A CASE STUDY OF THE EFFECTS OF CLASSROOM MANAGEMENT OF COOPERATIVE LEARNING ON STUDENT ON-/OFF-TASK ENGAGEMENT IN FIVE HIGH SCHOOL MATHEMATICS CLASSROOMS

A Thesis Presented to the
Faculty of the College of Education
University of Houston

In Partial Fulfillment of the
Requirements for the Degree

Doctor of Education

by

Monica H. Kendall

May 2011

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"I can do all things through Christ, who gives me strength."

Philippians 4:13

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To all of my teachers, I pray that I may continue to learn from, live up to, and lead by your example.

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Abstract

Cooperative learning is one active learning strategy that creates an opportunity for students to work together to acquire both cognitive and affective skills. However, observations of secondary classrooms reveal that students seldom experience cooperative learning. Moreover, when they do, classroom management often becomes a barrier to student academic engagement. This case study evolved from a previous pilot study of an eighth-grade Algebra I teacher whose classes were observed three times over a six-month period. This study includes data collection of five high school mathematics teachers over an 11-week period to determine if classroom management of cooperative learning may affect on-/off-task student engagement. This study utilizes a mixed methods design to address the following questions: (1) Does classroom management of cooperative learning in five high school mathematics classrooms affect student on-/off-task engagement? (2) Do students from the study classrooms confirm what observers report as on-/off-task behavior? To address the first research question, data from a fixed category classroom observation system that focuses on classroom management and instruction and data from this researcher’s field notes and teachers’ written reflections during post-observation debriefing/coaching sessions have been collected. To address the second question, student survey data have been collected and audio-recorded student interviews have been conducted. The field notes, combined with the student survey and

interview data, have been used to triangulate with the classroom observation data. The findings from this study indicate that student off-task behaviors during cooperative learning increased from the first to the second observation, and decreased from the second to the third observation. In addition, the student survey and student interviews confirmed the observation data, with the interviews having a higher confirmation rate than the survey. The survey, interviews, and written reflections triangulated with the observation data to provide a confirmatory data set.

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A Case Study of the Effects of Classroom Management of

Cooperative Learning on Student On-/Off-task Engagement in

Five High School Mathematics Classrooms

CHAPTER I: INTRODUCTION

Justification for Inquiry

Social Purpose

The world is a continuously transforming, complex entity that is increasingly more difficult for humankind to comprehend. To manage change in such an environment, students must become literate and numerate lifelong learners, equipped with the knowledge and social skills to collaboratively solve unique and complex problems posed by a scientifically advanced and technological world (Shinn, Briers, Christiansen, Harlin, *et al*., 2003). However, publications such as *A Nation at Risk* (1983), legal reforms outlined in *Goals 2000: Educate America Act of 1994* and the *No Child Left Behind Act of 2001,* and evidence in the form of standardized tests results, student dropout rates, and America's decreasing share of a global economy all serve to illustrate that the current American public education system is not meeting students' academic and social needs (Herreid, 1998).

Although yellow school buses, cell phones, and the internet serve to connect students each day, cemetery-style classroom seating and independent tasks soon disconnect them. In business, families, religion, and society, cooperation to solve problems is normal—but not so in school (Rogers & Freiberg, 1994). Cooperative learning activities provide a foundation for instruction that increases positive interaction among students and allows them to explore and engage in learning (Hendrix, 1996). In fact, students remember 95% of what they teach others but only 30% of what they hear (Alcorn, Kinder, & Schmert, 1970; Putnam, 1997). When students work individually, they have little opportunity to ask questions of each other or engage in deep conversation about their work. Yet, when working cooperatively, students are empowered to take responsibility for their own learning while achieving and sharing progress toward a learning goal with others.

Therefore, this study's social purpose is to shed light upon the roles that students and teachers play in the implementation of cooperative learning so that students may become actively engaged in achieving both cognitive and affective learning goals. This researcher makes the assumption in this study that the lack of such active engagement in learning serves to widen the achievement gap between American students and those from other countries with whom the United States competes on a global stage.

Practical Purpose

Walkthrough observations of high school mathematics classrooms reveal students who are disengaged from mathematics instruction, and teachers who utilize the teacher-centered, direct-instruction method of lecture as their primary instructional activity. This researcher's doctoral degree program—the Executive Ed. D. for Professional Leadership—is a practitioner's degree designed to train educational leaders to pose creative solutions to problems faced daily by students, teachers, and leaders. As a mathematics curriculum manager for a large urban school district in the south-central United States, identifying and solving a problem related to students' engagement in mathematics instruction is relevant to this researcher's daily job description.

