asked to complete: (1) the Index of Learning Style (ILS) survey and the Survey of Teaching Styles. The ILS (Felder & Solomon, 2004) has a correlation coefficient that varied between 0.7 and 0.9 on all four scales for reliability and the ILS demonstrated convergent construct validity (p. 107). The Survey of Teaching Styles (Morrow, 2010) was based upon work by Steiner, et al., (2006) and has a calculated reliability of .80 and an estimated index of validity of .89 (Salkind, 2008, p. 117-118). The information requested from the teachers was used to identify relationships sought for hypotheses develop for this study.

Instruments

A Survey of Teaching Styles (a modified 11-item Likert Type survey based upon the work of Steiner, et al., (2006) was used to gather data regarding the teaching styles of teachers. The questionnaire consisted of items such as teachers' use of PowerPoint presentations, videos, extra credit opportunities, and time spent on lecturing. The items on the survey were rated on a 4-point Likert type scale: Always (4), Usually (3), Seldom (2), and Never (1). The reliability coefficient was calculated to be .80 and the estimated validity was .89 (Salkind, 2008). The Index of Learning Styles Questionnaire (Felder and Solomon, 2004), was used for teachers in this study to assess teachers' learning styles in a 44-item format. The inventory consisted of items such as 1) I find it easier to a) learn facts or b) learn concepts; 2) When I am learning something new, it helps me to a) talk about it or b) think about it; and 3) I would rather first a) try things out or b) think about how I'm going to do it. The ILS correlation coefficient varied between 0.7 and 0.9 on all four scales on this instrument for reliability and the ILS demonstrated convergent construct validity (Felder & Solomon, 2004).

The Paragon Learning Style Inventory (PLSI) (Shindler, 2004), is a 52 item questionnaire used to obtain information about learning styles of students in this study. Students were asked to

complete the questionnaire according to directions supplied by authors of the PLSI. The items on the survey are rated on selections from statements that the student chose. (i.e., would you rather have things, a) finished and decided or b) open to change; it is worse to do, a) mean things or b) unfair things). There are sixteen possible combinations of learning styles that can be found from the inventory. They consist of ENFJ (Extrovert/Intuitive/Feeler/Judger), ENFP (Extrovert/Intuitive/Feeler/Perceiver), ENTJ (Extrovert/Intuitive/Thinker/Judger), ENTP (Extrovert/Intuitive/Thinker/Perceiver), ESFP (Extrovert/Sensitive/Feeler/Perceiver), ESTP (Extrovert/Sensitive/Thinker/Perceiver), ESTJ (Extrovert/Sensitive/Thinker/Judger), ESFJ (Extrovert/Sensitive/Feeler/Judger), INFJ (Introvert/Intuitive/Feeler/Judger), INFP (Introvert/Intuitive/Feeler/Perceiver), INTJ (Introvert/Intuitive/Thinker/Judger), INTP (Introvert/Intuitive/Thinker/Perceiver), ISFJ (Introvert/Sensitive/Feeler/Judger), ISTJ (Introvert/Sensitive/Thinker/Judger), ISTP (Introvert/Sensitive/Thinker/Perceiver), and ISFP (Introvert/Sensitive/Feeler/Perceiver). These styles will be further explained in Chapter 4. The reliability coefficient for each of the dimensions is between .90 and .94 and shows a psychometric indication of theoretical validity. Permission was granted to this researcher to use both the ILS and the Paragon Learning Style Inventory. These surveys were completed using paper copies.

Procedure

Upon approval from the Dissertation Committee, Institutional Review Board (IRB) from the University of Mississippi, authors of the instruments used in the study, and the School District in which the research was conducted, the researcher submitted a letter to the principals of the four schools selected to participate in the study. Arrangements were made with the teachers for times to administer the surveys to the students. The researcher administered the surveys to

the schools using paper copies. Parental consent forms were given to the parents and student assent letters given to students informing them of the rights to withdraw at any time.

A total of 577 survey instruments were distributed to the school district in the rural area of West Tennessee. The school district serves approximately five to six thousand students. Four middle schools that services seventh and eighth grade students were participants for this research. Three hundred seventh graders and 277 eighth graders participated in the study. Of the 577 students, 290 were surveyed in math classes, 148 students in English classes, and 139 students in science classes. The sample of teachers (N = 30) were given paper copies of the questionnaire and were asked to complete it. Data was collected by the researcher once students and teachers finished the survey. Participants were informed that their responses were strictly confidential and that the survey took approximately 15 to 20 minutes to complete. All data collected for this study was viewed only by this researcher and my committee and all data was kept in a locked drawer accessed only by the researcher.

Design and Data Analysis

This study was primarily a quantitative study that examined the relationship between the learning styles of middle school students and the teaching and learning styles of middle school teachers. With regard to the first purpose of this study, the following explanation of data treatment and analyses performed is provided:

Hypothesis 1: The is no significant relationship between the teaching styles of middle school teachers and the learning styles of middle school students. The independent variable for Hypothesis 1 was the teaching styles of middle school teachers. The dependent variable was the learning styles of middle school students. The results of the Survey of Teaching Styles (Morrow, 2010), established that teachers fell into the categories of (1) Always and (2) Usually when asked

about the use of certain methods or tools or instruction constituting their style of teaching (i.e., see Table 1, pg. 58). Next, frequencies for these two (teaching style) categories was established by sorting students having a certain learning style into the category of teaching style found for the respective teachers of these students. That is, students followed their teachers. A Chi-Square analysis ($p \leq 05$) was then performed to determine the degree of influence/relationship of teaching styles on the learning styles of students. For seventh grade teacher and students was analyzed this way and this was repeated for the data of eighth grade students and teachers.

Hypothesis 2 investigated, with regard to the primary purpose of this study, stated that there is no significant relationship between the learning styles of middle school teachers and the learning styles of middle school students. The independent variable for Hypothesis 2 was the learning styles of middle school teachers, while the dependent variable was the learning style of middle school students. The results of the Index of Learning Styles (Felder & Solomon, 2004), established the various categories of learning styles of teachers (see, for example, Table 4) and the Paragon Learning Style Inventory (2004) help to identify the various categories of learning styles for students. As done previously, frequencies for categories of learning styles of teachers was found by sorting students having a certain learning style into the category of learning style found previously for respective teachers of these students. Once again, students followed their teachers into established frequencies counts in categories relevant to this hypothesis. A Chi-Square Analysis ($p \leq .05$) was then performed to determine the degree of influence/relationship between learning styles of middle school teachers and their students.

A second purpose of this study was to examine the effects on student achievement of (1) students' learning styles and (2) middle school teachers' learning and teaching styles. With regard to the secondary purpose of this study, three hypotheses (3, 4, and 5) were investigated:

Hypothesis 3: There is no significant difference in student achievement for middle school students with different styles of learning. The independent variable for Hypothesis 3 was the learning styles of middle school students and the dependent variable was the achievement of individual students. The Paragon Learning Style Inventory (2004), helped to determine the learning styles of students and students' nine weeks grades (N= 300 seventh graders and N = 277 eighth graders) was the dependent variable. Using the various student learning styles as groups, student achievement (by subject) was analyzed by putting nine weeks grades of students into groups according to the learning style found for a particular student. Mean scores for students in each learning style group (by grade levels) was then compared using the One-way ANOVA procedure ($p \leq .05$). Math, Science, and English achievement by learning styles group was analyzed this way for seventh, then eighth grade.

