

FREQUENCY OF USE OF CONSTRUCTIVIST TEACHING STRATEGIES: EFFECT
ON ACADEMIC PERFORMANCE, STUDENT SOCIAL BEHAVIOR, AND
RELATIONSHIP TO CLASS SIZE

by

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ABSTRACT

The purpose of this research was to explore the relationship between frequency of use of constructivist teaching strategies with student academic performance, student social behavior, and class size. The researcher developed the research tool to measure frequency of use of constructivist teaching strategies in three areas: classroom management, teaching and learning activities, and assessment. A pilot survey was conducted at Tripoli Middle School to determine the validity and reliability of the research tool. The final survey was developed and sent to six hundred and ninety-nine middle school teachers in a Southwestern Florida County school system. Three hundred and eighteen teachers responded to the survey.

Academic performance was measured using each Middle School's grade (A, B, C, D, or F) on the Florida State Accountability System. Social behavior was measured by the number of behavioral referrals given per year by teachers at each school as indicated on the survey, and class size was determined by teacher responses on the demographic portion of the survey.

The survey was developed using focus groups of teachers, the National Board Certification standards, CRISS – Creating Independence through Student-Owned Strategies (Santa, 1998), SHINES – Strategies to Help Implement New Educational Standards (Finger, 1999), and instructional strategy textbooks. Five experts in the field of instructional strategy, and the director of a Southwestern Florida County Research and

Testing Division reviewed the survey and assigned test items to categories defined by those facets of the survey. The six experts agreed on the wording of the descriptive phrases on the survey and on the category assignment for each phrase as either traditional or constructivist. Equal numbers of constructivist and traditional teaching strategies were included in the survey instrument and teachers were asked to respond to each teaching strategy using a Likert scale as follows: 5 = Always, 4 = Frequently, 3 = Sometimes, 2 = Rarely, and 1 = Never. Teacher privacy was protected because the survey had no specific identifying teacher information and teachers were encouraged not to answer questions they so chose. There were no anticipated risks as the information collected from the participants was collected anonymously.

The researcher developed survey instrument was piloted and revised prior to use with the participants in this study. Data collected using the final survey instrument indicated that there was no significant correlation between the use of constructivist teaching strategies and student academic performance as measured by each middle school's grade (A, B, C, D, F) on the states mandated grading of schools scale. The scale is calculated by student performance on the state's high stakes test (FCAT – Florida Comprehensive Assessment Test) in reading and mathematics, percentage of students tested, attendance, and student drop out rates.

A small significant negative correlation between the use of constructivist teaching strategies and the number of student behavioral referrals indicated that the more teachers use constructivist teaching strategies, the lower the numbers of referrals per year.

Additionally, it was determined that as class sizes increased, the use of constructivist teaching strategies increased.

This document is dedicated to the memory of my mother Byrd Kendall Binkley (Professor and teacher), and father Professor Wendell Chester Binkley, and to my husband Lewis E. Henry and children Wendell Tyler Campbell, Leigh Ellen Baird, Major Lewis Earl Henry, and Kendall Lyon Henry.

I am grateful to my parents for their love and guidance, for instilling in me an undying work ethic, and a love of learning. They imparted to me their belief that “we have an obligation to use to the fullest whatever talents God, luck, or fate has bestowed to leave the world a better place”.

It was my husband’s love, patience, and encouragement that allowed me the time and strength to complete this intellectual journey. He taught me to chase a rainbow.

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CHAPTER 1: INTRODUCTION

Background and Significance

Social Constructivism centers around the idea that knowledge is not located in individuals but in communities. The social constructivist's underlying assumption is that learning depends on group interaction and learning activities and assignments should be collaborative (Phye, 1993). The social constructivist's view of learning encourages teaching for understanding in a hands-on approach. Thus an environment that includes trial and error, experimentation, and interaction with fellow learners, assisted by the teacher, and that allows students to build their own understanding is appropriate (Brody & Davidson, 1998). In a constructivist classroom, lessons are introduced to motivate students to see how it is relevant to their lives. The classroom structure is open and trial and error is encouraged. Student groups reflect on what is learned academically as well as develop social skills. The goal is to foster student's intrinsic motivation to become a life long learner and a caring responsible citizen. Constructivist teachers provide an environment in which students construct their understanding of the world through reflection on their own experiences. Students use the rules and mental models they generate in the process of learning to make sense of new experiences. Constructivist

teachers help students understand that “I am where I am today. I was different yesterday, and I will be different tomorrow. But I am where I am today, and it’s ok” (Cohen, 1996).

According to Piaget (1968), the acquisition of knowledge is a social endeavor. Knowledge results from continuous phases of understanding which involve engagement of the learner with information and people, and invention and exploration lead to passage from one stage to another, characterized by new structures which did not exist before in the subject’s mind or in the external world. The acquisition of knowledge is a social endeavor (Piaget, 1968).

The broad goals of public education should be to facilitate the acquisition of knowledge so that students construct their knowledge and move through an upward learning spiral with confidence. Public education should encourage considerate citizenry within our culture, and to foster student awareness and concern for our environment. Constructivist teaching strategies accomplish these goals (Cohen, 1996).

From the 1980s to 1999, research involving the effect of class size on student achievement and teacher morale indicates that smaller classes increase student achievement in reading and math, reduce student drop-outs, increase positive classroom behavior, increase the numbers of students aspiring to attend college, and increase teacher morale (Achilles, 1999). Education is an investment in the growth of human capital and the actual return on the investment in education includes social benefits like less vandalism or violence, reduced teen pregnancy and unemployment, and fewer dropouts (Achilles, 1999).

Purpose of the Study

The purpose of this research was to explore the relationship of frequency of use of constructivist teaching strategies with academic performance, student social behavior, and class size.

Research Questions

Research Question One: What is the relationship between teacher's use of constructivist teaching and learning strategies and student academic achievement in reading and mathematics on the Florida Comprehensive Assessment Test as reflected in each school's Florida State Accountability Grade (A,B,C,D, or F).

Research Question Two: What is the relationship between teachers use of constructivist teaching and learning strategies and student social behavior as determined by teacher's behavioral referrals?

Research Question Three: What is the relationship between teacher's use of constructivist teaching and learning strategies and class size as measured by teacher survey responses.

Definition of Terms

In this study the following terms were used as described below:

- Adaptation: An equilibrium between the action of the organism on the environment (Piaget, 1972).
- Constructivism: Knowledge is viewed as a human construction and learning means constructing, creating, inventing, and developing knowledge (Marlow & Page, 1998).
A perspective of learning that is founded on the premise that people construct their own understanding of the world through a process of adjusting mental modes to accommodate new experiences (Marlow & Page, 1998).
- Constructivist Teaching: Teachers provide an environment in which students are actively engaged in their own learning, and build their own knowledge structures by investigating and discovering (Marlowe & Page, 1998).
- Compensation: The accommodation of internal structures in response to a knowledge disturbance, restoring the disturbed balance.
- Disequilibrium: An imbalance that occurs when new information is assimilated into existing schema (Cohen, & Younghee, 1999).
- Equilibration: The re-balancing that occurs when new information is assimilated into the existing structure or when the learning structure is modified to accommodate the new information (Cohen & Younghee, 1999).
- Genetic Epistemology: Knowledge results from continuous construction because each act of understanding involves invention and the passage from one learning stage to another is characterized by new structures which did not exist before in the subject's mind (Piaget, 1968).
- Intelligence: Mental adaptation to new circumstances (Piaget, 1972).

- Learning: The assimilation of new information into the existing structure, and accommodating or modifying the existing structure to deal with the new information (Cohen & Younghee, 1999).
- Schema: Mental frameworks of existing knowledge or prior knowledge.
- Social Constructivism: Learning depends on group interaction and learning activities should be collaborative (Phye, 1993). The knower and the environment cannot be separated in the development of logical thinking processes (Piaget, 1968).

Limitations

Although all teachers had an opportunity to participate in the research, some teachers may have chosen not to participate or may not have returned the survey. If these teachers had specific and strong beliefs about constructivist teaching strategies, this lack of response could have biased the results of this study.

Some teachers may have chosen not to answer questions on the demographic section of the survey, thus not providing a true picture of the participants in the study.

Since only one of the schools in this study was rural, the generalizations of the study are limited to urban and suburban populations.

Underlying Assumptions

The participants were assured of anonymity, and the researcher assumed that the participants responded honestly. It was assumed that the survey would be completed by all middle school teachers in the county and that each teacher would answer all questions accurately. The measurement instrument was an appropriate tool for obtaining the necessary data.

Methodology

Design of the Study

The researcher developed a survey designed to measure the use of constructivist and traditional teaching strategies. The pilot survey was developed using focus groups of teachers and their descriptions of traditional and constructivist teaching strategies, the CRISS (Santa, 1998), and SHINES (Finger, 1999) Strategy Manuals, and the National Board for Professional Teaching Standards (NBPTS, 2002).

The survey was piloted at Tripoli Middle School in Southwestern Florida and evidence of the validity and reliability of the survey questions were obtained. Questions that were not valid nor reliable were eliminated from the original survey. The final survey was completed by teachers at 18 middle schools in a Southwest Florida school district. Teachers responded to descriptive sentences regarding their classroom

management style, teaching and learning activities, and student assessment. The response scale was: Always (5 points), Frequently (4 points), Sometimes (3 points), Rarely (2 points), Never (1 point).

The instrument was constructed such that descriptions of traditional and constructivist teaching strategies were equally represented and randomly mixed on the survey. Teachers' scores per school reflected the degree to which constructivist teaching and learning strategies were utilized in classes at that school. The researcher delivered the instrument to, and discussed it with the principals and their secretaries at each middle school. The principals' secretaries placed the survey instrument in the appropriate faculty mailboxes and collected the answered surveys. The researcher returned to the schools to pick up the completed surveys in order to maximize teacher participation in the study.

Population

The population of this study consisted of 699 teachers from 18 public middle schools in a medium sized Southwestern Florida school district. There were five city schools, twelve suburban schools, and one rural school. School sizes ranged from a student population of 800 to 1300 students, with the average being 1000 students.

Instrument Design

A researcher-designed instrument was used to collect data for this study. To design the instrument, the researcher used the criteria for National Board Certification, SHINES

(Strategies to Help Implement New Educational Standards), and CRISS (Creating Independence through Student owned Strategies) teaching strategies to form a composite list of strategies that could be perceived as constructivist or traditional. The lists were provided to focus groups of middle school teachers to review. After the teacher input, the strategies were clustered into three groups: Classroom Management, Teaching and Learning Activities, and Assessment. In each of the areas of traditional and constructivist strategies the instrument was then viewed by five persons familiar with instructional strategies and all agreed that the items were properly classified as traditional or constructivist. The five experts in the field had written extensively in the field of education with emphasis on teaching strategies. The resulting Likert scaled instrument was administered to the faculty at Tripoli Middle School. Data was collected and validity and reliability of the instrument were obtained. Changes were made and the instrument was finalized.

Time Frame and Data Collection

The survey instrument was developed in September through November, 2002 and the researcher gave the survey instrument to 63 middle school teachers at Tripoli Middle School on October 30 to be returned to the researcher by November 6, 2002. The content validity of the instrument was obtained by consulting five experts in the field of pedagogy and the field of instructional strategy who reviewed the instrument. The instrument maintained integrity with all five consultants. The data from the pilot study was analyzed and the internal structure validity was confirmed using the Pearson

Correlation. The Reliability was determined using the Cronbach Alpha and each group of interrelated statements were determined to be above the recommended Alpha .6. The final survey instrument was delivered by the researcher to the 18 middle schools on December 2 and picked up by the researcher on December 16, 2002.

Data Analysis

The degree of relationship between the constructivist and traditional teaching variables and student achievement, class size, and student referrals were established using Pearson Correlation coefficients. Analysis of Variance (ANOVA) was used to determine if there were any differences in teachers' use of constructivist and traditional teaching strategies with respect to class size, student achievement, or student referrals. Where significant differences were detected, a post hoc test (Tukey) was employed to identify which of the groups differed significantly from other groups.

CHAPTER 2: REVIEW OF THE LITERATURE

Review Overview

A review of the literature revealed that information centered around seven topics:

- A definition of constructivism
- An examination of constructivist classroom strategies
- A review the politics of constructivism
- The development of an historical perspective for constructivist teaching strategies
- An examination of the definitions of learning and intelligence in students
- An examination of the role of education
- An examination of the potential effects of class size on teaching and learning

Constructivism

Social Constructivism centers around the idea that knowledge is not located in individuals but in communities. The social constructivist's underlying assumption is that learning depends on group interaction and learning activities and assignments should be collaborative (Phye, 1993). The social constructivist's view of learning encourages

teaching for understanding in a hands-on approach. Thus an environment that includes trial and error, experimentation, and interaction with fellow learners, assisted by the teacher, and that allows students to build their own understanding is appropriate (Brody & Davidson, 1998). In a constructivist classroom, lessons are introduced to motivate students to see how it is relevant to their lives. The classroom structure is open and trial and error is encouraged. Student groups reflect on what is learned academically as well as develop social skills such as: demonstrating respect for others by being a courteous listener, and encouraging all members in the group to participate in the learning experience. The goal is to foster student's intrinsic motivation to become a life long learner and a caring responsible citizen. Learning becomes a personal commitment and is a meaningful self-motivating endeavor. Students learn more when they are actively engaged in their own learning and they build their own knowledge structures by investigating and discovering. Learning actively leads to an ability to think critically and to solve problems, and it is through active learning and cooperative learning approaches that students learn content and process simultaneously (Marlowe, 1998).

According to Piaget (1968), knowledge results from manipulating real objects, experiencing conflicts between one's perceptions and the real world events, and then reorganizing one's thinking as human intelligence constructs the cognitive structure it needs in order to adapt to the environment. Piaget championed the development of a "critical spirit" through give and take in peer group learning or cooperative learning opportunities. Piaget's genetic epistemology supports the importance of social learning in children noting that action is a result of internal impulses during the first part of the

sensorimotor period. It is not generated exclusively in a centrifugal fashion, rather in the experience of the child. The situations encountered are generated by the social environment and the objects appear within contexts which give them specific significance (Piaget, 1968).

Constructivist Classroom Strategies

“Constructivist teachers use authority selectively and wisely in order to give children the opportunity to construct themselves gradually into personalities having self-confidence, respect for self and others, and having active, inquiring, creative minds” (DeVries & Zan, 1994). Piaget argued that only by refraining from exercising unnecessary authority, do adults open the way for children to develop minds capable of thinking independently and creatively and to develop moral feelings and convictions that take into account the best interests of all parties (Piaget, 1972). Autonomous and cooperative teacher-student relations are characterized by mutual respect and cooperation and by the teacher returning the students’ respect by giving them the possibility to regulate their behavior voluntarily (DeVries & Zan, 1994).

In a constructivist classroom the teacher serves as a mentor who fosters the classroom community through the attitude of mutual respect and cooperation. Classrooms are organized to meet the students’ needs and to promote peer interaction and responsibility. Teachers are mentors who are emotionally present and available to students and who continually take children’s feelings into account. Classroom activities

are designed to stimulate interest and to inspire students to figure out how things work. The program is organized to promote peer interaction and cooperative groups do experiments and solve problems. In the course of experimenting, the child constructs physical knowledge and intellectual power or intelligence (DeVries, 1994).

Constructivist teachers cooperate with students in mutual reciprocity of respect and engagement. Conflict and resolution in the classroom involves the teacher remaining calm, children taking ownership of the problem, the prevention of potential for physical harm, and the use of non-verbal methods to calm children. The teacher acknowledges, accepts and validates all the children's feelings in conflict resolution and helps children verbalize their feelings, discuss, and listen to each other. Children suggest solutions to the problem, they agree on one, and they are encouraged to make restitution with each other. The classroom is like a home in that it is interactive and secure and it operates like a miniature community (Stupiansky, 1997).

Brody and Davidson, 1998, described a packaged curriculum designed by the Child Development Project to promote children's ethical, social, and intellectual development:

“Caring Community Learners is a comprehensive curriculum approach to education, designed by the Child Development Project to promote children's ethical, social, and intellectual development. It is a learning environment in which students have close caring relationships with their peers and teachers; are engaged in challenging, relevant, learner-centered curriculum; and learn about and practice pro-social values such as kindness, helpfulness, personal responsibility, and respect for others. In this program, learning is an inherently social process involving the construction of meaning, intrinsic motivation, cooperative learning, and students experience the classroom and school as a caring community” (Brody & Davidson, 1998, p. 149).

In 1997, Stupinsky proposed principles for teaching science in a constructivist classroom. Students should be encouraged to propose and test their own questions and ideas about scientific phenomena, modeling an inquiry based approach to learning about the world, and building in opportunities for students to investigate answers to the teacher's questions in cooperative groups. Science is presented as concrete as possible for the pre-operational and concrete operational students, questions are open-ended and encourage divergent thinking, and science equipment and resources are available for students to use at will. The teacher takes advantage of naturally occurring events in the classroom, on the campus, locally, or nationally and there is the constant emphasis on the importance of caring for the environment

Politics of Constructivism

The constructivist movement in the United States can be viewed at the macro level as a political movement and at the micro level as a social movement. The re-structuring of K-12 involves a question of the minimal standards of student academic performance. Student academic competency testing allows students in diverse geographical and socioeconomic areas to be compared, and facilitates the comparison of student academic performance in the United States to that of students in other industrial countries. At the micro level, the focus is on individual teachers, the interacting with individual students in a social setting to facilitate students constructing personal meaning and understanding. In this context, a constructivist classroom involves a physical setting in which students work

cooperatively with other students and interact with the teacher, and it involves problem solving activities that require the use of higher order skills (Phye, 1997).