Furthermore, the University of Houston is uniquely poised to contribute a body of research and resources to the study of this problem in this particular school district. For example, this researcher's study is based in part on research previously conducted in this school district by Dr. H. Jerome Freiberg, who is serving as this researcher's faculty advisor. Therefore, this study's practical purpose is to expand upon an existing body of knowledge relating to student engagement in high school mathematics, and data collected from observations of teachers and from student surveys and interviews demonstrate that standard administrative walkthrough observations do not conform to a "one size fits all" model of meeting teachers' need for feedback on their craft.

Personal Purpose

This researcher believes it to be a moral imperative for students of all ethnic and economic backgrounds to receive instruction that includes active engagement and participation in research-based activities. In addition, instruction should provide opportunities for all students to grow cognitively and affectively. The fact that not all students receive this type of instruction has motivated this researcher to propose this study.

This researcher assumes that all students can learn rigorous mathematics content. Furthermore, teacher-centered, passive instruction forms a foundation for a mathematics of poverty and color that serves to widen the achievement gap between middle-class and economically disadvantaged students, and between White children and children of color, in America. In conclusion, this researcher hopes to understand the contexts within which teachers utilize cooperative learning, a strategy that is supported by both research and teachers' organizations, to engage all high school students in mathematics instruction.

Definition of Cooperative Learning

A defining characteristic of cooperative learning is that the group facilitates the success of each individual group member (Slavin, 1987). Cooperative learning operates under the assumption that learning occurs in an active, challenging, diverse, and social environment (Smith & MacGregor, 1992). Through cooperative learning, students experience:

- Positive interdependence—Group members take interest in and responsibility for the achievement and performance of all group members.
- Individual accountability—Cooperative learning works only when individual group members assume responsibility for accomplishing the group goal; they also grow to care about each other and challenge each other to do his/her best.
- Cooperative skills—Cooperative learning includes active listening and contributing ideas to the group.
- Face-to-face interaction—Rather than just working while talking, students share ideas, make decisions, and engage in negotiations.
- Group reflection and goal setting—Students reflect upon how well they are achieving the group goal and how well they are functioning as a team (Johnson, Johnson, & Holubec, 1993, as cited in Putnam, 1997).

Statement of the Problem

The Need to Teach Cognitive and Social Skills

"One of the challenges facing educators today is addressing the needs of today's diversity of learners, including students from different ethnic and cultural backgrounds, students with disabilities…," and students from poverty who come to school hungry and unprepared to learn (Putnam, 1997, p. 26). Such challenges require more demanding, engaging instruction and the use of innovative instructional strategies to assist students in learning creative thinking skills. For example, allowing English language learners to hold small-group conversations about new content is vital for their language acquisition and development. "Whole-class instruction, worksheets, textbooks, and ability grouping are insufficient…" for meeting the cognitive and social needs of students in the 21st century. Nonetheless, they are the pervasive method of instruction in secondary schools (Putnam, 1997, p. 18).

In cooperative learning, the development of interpersonal skills is as important as the learning itself. Because cooperative learning prepares students to work with others, business courses and corporate training programs utilize it as an instructional strategy (Fellers, 1996), and the social importance of cooperative learning manifests itself in the diverse interactions that characterize 21st century work life (Duncan & Baker, n.d.).

Furthermore, cooperative learning develops the mutual communication and people skills that alienated students need (Sharan & Sharon 1989, as cited in Tucker-Ladd, 1990). When students participate in cooperative learning experiences, as opposed to competitive and individualistic experiences, they experience greater liking from their peers, regardless of learning ability, ethnicity, or physical limitations (Johnson, Johnson, & Smith, 1991, and Slavin 1991, as cited in Hendrix, 1996; Sayers, 1996; Putnam, 1997). This increase in mutual esteem has been attributed to the idea that cooperative learning can be utilized to create equitable classrooms with equal-status relationships within student groups (Cohen, Lotan, Scarloss, & Arellano, 1999).