Hypothesis 4: There is no significant difference in student achievement for middle school students whose teachers have different styles of learning. The independent variable for Hypothesis 4 was the learning styles of teachers and the dependent variable was the achievement of individual students. The Inventory of Learning Styles (Felder & Solomon, 2004) helped determine the various learning styles of teachers as indicated earlier and the achievement scores of these students were used to determine mean achievement scores within each learning style group for teachers at a particular grade level. Students' mean achievement scores in each group was then compared using the One-way ANOVA procedure performed separately for the subject area of Math, Science, and English ($p \leq .05$) for seventh and then for eighth grade.

Hypothesis 5: There is no significant difference in student achievement for middle school students whose teachers have different styles of teaching. The independent variable for Hypothesis 5 was the teaching styles of teachers and the dependent variable was student

achievement (by grade level) of middle school students. The results of the Survey of Teaching Styles (Morrow, 2010) established that teachers fell into two teaching styles (Always and Usually) with respect to their use of various methods or tools used during instruction. Next, student achievement scores were sorted based upon the teaching style of a particular teacher. Mean achievement scores of students (by grade level) for groups formed by different teaching style were then compared using the One-Way ANOVA procedure ($p \leq .05$)

Nine weeks grades were the dependent variables used in One-way ANOVAs to determine the effects on achievement in relation to teachers' learning styles and students' learning styles. All statistical analyses were conducted using The Statistical Package of Social Sciences (SPSS), version 17 and the level of significance for all tests was set at $p = .05$.

Summary

This chapter described the methodology employed in analyzing the data that was gathered for this study. Results of all analyses are presented and discussed in Chapter IV.

CHAPTER IV

RESULTS OF THE STUDY

Introduction

The purpose of this study was to investigate the relationship between middle school students' learning styles and the teaching and learning styles of middle school teachers in a rural Tennessee school district. The effects on student achievement were also explored with respect to (1) the learning styles of middle school students, (2) different learning styles of middle school teachers, and (3) different teaching styles of middle school teachers. Chapter Four presents the results for the analysis of the data related to several hypotheses developed for this study.

Results and Hypotheses Testing

Hypothesis 1

There is no significant relationship between the teaching styles of middle school teachers and the learning styles of middle school students.

Seventh Grade Results for Hypothesis 1

Chi square testing involving teaching styles and student learning styles in the subject areas of math, English, and science for the seventh grade indicated that significant relationships existed between the teaching styles and students' learning styles in (a) Math, $\chi^2(4, N = 98), = 44.127, p = .000$, (b) English, $\chi^2(1, N = 76), = 7.614, p = .006$, and (c) Science, $\chi^2(1, N = 58), = 12.083, p = .001$. The teaching styles fell into two categories (Always and Never) and indicate that teachers "always" and "usually" used the 11 teaching styles (i.e., PowerPoint presentations, test review, etc) stated in the Teaching Style Inventory (Morrow, 2010).

Student learning styles related to these results were ENTJ (Extrovert/Intuitive/Thinker/Judger), ESFP (Extrovert/Sensitive/Feeler/Perceiver), ESTP (Extrovert/Sensitive/Thinker/Perceiver), ESFJ (Extrovert/Sensitive/Feeler/Judger), and ENFJ (Extrovert/Intuitive/Feeler/Judger). These five learning styles also parallel the types of learning styles commonly found among middle grade learners (Shindler, 2004). Additionally, the effect size (Cramer's V) for the relationship between teaching styles and students' learning styles was found to be moderate to strong (= .671) for Math; weak to moderate (= .317) for English; and moderate (= .456) for Science. Therefore, this study failed to reject Hypothesis 1 for seventh grade English, math and science.

Eighth Grade Results for Hypothesis 1

Chi square testing involving teaching styles and student learning styles in the subject area of math, English, and science for the eighth grade indicated that significant relationships existed between the teaching styles and students' learning styles in (a) English, $\chi^2(1, N = 142) = 12.650, p = .000$, and (b) Science, $\chi^2(1, N = 44) = 9.313, p = .002$. However, in Math, $\chi^2(1, N = 152) = 2.498, p = .114$, results indicated that there was not a significant relationship between the teaching styles and the students' learning style. Teaching styles fell into two categories (Always and Usually) and results indicated that teachers "always" and "usually" used the 11 teaching styles (i.e., cooperative learning opportunities, small group instruction, etc) as stated in the Teaching Style Inventory (Morrow, 2010). Student learning styles related to these results were ENTJ (Extrovert, Intuitive/Thinker/Judger), ESFP (Extrovert/Sensitive/Feeler/Perceiver), ESTP (Extrovert/Sensitive/Thinker/Perceiver), ESFJ (Extrovert/Sensitive/Feeler/Judger), and ENFJ (Extrovert/Intuitive/Feeler/Judger). As with the seventh grade students in these subject areas, these students' learning styles also parallel those learning styles commonly found among learners

in middle school grades (Shindler, 2004). Although there was a significant difference between teaching styles and students' learning size in English and science, there was not a significant difference between teaching styles and students' learning styles in eighth grade mathematics. Therefore, Hypothesis 1 was rejected for mathematics results for the eighth grade, but failed to reject Hypothesis 1 for English and science for eighth grade. The effect size for the relationship between teaching styles and students' learning styles (Cramer's V) was found to be weak (= .128) for math; weak (= .298) for English; and moderate (= .460) for science.

Glenn (2009) revealed that matching the teaching styles of teachers and the learning styles of students may not help students in their academic process. The author contends that there is no definite relationship to support the aligning of teaching styles of teachers and learning styles of students. This research seems to coincide with the findings in earlier research. Felder (2005) revealed that teachers' must first understand the difference in students' learning before any teaching can take place, therefore teaching styles and the delivery method practiced in the classroom, according to Felder, will have a significant affect on student learning styles.

Hypothesis 2

There is no significant relationship between the learning styles of middle school teachers and the learning styles of middle school students.

Seventh Grade Results for Hypothesis 2

Chi square testing involving teachers' learning styles and students' learning styles in the subject areas of math, English, and science for the seventh grade indicated that significant relationships existed between teaching styles and students' learning styles in (a) Math, χ^2 (8, N = 152), = 139.156, p = .000, and (b) Science, χ^2 (1, N = 58), = 4.215, p = .040. However, no significant relationship existed in English, χ^2 (1, N = 76), = .028, p = .867. Teachers' learning

styles fell into three categories (Verbal, Visual, and Balanced) as indicated on the Index of Learning Styles Inventory (Felder & Solomon, 2004). Student learning styles related to these results were ESFP (Extrovert/Sensitive/ Feeler/Perceiver), ESTP (Extrovert/Sensitive/Thinker/Perceiver), and ESFJ (Extrovert/ Sensitive/Feeler/Judger). These three learning styles were found to be parallel to the learning styles commonly found among middle grade learners (Shindler, 2004). Chi- square test results indicated a significant relationship existed between the learning styles of teachers and students at the middle school level in seventh grade math and Science, but no significant relationship was found between the learning styles of teachers and students in seventh grade English. The effect size (Cramer's V) for the relationship between teachers' learning styles and students' learning styles was found to be weak to moderate ($=.230$) for math; weak ($= .019$) for English; and weak to moderate ($= .270$) for science. Therefore, Hypothesis 2 failed to reject seventh grade English.