La Rochelle, 1998, expressed concern that the application of non-constructivist teaching methods in science maintain social and economic inequalities.

“The roots constructivism will pull up are philosophical, economic, cultural, and political, as well as educational. Science education contributes to the schools role in maintaining social and economic inequalities. The application of non-constructivist teaching methods, the assertion of subject knowledge standards, and the use of certain types of testing excludes and allocates who learns scientific knowledge. The assumption of normality in education filters in favor of the middle class students who have a greater cultural capital” (La Rochelle, 1998, p 159).

“Schools produce enough technical knowledge to keep our industrial engines running and our society thrives on lower levels of math and science achievement in students from the lower classes as well as women and minority students. Our education system ensures that a sufficient amount of scientific and mathematical knowledge is generated but assists in its regulation by preventing too many students from acquiring it because widespread distribution of this knowledge would render it a less valuable commodity. Organizations in our capitalist society function at greatest efficiency when society’s unemployment rate is four to six percent. The cost of full employment would erase all economic profits”(La Rochelle, 1998, p 159).

Constructivism: Historical Perspective

Plato, Socrates, Aristotle, and other great teachers of antiquity lavished individual attention on their students. They used dialogue, the Socratic Method, and walked and talked in groves of academe characteristic of peripateticism (Achilles, 1999).

In more recent history, John Dewey believed that learning was about being active, not passive, and in 1896 he opened his laboratory school in Chicago (Dewey, 1931). The laboratory school encouraged students to conduct their learning, discover answers, and create interpretations. Student learning was deeper, more comprehensive, and longer lasting, and the learning that occurred actively led to an ability to think critically (Dewey, 1933).

Dewey objected to classical education because the content and method did not involve problem-solving or reflective thinking. Dewey described his education as boring because students memorized and recited unrelated chunks of material (Dewey, 1931). In 1916, John Dewey proposed that “There is no such thing as genuine knowledge and fruitful understanding except as offspring of doing” (Dewey, 1916, p 321).

Jean Piaget and Lev S. Vygotsky are described by Margaret Gredler as the original constructivists (Gredler, 1977). In 1936, Piaget proposed a then radical concept that the knower and the environment could not be separated in the development of logical thinking processes (Piaget, 1936/1967). He believed that human intelligence constructs the cognitive structures it needs to adapt to the environment and his research documented the levels of thinking constructed by children from infancy to adulthood. These

constructions resulted from manipulating real objects, experiencing conflict between perceptions and real world events, and then reorganizing thinking (Piaget, 1967).

Lev S. Vygotsky focused on higher mental processes including categorical perception, conceptual thinking and self-regulated attention. These processes include learning to use language and other symbols to manage one's thinking. He proposed that learning is socially mediated in two ways. First the child learns to construct the essential meanings of signs and symbols through social interaction with adults and knowledgeable others in the cultural context and then the associated language and symbols shape the child's view of reality (Vygotsky, 1978).

In 1994, Prawatt and Floden described two broad types of constructivism in the classroom to include radical constructivism and social constructivism. Radical constructivism is derived from the Piagetian perspective and views knowledge as adaptive. The teacher's role is to develop an adequate model of the students' ways of viewing an idea, to revise the situations that challenge the child's way of thinking, and to help students examine the coherence in the current modes of thinking (Prawatt & Floden, 1994).

Social constructivism consists of related perspectives that, according to Prawatt and Gloden (1994), share the belief that knowledge is a social product. The teacher's task is to create discourse communities that allow students to hammer out big ideas and apply them to real-world situations. The teacher's role is that of a cross-country guide, helping the group to travel in new cognitive territory (Prawatt & Floden, 1994).

According to Cobb (1995), the emergent approach to constructivism is Piagetian and social constructivism should be implemented in the classroom as the need arises (Cobb, 1995).

Lave and Wenger (1991) advocate a theory of social practice in which learning is an aspect of all activity. This constructivist theory is exemplified in apprentices that provide for an individual to be transformed from a new comer into an old timer in the community of practice (Lave and Wenger, 1991). In the current educational setting, “school to work” provides for the implementation of this theory. Examples include students who attend vocational school and are trained in automotive mechanics and who then serve apprenticeships with local auto mechanic businesses to implement and reinforce their cognitive knowledge. Historically, all theories of constructivist learning are based on the assumption that knowledge is a human construction and that learning is an active not a passive activity.

Learning and Intelligence

“Homo sapien means we think, we know, we act knowingly, and we strive for greater knowledge and understanding” (Mintzes, 1997, p 405). Meaningful learning is non-arbitrary, non-verbatim, substantive incorporation of new knowledge into long-term memory. New learning requires a strong and deliberate commitment to forging links between new knowledge and relevant aspects of prior knowledge that constitute the learner’s existing cognitive structure. When commitment is lacking or the prior

knowledge is inadequate, new knowledge is incorporated in an arbitrary, verbatim, rote-learning fashion (Mintzes, 1997).

Learning and cognitive growth involve the dual aspects of equilibration including adaptation and organization. Adaptation is the fit or adjustment to the environment and organization involves rearranging the original schema to include new information (Cohen, 1999). Equilibration occurs when the individual encounters something new and an imbalance is created that requires restoring balance or re-equilibration. The person must assimilate new information into the existing structure and simultaneously accommodate or modify the learning structure to deal with the new aspects.

Three types of equilibration include: simple equilibration is the equilibration of the new object into the existing scheme; reciprocal equilibration is the equilibration between schemes; and hierarchical equilibration is the equilibration of totalities in which the totality is differentiated into parts and integrated back into the whole (Piaget, 1972). In a file cabinet anthology, the simple equilibration is a piece of paper put into a file (Cohen, 1999). The reciprocal equilibration would be the consolidation of two files into a third file, and the hierarchical equilibration would be the reorganization of the entire file cabinet with a new system to classify and integrate all material. Gifted students make the simultaneous transition from a few files to reorganizing the file cabinet because they are pattern seekers and they construct general principles to apply to all domains (Cohen, 1999).

Learning is greatly influenced by students' developmental levels and social/cultural contexts in their background experiences and their personal interests.

Learning involves an active process of constructing, challenging, and reconstructing how things work and what things mean. Piaget identified four familiar universal stages of development in which children understand the world differently. These include the Sensorimotor Stage from birth to about two years, the Pre-Operational Stage from about two to seven years, the Concrete-Operational Stage from about seven to eleven years, and the Formal Operational Stage from about eleven years to adult. During the Sensorimotor Stage, infants think and understand the world around them through their senses using their eyes, ears, mouth, and hands and they develop their abilities from coordination of sensation and their physical movements and actions in the environment. Preschool children enter the Pre-Operational Stage and begin to represent the world with symbols. They have increased capacity for symbolic thinking and can go beyond their earlier sensorimotor discoveries through the use of language and images, though their thinking is not yet logical. Children in the Concrete-Operational Stage can think logically and are able to conserve, seriate, classify, and organize events or objects into different classes or sets. They can reorganize other points of view but are not yet able to think abstractly. Adolescents in the Formal Operational Stage think in more logical and abstract ways. They can reason with symbols that are beyond the world of concrete experiences and they can imagine many possible combinations, separate real from the possible, deal with hypothetical propositions, and combine elements in a systematic way (Piaget, 1936/1963).

The thinking of adolescents differs radically from that of a child. The child develops concrete operations but never integrates them into the total system found in

formal logic. The adolescent gradually structures formal thinking that allows the adolescent to bring inversion and reciprocity together into a whole. The adolescent controls hypothetico-deductive reasoning and experimental proof based on the variation of a single factor, with all others held constant. "Following adolescence, subjects have at their disposal a conception of the world which determines future assimilation of any experiences" (Piaget & Garcia, 1989). Formal thinking is essentially hypothetico-deductive in that the deduction no longer refers to perceived realities but to hypothetical statements. The reversal in direction of thinking between reality and possibility in formal thought occurs because reality is secondary to possibility. In the Formal Operational Stage, adults and adolescents have an elaborate arsenal of cognitive instruments enabling them to assimilate, and hence to interpret the data received from the surrounding objects as well as to assimilate information transmitted by society (Inhelder and Piaget, 1958).

Gifted students do not enter higher stages of development earlier than their peers but the quality or breadth of ability within the stage is evident in multiple studies. Feldman (1991) found that although there was extraordinary advancement in particular domains such as music, chess playing or mathematics, gifted children did not demonstrate advanced development through the universal Piagetian stages. Carter (1985) compared a large sample of gifted students to their peers and found that the stage advancement of gifted was at best two years ahead of typically developing peers.

Intelligence is adaptation and adaptation is equilibrium between the action of the organism on the environment and vice versa. Learning depends on the stage of development and internal reinforcement through self-regulation (Evans, 1973). Mental

assimilation is the incorporation of objects into patterns of behavior and accommodation involves the individual modifying the assimilatory cycle by accommodating themselves to the surrounding stimuli. In this view intelligence is mental adaptation to new circumstances (Piaget, 1972).

Role of Education

The role of education is to support the spontaneous research of the child (Gredler, 1997). Experimentation with real objects and interaction with peers supported by the teacher's insightful questions permits students to construct both physical and logical-mathematical knowledge. A rich educational curriculum provides opportunities for students to interact with the physical world, their environment, and with their peers. Social interaction is the focus of student/teacher and student/student relationships. Social interaction in the educational environment includes exchanges with others, the examination of one's own thinking, and the ability to view issues from many perspectives.

School systems have been constructed by conservatives who think in terms of fitting rising generations into molds of traditional learning rather than in terms of training inventive and critical thinking minds (Gruber & Voneche, 1977). Our school systems have been rendered inadequate and this has encouraged the inadequacy of the social and economic positions of teachers. The old system has imprisoned teachers in a lowly status

by making teachers mere transmitters of general knowledge with no opportunity for initiative and research (Gruber & Voneche, 1977).

The three levels of compensation or acts that, in response to a knowledge disturbance, restore the disturbed balance are Alpha, Beta, and Gamma. Alpha involves the student not dealing with the inconsistency and distorting, ignoring or denying it. Beta students attempt to deal with inconsistency but can only deal with partial modifications and the student stays in a state of unstable equilibrium. This is probably the optimal level for learning in public schools. In Gamma compensation, if the item is not inconsistent to the student's internal schemes, the student readily makes the mental reorganization and can integrate the disturbance easily because the material is not sufficiently inconsistent to the student's structures.

The optimum learning performance of gifted students in the regular school system is at best Gamma compensation or at worse at the habitual level (Cohen, 1999). The opportunity for mental growth is limited because the material presented is not sufficiently inconsistent with the student's structures. Giving more of the same material to gifted students does not require any compensation. The use of constructivist teaching strategies, including self-selection of areas for study and research, peer cooperation, and alternative assessments avoids these problems (Cohen, 1999).

Effects of Class Size on Teaching and Learning

In 1986, Glen E. Robinson and James H. Wittebols published a research brief for the Educational Research Service entitled: Class Size Research: A Related Cluster Analysis for Decision Making. In this publication, Robinson and Wittebols summarized the major efforts to review, synthesize, analyze, and find meaning in a large body of research that accumulated from 1954 until 1985 regarding the effects of class size on student achievement and the classroom environment. Diverse school populations in Toronto, Canada and in the United States in rural Virginia, in urban schools in California, New York, Detroit, Michigan, and Nashville, Tennessee were included in the summary (Robinson & Wittebols, 1986).

Significantly, the research from 1954 until 1979 supported the notion that smaller class size had little or no significant impact on learning in reading and mathematics. In contrast, the research from 1980 until 1985 supported the notion that students in smaller classes scored significantly higher in reading and mathematics. The effect of class size on student academic performance and teaching practices in Robinson and Wittebols research from 1981 through 1985 revealed the following:

In 1982 Doss and Holley studied two experimental schools of grades 2 through 6 compared to two comparable Title I schools. They reported that smaller classes were higher on all tests, had more instruction and on-task time in basic skills, more reading instruction, more a greater number of minutes of contact with the teachers.

In 1983 Cahen studied two second grade classes of 39 students that had been made into three classes of 13 students in rural Virginia and two classes of 35 students in

urban California that had been changed into three classes of 22 students. Cahen reported that smaller classes resulted in higher test scores, increased teacher/pupil contact, and more engaged time. Observational analysis of teacher logs in this study showed more on task and engaged time for students, and less time waiting for teacher help in smaller classes, and that normally inattentive students behaved better in the smaller than in larger classes.

In 1985 Whittington reported that experimental smaller classes scored higher than in either of the two control groups in reading and mathematics in the first year of study of first grade classes in metropolitan Nashville, Tennessee. 105 students were in experimental classes with student to teacher ratios of 15:1 compared to 90 in control classes and one hundred five in matched control classes with 25:1 student teacher ratios. Teacher logs revealed better classroom climate, more individualization, better behavior, more pupil participation, and a faster pace of learning in smaller classes of 15 students per teacher, as compared to the larger classes of 25 students per teacher.

In 1975, the National Education Association Teacher Opinion Poll on class size in Today's Education: January-February revealed the following:

1. Small classes were believed to be “extremely important” in improving academic achievement of students in 80% of the teachers surveyed and 20% considered them moderately important.
2. Smaller classes were rated as “extremely important” for social and personal development of pupils by 2/3 of the respondents with the other 1/3 rating it as “moderately important”.
3. Three-fourths believed small classes were “extremely important” for teacher job satisfaction.

4. “Lower class size” was ranked first among improvements that would lead to better teacher moral with 10.9 percent of the responding teachers selecting this option.

Metropolitan Insurance Company reported in the Metropolitan Life Survey of Former Teachers in America in 1985 that when asked what steps should be taken to retain good teachers, 65% of the former teachers felt that “providing smaller class size” would be extremely important (Robinson & Wittebols, 1986).

Robinson and Wittebols summarized their research as follows:

1. In general, the strength of the research evidence supporting the effects of smaller classes on increased student learning decreases as grade level increases.
2. Studies to date indicate that smaller classes tend to have slight positive effect on student achievement in the junior grades of 4-8.
3. The research evidence is rather consistent in finding that students who are economically disadvantaged or from an ethnic minority achieve more academically in smaller classes.
4. Studies of the effects of class size on teaching practices indicated that smaller classes tend to promote the use of more desirable teacher practices, though they do not guarantee this.
5. In the studies involving the primary grades K-3, four of the six studies found smaller classes related to positive student attitudes or behavior.
6. The opinion polls of teachers conducted by the National Education Association from 1968 to 1975 consistently indicated that teachers viewed large classes as a major problem. Teachers felt that large classes negatively influenced the academic performance, personal development, and social development of pupils as well as the teachers’ own job satisfaction and morale (Robinson & Wittebols, 1986 p. 204).

In 1987, Thomas Gregory stated that good teaching requires reasonable limits be placed on the complexity of the situation in which we expect the act to be performed: it

requires few enough students for the individual learning problems of each student to be diagnosed and addressed. Gregory proposed that we have chosen to deal with students in groups so large that the resentment and cynicism they spawn overwhelm the attempts that teachers make to personalize the high school experience.

In 1992, H.P. Bain reported that a common benefit cited by teachers in small classes was that they were better able to individualize instruction. They reported increased monitoring of student behavior and learning, opportunities for more immediate and more individualized re-teaching, more enrichment, more frequent interactions with each child, a better match between each child's ability and the instructional opportunities provided, a more detailed knowledge of each child's needs as a learning and more time to meet individual learners' needs using a variety of instructional approaches (Bain et al., 1992 p. 254).

Student academic achievement benefits favoring students in smaller rather than larger classes have been found in all recent well-designed and conducted class-size studies. These studies include Wisconsin's Student Achievement Guarantee in Education (SAGE) effort; Burke County, NC: Success Starts Small (SSS); and the Lasting Benefits Study (LBS) that followed the STAR students in grades four through eight (Achilles, 1999 p.90).

Charles M. Achilles reported that small classes offer students many benefits, especially disadvantaged and minority students in early grades. In answer to the question regarding the high cost of providing smaller classes, he proposed that education is properly considered an investment and seed money for the growth of human capital. The

actual return on education makes education a productive investment, and the potential social-benefit returns like less vandalism or violence, reduced teen pregnancy and unemployment, and fewer dropouts are the education's equivalent of the miracle of compound interest (Achilles, 1999 p. 147).

Alan Krueger used the data from STAR and previous studies of school performance and personal income and concluded that the benefits – in terms of students' future earnings – of reducing class sizes are very close to the per-pupil cost of smaller classes. In other words, the costs are recovered in the form of personal income to the students (Krueger, 1998).

Project STAR and research conducted in conjunction with other CSR initiatives reveal the following:

- teacher morale is improved in small classes
- teachers spend more time on direct instruction and less on classroom management in smaller classes.
- there are fewer disruptions in small classes and fewer discipline problems.
- students engagement in learning is increased
- in-grade retentions are reduced
- dropout rates are reduced
- greater numbers of students who attended small classes in the early grades elected to take the SAT or ACT and to attend college, especially among the African American students (Finn, 2002).

Barbara Tye and Lisa O'Brien (2002) followed the records of the credentialed Chapman University graduating teachers during the five years between 1990-91 and

1994-95. Five hundred and fifty one teachers were followed for seven years after they completed their training programs. It was found that 49% were not working as teachers. The teachers cited accountability and increased teaching demands as the reason for leaving the profession.