When students of multiple abilities work together in cooperative groups, initial differences in achievement level do not determine what a student learns in a group situation; that is, group members influence each other in ways that raise achievement (Johnson & Johnson, 1998). Another benefit to cooperative learning is the effect it has on students' self-esteem, which is affected by their learning environment and how their teachers communicate their success to them (Patrick, Anderman, Ryan, Edelin, & Midgley, 2001, as cited in Gillies, 2007). In fact, when cooperative, competitive, and individualistic methods were compared, working cooperatively resulted in higher increases in self-esteem (Johnson & Johnson, 1989, and Slavin, 1995, as cited in Putnam, 1997). In short, cooperative learning is a strategy designed to meet both the cognitive and social needs of learners in a diverse, complex society.

The Need to Increase Student Engagement

Cooperative learning also has the potential for increasing student engagement in instruction. Marzano (2007, p. 99) defined student engagement as "…attending to the instructional activities during class" and including "…on-task behavior, positive emotions, invested cognition, and personal voice, and functions as the engine for learning and development" (Reeve, 2006, as cited in Marzano, 2007, p. 99). Research on engagement in instruction shows the average effect size of student engagement on achievement to be 0.75 – 0.88 (an average percentile gain of 27 to 31 points) (Marzano, 2007).

Given the pressure teachers feel to cover extensive curriculum objectives, every minute their students spend learning is a precious commodity. Time on task is one way to measure student engagement in instruction, and increased time on task has an effect size of 0.4 – 0.6 (an average percentile gain of 16 to 22 points) on student achievement (Cawelti, 1999, as cited in Wong, 2001). Although the amount of time students spend engaged in an academic task is a strong predictor of student achievement, students in U.S. schools spend relatively little time engaged in academic tasks (Ysseldyke, Spicuzza, Kosciolek, & Boys, 2003). For example, the second most common use of class time (behind listening and passive learning) involves the off-task behavior of waiting, such as waiting while the teacher takes attendance or waiting for the bell to ring (Fisher, 2009). In addition, for children of poverty, the primary mode of instruction is "teacher on the stage" and "children on the side, nice and quiet," waiting for the teacher to continue once they have completed their task (T. Weeden, personal conversation, March 10, 2011). It is clear that while class time is valuable, not all teachers and students make the most of it.

Support for the Use of Cooperative Learning

Over 900 research studies validate the effectiveness of cooperative over competitive and individualistic activities (Johnson, Johnson, & Stanne, 2000). A 1989 meta-analysis of 375 studies found the effect size with respect to achievement of cooperative over competitive activities to be 0.67 (an average percentile gain of 25 points), and the effect size of competitive activities over individual activities to be 0.64 (an average percentile gain of 24 points); when only studies with high internal validity were included in the analysis, effect sizes increased to 0.88 and 0.61 (average percentile gains of 31 and 23 points), respectively (Johnson & Johnson, 1998). A best-evidence synthesis technique of 68 studies on cooperative learning and achievement found that 72% of the studies showed a positive effect and only 12% favored the control groups (Slavin, 1990, as cited in Putnam, 1997). In addition, an effect size of 0.46 (an average percentile gain of 18 points) was found for cooperative learning programs for middle and high school and 0.29 (an average percentile gain of 11 points) for elementary school (Slavin, Lake, & Groff, 2009). The positive link between cooperative learning and student achievement has been confirmed by other meta-analyses, such as those conducted by Johnson and Johnson (1998), and by Cohen (1994), who observed that the larger the proportion of students talking and working together, the greater the learning gains on standardized tests.

Additionally, the research points to the use of cooperative methods that utilize group rewards and individual accountability as consistently increasing student achievement. In a meta-analysis conducted on 46 cooperative learning studies at grades three through nine, of the 27 studies that used group rewards for individual learning, 24 (89%) found positive effects on student achievement (Slavin, 1984). Due to the volume of studies and the length of time (eight decades) over which they have been conducted, the research on cooperative learning has a validity and generalizability rarely found in other areas of research (Johnson, Johnson, & Smith, 1998). Other qualities of the research on cooperative learning that lend to its validity as a strategy include the varied backgrounds (class, age, sex, nationality, and ethnicity) of the participants, and the variety of methodologies, tasks, and content areas explored (Johnson, Johnson, & Smith, 1998).

In addition to research that supports the use of cooperative learning to increase student achievement and student engagement in instruction, its use has support from teachers' professional organizations. For example, the National Science Teachers Association (NSTA) has stated that learning is a social process and science instruction should be presented in ways, including cooperative learning, that facilitate this social process (NSTA, 2003). Likewise, in its publication, *Principles and Standards for School Mathematics* (2000), the National Council of Teachers of Mathematics (NCTM) advocates cooperative learning as an instructional strategy: "Small groups provide a forum in which students ask questions, discuss ideas, make mistakes, learn to listen *to* others' ideas, offer constructive criticism, and summarize their discoveries in writing" (NCTM, 2000, as cited in Ding, Piccolo, Kulm, & Li, 2007, p. 162).