Eight Grade Results for Hypothesis 2

Chi square testing involving teachers' learning styles and students' learning styles in the subject areas of math, English, and science for the eighth grade indicated that significant relationships existed between the teaching styles and students' learning styles in (a) English, χ^2 (2, N = 142), = 16.449, $p = .000$, and (b) Science, χ^2 (1, N = 52), = 4.592, $p = .032$. However, for Math, χ^2 (2, N = 152), = 3.263, $p = .196$, the results indicated that there was not a significant relationship between teaching styles and students' learning style. Teachers' learning styles fell into the categories Visual, Verbal and Balanced as described on the Index of Learning Styles Inventory (Felder & Solomon, 2004). Student learning styles related to these results were ENTJ (Extrovert/ Intuitive/Thinker/Judger), ESFP (Extrovert/Sensitive/Feeler/Perceiver), ESTP (Extrovert/Sensitive/Thinker/Perceiver), ESFJ (Extrovert/Sensitive/Feeler/Judger), and ENFJ

(Extrovert/Intuitive/Feeler/Judger). As with the seventh grade students in these subject areas, these students' learning styles parallel with those commonly found in middle school grades (Shindler, 2004). Although there was a significant difference between teachers' learning styles and students' learning styles in English and science, there was not a significant difference between teachers' learning styles and students' learning styles in math. Therefore, this study failed to reject Hypothesis 2 for eighth grade math. The effect size (Cramer's V) for the relationship between teaching styles and students' learning styles was found to be weak ($= .147$) for math; weak to moderate ($= .340$) for English; and weak to moderate ($= .297$) for science.

In a study conducted by Evans, Harkins, and Young (2008), the teaching styles of classroom teachers, not only may have a minimum effect on their learning style, but may have a definite effect on students' learning styles. The authors also revealed that teachers' have a direct effect on student learning and they must be conscious of the information that is being given to the students to meet the academic performance standards set forth for success.

Hypothesis 3

There is no significant difference in student achievement for middle school students with different learning styles.

Seventh Grade Results for Hypothesis 3

One-way ANOVA testing indicated that there was no significant difference ($p > .05$), in student achievement in (a) math, $F(4, 83) = .770$, $p = .548$, (b) English, $F(1, 74) = .014$, $p = .908$, or (c) science, $F(1, 56) = .451$, $p = .505$ among seventh grade middle school students who had different learning styles. The learning styles found among seventh grade students in Math were ENTJ (Extrovert/ Intuitive/Thinker/Judger), ESTP (Extrovert/Sensitive/Thinker/Perceiver),

ESFJ (Extrovert/Sensitive/Feeler/Judger), and ENFJ (Extrovert/Intuitive/Feeler/Judger).

Learning styles found among seventh grade English were ESFP (Extrovert/Sensitive/Feeler/Perceiver) and ESTP (Extrovert/Sensitive/Thinker/Perceiver). In Science, they were ESFJ (Extrovert/Sensitive/Feeler/Judger), and ESTP (Extrovert/Sensitive/Thinker/Perceiver). Hence, this study failed to reject Hypothesis 3 for seventh grade math, science and English.

Eighth Grade Results for Hypothesis 3

In eighth grade, (a) Math, $F(1, 150) = 2.540, p = .113$, (b) English, $F(1, 140) = .721, p = .101$, and (c) Science, $F(1, 42) = .112, p = .739$, no significant difference in student achievement were found for eighth graders who had different learning styles. At the eighth grade level, the learning styles in Math were ENTJ (Extrovert/Intuitive/Thinker/Judger) and ENFJ (Extrovert/Intuitive/Feeler/Judger), in English the styles were ESFP (Extrovert/Sensitive/Feeler/Perceiver) and ESTP (Extrovert/Sensitive/Thinker/Perceiver), and in Science the learning were found to be ESFJ (Extrovert/Sensitive/Feeler/Judger) and ESFP (Extrovert/Sensitive/Feeler/Perceiver).

Levene's Test of Equality of Variance $F(1, 56) = 1.053, p = .309$ (seventh grade) and $F(1, 42) = 1.541, p = .221$ (eighth grade) showed that variances for scores were different, but did not rise to the level of significance. Again, no significant difference in student achievement was found involving the above grades and student learning styles. Therefore, this study failed to reject Hypothesis 3 for eighth grade math, science, and English.

Balhan (2007) conducted a study that emphasized that when the students' learning styles were included in the teaching process, student achievement was shown to make a positive gain throughout the middle school grades, especially mathematics. Joseph (2010) emphasized that academic success is maintained at a higher rate of success when the students' learning styles are

enhanced by the teaching process. Through defined instruction, according to Joseph, students' will perform better not only in the classroom, but in society as well.

Hypothesis 4

There is no significant difference in student achievement for middle school students whose teachers have different styles of learning.

Seventh Grade Results for Hypothesis 4

One-way ANOVA testing indicated that there was no significant difference ($p > .05$), in student achievement in (a) Math, $F(2, 87) = 2.571$, $p = .082$, and (b) Science, $F(1, 58) = .452$, $p = .504$. However, there was a significant difference in achievement for English, $F(1, 74) = .452$, $p = .021$, among seventh grade middle school students whose teachers' styles of learning were different. Hence, this study failed to reject Hypothesis 4 for seventh grade English, but Hypothesis 4 accepted for seventh grade math and science.

Eighth Grade Results for Hypothesis 4

In eighth grade, (a) Math, $F(2, 149) = .665$, $p = .521$, (b) English, $F(1, 139) = .315$, $p = .730$, and (c) Science, $F(1, 42) = .672$, $p = .417$, there were no significant differences found in student achievement where teachers had different learning styles. Therefore, this study failed to reject Hypothesis 4 regarding math, English, and science student achievement and teacher learning styles among eighth grade students.

The learning styles found among seventh grade teachers in math were Verbal, Visual and Balanced. Teachers' learning styles found in English were Verbal and Balanced, and in science, the learning styles were Visual and Balanced. For eighth grade teachers, the learning styles found in math and English were Visual, Verbal, and Balanced. For eighth grade Science, the learning styles for teachers were Visual and Balanced.

Levene's Test of Equality of Variance $F(1, 74) = .145, p = .704$ (seventh grade) and $F(2, 139) = .303, p = .739$ (eighth grade) indicated that variances were different but did not rise to the level of significance.

In a study conducted by Wentzel (2002), the author concluded that teaching styles of teachers may have a relevant impact on student achievement and how they perform academically in not only the subjects mentioned above, but all subjects. Farkas (2003) contends that teaching styles will have a significant relationship on achievement. Results in this study seem to be in contrast with the above mentioned research.

Hypothesis 5

Hypothesis 5 stated that there is no significant difference in student achievement for middle school students whose teachers have different styles of teaching.

Seventh Grade Results for Hypothesis 5

One-way ANOVA testing indicated that there was no significant difference ($p > .05$), in student achievement in (a) Math, $F(1, 86) = 2.383, p = .126$, (b) English: $F(1, 74) = 1.964, p = .165$, and (c) Science, $F(1, 56) = .098, p = .756$ among middle school students (seventh grade) whose teachers have different styles of teaching. Hence, this study failed to reject Hypothesis 5 for seventh grade.