Teacher shortages increased class sizes and teaching demands as school districts coped with teacher shortages by increasing class size and the paperwork was overwhelming. The larger classes demanded that teachers spend hours after school and on weekends grading papers and preparing lesson plans, neglecting their families because of the at-home hours spent on school-related activities (Tye & O'Brien, 2002).

In addition, students who were uninterested in learning became formidable challenges in larger classes. Teachers cited that students had grown up in a culture of instant gratification and simply refused to put in the hard work involved in studying. The teachers found themselves having to devote more time and energy to classroom management than to actual teaching.

The conditions that undermine the power and effectiveness of our public school system need to be identified and promptly rectified. This includes above all creating a work environment that will continue to draw the bright, committed new teachers we need and will keep them enthusiastic, energetic, and productive throughout their careers. Whatever the cost, it is preferable to the depressing alternative. Unfortunately, the track record over the past 40 years is not very promising (Tye & O'Brien, 2002).

Survey Literature Review

Constructivist teachers understand that learning is a process of adjusting mental models to accommodate new experiences. They provide an environment in which students construct their understanding of the world through reflection on their own experiences. Students use the rules and mental models they generate in the process of learning to make sense of new experiences. Constructivist teachers help students understand that “I am where I am today. I was different yesterday, and I will be different tomorrow. But I am where I am today, and it’s ok” (Cohen, 1996).

According to Piaget, 1968, the acquisition of knowledge is a social endeavor and knowledge results from continuous construction. Each phase of understanding involves invention and the passage from one stage to another is characterized by new structures which did not exist before in the subject’s mind or in the external world.

Learning is an upward spiral and each equilibration moves the person to a higher level of knowing. The broad goals of public education should be to facilitate the acquisition of knowledge so that students construct their knowledge and move through this spiral with confidence, to encourage considerate citizenry within our culture, and to create student awareness and concern for our environment. Constructivist teaching strategies accomplish these goals (Cohen, 1996).

From the 1980s to the present, research involving the effect of class size on student achievement and teacher morale indicates that smaller classes increase student achievement in reading and math, reduce student drop-outs, increase positive classroom behavior, increase the numbers of students aspiring to attend college, and increase teacher

morale. Education is an investment in the growth of human capital and the actual return on the investment in education includes social benefits like less vandalism or violence, reduced teen pregnancy and unemployment, and fewer dropouts (Achilles, 1999 p 147).

Conditions that undermine the public school system need to be identified and promptly rectified. This includes creating a work environment that will continue to draw the bright, committed new teachers we need – and will keep them enthusiastic, energetic, and productive throughout their careers (Achilles, 1999 p 147).

CHAPTER 3: METHODOLOGY

The purpose of this study was to determine the relationship of the use of constructivist teaching strategies with academic performance, student negative social behavior, and class size.

Research Design

The design of this study was descriptive surveys with some correlation analysis. The researcher developed a survey designed to measure the use of constructivist and traditional teaching strategies. Descriptive phrases for constructivist and traditional teaching strategies were developed by the researcher using instructional teaching strategy textbooks, the CRISS Manual-Creating Independence through student-owned Strategies (1998), SHINES Manual – Strategies to Help Implement New Educational Standards (1999), and the National Board Certification Manual (2000). Additional references used included Bruce Marlowe and Marilyn Page's book *Creating and Sustaining The Constructivist Classroom* (1998), and LaRochelle, Bednarze, and Garrison's book *Constructivism in Education* (1998). Sixteen middle school teachers participated in a focus group that individually and then collectively categorized each descriptive phrase as either constructive or traditional. Five experts in the field of instructional strategy agreed with the focus groups' assignment of the test items as exemplary of either constructivist

or traditional teaching strategies. The experts concurred with the wording of each of the test items and with the grouping of test items into three categories: classroom management, teaching and learning activities, and assessment.

The pilot survey was constructed with equal numbers of test items descriptive of traditional and constructivist teaching strategies and the seventy-eight test items were randomly mixed within the three categories that included classroom management strategies, teaching and learning activities, and student assessment.

In October 2002 the Institutional Review Board (IRB) of the University of Central Florida granted permission to conduct this research. (Appendix I). In October 2002, a Southwestern Florida school district's Department of Evaluation, Testing, and Research granted permission to conduct this research at all middle schools (Appendix K). A letter of Informed Consent (Appendix J) and an Abstract (Appendix B) were sent to all middle school principals in the county and permission was granted to conduct the research. In November 2002, the pilot study (Appendix E) was conducted at Tripoli Middle School and the validity and reliability of the survey were obtained. A final survey (Appendix F) was designed omitting the non-valid and non-reliable questions.

Six hundred and ninety-nine final surveys were delivered to the 18 county middle school principals on December 2, 2002. The principals and their secretaries distributed and collected the surveys and the researcher picked up the surveys on December 16, 2002. Teachers responding totaled 384 out of the 699 surveyed or 54.9%. Elimination of 66 surveys missing essential information resulted in a sample size of 318 (see Table 1).

Table 1: Southwestern Florida County Middle School Surveys Returned (N=318)

School Number	School	Surveys Distributed	Surveys Returned	Percentage
552	ALC-Middle	12	11	91.7%
91	Alva Middle	29	18	62.1%
611	Bonita Springs	50	24	48.0%
572	Caloosa Middle	60	27	45.0%
141	Cypress Lake	45	24	53.3%
772	Diplomat	46	24	52.2%
211	Ft. Myers Middle	40	23	57.5%
671	Gulf Middle	60	22	36.7%
271	Lee Middle	40	26	65.0%
691	LeHigh Acres	70	44	62.9%
241	LeHigh Sr. Middle	15	4	26.7%
411	Michigan Montessori	15	7	46.7%
601	N. Ft. Myers	26	13	50.0%
161	Dunbar Middle	55	25	45.5%
591	Riverdale High Mid.	19	11	57.9%
361	Sanibel Middle	4	4	100.0%
821	Three Oaks Middle	50	22	44.0%
761	Trafalgar Middle	63	55	87.3%
Total Surveys		699	384	54.9%

Instrumentation

There were no surveys designed to measure use of constructivist or traditional teaching strategies. The researcher developed the survey using teacher forums, instructional strategy textbooks, the CRISS Manual (Santa,1998), the SHINES Manual (Finger 1999), the National Board Professional Teaching Standards (NBPTS, 2002) and reference books including Bruce Marlowe and Marilyn Page's *Creating and Sustaining a*

Constructivist Classroom (Marlowe and Page, 1998). Seventy-eight descriptive survey items were developed with equal numbers of items to describe constructivist and traditional teaching strategies. Five experts in the field of instructional teaching strategies were consulted during the development of the survey and concurred that the seventy-eight descriptive phrases were worded correctly and were properly classified as descriptive of traditional or constructivist teaching strategies. The experts agreed that the survey items were appropriately grouped into three categories: Classroom Management, Teaching and Learning Activities, and Assessment (see Appendix B).

Validity

Validity is evidence accumulated to provide a scientific base for the proposed interpretation of the test scores. The content validity of the survey was established by the process described above in which five experts in the field of instructional strategy provided consultation in the development of the survey items and concurred that the survey items were properly classified as descriptive of traditional or constructivist teaching strategies. Additionally, they approved the wording of the descriptive phrases, and the placement of the survey items into the three categories: Classroom Management, Teaching and Learning Activities, and Assessment.

A pilot study was conducted at Tripoli Middle School where fifty-five out of sixty-three teachers completed and returned the survey. In order to address the construct validity of the survey, an exploratory factor analysis was employed to identify groupings of survey items that measured similar concepts (see Appendix E). Items were eliminated

from the analysis in order to maintain factor loadings greater than .40 and to prevent mixing of traditional and constructivist items in the same group (scale). This analysis provided the basis for grouping items into scales which measured traditional and constructivist concepts. The construct validity of the scales was also evident in the correlation analysis between the scales. Results indicated that the traditional teaching style scales displayed a positive correlation with each other and negative correlation to the constructivist teaching style scales and that the constructivist teaching style scales displayed positive correlation with each other and negative correlation to the traditional teaching styles. Therefore, evidence was provided that the scales established in the survey could be interpreted as measuring the concepts that were intended to measure. (see Appendix F).

Reliability

Reliability is a measure of internal consistency of the teaching style scales formulated in the survey or the extent to which a researcher would obtain the same result with the same measure. Cronbach's Alpha was used to describe how each item was associated with each other item in the scales and to describe the overall consistency of the scales. Survey items that detracted from the internal consistency of the scales and were deleted from the survey. After deletion of these items, all scales in the pilot study resulted in reliability estimates at or greater than the generally accepted alpha .60 (see Appendix F).

In the pilot survey, three sub-groups, or scales, that clustered in the category of Classroom Management were identified with reliable internal consistency (see Appendix F):

T-1 Traditional Management – Teacher Control ($\alpha=.79$)
(Questions 3,4,5,8,16, and 18)

C-1 Constructivist Management Strategy – Student Centered ($\alpha= .61$)
(Questions 7,13,15,17, and 20)

C-2 Constructivist Management Strategy – Student Interaction ($\alpha= .65$)
(Questions 12 and 19)

Five scales (sub-group)s in the category of Teaching and Learning Activities were identified with acceptable reliability estimates(see Appendix F):

T-1 Traditional Activities – Teacher Rigidity ($\alpha= .65$)
(Questions 25, 38, 45, and 56)

T-2 Traditional Activities – Teacher Control ($\alpha= .73$)
(Questions 21,23,24, 26, and 33)

T-3 Traditional Activities- Teacher Presentations ($\alpha=.63$)
(Questions 34, 37, and 46)

C-1 Constructivist Activities – Student Engagement ($\alpha=.80$)
(Questions 23a, 27, 31, 32, 35, 43, 48, 52, 53, and 55)

C-2 Constructivist Activities – Student Control ($\alpha= .76$)
(Questions 36, 41,44, 47, 50, 51, and 54)

Four scales (sub group)s were identified with good reliability estimates in the category of student assessment (see Appendix F):

T-1 Traditional Assessment – Teacher Control ($\alpha= .79$)
(Questions 60, 61, 62, and 66)

T-2 Traditional Nature of Assessment ($\alpha = .75$)
(Questions 63, 67, 69, and 73)

C-1 Constructivist Assessment – Student Control ($\alpha = .75$)
(Questions 68, 72, 76, 77, and 78)

C-2 Constructivist Nature of Assessment ($\alpha = .79$)
(Questions 70 and 71)

After deletion of the items that detracted from the internal consistency of the scales, all scales resulted in reliability estimates at or greater than the generally accepted alpha .60. The final survey consisted of the remaining fifty-seven test items and the questions were maintained in the same order as the questions on the pilot survey (see Appendix G).

The researcher delivered the surveys to and discussed it with the principals and their secretaries at 18 middle schools on December 2, 2002. Six hundred and ninety-nine surveys were distributed to middle school teachers and the completed surveys were collected by the principals' secretaries and picked up by the researcher on December 16, 2002.

The survey results of the final sample were analyzed and final teaching style scales were established using Cronbach's Alpha (see Appendix H). The researcher maintained the integrity of the sub-groups under the three categories of classroom management, teaching activities, and student assessment but some of scales (sub-groups) were combined as shown in order to obtain maximum:

CLASSROOM MANAGEMENT (Cronbach's Alpha)

T-1 Traditional CLASS T1– Teacher Control ($\alpha = .54$),

C-1 Constructivist CLASS C1– Student Centered ($\alpha= .69$)
Established by re-grouping the pilot survey C-1 (questions 4, 7, 8, 10, 13)
and C-2 (questions 6 and 12).

TEACHING ACTIVITIES (Chronbach's Alpha)

T-1 Traditional TEACH T 1 ($\alpha= .70$)
Established by re-grouping the pilot T1 (questions 18,28,32),
T2 (questions 14,16,17,19,23), and T3 (questions 24,27,33)

C-1 Constructivist – TEACH C1 Student Engagement ($\alpha= .77$)

C-2 Constructivist – TEACH C2 Student Control ($\alpha= .74$)

ASSESSMENT (Cronbach Alpha)

T-1 Traditional – ASSESS T1 Teacher Control ($\alpha= .56$)

T-2 Traditional – ASSESS T2 Nature of Assessment ($\alpha= .68$)

C-1 Constructivist – ASSESS C1 Student Control ($\alpha=.72$)

C-2 Constructivist – ASSESS C2 Nature of Assessment ($\alpha=.77$)

While two of the scales were slightly below the generally acceptable $\alpha= .60$,
it was determined that inclusion of these would be important in interpretation of the
overall results of the study.

Data Analysis

The Pearson Correlation was used to determine the degree of relationship between
constructivist or traditional teaching variables and student achievement, number of

behavioral referrals, and class size. Academic performance was measured by the school's Florida State Accountability grade, which is based on student academic performance in mathematics and reading on the high stakes Florida Comprehensive Assessment Test (FCAT). The number of student behavioral referrals was determined by teacher responses regarding the number of behavioral referrals given per year on the demographic portion of the survey because teachers in this county were required to keep records on the number of referrals given. Class size was established by teacher responses on the demographic portion of the survey.

The mean responses were calculated and evaluated for each group of teaching strategies and school grade, number of behavior referrals, and class size. An Analysis of Variance (ANOVA) was used to determine the between group or within group variation, and where differences were noted at the .05 probability level on the ANOVA, a post hoc test (Tukey) was employed to identify which of the groups differed significantly from other groups.

Conclusions were drawn about the degree of relationship between constructivist teaching styles and student achievement, student behavioral referrals, and class size. Although data was generated regarding the use of both traditional and constructivist teaching strategies, the researcher focused on the use of constructivist teaching strategies in this research study with the exception of the examination of patterns of the mean use of traditional and constructivist teaching strategies.

Population

The population of this study consisted of 699 teachers from 18 public Middle schools in a Southwestern County in Florida. There were five city schools, twelve suburban schools, and only one rural school. School sizes ranged from a student population of 800 at the rural middle school to 1300 at a suburban middle school. The average student population was 1000. Student demographics in the county were comprised of 69% Caucasian, 12% Black, and 15% Hispanic, and 4% Asian, Indian, or multi-racial.

The respondents were asked to provide information regarding gender, certification, teaching in or out of field, ethnicity, and years of teaching (see Table 2).

Table 2: Gender, Certification, Teaching Assignment, Ethnicity, Years Teaching (N=318)

	<u>Frequency</u>	<u>Percent</u>
GENDER:		
Female	242	76.1
Male	72	22.6
Unknown	4	1.3
CERTIFICATION TYPE:		
Professional	292	91.8
Temporary	21	6.7
Unknown	5	1.6
TEACHING CERTIFICATION FIELD:		
In Field	298	93.7
Out of Field	14	6.6
Unknown	4	1.6
ETHNICITY:		
Caucasian	286	89.9
Hispanic	11	3.5
Asian	1	.3
African-American	10	3.1
Other	3	.0
Unknown	7	2.2
YEARS TEACHING:		
0-3 years	29	9.1
4-10 years	100	31.7
11-20 years	73	23.0
Over 20 years	113	35.9
Unknown	3	.9

The distribution of the gender of teachers responding, 76% female to 23% male, closely mirrored the distribution of 74% female to 26% male teachers in Lee County middle schools. Professional Teaching Certificates were held by 92% of the respondents

compared to 7% with a Temporary Certificate, and 93.7% of the teachers responding were teaching in the field of their certification compared to 6.6% teaching out of their field of certification see Table 2).

The ethnic distribution of teachers in Lee County is 69% Caucasian, 12% African-American, 15% Hispanic, and 4% Asian, Indian, or multi-racial. Of the 318 respondents, a greater percentage of non-minority teachers (89.9%) responded to the survey compared to 3.1% of the African American teachers responding, 3.5% of the Hispanic teachers responding, and .3% of the Asian or multi-racial (see Table 2).

Teachers who had taught over 20 years represented largest group of teachers responding with 35.9% of the surveys returned. Teachers who had taught 4-10 years returned 31.7% of the surveys, teachers who had taught 11-20 years returned 23% of the surveys, and teachers having taught 0-3 years had the lowest responding rate of 9.1% (see Table 2).

The numbers of years teaching experience for teachers in the county school system was not available.

Primary Subjects Taught

The highest percentage of teachers indicating their primary academic responsibility included Language Arts (17.3%), Mathematics (14.5%), Reading (12.6%), Science (12.3%), Social Studies (10.7%), and ESE (7.9%). The balance of the respondents include: Computer 3.1%, PE 2.5%, Drama and Music 2.2%, Exploratory 1.6%, and Life Skills 1.3%. One survey each (.3%) was received from teachers indicating the remaining 10 primary teaching categories: Media Specialist, Academics,

Study Skills, Critical Thinking, Behavior Specialist, ESOL, Peer Counseling, Industrial Technology, Gifted, and Environmental Education (see Table 3).