Furthermore, NCTM promotes students working together in problem-solving settings to communicate their reasoning to both their teachers and their peers (2000). Students themselves have suggested that one way to increase engagement in instruction is to allow for more active participation in class, including the use of cooperative, small-group, and hands-on activities that connect classroom experiences to real-world and career interests (Nardi & Steward, 2003; Anderson, Christenson, & Lehr, 2004). While the use of cooperative strategies has been found to increase rates of engagement from 66.7 to 73.7%, these methods have been reported to be used only 8% of the time (Yair, 2000).

Reliance upon Teacher-centered Instruction

Classrooms typified by teacher-directed, whole-class instruction have been characterized as "…overly regimented and boring, (taught by) teachers who employed few instructional approaches, rarely individualized instruction, and rarely engaged students in active learning or group learning" (Goodlad, 1993, as cited in Putnam, 1997, p. 29 – 30). Rogers and Freiberg (1994, as cited in Freiberg, 1996) referred to students in these situations as "(t)ourists (who) simply pass through without involvement, commitment, or belonging" (p. 32). In effect, there appears to be an unspoken pact between teachers and students in such classrooms to "(l)eave me alone, and I won't give you trouble" (Rogers & Freiberg, 1994, as cited in Freiberg, 1996, p. 32).

In considering the volume of research-based evidence regarding the benefits of using cooperative learning as an instructional strategy, it is "…puzzling that cooperative learning has not found its way into many secondary school math and science classrooms" (Lord, 1994, p. 280). In fact, the National Center on Education in the Inner Cities (1993, as cited in Rogers & Freiberg, 1994) found that only 3% of learning activities selected by high school teachers were cooperative in nature. Lipson and Tobias (1991) concluded, "Science and math continue to be taught in most high schools in the traditional lecture-laboratory mode," despite the urging from national teacher organizations for teachers to adopt "…less traditional teaching methods in their instruction (Lipson & Tobias, 1991, as cited in Lord, 1994, p. 280).

Freiberg (2002) observed that "…most of the national curriculum standards expect teachers to create active learning environments that stimulate higher-level student thinking—yet few teachers have experienced instruction in such settings" (p. 56). Reasons for teachers' reluctance to use cooperative learning often stem from misunderstanding or fearing an unknown strategy if it is new to them, from believing that students cannot be held accountable for group work, or from dreading the loss of control that may result from students becoming disengaged and off-task (Fellers, 1996).

In addition, there are two limitations to cooperative learning that may explain teachers' reluctance to use it. The first limitation to the use of cooperative learning relates to the effort it takes to establish and maintain a cooperative learning system.

Teachers may consider the use of cooperation to be prohibitive when individual student activities are more practical and require less effort to organize and manage, when lecture is a more efficient means to cover content, and where cooperation is not essential (Johnson & Johnson, 2005). Another limitation to the use of cooperative learning relates to the social connectedness attached to cooperation. That is, a focus on others to the exclusion of the self may take its toll on the individual's psychological well-being, negating the positive effects of participating in a cooperative activity (Fritz & Helgeson, 1998, as cited in Johnson & Johnson, 2005).

Furthermore, students may respond in different ways when placed in cooperative groups. For example, high-achieving students tend to either dominate a group or choose to work alone, while some students show passive behavior with minimal involvement in cooperative group activities (Good, Reys, Grouws, & Mulryan, 1989 – 1990, as cited in Mulryan, 1992). Finally, students may be more familiar with passive learning in a lecture situation and less accustomed to interacting with their peers (Herreid, 1998).

To bridge the widening gap between research and practice, teachers may need specific coaching and instruction on how to utilize cooperative learning in their lessons. According to Freiberg (2002), "The good news is that, with time and experience, teachers can learn to use more student-centered instructional approaches" (p. 58). Teachers can start small, for example, using a "think-pair-share" cooperative strategy at various points in a lecture, and eventually "…incorporate cooperative learning structures, student research projects, and inquiry-based lessons that require students to seek knowledge from sources other than the textbook or the teacher" (Freiberg, 2002, p. 58).