Eighth Grade Results for Hypothesis 5

At the eighth grade level, for (a) Math, $F(1, 150) = .000, p = .988$, (b) English, $F(1, 140) = .031, p = .860$, and (c) Science, $F(1, 42) = .143, p = .707$, ANOVA results were not significant regarding student achievement and teachers' learning styles in the eighth grade. Therefore, this study failed to reject Hypothesis 5.

Levene's Test of Equality of Variance $F(1, 86) = 1.161, p = .284$ (seventh grade) and

$F(1, 42) = 1.103, p = .303$ (eighth grade) showed that variances were not equal, but did not rise to the level of significance.

Teaching styles fell into two categories across the scale from (Always and Never) and results indicated that teachers “always” and “usually” used the 11 teaching styles (i.e., cooperative learning opportunities, small group instruction, etc) as stated in the Teaching Style Inventory (Morrow, 2010).

In a study conducted by Evans, Harkins, and Young (2008), the authors concluded that a particular difference in teaching styles may have a direct impact on students’ learning and how they learn. Glenn (2009) contends that teachers with different learning styles will have an immense effect on students’ learning styles. Chiou (2008) showed results in testing measures of middle school mathematics students and the teachers’ that possessed different delivery methods of information and found that there was not a difference in the factors presented in his study. Results in this study seem to coincide with the finding of earlier research.

Discussion of Instrument Findings

Rating the teaching styles of teachers at the middle school level was accomplished by using a scale that rated the response by the teachers as Always (4), Usually (3), Seldom (2), and Never (1). Teachers scores on the Teachers’ Learning Style Survey Instrument indicated that teachers could score in the range of 44-34 for teachers with an Always style; between 33-23 for teachers with a Usually style; between 22-12 for the Seldom style; and 11-1 for teachers with a Never style. Of the thirty teachers surveyed, forty-six (46) percent of them possessed the Always teaching style and fifty-four (54) percent possessed the Usually style. There were no teachers surveyed that possessed the Seldom or Never teaching styles. Twenty-seven (27) percent of eighth grade teachers possessed the Uusally style while their seventh grade co-workers shared

the same percentage (27%) for the Usually style. The Always style was twenty (20) percent and twenty-six (26) percent, respectively for the seventh and eighth grade teachers.

Table 1 shows the percentages of teachers that indicate that they: Always (4), Usually (3), Seldom, and Never (1) used the factors for teaching in their classroom. Sixty percent (60%) indicated that they Always (4) use PowerPoint as part of the instructional process; whereas, twenty percent (20%) respectively indicated that they usually (3) or seldom (2) use this type of instructional process. Eighty percent (80%) indicated that internet related technology is always (4) part of their teaching style in the delivery of information and twenty percent (20%) indicated that they usually (3) use this type of strategy. Approximately eighty seven percent (87%) always (4) use videos and guest speakers as part of their teaching process, where thirteen percent (13%) indicated they never (1) use this type of instruction in their classrooms. Review sessions always (4) are indicated at ninety three percent (93%) of teachers' survey as part of teaching before exam, and only seven percent (7%) show that this teaching strategy is usually (3) used as part of their teaching styles. Eighty three percent (83%) of teacher's surveyed always (4) use extra credit opportunities as part of the evaluation process; whereas seventeen percent (17%) usually (3) use this type of evaluation for assessment.

Table 1

Factors used in the Delivery of Information in A Classroom

Teacher Responses Indicated	Always	Usually	Seldom	Never
I use Powerpoint presentations	60% (18)	20% (6)	20% (6)	0%
I use internet-related technology	80% (24)	20% (6)	0%	0%
Review session before exams are given in my classroom	93% (28)	7% (2)	0%	0%
Videos and guest speakers are part of my delivery of information	87% (26)	0%	0%	13% (4)
Extra credit opportunities exist in my classroom	83% (25)	17% (5)	0%	0%
Opportunities for peer tutoring are present in my classroom	93% (28)	7% (2)	0%	0%
My main teaching strategy is lecture.	83% (25)	17% (5)	0%	0%
Students are actively engaged at least 10% or more in my class	86% (26)	14% (4)	0%	0%
Opportunities for small group instruction exist in my class	93% (28)	7% (2)	0%	0%
My primary focus is whole group instruction	77% (23)	23% (7)	0%	0%
Cooperative learning is present in the classroom	86% (26)	14% (4)	0%	0%

Lecture based teaching always (4) accounts for eighty three (83%) of teachers surveyed, but only seventeen percent (17%) of teachers indicated that they seldom (1) use lecture as part of the teaching process. Ninety three percent (93%) of teachers indicated that they always (4) give opportunities for peer tutoring during their class times and only seven percent (7%) indicated that it seldom (1) happens in their classroom. Teachers that reported that students are actively engaged in the classroom, always (4), resulted eighty six percent (86%), while usually (3) statistics signified fourteen percent (14%). Other finding pointed out the following: 1) Small group instruction opportunities: Always (4) 93%, Usually (3) 7%; 2) Whole group instruction always happen: Always (4) 77%, Usually (3) 23%; 3) Opportunities for cooperative learning: Always (4) 86%, Usually (3) 14%.

Table 2 shows the results of learning styles indicated in this study. The learning styles of students were determined by the Paragon Learning Style Inventory (PLSI) with students answering a series of questions that pertained to their own feelings about certain statements. Learning styles of students fell into six out of the possible sixteen categories, which is 43% of the total population of learning styles. Results show that the five dominant learning styles existed for students in seventh grade that consisted of ENTJ (Extrovert/Intuitive/Thinker/Judger), ESFP (Extrovert/Sensitive/Feeler/Perceiver), ESTP (Extrovert/Sensitive/ Thinker/Perceiver), ESFJ (Extrovert/Sensitive/Feeler/Judger), and ENFJ (Extrovert/Intuitive/Feeler/Judger). The most dominant ESFP (Extrovert/Sensitive/Feeler/Perceiver) (43%) indicated that students are extroverts, sensate, feelers, and perceivers. These students were found to be in the English classes that were surveyed. References indicate that this learning style is the most dominant overall in the learning style population distribution (Shindler, 2004).

Table 2

Five Most Dominant Students' Learning Styles

Students' Learning Styles				
ESFP	ENTJ	ESTP	ENFJ	ESTJ
43% (248)	26% (150)	23% (133)	2% (11)	2% (11)

The second most dominant learning style was ENTJ (Extrovert/Intuitive/Thinker/Judger) (26%).

These students were in 5 out of the 8 Math classes surveyed. ESTP (Extroverts/Sensitive/Thinkers/Perceiver) were ranked third. These students comprised a small number in math, English and science classes surveyed. Although this classification is slightly higher than the overall learning style population distribution indicated by the author, it relates only to the number of participants in this study. The majority of science students that were surveyed were classified as possessing this learning style (74%). Students that had a learning style that classified them as Extrovert/Sensitive/Feeler/Judger), ESFJ, were surveyed at 4%. ENFJ (Extrovert/Intuitive/Feeler/Judger) and ESTJ (Extrovert/Sensitive/Thinker/Judger) were classified at 2% each, respectively in this research study. These students were found to be in the Math classes. The other 4% of students possessed several of the other combinations of learning styles indicated by the author. Each learning style was pointed out by Dr. Shindler (2004) that many different labels for each study would vary by only a small percentage in each category.