Table 3: Primary Subject Taught (N=318)

Primary Subject Taught	Number	Percent
Language Arts	55	17.3
Mathematics	46	14.5
Reading	40	12.6
Science	39	12.3
Social Studies	34	10.7
Primary Subject Taught	Number	Percent
ESE	25	7.9
Computer	10	3.1
Art	8	2.5
PE	8	2.5
Drama	7	2.2
Music	7	2.2
Life Skills	4	1.3
Media Specialist	1	.3
Academics	1	.3
Study Skills	1	.3
Critical Thinking	1	.3
Behavior Specialist	1	.3
ESOL	1	.3
Peer Counseling	1	.3
Industrial Technology	1	.3
Gifted Education	1	.3
Environmental Education	1	.3

Grade Levels Taught

Teachers who taught 6th, 7th, and 8th grade students represented the largest percentage of teachers responding with 108 surveys out of 318 (34%). Multi-grade level teams of sixth, seventh, and eighth grade Gifted Students were located at each middle

school, which may have accounted for this data. Teachers who taught one grade level of students represented the next highest frequency of returned surveys as follows: 6th grade returned 57 surveys (17.9%), 7th grade returned 50 surveys (15.7%), and 8th grade returned 59 surveys (18.6%). Teachers who taught two grade levels responded as follows: 6th and 7th returned 15 surveys (4.7%), 6th and 8th grades returned 5 surveys (1.6%), and 7 and 8 grades returned 13 surveys (4.1%) (see Table 4).

Table 4: Grade Levels Teachers Taught (N=318)

Grade Level	Number	Percent
Grades 6,7, and 8	108	34
Grade 8 only	59	18.6
Grade 7 only	50	15.7
Grade 6 only	57	17.9
Grades 6 and 7	15	4.7
Grades 7 and 8	13	4.1
Grades 6 and 8	5	1.6

Class Schedules

Teachers were asked to respond to a description of their class schedule as periods, blocks, or other (combinations). Of the 318 respondents, 187 had class periods (58.8%),

119 had block schedules (37.4%) and 9 had other or combinations of periods and blocks (2.8%).

CHAPTER 4: ANALYSIS OF DATA

This chapter presents the results of the data analyses and addresses each of three research questions posed for this study. For each of the three research questions the Pearson Correlation was used to examine teacher responses indicating the use of constructivist or traditional teaching strategies. The means were examined for each of the teacher style scales and an Analysis of Variance (ANOVA) was run to examine group differences. Where differences were noted, a post hoc Tukey was employed to identify specific group differences. Despite the availability of data regarding the use of traditional teaching strategies, this researcher chose to focus on the use of constructivist teaching strategies in classroom management, teaching and learning activities, and student assessment, reporting only an analysis of the means for traditional teaching Strategies.

Research Question One

Research question 1. Given a survey to determine the use of constructivist teaching strategies, what is the effect of use of constructivist teaching strategies on student academic performance?

A Pearson Correlation was performed to examine the relationship between the teacher responses indicating the use of constructivist or traditional teaching strategies and each middle schools' grade on the Florida Accountability Scale (A, B, C, D, or F).

Table 5: Pearson Correlations: Constructivist Styles and School Grade

	School Grade
CLASS C1	-.037
TEACH C1	.000
TEACH C2	.045
ASSESS C1	.032
ASSESS C2	-.031

**p<.01, 3 Standard Deviations, 99% significant

*p<.05, 2 Standard Deviations, 95% significant

Student Centered Activities (CLASS C1) showed a negative correlation to school grade at a -.037, teaching activities/student engagement (TEACH C1) did not correlate reflecting a .000, teaching activities/student control (TEACH C2) correlated at .045, assessment/student control (ASSESS C1) correlated at .032, and assessment/the nature of assessments (ASSESS C2) showed a negative correlation at -.031 (see Table __).

The mean responses to use of constructivist teaching strategy categories and standard deviation for each category and the middle school grade (A, B, C, D, or F) was analyzed. There was one school with a Grade D and there were three with grade C, 6 with grade B, and 7 with an A grade on the State Accountability Scale. The mean responses were positive at 3.5 and above in all categories except constructivist assessment (ASSESS C1). This indicated that teachers did not give students control in

student assessment by using such teaching techniques as students carry out simulations, role-play, self-assess their learning activities, determine assessment tools with rubrics for activities, and monitor their own academic progress (see Table 6 and Figure 1).

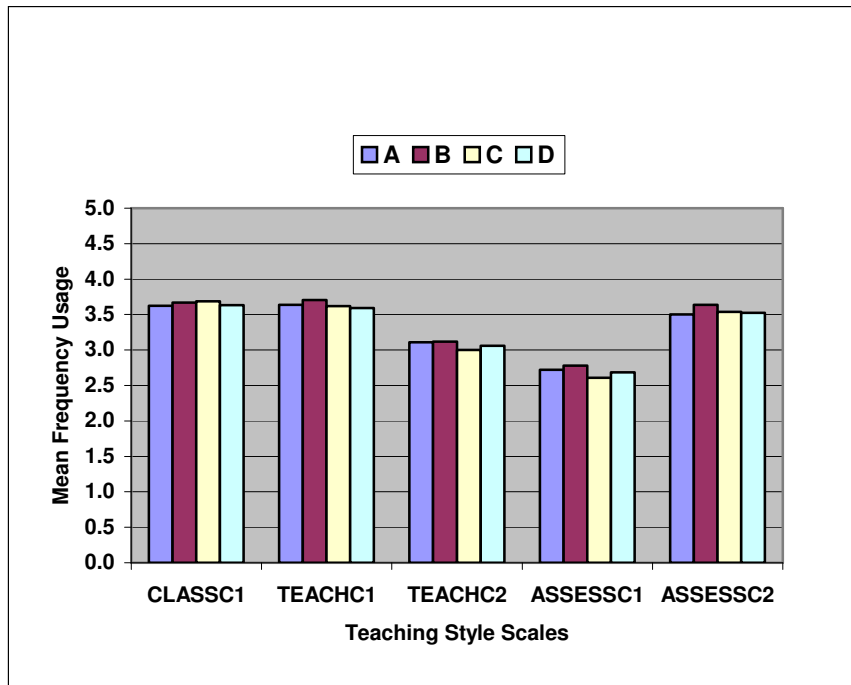


Figure 1: Frequency of Use of Constructivist Teaching Styles by School Accountability Grade

Table 6: School Grade and Mean Responses to Frequency of Use of Constructivist Teaching Strategies

Grade	Schools	CLASSC1	TEACHC1	TEACHC2	ASSESSC1	ASSESSC2
D	1	3.63	3.59	3.06	2.68	3.52
C	3	3.68	3.61	2.99	2.60	3.53
B	6	3.66	3.70	3.11	2.78	3.63
A	7	3.62	3.63	3.11	2.72	3.50

An Analysis of Variance was run between use of constructivist teaching strategies and school grades (A,B,C,D, or F) and it exceeded the acceptable .05 or less, indicating no significant variance. There was no significant correlation between the use of constructivist teaching strategies and middle schools' grades on the Florida State Accountability system.

Research Question Two

Research Question Two. Given a survey to determine the use of constructivist teaching strategies, what was the effect of use of constructivist teaching strategies on student social behavior as measured by the number of behavioral referrals given per teacher per year?

Teachers in this county were required to keep records regarding the number of referrals they give students. The respondents were asked to indicate the number of

student behavioral referrals they gave per month and then the number of student behavioral referrals they gave per year. Teachers in the sample were grouped into the following yearly student behavioral referral categories:

- 1) 0-5 referrals per year
- 2) 6 – 10 referrals per year
- 3) 11 – 15 referrals per year
- 4) 16 – 20 referrals per year
- 5) 21 – 25 referrals per year
- 6) 26 or more referrals per year

Of the 318 surveys returned, 227 indicated 0-3 student behavioral referrals per month (71.4%), 54 indicated 4-6 per month (17%), 19 gave 7-9 per month (6%), and 13 gave 10 or more per month (4.2%). The teachers indicating that they gave 0-3 student behavioral referrals per month correlated with the top three categories of total student behavioral referrals per year. Eighty teachers indicated they gave 0-5 student behavioral referrals per year (25.2%), 63 indicated 6-10 behavioral referrals per year (19.8%), 58 indicated 16-20 behavioral referrals per year (18.2%), 29 indicated 21-15 behavioral referrals per year (9.1%), and 44 teachers gave 26 or more student behavioral referrals per year (13.8%) (see Tables 7 and 8).

Table 7: Numbers of Student Behavioral Referrals Per Month (N-318)

Number of Behavioral Month	Number of Teachers	Percent of teachers Responding
0-3	227	71.4%
4-6	54	17%
7-9	19	6%
10 or more	13	4.1%

Table 8: Number of Behavioral Referrals Per Year (N-318)

Number of Behavioral Referrals Per Year	Number of Teachers	Percent of teachers Responding
0-5	80	25.2
6-10	63	19.8
11-15	58	18.2
16-20	38	11.9
21-25	29	9.1
26 or more	44	13.8

A Pearson Correlation was run between the frequency of use of constructivist teaching strategies at middle schools and the number of student behavioral referrals given by teachers at corresponding middle schools per year (see Table 9 and Figure 2). There were small negative correlations between all areas of Constructivist Teaching Strategies and the number of referrals per year: CLASS C1 -.137, TEACH C1 -.151, TEACH C2 -

.124, ASSESS C1 -.195, and ASSESS C2 -.120. This indicated a small significant negative correlation between frequency of use of constructivist teaching styles and the numbers of referrals (see Table 9).

Table 9: Pearson Correlation: Constructivist Styles and Behavioral Referrals/Year

	Referrals
CLASS C1	-.137*
TEACH C1	-.151**
TEACH C2	-.124*
ASSESS C1	-.195**
ASSESS C2	-.120*

**p<.01, 3 Standard Deviations, 99% sig

*p<.05, 2 standard deviations, 95% sig.

An analysis of the mean for the numbers of student behavioral referrals given per year correlated to the use of constructivist teaching strategies revealed a general pattern indicating that the less frequently teachers used constructivist teaching strategies, the greater the numbers of student behavioral were referrals. The groups with the lowest numbers of referrals used the most varied assessment strategies (ASSESSC1) and groups with the highest numbers of referrals used the least varied assessment strategies. The mean responses reflected a general increase in numbers of behavioral referrals with a decrease in use of constructivist teaching strategies (see Table 10 and Figure 2).

Table 10: Numbers of Referrals and Mean Responses to Frequency of Use of Constructivist Teaching Strategies

Number of Referrals	CLASSC1	TEACHC1	TEACHC2	ASSESSC1	ASSESSC2
0-5	3.73	3.75	3.16	2.83	3.71
6-10	3.69	3.65	3.16	2.87	3.43
11-15	3.63	3.62	3.04	2.69	3.62
16-20	3.60	3.70	3.16	2.60	3.53
21-25	3.52	3.50	2.90	2.62	3.45
26 +	3.54	3.53	2.97	2.48	3.35

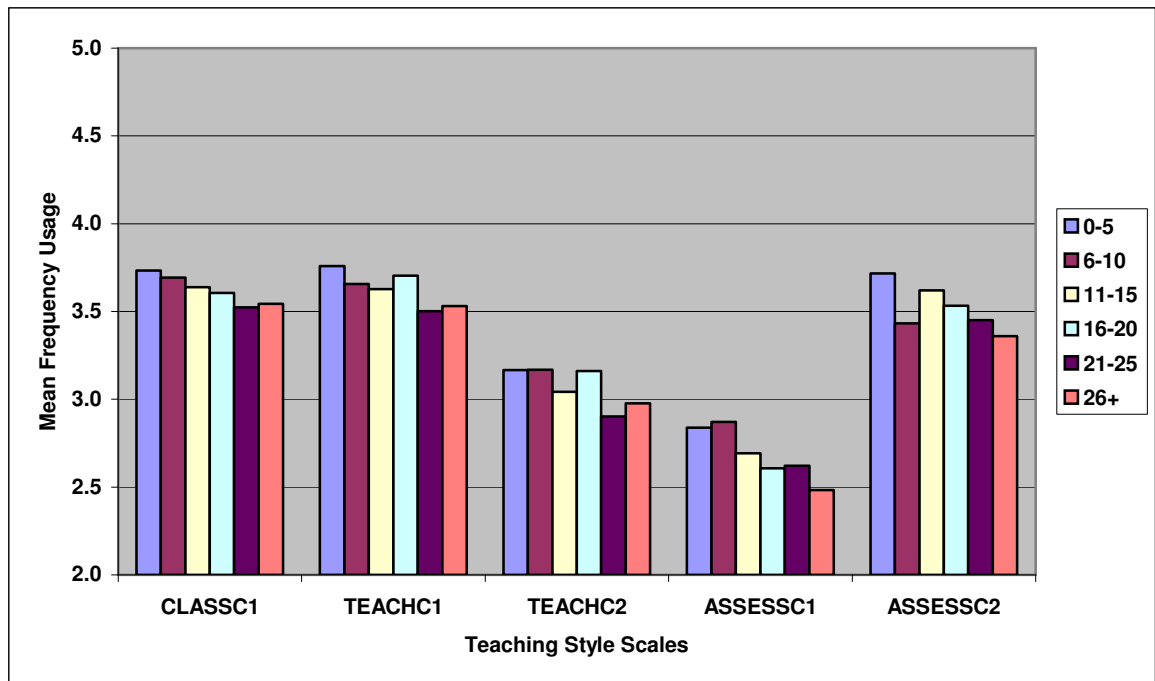


Figure 2: Frequency of Use of Constructivist Teaching Styles by Referrals Per Year

An Analysis of Variance revealed between group differences in constructivist assessment strategies at Sig. .020 (see Table 11).

Table 11: Analysis of Variance Test Results (ANOVA):

Category	Sum of Squares	df	Mean Square	F	Sig.
Constructivist Assessments and Referrals/Year:					
ASSESS C-1					
Between groups	5.826	5	1.165	2.716	.020*
Within groups	131.9	306	.429		

The post hoc Tukey revealed that the between group variances were between teachers who gave 26 or more referrals per year and those who gave 0-5 referrals/year at a significance of .048, and teachers who gave 26 or more referrals per year and those who gave or 6-10 referrals per year at a significance of .033 (see Table 12).

Table 12: Post Hoc Tukey Assessment (ASSESS C-1) and Numbers of Referrals/Year

Dependent Variable	(I) Referral/Year	(J) Referral/Year	Mean Difference	Standard Error	Sig.
ASSESSMENT					
C-1	26 or more	0-5	-.3541	.12294	.048
		6-10	-.3881	.12869	.033

Research Question Three

Research Question Three. Given a survey to determine the use of constructivist teaching strategies in the classroom, what was the effect of class size on the use of constructivist teaching strategies?

Teachers in the sample were grouped into the following student class size categories:

- 1) 1 - 15 students
- 2) 16 - 20 students
- 3) 21 - 25 students
- 4) 26 - 30 students
- 5) 31 - 35 students
- 6) 36 - 40 students
- 7) More than 40 students

Numbers of Students per Class

The highest response rate of the 318 teachers were teachers who had 26 to 30 students in their classrooms or 37.4% of the returned surveys, followed by teachers having 31 to 35 student at 22.6% of the total surveys returned. The rest of the respondents had the following numbers of students in their classes: 27 had 1 to 15 students (8.5%), 32 had 16-20 students (10.1%), 48 had 21-25 students (15.1%), 11 had 36 to 40 students (3.5%), and 1 had over 40 students (see Table 13).

Table 13: Numbers of Students Per Teacher Classroom (N=318)

Student/Class	Number	Percent
1-15 students	27	8.5
16-20 students	32	10.1
21-25 students	48	15.1
26-30 students	119	37.4
31-35 students	72	22.6
36-40 students	11	3.5
Over 40	1	.3

A Pearson Correlation was run between frequency of use of constructivist teaching strategies and class size. A small positive correlation existed between CLASS C1 at .146 and TEACH C1 at .177 indicating that as class size increased, the frequency of use of constructivist teaching strategies increased (see Table 15).

Table 14: Pearson Correlations: Constructivist Styles and Class Size

CLASS C1	.146*
TEACH C1	.177**
TEACH C2	.064
ASSESS C1	.085
ASSESS C2	.086

**p<.01, 3 Standard Deviations, 99% significant

*p<.05, 2 Standard Deviations, 95% significant

An analysis of the mean responses for frequency of use of constructivist teaching strategies and class size revealed that use of constructivist teaching strategies increased from smaller classes of 1-15 up to class sizes of 36-40. The highest number of responses indicated that teachers used constructivist teaching strategies more in class sizes 31-35 and 36-40 students. The mean responses reflected a general increase in use of constructivist teaching strategies as class size increased. Teachers with the largest classes used constructivist teaching strategies most often. (see Table 16 and Figure 3).