While teachers may be more familiar with, and more comfortable with, teacher-centered instruction, the research supports an argument in favor of using student-centered strategies. “With training and experience,” declare Battistich, Solomon, and Delucchi (1993), “teachers can develop skill at managing small groups and thus minimize or avoid many of the conditions that may lead to negative outcomes for some or all group members.”

The Problem

In summary, a problem exists in secondary school mathematics classrooms: both research-based evidence and teachers’ professional organizations support the use of cooperative learning to improve student cognitive and affective skills, self-esteem, instructional engagement, and time on task. Yet, this instructional strategy is seldom used in secondary mathematics classrooms. Moreover, when it is used, classroom management often becomes a barrier to student academic engagement. Walkthrough observations conducted by this researcher of high school mathematics classrooms across the district confirm that students are frequently disengaged from mathematics instruction and that teachers utilize the teacher-centered, direct-instruction method of lecture as their primary instructional activity.

Need for the Study

Lack of Research on the Problem

Although considerable evidence exists to support the premise that cooperative learning promotes cognitive and affective outcomes at the elementary and middle-grade levels (Bentrup, Rienzo, Dorman, & Lee, 1990), several researchers have found relatively few studies that have examined the effects of cooperative learning at the high school level, especially in mathematics (Slavin, 1990; Whicker, Bol, & Nunnery, 1997; Johnson, Johnson, & Stanne, 2000). An October 2010 Internet search for articles on cooperative learning in high school mathematics netted a ratio of these articles to the total number of articles on cooperative learning to be between 0.5% and 1.9% (see Table 1).

Table 1

Results of an October 2010 Internet Search for Articles on Cooperative Learning in High School Mathematics

Search Engine	Total Number of Articles on Cooperative Learning[a]	Total (and Percent) of Articles on Cooperative Learning in High School Mathematics[b]
Google Scholar	88,300	6741 (7.6%)
JSTOR	4,432	27 (0.6%)
EBSCO Academic Search Complete	1,043	5 (0.5%)
WorldCat	15,316	291 (1.9%)
EBSCO ERIC	1,642	10 (0.6%)

[a] Search Criteria: “Cooperative Learning”
[b] Search Criteria: “Cooperative Learning” + “High School” + “Mathematics” – “Middle School” – “Elementary” – “College

Therefore, this study is needed to contribute to the body of research on the effects of cooperative learning in high school mathematics, thus contributing to a field for which there is little research.

Exploration of a Possible Solution

In their best evidence review, Slavin and Lake (2008, as cited in Freiberg, Huzinec, & Templeton, 2009) found that the key to improving student achievement in mathematics lies in "changing the way teachers and students interact in the classroom" (p. 16). One way to influence teacher-student interaction in the classroom is through better classroom management skills and organization, which has an effect size of 0.4 – 0.6 (an average percentile gain of 16 to 23 points) on student achievement (Cawelti, 1999, as cited in Wong, 2001).

Teachers need to know "…*why and when and how* cooperative learning strategies should be implemented, as well as pointing out possible pitfalls to avoid" (Hekimoglu & Sloan, 2005, p. 39). By proactively planning for instruction and classroom organization, teachers can find additional learning time for students (T. Weeden, personal conversation, March 10, 2011). For example, a teacher could use a "7E" lesson plan that *elicits* students' background knowledge, *engages* the learner, gives students opportunities for hands-on *exploration* of new concepts, *explains* new content, *elaborates* upon new knowledge through application, *extends* new learning to facilitate transfer, and *evaluates* learning both formatively and summatively (Eisenkraft, 2003). "When teachers have a rich management and discipline repertoire, students become more self-disciplined, minimizing the need to refer students to the office and maximizing instructional time with greater opportunities to teach and learn" (Freiberg, Huzinec, & Templeton, 2009, p. 15). Thus, classroom management that supports the "…effective and efficient use of instructional time (and) the building of student self-discipline"… "can create a highly significant pathway to student achievement" (Freiberg, Huzinec, & Templeton, 2009, p. 17).

In addition to improving management and organization in the classroom, it is necessary for teachers to plan lessons that limit opportunities for off-task behavior. One approach to reducing off-task behavior is the implementation of cooperative learning because it offers students a structured environment for interaction (Pate-Clevenger, Dusing, Houck, & Zuber, 2008). In over 30 studies that measured time on task, students working cooperatively spent more time on task than did students working competitively (effect size = 0.76, (an average percentile gain of 28 points)) or students working individualistically (effect size = 1.17, (an average percentile gain of 38 points)) (Johnson & Johnson, 1998). On the other hand, while working cooperatively is important to reducing off-task behavior, it is more important for the teacher to carefully plan and structure the task. In addition, working together cooperatively on a task will not, by itself, increase on-task behavior. A cooperative reward structure must be built in to reduce off-task behavior (Slavin, 1980).