Of the teachers surveyed in relationship to student learning styles, seventh grade Math teachers possessed a teaching style of Always more than doubled those that possessed a teaching style of Usually, sixty-two (68) percent versus thirty-one (31) percent, respectively. Table 3 shows the following results. Thirty-eight (38) percent of students in seventh grade Math fell into

the ENTJ (Extrovert/Intuitive/Thinker/Judger) learning style, ten (10) percent of students indicated an ESFP (Extrovert/Sensitive/Feeler/Perceiver), seven (7) percent ESTP (Extrovert/Sensitive/Thinker/Perceiver), and thirteen (13) percent ESFJ (Extrovert/Sensitive/Feeler/Judger) with teachers with an Always teaching style. The thirty-two percent of teachers that indicated a teaching style of Usually accounted for students with learning styles of ESFP (Extrovert/Sensitive/Feeler/Perceiver), sixteen (16) percent and five (5) percent indicated a learning style of ESTP (Extrovert/Sensitive/Thinker/Perceiver).

Seventh grade English teachers' teaching style indicated a fifty-two (52) percent for the Always teaching style of teachers, and forty-eight (48) for the Usually teaching styles of teachers. Students that fell into the category of teachers' possessing the Always teaching style in English, accounted for seventy-one (71) percent of student surveyed, while the other twenty-nine percent (29) percent fell into the teaching style of Usually. Two student learning styles resulted in this analysis, ESFP (Extrovert/Sensitive/Feeler/Perceiver), and ESTP (Extrovert/Sensitive/Thinker/Perceiver). Science teachers in seventh grade indicated fifty (50) percent for the Always and Usually teaching styles. ESTP (Extrovert/Sensitive/Thinker/Perceiver) and ESFJ (Extrovert/Sensitive/Feeler/Judger) were the two learning style indicated for students. Students that possessed the ESTP (Extrovert/Sensitive/Thinker/Perceiver) learning style in Science accounted for (100) one-hundred percent in the Always teaching style indicated by teachers and teachers' with the teaching style of Usually, accounted for sixty-six (66) percent of ESTP (Extrovert/Sensitive/Thinker/Perceiver) and thirty-four (34) percent of ESFJ (Extrovert/Sensitive/Feeler/Judger), respectively.

Eighth grade Math teachers were shown to have a teaching style of Always, sixty-seven (67) percent surveyed versus thirty-three (33) percent of teachers possessing a teaching style of

Usually. Learning styles indicated for students that fell under the teaching style of Always was seventy-three (73) percent ENTJ (Extrovert/Intuitive/Thinker/Judger) and twenty-seven (27) percent ENFJ (Extrovert/Intuitive/Feeler/Judger). The Usually teaching style, students indicated seventy-six (76) percent ENTJ (Extrovert/Intuitive/Thinker/Judger) and twenty-four (24) percent ENFJ (Extrovert/Intuitive/Feeler/Judger) learning styles, respectively. Results show that English teachers in eighth grade possessed an Always teaching style forty three (43) percent versus fifty-six (56) percent that possessed a Usually teaching style. Learning styles of ESFP (Extrovert/Sensitive/Feeler/Perceiver) and ESTP (Extrovert/Sensitive/Thinker/Perceiver) account for ninety-three (93) and seven (7) percent for a Usually teaching style, and sixty-nine (69) and thirty-one (31) percent for the Always teaching styles, respectively. Eighth grade Science teachers possessed sixty-eight (68) percent of an Always teaching style while thirty-two (32) percent indicated a teaching style of Usually. Within this Usually teaching style, twenty-nine (29) and seventy-one (71) percent of students fell into the ESFJ (Extrovert/Sensitive/Feeler/Judger) and ESTP (Extrovert/Sensitive/Thinker/Perceiver), respectively, while seventy-six (76) percent and twenty-three (23) percent fall under the Always teaching styles in the ESFJ (Extrovert/Sensitive/Feeler/Judger) and ESTP (Extrovert/Sensitive/Thinker/Perceiver) styles.

Table 3

Students' Learning Styles by Subject/Grade in Relation to Teachers' Learning Style

Subject/Grade	Teaching Style	Student Learning Style	Percentage
Math/7 th	Always (68%)	ENTJ	38%
		ESFP	10%
		ESTP	7%
		ESFJ	13%
	Usually (32%)	ESFP	16%
		ESTP	5%
English/7 th	Always (52%)	ESFP	71%
	Usually (48%)	ESTP	29%
Science/7 th	Always (50%)	ESTP	100%
	Usually (50%)	ESTP	66%
		ESFJ	34%
Math/8 th	Always (67%)	ENTJ	73%
		ENFJ	27%
	Usually	ENTJ	76%
		ENFJ	24%
English/8 th	Always (43%)	ESFP	69%
		ESTP	31%
	Usually (56%)	ESFP	93%

Table 3 cont.

Students' Learning Style by Subject/Grade in Relation to Teachers' Learning Style

Subject/Grade	Teaching Style	Student Learning Style	Percentage
English/8th	Usually	ESTP	7%
Science/8th	Always (68%)	ESFJ	76%
		ESTP	23%
	Usually (32%)	ESFJ	29%
		ESTP	71%

Determining the learning styles of teachers was accomplished using the Index of Learning Style (ILS) that required teachers to answer questions related to how they perceived themselves as learners. Table 4 show the following results from teachers surveyed in relationship to their learning styles. In seventh grade, forty (40) percent of teachers possess the Visual Learning Style, thirty-one (31) percent possessed the Balanced Learning Style, and twenty-nine (29) percent possessed the Verbal Learning Style. The learning styles of eighth grade teachers resulted in Visual (61%), Verbal (18%), and Balanced (21%).

Table 4

Teachers' Learning Style as Indicated By Grade

Grade	Learning Style	Percentage
7th	Visual	40%
	Balanced	31%
	Verbal	29%
Grade	Learning Style	Percentage
8 th	Visual	61%
	Balanced	21%
	Verbal	18%

Of the 247 seventh graders surveyed for learning styles ten (10) percent possessed the learning style of ENTJ (Extrovert/Intuitive/Thinker/Judger); thirty-one (31) percent ESFP (Extrovert/Sensitive/Feeler/Perceiver); twenty-eight (28) percent ESTP (Extrovert/Sensitive/Thinker/Perceiver); eight (8) percent ESFJ (Extrovert/Sensitive/Feeler/Judger); and four (4) percent ENFJ (Extrovert/Intuitive/Feeler/Judger). Other learning styles were present but these five were the most dominant ones for seventh grade students surveyed. The 330 eighth grade students' surveyed learning styles results show that forty-five (45) percent possess the style of ENTJ (Extrovert/Intuitive/Thinker/Judger); twenty-two (22) percent ENFJ (Extrovert/Intuitive/Feeler/Judger); thirteen (13) percent ESFP (Extrovert/Sensitive/Feeler/Perceiver), and ESTP (Extrovert/Sensitive/Thinker/Perceiver), and ESFJ (Extrovert/Sensitive/Feeler/Judger), five (5%), respectively. Table 5 shows these results.