Table 15: Class Size and Mean Responses to Frequency of Use of Constructivist Teaching Strategies

Class Size	CLASSC1	TEACHC1	TEACHC2	ASSESSC1	ASSESSC2
1-15	3.53	3.52	2.98	2.54	3.62
16-20	3.52	3.53	3.12	2.68	3.32
21-25	3.57	3.59	3.04	2.71	3.48
26-30	3.64	3.63	3.07	2.72	3.53
31-35	3.71	3.73	3.14	2.79	3.62
36-40	3.94	4.03	3.29	2.73	4.04

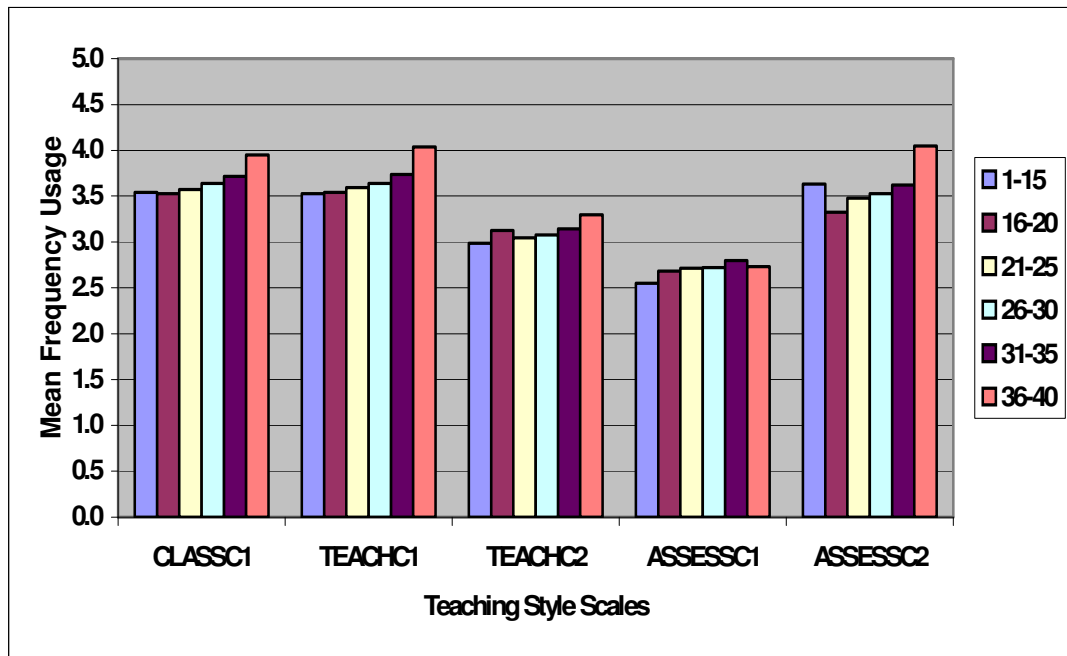


Figure 3: Frequency of Use of Constructivist Teaching Styles by Class Size

An ANOVA revealed that only one teaching category TEACH C1 differed significantly between groups at a significance of .022 (see Table 16).

Table 16: Analysis of Variance constructivist teaching strategies and class size

Category	Sum of Squares	df	Mean Square	F	Sig.
Teaching Activities and Class Size:					
TEACH C-1					
Between groups	3.131	5	.626	2.675	.022*
Within groups	70.928	303	.234		
Total	74.058	308			

There was a significant variance of .02 between groups in constructivist TEACH C-1 and class size (see Table17). A post hoc test (Tukey) was run on the dependent variable: TEACH C-1 and the between group difference was between class sizes of 36 to 40 students and class sizes of 1-15 at significance of .040 and class sizes of 36-40 students and class sizes of 16-20 students at significance. .041 (see Table 18).

Table 17: Post Hoc Tukey constructivist teaching strategy TEACH-C1 and numbers of students per class

Dependent Variable	(I)Students	(J) Students	Mean Difference (I-J)	Standard Error	Sig.
Constructivist Strategy TEACH-C1	36-40	1-15	.5097*	.17306	.040
		16-20	.4966*	.16910	.041

Comparison of the Internal consistency of the Scales

The Cronbach's Alpha reliability scale of the pilot study were compared to the Alpha Scale in the final study (see Table 19). The reliability of all scales, except one were maintained at the acceptable level of .6 or above. In classroom management, there was a decline in the measure of traditional teacher scale for teacher control of classroom management from .79 in the pilot study to .54 in the final survey. There was a rise in constructivist classroom student centered management scales from .61 in the pilot to .69 in the final study because two sub-groups C-1 and C-2 in the pilot study were combined into the one C-1 group in the final study.

An increase was achieved in the teaching and learning scales because three sub-groups, T-1, T-2, and T-3 in the pilot study with respective alphas of .65, .73, and .63

Were combined into one group T-1 the final study with an alpha of .70. In assessment, all groups were maintained with no changes in the sub-groups and all sub-group alphas showed a decline in alphas from the pilot study to the final county study (see Table 19).

Table 18: Comparison of Internal Consistency of the Scales

Scale	Reliability of Pilot Study	Reliability of Final Study
CLASSROOM MANAGEMENT:		
CLASS T-1 Traditional - teacher control	.79	.54
CLASS C-1 Constructivist - student centered	.61	.69 (C1, C2)
CLASS C-2 Constructivist - student-interaction	.65	
TEACHING AND LEARNING ACTIVITIES:		
TEACH T-1 Traditional -teacher rigidity	.65	.70 (T1, T2, T3)
TEACH T-2 Traditional-teacher control	.73	
TEACH T-3 Traditional-teacher presentations	.63	
TEACH C-1 Constructivist-student engagement	.80	.77
TEACH C-2 Constructivist - student control	.76	.74
ASSESS		
ASSESS T-1 Traditional - teacher control	.79	.56
ASSESS T-2 Traditional-nature of assessment	.75	.68
ASSESS C-1 Constructivist-student control	.75	.72
ASSESS C-2 Constructivist-nature of assessment	.79	.77

Analysis of Traditional Teaching Strategies

The researcher ran the statistical analysis on the mean frequency of use of traditional teaching styles compared to the school accountability scale, numbers of behavioral referrals, and class size to determine if there were notable patterns.

The data indicated that traditional teaching strategies were implemented more frequently than constructivist teaching strategies because the mean in classroom management (CLASST1), teaching and learning activities (TEACHT1) and assessment (ASSESST1) averaged 4.0 (see Figures 4,5, and 6). The mean averages for constructivist teaching strategies for classroom management (CLASSC1) and teaching and learning activities (TEACHC1) was 3.5 with teaching and learning activities (TEACHC2) averaging 3.0 (see Figures 1,2, and 3).

Teachers indicated on the survey that they "frequently" use traditional teaching strategies with the responses averaging 4 points on the Likert scale, and "sometimes" use constructivist teaching strategies with the responses averaging 3 points on the Likert scale (see Figures 1,2,3,4, 5, and 6).

There was a significant difference in the frequency of use of traditional teaching and learning activities between the "D" school on the state accountability scale and the "B" and "C" schools. An ANOVA revealed that TEACH T1 had a .008 between group significance factor and the Post Hoc Tukey revealed that the difference was between schools with a "D" grade and those with a "C" grade at a significance of .039, and between the "D" school and the "B" schools at a significance of .020. The data was not conclusive because there was one school with a State Accountability grade of "D" (see Figures 4, and Tables 14 and 15).

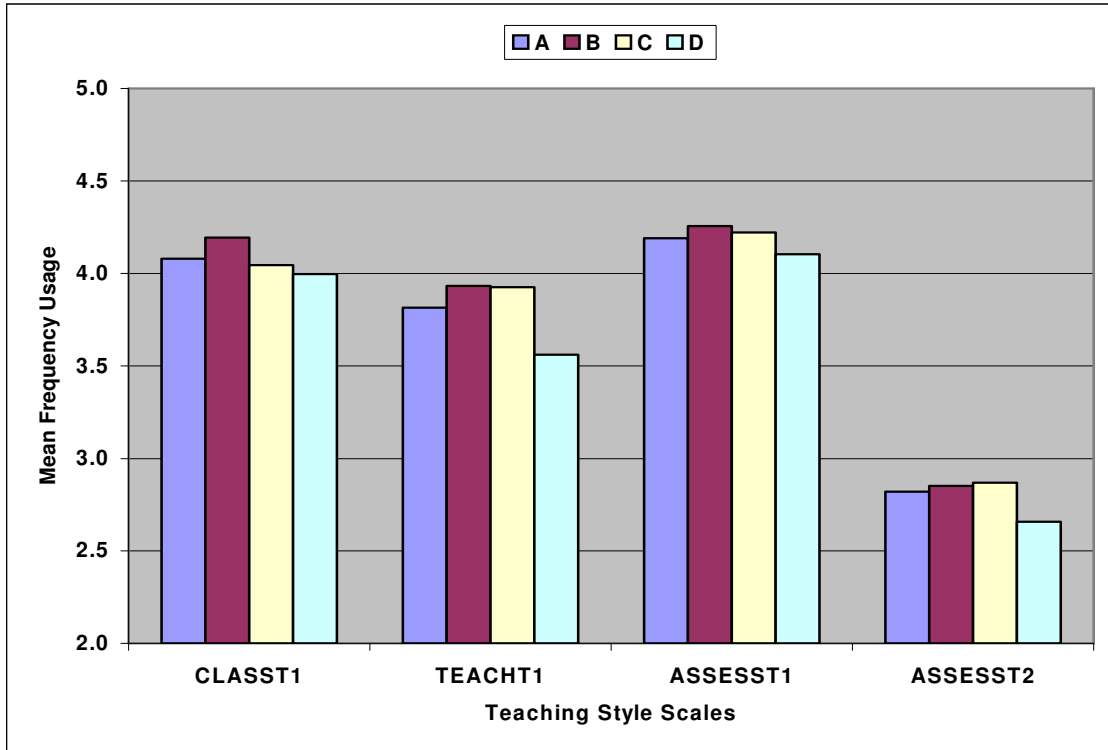


Figure 4: Frequency of Use of Traditional Teaching Styles by School Accountability Grade

Table 19: ANOVA Traditional Teaching Strategies and School Grade

Category	Sum of Squares	df	Mean Square	F	Sig.
Traditional Teaching Strategies					
TEACH T 1					
Between Groups	2.107	3	.702	4.025	.008
Within Groups	54.798	314	.175		
Total	56.905	317			

Table 20: Post Hoc Tukey TEACH T-1

Dependent Variable	(I) School Grade	J) School Grade	Mean (I-J)	Standard Error	Sig.
TEACH T-1	D	C	-.3656	.13674	.039
		B	-.3731	.12806	.020

Analysis of the mean indicated that teachers who used traditional teaching strategies more frequently gave more student behavioral referrals (see Figure 5).

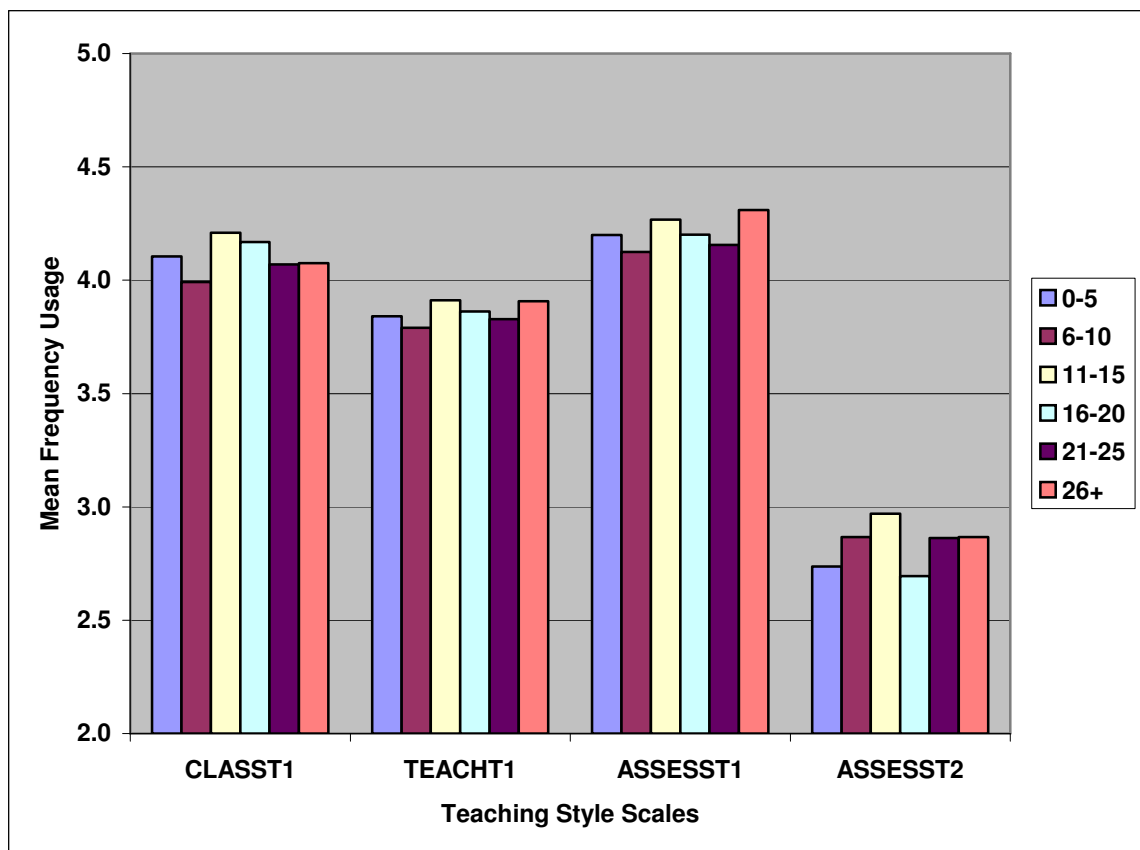


Figure 5: Frequency of Use of Traditional Teaching Styles by Referrals Per Year

Analysis of the mean frequency of use of traditional teaching strategies and class size indicated that the larger the class size, the less frequently teachers used traditional teaching strategies (see Table 6).



Figure 6: Frequency of Use of Traditional Teaching Styles by Class Size

Summary

There was no significant correlation between the use of constructivist teaching strategies and student academic performance as measured by the grades earned by Lee County Middle Schools on the Florida Accountability Scale (A,B,C,D). There was a small significant negative correlation between the use of constructivist teaching styles and the numbers of referrals, indicating that the greater the use of constructivist teaching strategies, the fewer the numbers of referrals per year.

Teachers with large class sizes of 36 to 40 students used constructivist teaching strategies more frequently than teachers with smaller classes, as the mean responses for classes of 36-40 ranged from 2.73 to 4.04 compared to the mean responses for smaller classes of 2.54 to 3.62.

The mean data for frequency of use of traditional teaching strategies revealed the following:

- Traditional strategies were used more frequently than constructivist teaching strategies (see Figures 1,2,3,4,5,and 6).
- Teachers at the school with a Florida State Accountability grade of a D used traditional teaching strategies less frequently than teachers at schools graded A, B, or C (see Figure 4).
- Teachers who used more traditional teaching strategies gave more student behavioral referrals (see Figure 5).
- Teachers with larger class sizes used traditional teaching strategies less frequently than teachers with smaller class sizes (see Figure 6)

CHAPTER 5: CONCLUSIONS, DISCUSSION, AND RECOMMENDATIONS

The purpose of this study was to determine the relationship between the use of constructivist teaching strategies and student academic performance, student social behavior, and class size. In this chapter, the researcher will restate each question, present conclusions based on the evidence, and discusses possible explanations for the findings.

Conclusions and Discussion

Research Question 1

Research Question One: Given a survey to determine the use of constructivist teaching strategies, what was the relation between the use of constructivist teaching strategies on student academic performance?

There was no significant correlation between the use of constructivist teaching strategies and student academic performance as determined by the schools' grade on the Florida State Accountability Scale (A, B, C, D, or F). School grades were determined by student academic performance in math and reading on the high stakes Florida Comprehensive Assessment Test (FCAT). This test was developed to measure how effectively students had learned state developed learning objectives listed in the Florida

Sunshine State Standards for reading and mathematics were learning objectives that teachers in the state of Florida were expected to teach students. Analysis of the mean responses indicated that schools with grades of C or D used constructivist teaching strategies slightly less frequently than middle schools with grades of A or B.

Constructivist management styles that teachers reported as having used sometimes to frequently (see Table 6) included: displayed student work, used music or art in the classroom, facilitated student-centered activities, cooperative learning, and social negotiation to solve student to student problems. Constructivist teaching and learning activities were also used sometimes to frequently. These included teaching to multiple intelligences, hands-on learning activities, interest-based learning choices, use of multiple resources, and the teacher served as a mentor and motivator. Teacher responded that constructivist assessment strategies were used rarely to sometimes, indicating that teachers were hesitant to encourage student control in the classroom. Assessment activities that were used rarely to sometimes included: student produced videos, student simulations or role-play, student created games based on knowledge learning, student determination of the rubric for the assessment tool, and students self-assessed their learning activities.

The lack of use of constructivist assessment strategies may have occurred for many reasons, some of which may include:

- Teachers were not trained to use these strategies
- Students did not have the social skills necessary to utilize this type of assessment
- Teachers preferred the use of traditional assessments

Research Question 2

Research Question Two: Given a survey to determine the use of constructivist teaching strategies, what was the relation between the use of constructivist teaching strategies on student social behavior as measured by the number of behavioral referrals given per teacher per year?

The Pearson Correlation revealed small negative correlations between all areas of constructivist teaching strategies and the number of referrals per year. This indicated that the greater the frequency of use of constructivist teaching strategies, the fewer the numbers of referrals per year. Analysis of the mean revealed a pattern of fewer referrals as the frequency of use of constructivist teaching strategies increased (see graph Figure 2). Teachers who reported 0-5 and 6-10 referrals per year indicated that they used constructivist classroom management and teaching and learning activities frequently but they used constructivist assessment strategies rarely to sometimes (see Table 10).

Student classroom behavior has been a serious problem in many classrooms today. If the reason for these results is due to lack of teacher training this research could provide useful information to support planning teacher training and inservices designed to encourage the implementation of constructive teaching strategies. Students could benefit from exposure to constructivist teaching strategies because these activities have the potential to encourage the development of mutual student respect, team planning, as well as social negotiation when students have disagreements.