Therefore, this researcher's study contributes to current educational research by investigating the role that classroom management techniques play in the implementation of cooperative learning and by possibly providing a solution to the problem of secondary mathematics teachers' reluctance to use cooperative learning. In addition, the development of a coaching protocol may be an outcome of this study. Thus, the results of this study may have implications for the design and implementation of teacher professional development for pre-service and in-service high school mathematics teachers.

Purpose of the Study

The purpose of this study is to explore how classroom management of cooperative learning may affect on-/off-task student engagement in five high school mathematics classrooms. Specifically, this case study has assisted this researcher to understand why cooperative learning—given that both research and teacher organizations support its use—is not used more often in high school mathematics instruction by exploring the effects of classroom management of cooperative learning on student engagement. In addition, this case study has shed light on the role that teachers, students, and classroom management play in the implementation of cooperative learning, and may possibly provide a solution to the problem of teachers' reluctance to use cooperative learning as a strategy in high school mathematics classrooms.

In the role of participant-observer, this researcher has presented teachers with observation data and provided instructional coaching on classroom management of cooperative learning in post-observation debriefing sessions. Since students may not necessarily be as off task as observers perceive, this study has also determined whether students confirm what observers report as on-/off-task behavior, and has empowered students, through surveys and interviews, with a voice to confirm data collected from classroom observations.

CHAPTER II: REVIEW OF THE RELATED LITERATURE

Historical and Theoretical Perspectives on Cooperative Learning

The concept of cooperative learning as an instructional strategy came to New York from England in the late 1700s and continued to be used during the Common School Movement of the 1800s. In the early 1900s, John Dewey (1859 – 1952) supported the use of cooperative learning since his philosophy of education emphasized a democratic classroom where the student and his/her experiences became the focal point of learning (Putnam, 1997). Thus began a nearly 90-year tradition of research on cooperative learning. There are at least three theoretical perspectives that have guided research on cooperative learning: constructivist, social interdependence, and humanistic. Each of these perspectives provides a basis for exploring how classroom management of cooperative learning may affect on-/off-task student engagement in high school mathematics classrooms.

Constructivist Theory

Piaget and cognitive constructivism. Jean Piaget (1896 – 1980) based his research on the premise that when individuals interact with their environment, conflict occurs that creates cognitive disequilibrium, which in turn stimulates cognitive development through the processes of assimilation and accommodation (Johnson & Johnson, 1998). Piaget studied how individuals construct their own knowledge. A teacher who allows students to participate in an inquiry-based learning activity, permits students to process new learning at their own pace, and follows-up with questions to facilitate students' learning, follows in the footsteps of Piaget's cognitive constructivism (Powell & Kalina, 2009).

Vygotsky and social constructivism. Lev Vygotsky (1896 – 1934) believed that social interaction is an essential component of learning. Vygotsky based his work on the principle that knowledge is social and is constructed from cooperative efforts to learn, understand, and solve problems (Powell & Kalina, 2009). He developed the theory of the Zone of Proximal Development, described as the disparity between what a learner already knows and what he/she is trying to learn. Through scaffolding, which assists learners to move through this zone, Vygotsky posited that learning occurs more effectively when students have others to support them (Powell & Kalina, 2009). Thus, cooperative learning provides a natural environment in which scaffolding can occur.

Summary. While Piaget emphasized the ways in which the individual reasons and interprets knowledge and Vygotsky emphasized the role of social interaction in learning, both valued the inquiry method as a means for providing students with challenging opportunities to construct knowledge (Powell & Kalina, 2009). Both theorists believed in the role of the teacher as the facilitator of learning, and the instructional strategy of cooperative learning is a natural product of the constructivist perspective.

Social Interdependence Theory

Koffka, Lewin, Deutsch, and the Gestalt school of psychology. Cooperative learning is partially based on the theory of social independence that grew out of the Gestalt school of psychology in the early 1900s (Johnson & Johnson, 1998). Kurt Koffka (1886 – 1941) proposed that groups were dynamic wholes and one of his colleagues, Kurt

Lewin (1890 – 1947), advanced Koffka's notions in the 1920s and 1930s by proposing that the fundamental nature of a group is the interdependence among members who are linked together by common goals. In the late 1940s, Morton Deutsch (1920 –), one of Lewin's graduate students, continued Lewin's reasoning about the interdependence of group members and formulated a theory of conflict resolution (Johnson & Johnson, 1998).