Table 6 shows the results for seventh grade teachers that possessed a verbal learning style accounted for 15% of students that possessed a learning style of ESFP (Extrovert/Sensitive/Feeler/Perceiver); 6% ESFJ (Extrovert/Sensitive/Feeler/Judger); 5% ENFJ (Extrovert/Intuitive/Feelder/Judger), and 4% ESTP (Extrovert/Sensitive/Thinker/Perceiver). Teachers that possessed a visual learning style accounted for students with learning styles of ENTJ (Extrovert/Intuitive/Thinker/Judger) (8%), ESFP (Extrovert/Sensitive/Feeler/Perceiver) (11%), ESTP (Extrovert/Sensitive/Thinker/Perceiver) (21%), and ESFJ (Extrovert/Sensitive/Feeler/Judger) (10%). Results show that teachers with a balanced learning style account for 9% of students with a learning style of ENTJ (Extrovert/Intuitive/Thinker/Judger), 7% ENTP (Extrovert/Intuitive/Thinker/Perceiver), 12% ENFP (Extrovert/Intuitive/Feeler/Perceiver), and 3% ESTP (Extrovert/Sensitive/Thinker/Perceiver). Eighth grade teachers' with the visual learning style accounted for 9% of students with the learning style of ESFJ (Extrovert/Sensitive/Feeler/Judger); 13% ESTP (Extrovert/Sensitive/Thinker/Perceiver); 17% ENTJ (Extrovert/Intuitive/Thinker/Judger); 4% ENFJ (Extrovert/Intuitive/Feeler/Judger); and 15% ESFP (Extrovert/Sensitive/Feeler/Perceiver); Teachers that possessed a verbal learning style accounts for 6% of students with a learning style of ENTJ (Extrovert/Intuitive/Thinker/Judger); 10% ESFP (Extrovert/Sensitive/Feeler/Perceiver); and 1% ESTP (Extrovert/Sensitive/Thinker/Perceiver); while the teacher with the balanced learning style accounts for 3% ESFJ (Extrovert/Sensitive/Feeler/Judger); 12% ENTJ (Extrovert/Intuitive/Thinker/Judger); 2% ENFJ (Extrovert/Intuitive/Feeler/Judger), and 8% ESFP (Extrovert/Sensitive/Feeler/Perceiver).

Table 7 results revealed that students' learning styles in relation to student achievement 31% of students in seventh grade Math possessed a ENTJ (Extrovert/Intuitive/Thinker/Judger) learning style, 27% ESFP (Extrovert/Sensitive/Feeler/Perceiver); 16% ESTP (Extrovert/

Sensitive/Thinker/Perceiver); 15% ESFJ (Extrovert/Sensitive/Feeler/Judger); 11% ENFJ (Extrovert/Intuitive/Feeler/Judger). In seventh grade English, 80% of students possessed a learning style of ESFP (Extrovert/Sensitive/Feeler/Perceiver) and 20% possessed ESTP (Extrovert/Sensitive/Thinker/Perceiver). In seventh grade Science, 83% ESTP (Extrovert/Sensitive/Thinker/Perceiver) and 17% ESFJ (Extrovert/Sensitive/Feeler/Judger). On the other hand, eighth grade Math students possessed 88% ENTJ (Extrovert/Intuitive/Thinker/Judger) and 12% ENFJ (Extrovert/Intuitive/Feeler/Judger), respectively. Eighth grade English students, 95% of them possessed ESFP (Extrovert/Sensitive/Feeler/Perceiver) with only 5% of students that possessed a learning style of ESTP (Extrovert/Sensitive/Thinker/Perceiver). And finally, in eighth grade Science, results indicated that 61% ESFJ (Extrovert/Sensitive/Feeler/Judger) and 39% ESTP (Extrovert/Sensitive/Thinker/Perceiver) for these students.

Table 8 shows the summary of variables and hypothesis testing. Hypothesis 1 shows that there is a significant relationship between the learning styles of students in seventh grade in English, science, and math and teaching strategies. In eighth grade, there was a significant relationship between the students' learning styles and teaching strategies for students in English and science, but not a significant relationship with these two variables for math. Hypothesis 2: Seventh grade results show that there was a significant relationship between teachers' learning styles and students' learning styles for math and science, but not a significant relationship for English. Eighth grade results show that the significant relationship existed for Hypothesis 2 in English and science, but not for math. Hypothesis 3 results show that there is not a significant relationship between students' learning styles and student achievement for students in seventh and eighth grade English, science, and math classes, respectively. For Hypothesis 4, results show that a significant relationship exists for seventh grade English only between teachers' learning

style and student achievement, but not a significant difference for math and science. There is not a significant difference between teachers' learning styles and student achievement in English, math, and science classes for students in eighth grade. Hypothesis 5, there is not a significant relationship between teachers' learning styles and student achievement in seventh and eighth grade English, math, and science classes, respectively.

Table 5

Students' Learning Styles by Grade

Grade	Students' Learning Style	Percentage
7 th	ENTJ	10%
	ESFP	31%
	ESTP	28%
	ESFJ	8%
	ENFJ	4%
8 th	ENTJ	45%
	ENFJ	22%
	ESFP	13%
	ESTP	5%
	ESFJ	5%

Table 6

Teachers' Learning Style in Relation to Students' Learning Style by Grade

Grade	Teachers' Learning Style	Students' Learning Style	Percentage
7 th	Verbal	ESFP	15%
		ESFJ	6%
		ENFJ	5%
		ESTP	4%
	Visual	ENTJ	8%
		ESFP	11%
		ESTP	21%
		ESFJ	10%
	Balanced	ENTJ	9%
		ENTP	7%
		ENFP	12%
		ESTP	3%
8 th	Verbal	ENTJ	6%
		ESFP	10%
		ESTP	1%
	Visual	ESFJ	9%
		ESTP	13%

Table 6 cont.

Teachers' Learning Style in Relation to Students' Learning Style by Grade

Grade	Teachers' Learning Style	Students' Learning Style	Percentage
8 th	Visual	ENTJ	17%
		ENFJ	4%
		ESFP	15%
	Balanced	ESFJ	3%
		ENTJ	12%
		ENFJ	2%
		ESFP	8%

Table 7

Students' Learning Styles by Subject and Grade

Grade	Subject	Students' Learning Style	Percentage	
7 th	Math	ENTJ	31%	
		ESFP	27%	
		ESTP	16%	
		ESFJ	15%	
		ENFJ	11%	
	English	ESFP	80%	
		ESTP	20%	
	Science	ESFJ	17%	
	8 th	Math	ENTJ	88%
			ENFJ	12%
English		ESFP	95%	
		ESTP	5%	
Science		ESFJ	61%	
		ESTP	39%	

Table 8

Summary of Variables and Hypothesis Testing

	Variables (I = Independent) (D= Dependent)	Significance $P \leq .05$	Grade		Analysis Type
			7 th	8 th	
Hypothesis 1	Teaching Strategies (I) Students' Learning Styles (D)	Y = Yes N = No	Eng – Yes Math- Yes Sci – Yes	Eng- Yes Math-No Sci - Yes	Chi- Square
Hypothesis 2	Teachers' Learning Styles (I) Students' Learning Styles (D)	Y = Yes N = No	Eng – No Math- Yes Sci – Yes	Eng–Yes Math-No Sci- Yes	Chi- Square
Hypothesis 3	Students' Learning Styles (I) Student Achievement (D)	Y = Yes N = No	Eng – No Math – No Sci – No	Eng – No Math- No Sci - No	One Way ANOVA
Hypothesis 4	Teachers' Learning Styles (I) Student Achievement (D)	Y = Yes N = No	Eng – Yes Math – No Sci – No	Eng – No Math – No Sci – No	One Way ANOVA
Hypothesis 5	Teachers' Learning Styles (I) Student Achievement (D)	Y = Yes N = No	Eng – No Math – No Sci – No	Eng – No Math–No Sci – No	One Way ANOVA

Summary

The results show that there are many different characteristics of teachers' learning styles, teachers' teaching styles, students' learning styles, and the effects that these aspects have on student achievement. Although, this study found that some of these attributes have a significant effect on student achievement, there are many more studies that can be and need to be conducted to find these outcomes. Chapter 5 will discuss the conclusions and recommendations for further research in respects to the hypotheses investigated in this study.