There could be many alternative explanations for the results of this study, some of which might include:

- Teachers were untrained in the technique of using constructivist teaching strategies.

- Teachers who choose to use constructivist teaching strategies have nurturing personalities and may be less likely to solve student problems by giving student referrals.
- The types of activities included in constructivist teaching required behavior that might generate referrals in a traditional classroom
- Student lack of social skills prohibited the use of constructivist teaching strategies.

Research Question 3

Research Question Three: Given a survey to determine the use of constructivist teaching strategies in the classroom, what was the relationship between class size and the use of constructivist teaching strategies?

The Pearson Correlation revealed a small positive correlation between class sizes and the use of constructivist teaching and learning strategies. In class sizes of 1 to 15 students, the mean response ranged from 2.9 to 3.6 indicating that teachers use these strategies "sometimes" to "frequently". The mean response from teachers with class sizes of 26-30 and 31-35 ranged from 2.7 to 3.7 and indicated that teachers used constructivist strategies "sometimes" to "frequently" (see Table 16). The most frequent use of constructivist teaching strategies occurred in class sizes from 36-40 as teacher responses were 3.94, 4.03, 3.29, 2.73, and 4.04 respectively.

An Analysis of Variance revealed that there was a mean difference among the groups of class sizes at .022 significance. A post hoc Tukey revealed that the greatest between group differences were between classes of 1-15 and classes of 36-40 student at a

.040 significance and classes of 16-20 and classes of 36-40 at a.041 significance (see Table 18).

There could be many explanations for the results of this study. Some of reasons might include:

- It was difficult to implement cooperative learning and team or peer collaboration in small classes.
- Some of the classes may have small because they included students with learning difficulties, behavioral disorders or were ESE students.
- Class sizes of 25-35 offered greater opportunity to place students in lab groups or teams for collaborative learning experiences.
- Teachers may have interpreted dividing large classes into small student groups as constructivist teaching when, in fact, the activity may have been traditional because it was designed and controlled by the teacher.

Discussion

When conducting research in public schools, difficulties exist which impact the research. In this study, the failure of 66 teachers to completely fill out the demographic portion of the survey resulted in a research base of 318 teachers rather than the 384 who returned their surveys. Despite the survey being returned in a sealed envelope with no identifying factors, teachers indicated that they were willing to answer the entire survey

but were hesitant to reveal any personal or professional information that might identify them.

It was interesting to note the many replies that teachers wrote on the survey, some of which include:

- "I am ashamed of the my answers on this survey, I need to revisit the way I teach"
- "I need to have my students participate in hands-on class activities"
- "Teaching would be more fun if I used some of the ideas on this survey"

Teachers responded positively to descriptions of both constructivist and traditional teaching strategies (see Figures 1-6). Possible explanations might include:

- Teachers used both teaching strategies frequently.
- The survey could have been more specific in specifying percentage of use of class time per week to determine a more accurate description of the teaching strategies used in the classroom.
- Teachers were aware of the importance of using constructivist teaching strategies in the classroom due to the current national educational policy encouraging teachers to complete the National Board Certification process. This program promotes the use of constructivist teaching strategies in the classroom.

Recommendations for Future Research

This research survey could serve as a base for the development a more sophisticated research tool to assess the frequency of use of constructivist and traditional teaching strategies in the classroom. In addition, the survey could be used as a pre and post-test for teachers seeking National Board Certification to determine if the frequency of use of constructivist teaching strategies in the classroom increased as the result of completing the rigorous National Board Certification Program.

Based on numerous teacher comments written on the research instrument, this survey could be used for teacher self-reflection regarding classroom management styles, teaching and learning activities employed in the classroom, and student assessment.

APPENDIX A:

DEMOGRAPHICS

DESCRIPTIVE DEMOGRAPHICS

NAME OF "MIDDLE" SCHOOL WHERE YOU TAUGHT *LAST YEAR*:

- | | |
|--|--|
| <input type="checkbox"/> ALC | <input type="checkbox"/> Lehigh Acres Middle |
| <input type="checkbox"/> Alva Middle | <input type="checkbox"/> Lehigh Middle AT Lehigh Sr |
| <input type="checkbox"/> Bonita Springs | <input type="checkbox"/> Riverdale High Middle |
| <input type="checkbox"/> Caloosa Middle | <input type="checkbox"/> Sanibel School (Middle) |
| <input type="checkbox"/> Cypress Lake Middle | <input type="checkbox"/> Michigan Montessori(Middle) |
| <input type="checkbox"/> Diplomat Middle | <input type="checkbox"/> North Ft. Myers Academy |
| <input type="checkbox"/> Ft. Myers Middle | <input type="checkbox"/> Paul Lawrence Dunbar |
| <input type="checkbox"/> Gulf Middle | <input type="checkbox"/> Three Oaks Middle |
| <input type="checkbox"/> Lee Middle | <input type="checkbox"/> Trafalgar Middle |
| | <input type="checkbox"/> NONE |

CIRCLE YOUR ANSWER :

3. Gender: a. female b. male
4. Primary subject area for which you are responsible:
a. Math b. Science c. Language Arts
d. Social Studies e. Other (specify)_____
4. Grade level(s) you teach: 6 7 8
5. Type of certificate: a. Professional b. Temporary
6. Teaching assignment:
a. In the field of my certification
b. Out of the field of my certification
7. Ethnicity: a. Caucasian b. Hispanic c. Asian
d. African American e. Other(specify)_____
8. Class times: a. Periods b. Blocks c. Other
9. Number of years teaching:
0-3 4-10 11-20 over 21
10. Average number of students per class:
1-15 16-20 21-25 26-30 31-35 36-40 41-45 over 46
11. Estimated number of referrals per month:
0-3 4-6 7-9 10 or more

12. Estimated number of referrals per year:

0-5 6-10 11-15 16-20 21-25 26 plus

APPENDIX B:

SURVEY SCRIPT BY TEACHING CATEGORY

CLASSROOM MANAGEMENT,

TEACHING AND LEARNING ACTIVITIES ASSESSMENT

SURVEY SCRIPT BY TEACHING CATEGORY

CLASSROOM/CLASSROOM MANAGEMENT:

TRADITIONAL:

1. I direct student behavior
2. I physically arrange the classroom
3. I assign student seating
4. Students raise hands to talk in class
5. Students request permission to
6. leave their seats or the classroom
7. I file student work
8. I determine and post class rules
9. Students abide by class rules
10. I resolve student to student problems
11. The physical arrangement of the classroom
12. stays the same

CONSTRUCTIVIST:

1. The physical arrangement of the room is
2. changed frequently based on learning activities
3. Students determine the class rules
4. Students work in cooperative groups
5. I use music and/or art in the classroom
6. Student needs determine use of class
7. time
8. Class activities are student-centered
9. Students actively move about in the room
10. Student work is displayed in the room
11. Students use social negotiation to solve
12. student to student social problems
13. The classroom environment/activities demonstrate
14. respect for multi-cultural diversity

TEACHING/LEARNING ACTIVITIES

TRADITIONAL:

1. I act upon student differences when they
2. are problematic.
3. I teach to the intellectual level of class.
4. I plan the learning experiences.
5. I use whole class instruction.
6. Coverage of the curriculum is the primary
7. influence on my lesson plans.
8. Students memorize material to be learned.
9. I give lectures.
10. The textbook is the primary reference.
11. I monitor student behavior.
12. Students give single interpretations of ideas
13. or events.
14. I am located in front of the class.
15. Students use drill and practice.
16. Students make presentations.
17. Students use workbooks or lab manuals.
18. I provide topics for independent student study.
19. I use one primary mode of presentation.
20. I test for student acquisition of information.
21. I monitor student learning.
22. I present the material to be learned.
23. I request parent conferences to discuss
24. student grades.
25. I present the material to be learned.

TEACHING/LEARNING ACTIVITIES

CONSTRUCTIVIST:

1. I teach to multiple student intelligence
2. I use art and music in class activities
3. I provide "hands-on" learning activities
4. Students work in cooperative groups
5. Students make interest-based
6. learning choices
7. The physical arrangement of the classroom
8. changes to facilitate learning activities.
9. I use student learning profiles to shape
10. classroom instruction.
11. Students choose from multi-option assignments.
12. Student needs determine use of class time.
13. Students use critical thinking and problem-
14. solving skills.
15. Students produce videos, simulations,
16. and/or role-play.
17. Students investigate and solve real-world problems.
18. Students use multiple resources.
19. Students select topics for independent study.
20. Social negotiation is a part of the learning process
21. I serve as a mentor and motivator.
22. Learning is active investigation
23. Students monitor their own learning.
24. Parents are included in the learning activities.
25. I move throughout the classroom.

ASSESSMENT:

TRADITIONAL:

1. Assessment is at end of learning.
2. Excellence is defined as percentage of
3. comprehension of material.
4. I determine the standard for grading.
5. A single form of assessment is used.
6. Tests include textbook lab and/or class activities.
7. I determine the grades for learning activities.
8. Standardized tests are used for assessment.
9. I determine the assessment tool for class activities.
10. Tests and final exams are used as the primary grades.
11. I monitor student academic progress

CONSTRUCTIVIST

1. Assessment is diagnostic
2. Assessment is based on student improvement
3. over time.
4. Multiple modes of assessment are used.
5. Students produce video/simulation/role-play.
6. Students perform authentic tasks.
7. Students self-assess their learning activities.
8. Assessment based on student performance
9. during lab practicums or authentic activities.
10. Students determine the assessment tool
11. (rubrics, questions, activities)..
12. Students create games based on the knowledge
13. learned
14. Students monitor their academic progress.

APPENDIX C:

PILOT SURVEY CODE

T = TRADITIONAL, C = CONSTRUCTIVIST

Circle the responses that most accurately reflect your classroom and your classroom activities. (5 = Always, 4 = Frequently, 3 = Sometimes, 2 = Rarely, 1 = Never)

Always Frequently Some- Rarely Never
times

CLASSROOM/CLASS MANAGEMENT:

1. T - Class rules are determined and posted when students arrive in my class.	5	4	3	2	1
2. C - Students actively move about in the room.	5	4	3	2	1
3. T - Students request permission to leave their seats or the classroom.	5	4	3	2	1
4. T - I correct student behavior.	5	4	3	2	1
5. T - Student work is filed.	5	4	3	2	1
6. C - Classroom furniture is re-arranged.	5	4	3	2	1
7. C - Student work is displayed.	5	4	3	2	1
8. T - Students raise hands to talk in class.	5	4	3	2	1
9. T - Students abide by class rules.	5	4	3	2	1
10. T - Classroom chairs/seats are arranged in rows.	5	4	3	2	1
11. C - Students determine class rules.	5	4	3	2	1
12. C - Students work in cooperative groups.	5	4	3	2	1
13. C - Music and/or art are used in the classroom.	5	4	3	2	1
14. T - I resolve student to student problems.	5	4	3	2	1
15. C - Student needs determine use of class time.	5	4	3	2	1

CLASSROOM/CLASS MANAGEMENT:

	Always	Frequently	Some- times	Rarely	Never
16. T - Students have assigned seating.	5	4	3	2	1
17. C - Class activities are student-centered.	5	4	3	2	1
18. T - I determine the physical arrangement of the classroom.	5	4	3	2	1
19. C - Students use social negotiation to solve student to student social problems.	5	4	3	2	1
20. C - The classroom environment/ activities demonstrate multi-cultural diversity.	5	4	3	2	1

TEACHING/LEARNING ACTIVITIES:

21. T - Coverage of the curriculum is the primary influence on my lesson plans.	5	4	3	2	1
22. T - Students are provided topics for independent student study.	5	4	3	2	1
23. C - I teach to multiple student intelligences.	5	4	3	2	1
23. T - I use whole class instruction.	5	4	3	2	1
24. T - I act upon student differences when they are problematic.	5	4	3	2	1
25. T - I am located in front of the class.	5	4	3	2	1
26. T - I teach to the intellectual level of the class.	5	4	3	2	1
27. C - Art and music are used in class activities.	5	4	3	2	1
28. T - Students memorize material to be learned.	5	4	3	2	1
29. T - I use one primary mode of presentation.	5	4	3	2	1

30. T - Parent conferences are requested to discuss student grades.	5	4	3	2	1
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TEACHING/LEARNING ACTIVITIES:

	Always	Frequently	Some-times	Rarely	Never
31. C - "Hands-on" learning activities are provided for the student.	5	4	3	2	1
32. C - Students work in cooperative groups.	5	4	3	2	1
33. T - I monitor student grade point averages.	5	4	3	2	1
34. T - I present the material to be learned.	5	4	3	2	1
35. C - Students make interest-based learning choices.	5	4	3	2	1
36. C - The physical arrangement of the classroom changes to facilitate learning activities.	5	4	3	2	1
37. T - I plan student learning experiences.	5	4	3	2	1
38. T - Students use drill and practice.	5	4	3	2	1
39. C - I use student learning profiles to shape classroom instruction.	5	4	3	2	1
40. T - Students make presentations.	5	4	3	2	1
41. C - Students choose from multi-option assignments.	5	4	3	2	1
42. C - Student needs determine use of class time.	5	4	3	2	1
43. C - Students use critical thinking and problem-solving skills.	5	4	3	2	1
44. C - Students produce video tapes, simulations, and/or role-play.	5	4	3	2	1
45. T - The textbook is the primary reference.	5	4	3	2	1
46. T - Students are tested for comprehension of information presented in class.	5	4	3	2	1

TEACHING/LEARNING ACTIVITIES:

	Always	Frequently	Some- times	Rarely	Never
47. C - Students investigate and solve real-world problems.	5	4	3	2	1
48. C - Students use multiple resources in class.	5	4	3	2	1
49. T - Students use workbooks or lab manuals.	5	4	3	2	1
50. C - Students select topics for independent study.	5	4	3	2	1
51. C - Social negotiation is a part of the learning process.	5	4	3	2	1
52. C - I serve as a mentor and motivator.	5	4	3	2	1
53. C - Learning is active investigation.	5	4	3	2	1
54. C - Students monitor their own learning.	5	4	3	2	1
55. C - Parents are included in the learning activities.	5	4	3	2	1
56. T - Students give single interpretations of ideas or events.	5	4	3	2	1
57. C - I move throughout the classroom.	5	4	3	2	1
58. T - Students take notes during a class lecture movie, or video.	5	4	3	2	1

ASSESSMENT:

	Always	Frequently	Some- times	Rarely	Never
59. C - Assessment is diagnostic.	5	4	3	2	1
60. T - Assessment is at end of learning.	5	4	3	2	1

61. T - I determine the assessment tool for class activities.	5	4	3	2	1
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62. Assessment is based on improvement	5	4	3	2	1
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ASSESSMENT:

	Always	Frequently	Some-times	Rarely	Never
63. T - I monitor student academic progress.	5	4	3	2	1
64. T - Excellence is defined as percentage of comprehension of material.	5	4	3	2	1
65. C - Multiple modes of assessment are used.	5	4	3	2	1
66. T - I determine the grading criteria for learning activities.	5	4	3	2	1
67. T - Standardized tests are used for assessment.	5	4	3	2	1
68. C - Students produce videos/simulation/role-play.	5	4	3	2	1
69. T - Tests and final exams are used as primary grades.	5	4	3	2	1
70. T - The standard for grading student work is given to the student.	5	4	3	2	1
71. C - Students perform authentic tasks.	5	4	3	2	1
72. C - Students self-assess their activities.	5	4	3	2	1
73. T - Students take standardized text tests.	5	4	3	2	1
74. C - Assessment is based on student performance during authentic activities.	5	4	3	2	1
75. T - A single form of assessment is used.	5	4	3	2	1
76. C - Students determine the assessment tool. (rubrics, questions, activities)	5	4	3	2	1

- | | | | | | |
|---|---|---|---|---|---|
| 77. C - Students create games based on knowledge they have learned. | 5 | 4 | 3 | 2 | 1 |
| 78. C - Students monitor their academic progress. | 5 | 4 | 3 | 2 | 1 |

APPENDIX D:

PILOT SURVEY QUESTIONS 1-78

Circle the responses that most accurately reflect your classroom and your classroom activities. (5 = Always, 4 = Most of the time, 3 = Sometimes, 2 = Rarely, 1 = Never)

Always Frequently Some- Rarely Never
times

CLASSROOM/CLASS MANAGEMENT:

1. Class rules are determined and posted when students arrive in my class.	5	4	3	2	1
2. Students actively move about in the room.	5	4	3	2	1
3. Students request permission to leave their seats or the classroom.	5	4	3	2	1
4. I correct student behavior.	5	4	3	2	1
5. Student work is filed.	5	4	3	2	1
6. The physical arrangement of classroom furniture is changed.	5	4	3	2	1
7. Student work is displayed.	5	4	3	2	1
8. Students raise hands to talk in class.	5	4	3	2	1
9. Students abide by class rules.	5	4	3	2	1
10. The physical arrangement of classroom furniture stays the same.	5	4	3	2	1
11. Students determine class rules.	5	4	3	2	1
12. Students work in cooperative groups.	5	4	3	2	1
1. Music and/or art are used in the classroom.	5	4	3	2	1
2. I resolve student to student problems.	5	4	3	2	1
3. Student needs determine use of class time.	5	4	3	2	1

CLASSROOM/CLASS MANAGEMENT:

	Always	Most of the time	Some-times	Rarely	Never
16. Students have assigned seating.	5	4	3	2	1
17. Class activities are student-centered.	5	4	3	2	1
18. I determine the physical arrangement of the classroom.	5	4	3	2	1
19. Students use social negotiation to solve student to student social problems.	5	4	3	2	1
20. The classroom environment/ activities demonstrate multicultural diversity.	5	4	3	2	1

TEACHING/LEARNING ACTIVITIES:

21. Coverage of the curriculum is the primary influence on my lesson plans.	5	4	3	2	1
22. Students are provided topics for independent student study.	5	4	3	2	1
23. I teach to multiple student intelligence.	5	4	3	2	1
23a. I use whole class instruction.	5	4	3	2	1
24. I act upon student differences when they are problematic.	5	4	3	2	1
25. I am located in front of the class.	5	4	3	2	1
26. I teach to the intellectual level of class.	5	4	3	2	1
27. Art and music are used in class activities.	5	4	3	2	1
28. Students memorize material to be learned.	5	4	3	2	1
29. I use one primary mode of presentation.	5	4	3	2	1

30 Parent conferences are requested to discuss student grades.	5	4	3	2	1
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TEACHING/LEARNING ACTIVITIES:

	Always	Some- times	Most of the time	Rarely	Never
31. "Hands-on" learning activities are provided for the student.	5	4	3	2	1
32. Students work in cooperative groups.	5	4	3	2	1
33. I monitor student grade point averages.	5	4	3	2	1
34. I present the material to be learned.	5	4	3	2	1
35. Students make interest-based learning choices.	5	4	3	2	1
36. The physical arrangement of the classroom changes to facilitate learning activities.	5	4	3	2	1
37. I plan student learning experiences.	5	4	3	2	1
38. Students use drill and practice.	5	4	3	2	1
39. I use student learning profiles to shape classroom instruction.	5	4	3	2	1
40. Students make presentations.	5	4	3	2	1
41. Students choose from multi-option assignments.	5	4	3	2	1
42. Student needs determine use of class time.	5	4	3	2	1
43. Students use critical thinking and problem-solving skills.	5	4	3	2	1
44. Students produce videos, simulations, and/or role-play.	5	4	3	2	1
45. The textbook is the primary reference.	5	4	3	2	1
46. Students are tested for comprehension of information presented in class.	5	4	3	2	1

TEACHING/LEARNING ACTIVITIES:

	Always	Some- times	Most of the time	Rarely	Never
47. Students investigate and solve real-world problems.	5	4	3	2	1
48. Students use multiple resources in class.	5	4	3	2	1
49. Students use workbooks or lab manuals.	5	4	3	2	1
50. Students select topics for independent study.	5	4	3	2	1
51. Social negotiation is a part of the learning process.	5	4	3	2	1
52. I serve as a mentor and motivator.	5	4	3	2	1
53. Learning is active investigation.	5	4	3	2	1
54. Students monitor their own learning.	5	4	3	2	1
55. Parents are included in the learning activities.	5	4	3	2	1
56. Students give single interpretations of ideas or events.	5	4	3	2	1
57. I move throughout the classroom.	5	4	3	2	1
58. Students take notes during a class lecture movie, or video.	5	4	3	2	1

	Always	Most of the time	Some- times	Rarely	Never
<u>ASSESSMENT:</u>					
59. Assessment is diagnostic.	5	4	3	2	1
60. Assessment is at end of learning.	5	4	3	2	1
61. I determine the assessment tool for class activities.	5	4	3	2	1
62. Assessment is based on student improvement over time.	5	4	3	2	1

ASSESSMENT:

	Always	Most of the time	Some- times	Rarely	Never
63. I monitor student academic progress.	5	4	3	2	1
64. Excellence is defined as percentage of comprehension of material.	5	4	3	2	1
65. Multiple modes of assessment are used.	5	4	3	2	1
66. I determine the grading criteria for learning activities.	5	4	3	2	1
67. Standardized tests are used for assessment.	5	4	3	2	1
68. Students produce video/simulation/roll-play.	5	4	3	2	1
69. Tests and final exams are used as primary grades.	5	4	3	2	1
70. The standard for grading student work is given to the student.	5	4	3	2	1
71. Students perform authentic tasks.	5	4	3	2	1
72. Students self-assess their learning activities.	5	4	3	2	1
73. Students take standardized textbook test.	5	4	3	2	1
74. Assessment is based on student performance during authentic activities.	5	4	3	2	1
75. A single form of assessment is used.	5	4	3	2	1
76. Students determine the assessment tool. (rubrics, questions, activities)	5	4	3	2	1
77. Students create games based on knowledge they have learned.	5	4	3	2	1
78. Students monitor their academic progress.	5	4	3	2	1

APPENDIX E:

EXPLORATORY FACTOR ANALYSIS

CLASSROOM MANAGEMENT

TEACHING AND LEARNING ACTIVITIES

STUDENT ASSESSMENT

EXPLORATORY FACTOR ANALYSIS

BOLD = TRADITIONAL

REGULAR TYPE = CONSTRUCTIVIST

CLASSROOM MANAGEMENT

QUESTION NUMBER	FACTOR			
	1	2	3	4
CLASS T-1				
Q3	.843	-.175	-.017	.015
Q8	.705	.226	.257	-.083
Q16	.569	.221	-.328	-.126
Q18	.552	.386	-.508	.136
Q4	.514	.494	.045	-.266
Q5	.425	.291	.019	.004
CLASS C-1				
Q13	-.579	.509	.059	.155
Q17	.124	.616	.134	.097
Q7	.075	.534	-.061	.171
Q20	-.146	.347	.004	.026
Q12	-.190	.147	.453	.725
Q19	-.334	.065	.237	.432

**TEACHING AND LEARNING ACTIVITIES
FACTOR ANALYSIS**

QUESTION NUMBER	FACTOR				
	1	2	3	4	5
TEACH T-1					
Q38	.137	-.180	.691	-.184	.294
Q45	-.136	.070	.621	.282	-.146
Q25	.070	-.319	.607	.193	-.082
Q56	-.119	-.080	.511	.045	.033
Q30	-.048	.101	.381	.356	.171
TEACH T-2					
Q21	-.041	-.178	.094	.656	.337
Q23B	.126	-.118	.289	.611	-.193
Q26	.228	-.039	-.002	.551	.547
Q33	.015	.082	.004	.453	.204
Q24	.368	.153	.342	.425	.187
TEACH T-3					
Q34	.049	-.097	.221	.026	.673
Q46	.008	.005	.451	.120	.580
Q37	.265	-.147	-.233	.291	.443
TEACH C-1					
Q53	.725	.052	-.041	.368	.061
Q23A	.658	.119	-.148	.165	.188
Q31	.648	.099	-.065	-.030	.202
Q52	.530	.033	-.470	-.049	-.196
Q27	.530	.033	-.470	-.049	-.196
Q48	.517	.365	-.390	.091	-.030
Q43	.455	.003	.206	.367	.030
Q55	.434	.068	-.072	.172	.131
Q35	.418	.404	.034	-.113	-.039
Q32	.365	.033	.020	-.132	-.256

FACTOR ANALYSIS

TEACHING AND LEARNING ACTIVITIES

QUESTION NUMBER	FACTOR				
	1	2	3	4	5
TEACH C-2					
Q41	.320	.741	-.197	-.095	.006
Q44	.224	.576	-.233	-.138	-.381
Q50	.218	.539	-.331	.107	.009
Q51	.304	.521	-.135	0.072	.189
Q47	.212	.415	-.075	-.003	.389
Q54	.304	.376	.074	.322	-.051
Q36	.263	.365	-.177	-.026	.364

ASSESSMENT

ASSESS T-1					
Q63	.761	.216	.129	-.054	
Q66	.656	.090	-.029	-.366	
Q61	.645	-.043	.107	-.268	
Q60	.632	-.116	.233	-.116	
ASSESS T-2					
Q70	.235	.360	.082	.046	
Q73	.010	-.185	.828	-.099	
Q67	-.012	.034	.762	.138	
Q64	.313	.204	.505	-.195	
Q69	.125	-.100	.478	-.270	
ASSESS C-1					
Q74	-.043	.865	-.140	-.029	
Q71	.060	.669	-.358	.152	
Q62	.157	.456	.270	-.157	
ASSESS C-2					
Q68	-.199	-.044	-.261	.702	
Q77	-.012	-.053	-.092	.616	
Q78	.068	.369	.203	.595	
Q76	-.392	.009	-.072	.586	
Q72	-.299	.487	-.001	.494	

APPENDIX F:

PILOT SURVEY ANALYSIS USING CRONBACH'S ALPHA

CLASSROOM MANAGEMENT Scales (Cronbach's Alpha)

T – 1: Traditional – Teacher Control (α = .79)

- 3. T – Student s request permission to leave their seats or the classroom
- 4. T – I correct student behavior.
- 5. T – Student work is filed.
- 8 T – Students raise hands to talk in class.
- 16. T – Students have assigned seating.
- 18. T – I determine the physical arrangement of the classroom

C – 1: Constructivist – Student Centered (α = .61)

- 7. C – Student work is displayed.
- 13. C – Music and/or art are used in the classroom.
- 15. C – Student needs determine use of class time.
- 17. C – Class activities are student centered.
- 20. C – The classroom environment/activities demonstrate multicultural diversity.

C – 2: Constructivist – Student Interaction (α = .65)

- 12. C – Students work in cooperative groups.
- 19. C – Students use social negotiation to solve student to student social problems.

Correlation

		CLASST1	CLASSC1	CLASSC2
CLASST1	Pearson	1	.070	-.200
	Correlation			
	Sig. (2-tailed)	.	.602	.131
	N	58	58	58
CLASSC1	Pearson	.070	1	.283(*)
	Correlation			
	Sig. (2-tailed)	.602	.	.032
	N	58	58	58
CLASSC2	Pearson	-.200	.283(*)	1
	Correlation			
	Sig. (2-tailed)	.131	.032	.
	N	58	58	58

- Correlation is significant at the 0.05 level (2-tailed).

On the above table, note:

C1 has a correlation of .070 and therefore no correlation to T1

C2 has a negative correlation to T1 (-.200)

C1 correlates to C2 with .283 confirming both are constructivist

This confirms that Constructivist C1 and C2 are measuring different concepts than T1 - Traditional

TEACHING ACTIVITIES Scales (Cronbach's Alpha)

T – 1 Traditional - Teacher rigidity ($\alpha = .65$)

- 25. T – I am located in the front of the class.
- 38. T – Students use drill and practice.
- 45. T – The textbook is the primary reference.
- 56. T – Students give single interpretations of ideas or events.

T – 2: Traditional – Teacher control($\alpha = .73$)

- 21. T – coverage of the curriculum is the primary influence on my lesson plans.
- 23b T – I use whole class instruction.
- 24. T – I act upon student differences when they are problematic.
- 26 T – I teach to the intellectual level of the class.
- 33. T – I monitor student grade point averages.

T – 3: Traditional – Teacher Presentation ($\alpha = .63$)

- 34. T – I present the material to be learned
- 37. T – I plan student learning experiences.
- 46. T – Students are tested for comprehension of information presented in class.

C – 1 Constructivist – Student Engagement ($\alpha = .80$)

- 23a. C – I teach to multiple student intelligence.
- 27. C – Art and music are used in class activities.
- 31. C – “Hands-on” learning activities are provided for the student.
- 32. C – Students work in cooperative groups.
- 35. C – Students make interest-based learning choices.
- 43. C – Students use critical thinking and problem-solving skills.
- 48. C – Students use multiple resources in class.
- 52. C – I serve as a mentor and motivator.
- 53. C – Learning is active investigation.
- 55. C – Parents are included in the learning activities.

C – 2: Constructivist – Student Control ($\alpha = .76$)

- 36. C – The physical arrangement of the classroom changes to facilitate learning.
- 41. C – Students choose from multi-option assignments.
- 44. C – Students produce videos, simulations, and/or role-play.
- 47. C – Students investigate and solve real-world problems.
- 50. C – Students select topics for independent study.
- 51. C – Social negotiation is a part of the learning process.
- 54. C – Students monitor their own learning.

Correlation

		TEACHT1	TEACHT2	TEACHT3	TEACHC1	TEACHC2
TEACHT1	Pearson Correlation	1	.325(*)	.329(*)	-.115	-.332(*)
	Sig. (2-tailed)	.	.013	.012	.389	.011
	N	58	58	58	58	58
TEACHT2	Pearson Correlation	.325(*)	1	.446(**)	.257	.040
	Sig. (2-tailed)	.013	.	.000	.052	.765
	N	58	58	58	58	58
TEACHT3	Pearson Correlation	.329(*)	.446(**)	1	.127	.023
	Sig. (2-tailed)	.012	.000	.	.342	.864
	N	58	58	58	58	58
TEACHC1	Pearson Correlation	-.115	.257	.127	1	.553(**)
	Sig. (2-tailed)	.389	.052	.342	.	.000
	N	58	58	58	58	58
TEACHC2	Pearson Correlation	-.332(*)	.040	.023	.553(**)	1
	Sig. (2-tailed)	.011	.765	.864	.000	.
	N	58	58	58	58	58

* Correlation is significant at the 0.05 level (2-tailed).

** Correlation is significant at the 0.01 level (2-tailed).

On the above scale note:

1. Three positive correlation occurred among the traditional scale
T2 to T1 = .388
T3 to T1 = .366
T3 to T2 = .466
2. C1 and C2 have negative correlation to T1
C1 to T1 = -.092 and C2 to T1 = -.304
3. C1 and C2 have no significant correlation to T2 and T3
C1 to T2 = .257
C2 to T2 = .040
C1 to T3 = .127
C2 to T3 = .023
4. C1 and C2 have a positive correlation .533

ASSESSMENT Scales (Cronbach's Alpha)

T – 1: Traditional – Teacher Control ($\alpha = .79$)

- 60. T – Assessment is at the end of learning.
- 61. T – I determine the assessment tool for class activities.
- 62. T – I monitor student academic progress.
- 66. T – I determine the grading criteria for learning activities.

T – 2: Traditional – Nature of Assessment ($\alpha = .75$)

- 63. T – Excellence is defined as percentage of comprehension of material.
- 67. T – Standardized tests are used for assessment.
- 69. T – Tests and final exams are used as primary grades.
- 73. T – Students take standardized textbook exams.

C – 1: Constructivist – Student Control ($\alpha = .75$)

- 68. C – Students produce video/simulation/role-play.
- 72. C – Students self-assess their learning activities.
- 76. C – Students determine the assessment tool (rubrics, questions, activities).
- 77. C – Students create games based on knowledge they have learned.
- 78. C – Students monitor their academic progress.

C – 2: Constructivist – Nature of Assessments ($\alpha = .79$)

- 70. C – Students perform authentic tasks.
- 71. C – Assessment is based on student performance during authentic assessments.

Correlation

		ASSESST1	ASSESST2	ASSESSC1	ASSESSC2
ASSESST1	Pearson Correlation	1	.290(*)	-.411(**)	.005
	Sig. (2-tailed)	.	.030	.002	.973
	N	58	56	56	56
ASSESST2	Pearson Correlation	.290(*)	1	-.209	-.245
	Sig. (2-tailed)	.030	.	.122	.069
	N	56	56	56	56
ASSESSC1	Pearson Correlation	-.411(**)	-.209	1	.285(*)
	Sig. (2-tailed)	.002	.122	.	.033
	N	56	56	56	56
ASSESSC2	Pearson Correlation	.005	-.245	.285(*)	1
	Sig. (2-tailed)	.973	.069	.033	.
	N	56	56	56	56

* Correlation is significant at the 0.05 level (2-tailed).
 ** Correlation is significant at the 0.01 level (2-tailed).