Johnson and Johnson, Slavin, Cohen, and social interdependence. Modern innovators in the field of cooperative learning, David and Roger Johnson at the University of Minnesota, Robert Slavin at Johns Hopkins University, and Elizabeth Cohen at Stanford, have committed many years to the study of the conditions under which cooperative, competitive, or individualistic learning structures influence student achievement, self-esteem, and social skills (Smith & MacGregor, 1992). Cohen (1932 – 2005) applied principals of sociology to promote equity for all learners through Complex Instruction, which involves students solving higher-level, open-ended tasks and using group norms to manage their own cooperative learning (Cohen, 1994).

Johnson and Johnson built their theory of social interdependence upon Deutsch's work on positive interdependence in cooperative groups and negative interdependence in competitive groups (Deutsch, 2000, as cited in Duncan & Baker, n.d.). They have theorized that social interdependence exists when individuals work together to achieve a common goal, and each individual group member ensures the success of the entire group by encouraging and assisting the others (Johnson & Johnson, 1998). Slavin has extended the theory of social interdependence to the study and development of several cooperative learning techniques for classroom use, most notably the Student Teams Achievement

Divisions (STAD), Team Accelerated Instruction (TAI), and Cooperative Integrated Reading & Composition (CIRC) (Johnson, Johnson, & Stanne, 2000).

Summary. Today, teachers apply the theory of social interdependence in the classroom when they use cooperative structures that feature individual accountability and group rewards. In addition, the effects of social interdependence on student self-esteem and social skills can be seen in the research of Stevahn, Johnson, Johnson, & Schultz (2002), for example, where cooperative learning is used in high school social studies as a means to teach students about conflict mediation. Cooperative learning, when applied through the lens of social interdependence, provides all students the opportunity to harness both their cognitive and social skills for the good of their own and their peers' learning.

Humanistic Theory

Rogers and humanistic psychology. During the 1950s, humanistic psychology originated from the works of Carl Rogers (1902-1987) and others as a reaction to psychoanalysis and behaviorism (Association for Humanistic Psychology, 2001). Psychoanalysis and behaviorism centered, respectively, on unconscious motivation and the conditioning processes that produced behavior. In contrast, humanistic thinkers felt that both traditions failed to consider the role of personal choice in determining behavior. Premised on the assumption that people are basically good, humanistic psychology emphasizes values as the main forces that guide human behavior. One such value is the belief in the worth of individuals and in the development of their potential to its fullest (Association for Humanistic Psychology, 2001).

Rogers and person-centered education. In order for students to become successful learners and fully develop their potential, Rogers concluded that teachers must strive to transform the student's role from that of a passive receiver of information to that of an active participant in his/her own learning (Rogers & Freiberg, 1994; Cornelius-White, 2007; Freiberg & Lamb, 2009). In active learning environments, students are engaged in instruction through activities involving cooperative learning, peer teaching, inquiry-based learning, discovery, project-based learning, and problem-solving situations that require higher-level thinking. Rogers and Freiberg (1994) stated that through active learning, students become citizens of the learning environment, taking responsibility for their own and each other's learning.

In sum, a person-centered classroom is characterized as a place where the student:

- feels as if his/her curiosity is welcome and prized;
- may become more expressive of both his/her feelings and thoughts;
- is valued as a person who can contribute to his/her own and the group's learning;
- learns to attack tasks cooperatively to achieve a common goal;
- has a say in decisions regarding his/her own learning;
- develops a liking for him/herself; and
- likes school (Rogers & Freiberg, 1994, p. 341 – 342).

Summary. In the present day, Dewey's idea of the democratic classroom lives on in the work of researchers who consider strategies such as cooperative learning to be vital to the transformation of classrooms into egalitarian learning communities in which students are active participants in, and designers of, their own learning (Hendrix, 1996;

Freiberg, 1998; Wolk, 2003). Cooperative learning is unmistakably poised as a means for providing students the opportunity to experience Dewey's legacy of the democratic classroom.