Chapter V

CONCLUSIONS, DISCUSSION AND RECOMMENDATIONS FOR FURTHER RESEARCH

Conclusions related to this study are presented in this chapter. Results and recommendations for further research are presented along with a discussion of the results.

Purpose of the Study

The primary purpose of this study was to investigate the relationship between middle school students' learning styles and the teaching and learning styles of middle school teachers in a rural Tennessee school district. A secondary purpose of this study investigated affects on student achievement and relationships to (1) students' learning styles, (2) styles of learning among middle school teachers, and (3) different styles of teaching among middle school teachers. The study examined five hypotheses in relationship to the effects of and the learning styles of middle school students and the teaching and learning styles of middle school teachers and student achievement (See Table 8).

Conclusions

1. Teachers surveyed in this study were always or usually using the factors on the survey for classroom instruction. (i.e., students actively engaged during class time; review sessions predominately used to review for tests; opportunities for peer tutoring exists in the classroom; small group instruction exists in the classroom; and the use of internet-related technology is part of instruction time.

2. Among seventh grade students in English, math, and science, significant relationships were found between teaching styles and students' learning styles. Significant findings between teaching styles and students' learning styles were also found in English and science for eighth graders.
3. Significant relationships were found to exist for seventh grade students' learning styles and teachers' learning styles in English, math, and science. For eighth grades, significant findings were found between students' learning styles and teachers' learning styles for English and science.
4. Among seventh and eighth grade students in English, math, and science, there was not a significant relationship between students' learning styles and student achievement at the middle school level.
5. Results resulted in a significant difference in seventh grade student achievement in English only, but no significance difference in math and science. For eighth grade, there was not a significant difference in teachers' learning styles and student achievement in English, math, and science classes.
6. A significant relationship did not exist between seventh or eighth grade students' achievement and teachers' learning styles in math, English, and science classes.
7. Teachers surveyed in this study were assessed to have either a Verbal, Visual or Balanced learning style.
8. Student achievement was not affected by teachers' teaching style no matter what their style of learning.
9. Students surveyed in this study possessed five dominant learning styles out of a possible sixteen combinations.

Discussion

Results indicate in this study that the teachers always or usually use the 11 factors as part of the delivery of information for the classroom. In this study, results show that the use of PowerPoint in presenting classroom information is used a combination of eighty (80) percent always and usually; the use of internet-related technology, review sessions before exams, extra credit opportunities, lecture based teaching strategy, students being actively engaged at least 10% or more in the classroom, opportunities for small group instruction, whole group instruction as the primary focus, and cooperative learning are used one hundred (100) percent of the time, respectively, while videos and guest speakers are assessed at eighty-seven (87) percent.

Steiner, et al. (2006), conducted a study that showed results that were comparable to the results in this study. Steiner concluded that all of the factors used in the delivery of information resulted in the 95th to 99th percentile of all factors used. These researchers also used gender as one of the factors in the study which resulted in a slight decline in whole group instruction (67%), and extra credit opportunities (79%). The study showed that male instructors as surveyed by the students were not as willing to use these types of factors when delivering information to the class.

In this study, teachers' learning styles results showed that they possessed three out of the eight possible learning styles indicated on the ILS. The visual learners remember best by what they see (pictures, diagrams, flow charts, time lines and demonstrations and verbal learners get more out of words (written and spoken explanations). According to Felder and Solomon (2004), all students gain more academically, when both of these learning styles are present, and balanced learners possess traits from both the verbal and visual learning styles.

Student achievement was not affected by teachers' teaching style as results show in this study. Math scores ranged from 77 to 100 and 76 to 100, in seventh grade and eighth grade respectively. English scores ranged from 77 to 100 in seventh grade and 76 to 100 for eighth grade, and Science scores ranged from 76 to 100 for seventh grade, and 78 to 100 for eighth grade. Although the scores are averaged at 88, this indicated that the students were achieving academic success based on this study. In direct contrast to this study, Balhan (2007) found that teachers' teaching style significantly affected achievement. He contends that the significance was found to be in the math scores that ranged from 67 to 88 in seventh grade and 70 to 81 in eighth grade. For English and Science, the seventh grade scores were shown to be between 73 and 78, and 70 and 84, respectively. These scores were also noted to come from private versus government schools, whereas, this study only indicates scores from public schools. Student achievement was affected significantly by the teachers' style of learning in seventh grade English, but not in seventh grade science or math.

Although the study was done for first year college students, Drysdale, Ross, and Shulz (2001) indicates that teaching styles does not have a significant effect on student achievement, but that other factors may cause students to fail (i.e., first time away from home, lack of prerequisites for college, class attendance). These factors can have a major effect on student achievement in all subjects. As well as, teachers' teaching styles, as shown by these researchers, can also affect achievement results involving student achievement and the teachers' style of learning for eighth graders indicated that student achievement in math, science, and English was not influenced by the style of learning among teachers. Math and English mean scores in this study equaled 89. These researchers contend that this mean score is showing academic indication of which one are affected and how success is aligned with their results.

Of the sixteen possible combinations, there were five dominant learning styles that resulted from this study. The dominant learning styles included ESFP (Extrovert/Sensitive/Feeler/Perceiver) (43%); ENTJ (Extrovert/Intuitive/Thinker/Judger) (26%); ESTP (Extrovert/Sensitive/Thinker/Perceiver) (23%); ENFJ (Extrovert/Intuitive/Feeler/Judger) (2%), and ESTJ (Extrovert/Sensitive/Thinker/Judger) (2%). The PLSI (Paragon Learning Style Inventory) indicate that these learning styles are shared by 7% of males and 10% of females for ESFP. For ENTJ, this style is shared by 3% of males and 3% of females; ESTP, 6% of males and 3% of females; ENFJ, 2% of males and 3% of females, and for ESTJ, 11% of males and 6% of females. Although this study did not complete a survey for gender and learning styles, the PLSI (2004), indicates a direct contrast of overall percentages for the learning styles of students surveyed.

Recommendations

The researcher suggests the following from this study. (1) Additional research should be performed to examine the relationship of student achievement and students learning styles in K-12 classrooms; (2) provide additional resources for teachers to become familiar with the students' learning styles in order to provide them with the tools needed to be successful; and (3) conduct research to align the same learning styles of middle school teachers and middle school students to see if the relationship would not be significant.