Note on the above correlation scale:

1. T1 and T2 have a positive correlation of .290
2. C1 and T1 have a negative correlation of -.411
3. C1 to T1 and T2 show no significant correlation
C1 to T1-.411
C1 to T2 -.209
C2 to T1 .005
C2 to T2 - .245
4. C1 And C2 have a positive correlation of .285

APPENDIX G:

FINAL SURVEY QUESTIONS 1-57

Circle the responses that most accurately reflect your classroom and your classroom activities. (5 = Always, 4 = Frequently, 3 = Sometimes, 2 = Rarely, 1 = Never)

Always Frequently Some- Rarely Never
times

CLASSROOM/CLASS MANAGEMENT:

1. Students request permission to leave their seats or the classroom.	5	4	3	2	1
2. I correct student behavior.	5	4	3	2	1
3. Student work is filed.	5	4	3	2	1
4. Student work is displayed.	5	4	3	2	1
5. Students raise hands to talk in class.	5	4	3	2	1
6. Students work in cooperative groups.	5	4	3	2	1
7. Music and/or art are used in the classroom.	5	4	3	2	1
8. Student needs determine use of class time.	5	4	3	2	1
9. Students have assigned seating.	5	4	3	2	1
10. Class activities are student-centered.	5	4	3	2	1
11. I determine the physical arrangement of the classroom.	5	4	3	2	1
12. Students use social negotiation to solve student to student social problems.	5	4	3	2	1
13. The classroom environment/ activities demonstrate multicultural diversity.	5	4	3	2	1

<u>TEACHING/LEARNING ACTIVITIES:</u>	Always	Frequently	Some- times	Rarely	Never
14. Coverage of the curriculum is the primary influence on my lesson plans.	5	4	3	2	1
15. I teach to multiple student intelligence.	5	4	3	2	1
16. I use whole class instruction.	5	4	3	2	1
17. I act upon student differences	5	4	3	2	1
18. I am located in front of the class.	5	4	3	2	1
19. I teach to the intellectual level of the class.	5	4	3	2	1
20. Art and music are used in class activities.	5	4	3	2	1
21. "Hands-on" learning activities are provided for the student.	5	4	3	2	1
22. Students work in cooperative groups.	5	4	3	2	1
23. I monitor student grade point averages.	5	4	3	2	1
24. I present the material to be learned.	5	4	3	2	1
25. Students make interest-based learning choices.	5	4	3	2	1
26. The physical arrangement of the classroom changes to facilitate learning activities.	5	4	3	2	1
27. I plan student learning experiences.	5	4	3	2	1
28. Students use drill and practice.	5	4	3	2	1
29. Students choose from multi-option assignments.	5	4	3	2	1
30. Students use critical thinking and problem-solving skills.	5	4	3	2	1
31. Students produce videos, simulations, and/or role-play.	5	4	3	2	1
32. The textbook is the primary reference.	5	4	3	2	1

33. Students are tested for comprehension of information presented in class.	5	4	3	2	1
--	---	---	---	---	---

TEACHING/LEARNING ACTIVITIES:

	Always	Frequently	Some-times	Rarely	Never
34. Students investigate and solve real-world problems.	5	4	3	2	1
35. Students use multiple resources in class.	5	4	3	2	1
36. Students select topics for independent study.	5	4	3	2	1
37. Social negotiation is a part of the learning process.	5	4	3	2	1
38. I serve as a mentor and motivator.	5	4	3	2	1
39. Learning is active investigation.	5	4	3	2	1
40. Students monitor their own learning.	5	4	3	2	1
41. Parents are included in the learning activities.	5	4	3	2	1
42. Students give single interpretations of ideas or events.	5	4	3	2	1

	Always	Frequently	Some-times	Rarely	Never
<u>ASSESSMENT:</u>					
43. Assessment is at end of learning.	5	4	3	2	1
44. I determine the assessment tool for class activities.	5	4	3	2	1
45. I monitor student academic progress.	5	4	3	2	1
46. Excellence is defined as percentage of comprehension of material.	5	4	3	2	1
47. I determine the grading criteria for learning activities.	5	4	3	2	1

48. Standardized tests are used for assessment.	5	4	3	2	1
49. Students produce video/simulation/role-play.	5	4	3	2	1

ASSESSMENT:

	Always	Frequently	Some-time	Rarely	Never
50. Tests and final exams are used as primary grades.	5	4	3	2	1
51. Students perform authentic tasks.	5	4	3	2	1
52. Students self-assess their learning activities.	5	4	3	2	1
53. Students take standardized textbook tests.	5	4	3	2	1
54. Assessment is based on student performance during authentic activities.	5	4	3	2	1
55. Students determine the assessment tool. (rubrics, questions, activities)	5	4	3	2	1
56. Students create games based on knowledge they have learned.	5	4	3	2	1
57. Students monitor their academic progress.	5	4	3	2	1

APPENDIX H:

FINAL TEACHING STYLES SCALES USING CRONBACH'S

ALPHA

Final Teaching Style Scales

CLASSROOM MANAGEMENT (Cronbach's Alpha)

Traditional - Teacher Control ($\alpha = .54$) CLASST1

1. Students request permission to leave their seats or the classroom.
2. I correct student behavior.
3. Student work is filed.
5. Students raise hands to talk in class.
9. Students have assigned seating.
11. I determine the physical arrangement of the classroom.

Constructivist - Student Centered ($\alpha = .69$) CLASSC1

4. Student work is displayed.
7. Music and/or art are used in the classroom.
8. Student needs determine use of class time.
10. Class activities are student-centered.
13. The classroom environment/ activities demonstrate multi-cultural diversity.
6. Students work in cooperative groups.
12. Students use social negotiation to solve student to student social problems.

TEACHING ACTIVITIES (Cronbach's Alpha)

Traditional - ($\alpha = .70$) TEACHT1

18. I am located in front of the class.
28. Students use drill and practice.
32. The textbook is the primary reference.
14. Coverage of the curriculum is the primary influence on my lesson plans.
16. I use whole class instruction.
17. I act upon student differences when they are problematic.
19. I teach to the intellectual level of the class.
23. I monitor student grade point averages.
24. I present the material to be learned.
27. I plan student learning experiences.
33. Students are tested for comprehension of information presented in class.

Constructivist – Student Engagement ($\alpha = .77$) TEACHC1

- 15. I teach to multiple student intelligences.
- 20. Art and music are used in class activities.
- 21. "Hands-on" learning activities are provided for the student.
- 22. Students work in cooperative groups.
- 25. Students make interest-based learning choices.
- 30. Students use critical thinking and problem-solving skills.
- 35. Students use multiple resources in class.
- 38. I serve as a mentor and motivator.
- 39. Learning is active investigation
- 41. Parents are included in the learning activities.

Constructivist – Student Control ($\alpha = .74$) TEACHC2

- 26. The physical arrangement of the classroom changes to facilitate learning activities.
- 29. Students choose from multi-option assignments.
- 31. Students produce video-tapes, simulations, and/or role-play.
- 34. Students investigate and solve real-world problems.
- 36. Students select topics for independent study.
- 37. Social negotiation is a part of the learning process.
- 40. Students monitor their own learning.

ASSESSMENT (Cronbach Alpha)

Traditional - Teacher Control ($\alpha = .56$) ASSESST1

- 43. Assessment is at end of learning.
- 44. I determine the assessment tool for class activities.
- 45. I monitor student academic progress.
- 47. I determine the grading criteria for learning activities.

Traditional – Nature of Assessment ($\alpha = .68$) ASSESST2

- 46. Excellence is defined as percentage of comprehension of material.
- 48. Standardized tests are used for assessment.
- 50. Tests and final exams are used as primary grades.
- 53. Students take standardized textbook tests

Constructivist – Student Control ($\alpha = .72$) ASSESSC1

- 49. Students produce video/simulation/roll-play.

- 52. Students self-assess their learning activities.
- 55. Students determine the assessment tool (rubrics, questions, activities).
- 56. Students create games based on knowledge they have learned.
- 57. Students monitor their academic progress.

Constructivist – Nature of Assessments ($\alpha = .77$) ASSESSC2

- 51. Students perform authentic tasks.
- 54. Assessment is based on student performance during authentic assessments.

APPENDIX I:

UCF IRB FORM

UCFIRB FORM

1. **Title of Project:** Frequency of Use of Constructivist Teaching Strategies: Effect on Academic Performance and Student Social Behavior

2. **Principal Investigator:**

Signature: _____

Name: Mrs. Betsy Binkley Henry

Degree: Ed. D.

Title: Trafalgar Teacher: Biology, Chemistry, Physics

Department Address: Trafalgar School, 2120 Trafalgar Pkwy., Cape Coral, Fl. 33919

Department Phone Number: 1-239-283-2001 (272)

Personal Address: 5217 SW 8th Pl., Cape Coral, Fl. 33914

Personal Phone Number: 1-239-839-3903

3. **Supervisor:**

Signature: _____

Name: Dr. Larry Holt

Degree: Ed. D.

Title: Director Educational Studies

Department Address: UCF Educational Studies, PO Box 161250, Orlando, Fl., 32816-1250

4. **Dates of Proposed Project:** From: FALL Semester 2002 To: _____

5. **Source of funding for the Project:** None – Assuming expenses personally

6. **Scientific Purpose of the Investigation:** The purpose of this research is to explore the relationship between frequency of use of constructivist teaching strategies with academic performance (as measured by the school's performance on the FCAT), student social behavior (as measured by the number of behavioral referrals per school), and class size.

7. **Research Methodology:**

- The research plan will be submitted to the UCF IRB board for approval.
- The research plan will be submitted to the Lee County Superintendent and The Lee County Research Center for approval.

- Teachers will be given an opportunity to voluntarily participate in this research study by answering questions on a survey regarding their teaching strategies.
- The time required to answer the survey questions is ten minutes.
- Teacher privacy will be protected because the survey has no specific identifying teacher information.
- A pilot study will be performed at a large middle school to establish the validity and reliability of the study.
- The survey will be given out during the school faculty meeting and collected following the meeting.
- The results of the research will be provided to:
 1. UCF - Doctoral Defense
 2. Lee County middle and high school teachers
 3. Lee County Superintendent
 4. Lee County Research Center
 5. Lee County Principals

8. Potential Benefits and Anticipated Risks:

There are no anticipated risks as the information collected from the participants is collected anonymously.

The anticipated benefits include: If it is determined that there is a relationship between frequency of use of constructivist teaching strategies and increased student performance on the FCAT, reduced behavioral referrals, and class size...teachers and administrators would be encouraged to provide an environment in the classroom for these strategies to be implemented.

9. Describe how participants will be recruited, the number and age of the participants, and proposed compensation:

Answer: The participants will be adult teachers who attend school faculty meetings. The reward for participating in the research survey will be that the results will be provided for all participants. There will be a pen or pencil provided along with the survey to encourage participation.

10. Describe the informed consent process: The informed consent will be the cover page for the survey instrument (See attached consent form).

I approve this protocol for submission to the UCFIRB.

_____ Department Chair or Director

_____ Date

APPENDIX J:

INFORMED CONSENT

Informed Consent

October 1, 2002

Dear Teacher:

My name is Betsy B. Henry and I am a graduate student working toward an Ed.D. Degree at the University of Central Florida. You are being asked to participate in an experiment designed to gather information on how teaching strategies affect student academic performance and social behavior. This research was designed solely for research purposes. The survey you will answer contains no information that will identify the participants and your identity will be kept confidential. Your participation in this project is voluntary and you do not have to answer any questions that you do not wish to answer. The questions on this survey will take approximately ten minutes to complete and there are no anticipated risks associated with participation in this experiment. You will be provided a pen to complete the survey and the results of this experiment will be provided to you.

If you have any question or comments about this research, please contact Mrs. Betsy B. Henry at 1-239-839-3903 or my Supervisor Dr. Larry Holt, University of Central Florida Educational Studies, 1-407-823-0899. Questions or concerns about the research participants' rights may be directed to the UCFIRB office, University of Central Florida Office of Research, Orlando Tech Center, 12443 Research Parkway, Suite 207, Orlando, FL 32826. The phone number is 1-407-823-2901.

Sincerely,

Mrs. Betsy B. Henry

_____I have read and received a copy of the procedure described above and I voluntarily agree to participate in the procedure.

APPENDIX K:

LEE COUNTY PERMISSION FORM

The School District of Lee County
Department of Evaluation,
Testing and Research

**RESEARCH PERMISSION
REQUEST**

Researcher	Date:
Mrs. Betsy B. Henry	11-1-2002
<hr/>	
Address:	Telephone No(s):
5217 S.W. 8 th Place Cape Coral, Fl. 33914	
<hr/>	
Sponsor (University/Agency):	Major
Professor:	
University of Central Florida	Dr. Larry Holt
<hr/>	
Title of Research (Topic):	
Effect of Teaching Strategies on Academic Performance and Student Behavior	
<hr/>	
Statement of problem or need to be addressed:	
What is the effect of frequency of use of onstructivist teaching strategies on student academic performance and social behavior?	

-
- Briefly describe what you would like to do and/or data requested:
1. The survey tool consists of both Traditional and Constructivist teaching strategies (see attached).
 2. Present the survey and letter of request to all middle school teachers in Lee County and request their voluntary participation in the research project.
 3. Collect all surveys and determine:
 - A. If there is a correlation between the frequency of use of constructivist teaching strategies and student academic performance as measured by the school's FCAT scores.
 - B. If there is a correlation between the frequency of use of constructivist teaching strategies and student behavior as measured by the number of behavioral referrals per school.
 4. All surveys responses are voluntary and confidential.
 5. The results of the research will be provided to Lee County Administrators and teachers and administrators at all middle schools in Lee County.
-

Briefly list measures to be taken and instruments to be used (include a copy of those instruments not in common use and any available technical support information on these instruments):

The instrument to be used is attached and was developed using National Certification Strategies, CRISS Strategies, SHINES strategies, groups of middle school teachers, the research references for this project (see attached reference list) and the assistance of Dr. Richard Itzen, Lee County Research and Testing.

Briefly describe subject groups participating in this research:

Grade Level	#	Relevant Characteristics
6	all	Middle School Teachers in Lee County
7	all	Middle School Teachers in Lee County
8	all	Middle School Teachers in Lee County

How are the participating subjects to be selected (randomly, matched, etc.)?:

All Middle School teachers in Lee County

School/Department involvement	School/Department personnel involved (e.g., teachers, administrators, guidance counselors, etc.):			
School/Department Name	Type Personnel	#	Time Required	Activity Involved
All Middle School Teachers	Teachers	all	10 minutes	Circle appropriate survey responses

RESEARCH PERMISSION REQUEST (Continued)

Proposed date for start of on-site operations:

November 2002 through February 2003 One visit per middle school

Expected date of termination of on-site operations:

One visit per middle school to be completed between Nov. 2002 and Feb. 2003

School facilities needed (briefly list space, materials, equipment, etc.):

The researcher will visit each school and hand out and collect the surveys following one faculty meeting.

No materials or equipment needed... Surveys and pens provided by the researcher.

Target date for receipt by this office of your results/discussion:

April 2003

Signature of Researcher:

Print Name:

Signature of Sponsor:

Print Name:

ENCLOSURE CHECKLIST

1 copy of an abstract of the research (3 page limit)

If applicable:

1 copy of instruments to be used

1 copy of procedures to be used to ensure confidentiality of subjects

(See attached letter insuring confidentiality of subjects)

1 copy of parental permission form and/or subject permission form

**Please return this form to:
The School District of Lee County
Director, Department of Evaluation, Testing &
Research
2055 Central Avenue, Fort Myers, FL 33901-
3988.**

**If you have questions regarding the
completion of this form, please call (239) 335-
1448.**

APPENDIX L:

**STATE OF FLORIDA SCHOOL ACCOUNTABILITY SUMMARY
AND TECHNICAL REPORT:**

**FOR OPERATIONAL TEST ADMINISTRATIONS OF THE 2000
FLORIDA COMPREHENSIVE ASSESSMENT TEST (FCAT)**

State of Florida School Accountability Summary

In 1991, with the enactment of the School Improvement and Educational Accountability Act, the state of Florida has developed and implemented a system of stringent education accountability. The goal is to identify high and low performing schools, stimulate academic improvement and summarize information about student achievement. Student achievement is measured by the Florida Comprehensive Assessment Test (FCAT). The primary purpose of the FCAT is to assess student achievement of the high-order cognitive skills represented in the Sunshine State Standards (SSS) in Reading, Writing, and Mathematics. The SSS portion of FCAAT is a criterion-referenced test. A secondary purpose is to compare the performance of Florida students to the performance of students across the nation using a norm-referenced test. All students in Grades 3-10 take the FCAT in the spring of each year. The FCAT consists of:

FCAT Writing – Students in Grades 4,8, and 10 write an essay for an assigned topic (prompt). This type of writing assessment is called “demand writing.” Students in Grade 4 write either an expository or narrative essay. Students in Grades 8 and 10 write either an expository or persuasive essay. Each Student essay is scored holistically by two trained readers. The highest score a student can receive is 6 points.

FCAT Reading and Mathematics NRT – All students in Grades 3-10 take the Norm-Referenced Test (NRT) Section of the FCAT and receive scale scores that range from 424-863 across all grades. In addition, National Percentile Ranks (NPR), Stanines, and content subscores are reported. The NRT section of the FDAT contains only multiple-choice questions. The NRT data provided includes mean scale scores and median NPR scores. Content scores are included on the student school, and summary reports provided to school districts.

As part of the accountability process in 1998 the State of Florida started “grading” public schools. School performance is measured primarily on the basis of performance data.

The grades are determined as follows:

- GRADE A:**
1. Meet higher performing criteria in Reading, writing and math for current Year.
 2. Test at least 95% of eligible students
 3. Maintain or improve reading scores of the lowest performing students.
 4. Demonstrate substantial improvement reading and no substantial decline.

- GRADE B:**
1. Meet higher performing criteria in reading, writing and math for current year.
 2. Test at least 90% of eligible students.
 3. Maintain or improve reading scores of the lowest performing students.
 4. Meet criteria for “other” data.

- GRADE C:**
1. Meet minimum criteria in reading, writing, and math for current year.
 2. Test at least 90% of eligible students
 3. Meet criteria for “other” data.

- GRADE D:**
1. Below minimum criteria in reading or Writing, and math for current year.
 1. Test at least 90% of eligible students.

- GRADE F:**
1. Below minimum criteria in reading and

Writing and math for current year OR

2. Meet “D” performance criteria, but test less than 90% of eligible students without reasonable explanation.

“Other” data for 2000-2001 includes 1999-2000 high school dropout rate. High schools must have a dropout rate not higher than one standard deviation above the 1999-2000 state average or show improvement from the previous year.

The minimal performance criteria for A and B Middle Schools include the following scores in Reading, Math, and Writing:

Reading:	50% score level 3 and above
Math:	50% score levels 3 and above
Writing	75% score 3 and above

The minimum performance criteria for C,D, and F schools for Reading, Math, and Writing include:

Reading	60% score level 2 and above
Math:	60% score level 2 and above
Writing:	67% score 3 and above

APPENDIX M:

DOCTORAL FINAL EXAMINATION ANNOUNCEMENT

BETSY BINKLEY HENRY

MARCH 26, 2003

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