REFERENCES

- Balhan, E. M. (2007). Learning styles in relation to academic performance in middle school mathematics. *Digest of Middle East Students, Spring*. 42-57.
- Baron, R. A., & Byrne, D. (2004). *Social Psychology*. 10th ed. Boston: Pearson.
- Corrice, A. (2009). Unconscious bias in faculty and leadership recruitment: A literature review. *Association of American Medical Colleges*. 9(2), 12 -15.
- Chiou, W. (2008). College students role models, learning styles preferences, and academic achievement in collaborative teaching: Absolute versus relativistic thinking. *Adolescence*, 43(169), 129-142.
- Damon, W. (2007). Dispositions and teacher assessment: The need for defining a more rigorous definition. *Journal of Teacher Education*. 56 (5), Nov/Dec. 365-369.
- Drysdale, M. T., Ross, J. L., & Shulz, R. A. (2001). Cognitive learning styles and academic performance in 19 first-year university courses: Successful students versus students at risk. *Journal of Education for Students Placed at Risk*, 6(3), 271- 289.
- Evans, C., Harkins, M., & Young, J. (2008). Exploring teaching styles and cognitive styles: Evidence from school teachers in Canada. *North American Journal of Psychology*, 1 (3), 567 – 582.
- Farkas, R. (2003). Effects of traditional versus learning-styles instructional methods on middle school students. *The Journal of Educational Research*. 97(1), 42- 51.
- Felder, R. (2006). An introduction to learning styles: How students learn, how teachers teach, and what usually goes wrong with the process. *Center for Teaching and Learning*. Retrieved June 7, 2010 from [<http://www.ncsu.edu/felder-public>].

- Felder, R., & Brent, R. (2005). Understanding student differences. *Journal of Engineering Education*. 94(1), 57-72.
- Felder, R., & Spurlin, J. (2005). Applications, reliability and validity of the index of learning styles. *International Journal of Engineering Education*, 21 (1), 103-112.
- Glenn, D. (2009). Matching teaching styles to learning styles may not help students. *The Chronicle of Higher Education*. December. 25 – 33.
- Gopalan, S., Khojasteh, M., & Cherikh, M. (2010). The impact of faculty teaching styles on student motivation and learning: results from an exploratory study of b-school students from India. *Proceedings of the Academy for Studies in International Business*, 10(1), 21 – 26.
- Joseph, N. (2006). Metacognition needed: Teaching middle and high school students to develop strategic learning skills. *New England Reading Association Journal*. 54(2), 99- 103.
- Kang, J., & Banaji, M. (2006). Fair measures: A behavioral realist revision of affirmative action. *California Law Review*, 94, 1063-1118.
- Kosmerl, K. M. (2003). Teacher's perception of gender bias in the classroom. Paper presented to the Graduate School, University of Wisconsin-Stout, May.
- Manochehr, N. (2004). The influence of learning style on learners in E-learning environments: An empirical studies. *Cheer*, 18, 10 –14.
- Merrigan, T., & White, W. (2010). Harvard Business School Grapples with gender imbalance. *The Harvard Crimson Inc.*, 16(1), 22-29.
- Moule, J. (2009). Understanding unconscious bias an unintentional racism. *Phi Delta Kappan*. January, 321-326.

- Opdenakker, M., & Damme, J. (2006). Teachers' characteristics and teaching styles as effective enhancing factors of classroom practices. *Teaching and Teacher Education, 22*, 1-21.
- Ouazad A. (2008). Assessed by a teacher like me: Race, gender and subjective evaluations. *Journal of Experimental Education. 17*(3), 1 – 44.
- Richardson, J. (2005). Instruments for obtaining student feedback: A review of the literature. *Assessment and Evaluation in Higher Education, 30*(4), 387- 415.
- Rimm-Kaufman, S., Storm, M., Sawyer, B., Planta, R., & LaParo, K. (2006). The teacher belief q-sort: A measure of teachers' priorities in relations to disciplinary practices, teaching practices, and beliefs about children. *Journal of School Psychology. 44*(2), 141-165.
- Rimm-Kaufman, S., & Sawyer, B. (2004). Primary grade teachers' self-efficacy beliefs, attitudes toward and discipline and teaching practice priorities in relation to the responsive classroom approach. *The Elementary School Journal. 104*(4), 321-341.
- Ross, H. (2008). Exploring unconscious bias. *Diversity Best Practics. 2*(5), 1 – 18. .
- Salkind, R. (2008) *Statistics for People Who (Think They) Hate Statistics*. Sage Publications, 3rd Edition. Los Angeles, CA.
- Shuaibu, S. (2010). Effects of learning styles on career preferences of senior secondary school students in Jigawa State, Nigeria. *Educational Journal of Counseling. 3*(1), 132-142.
- Smith, N., Bridge, J., & Clarke, E. (2002). An evaluation of students' performance based on their preferred learning styles. *Proceedings 3rd Annual Conference for Engineering Education*, Melbourne, Australia. 340 – 358.
- Steiner, S., Holley, L., Gerdes, K., & Campbell, H. (2006). *Journal of Social Work Education. 42*(2), 355- 373.

- Tenenbaum, H., & Ruck, M. (2007). Are teachers' expectations different for racial minority than for European American students: A meta-analysis. *Journal of Educational Psychology*, 99(2), 253-273.
- Teven, J., & McCroskey, (1997). The relationship of perceived teacher caring with student learning and teacher evaluation. *Communication Education*. 46, 167-176.
- Theall, M., & Franklin, J. (2001). Looking for bias in all the wrong places: A search for truth or a witch hunt in student ratings of instruction? *New Directions for Institutional Research*, 109, Spring, 45 – 56.
- Tyler, K., Stevens, R., & Uqdah, A. (2008). Cultural bias in teaching. *Education Journal*, 3(2), 29 – 42.
- Vaughn, L.M., & Baker, R. C. (2008). Do different pairing of teaching styles and learning styles make a difference? Preceptor and resident perceptions. *Teaching and Learning in Medicine*, 20(3), 239 – 247.
- Wentzel, K. (2002). Are effective teachers like good parents? Teaching styles and student adjustment in early adolescence. *Child Development*, 73 (1), 287-301, January/February.
- Zhang, L. (2008). Teachers' styles of thinking: An exploratory study. *The Journal of Psychology*. 142(1), 37-55.
- Zhenhui, R. (2001). Matching teaching styles with learning styles in East Asian contexts. *The TESL Journal*, 7(7), 1 – 9.

CERTIFICATIONS & EDUCATION

UNIVERSITY OF MISSISSIPPI – University, MS **2006–2011**
Ed.D. in Education/Emphasis: Curriculum & Instruction

FREED-HARDEMAN UNIVERSITY – Henderson, TN **1998-1999**
Masters of Education: Curriculum & Instruction (45 hrs. of Administrative & Supervision)

UNION UNIVERSITY – Jackson, TN **1991-1993**
Bachelors of Science: Business Administration

Teaching Licensing & Certifications:
California & Tennessee

ACCOMPLISHMENTS

- **Dependable, dedicated professional with leadership abilities.**
- **Commissioned 2nd Lieutenant in 1993/Staff Sergeant (SSG-E6) Retired United States Army National Guard**