Selected Review of Related Research

This researcher's selected review of the research on cooperative learning encompasses 38 studies conducted from 1980 to 2009 relating to cooperative learning and achievement (six), cooperative learning and social interaction (six), cooperative learning and student engagement (eight), cooperative learning and mathematics (six), cooperative learning and other content areas (six), and observing student engagement (six) (see Table 2). Sources for these studies are the result of searches conducted in the University of Houston M. D. Anderson Library, through Google and Google Scholar searches, and through searches of electronic journal databases including JSTOR, EBSCO Academic Search Complete, EBSCO ERIC, and WorldCat. The studies shared in this review are listed by method (experimental, quasi-experimental, mixed methods, and qualitative), and within each method listed by grade span (elementary, middle school, high school, and college) and content area (general education, mathematics, English/reading, science, and social science).

Table 2

Overview of Selected Review of Related Research

Variables Studied	Total # of studies	% [a]	Number of Studies by Methodology: Experi-mental	Quasi-experi-mental	Mixed Method	Case Study	Action Re-search	Number of Studies by Content Area: General Educa-tion	Mathe-matics	English/ Reading	Science/ Tech-nology	Social Science	Number of Studies by Grade Level: Elemen-tary	Middle School	High School	College
CL[b] and Achievement	6	16%	2	2	2		1	1	3	1	1		2	2	1	1
CL and Social Interaction	6	16%	1	1	5			3	2	1			3		3	
CL and Student Engagement	8	20%	1	2	2	4	1	4	2	1	1		4		4	
CL and Mathematics	6	16%		5	3	1			6				2	1	2	1
CL and Other Content Areas	6	16%	1	3		2				2	3	1	2	1	2	1
Observing Student Engagement	6	16%		1	2	5		2		1	2	1	3		2	1
Total	38		5	14	14	12	2	10	13	6	7	2	16	4	14	4
Percent		100%	13%	37%	37%	32%	5%	26%	34%	16%	18%	5%	42%	11%	37%	11%

[a] Percents do not add to 100 due to rounding and to the fact that a study may fit into multiple categories.

[b] CL = Cooperative Learning

Cooperative Learning and Achievement

Overview. This researcher's selected review of the research on the effects of cooperative learning on student achievement included two experimental studies, two quasi-experimental studies, two that used a mixed methods approach, and an action research study. Two studies involved elementary students (one general education study and one mathematics study), two involved middle school students (one English study and one mathematics study), one involved high school mathematics students, and one involved college-level engineering students.

Review. Using an experimental design, Phelps and Damon (1989) conducted a two-year study to assess the longitudinal effects of peer collaboration on the mathematical and spatial reasoning ability of 152 fourth graders who were randomly divided into four groups (mathematics, spatial reasoning, and two control groups), and on their learning with manipulatives one year later. Students engaged in problems that required either formal reasoning or rote learning. Pre-/posttest data indicated that peer collaboration provided an effective learning environment for tasks that require formal reasoning, but not for tasks that require rote learning. In addition, learning that occurred in the second year was directly related to students' first-year gains in mathematical reasoning. The results of this study may be limited in generalizability to the grade-specific mathematics skills studied. Phelps and Damon concluded that peer collaboration engages children's reasoning skills and leads to deep conceptual mathematical change.

Using an experimental design to explore the effects of cooperative learning on student motivation and achievement in a high school geometry class over one semester, Nichols (1996) randomly assigned 88 high school geometry students to either a control group receiving traditional instruction or to one of two treatment groups receiving cooperative learning instruction. In addition to student achievement in geometry, four dependent variables were measured to examine the effects of cooperative learning on motivation: goal orientation, self-efficacy, intrinsic motivation toward geometry, and cognitive processing. The student population was approximately 90% Caucasian, and enrollment in the geometry classes was restricted to students who had successfully completed Algebra I. Both control and treatment groups covered the same content and completed similar assignments; however, students in the control group were taught by lecture and students in the treatment group participated in STAD (Student Team Achievement Divisions), a cooperative learning technique. Geometry achievement was assessed using scores from a standardized mathematics achievement test and teacher-made exams. An 83-item questionnaire was used as a pre-/posttest assessment of the variables measuring motivation. The results of this study may be limited to the ethnic homogeneity and size of the sample. The researcher found that students in the cooperative treatment groups exhibited significantly greater gains than the control group on both achievement and motivation indicators. Nichols concluded that increased student achievement, intrinsic valuing of the learning task, self-efficacy, learning goal orientations, and students' reported use of deep processing strategies appear to be benefits of proper implementation of cooperative learning strategies.

Using a quasi-experimental design, Brush (1997) examined the effects of computer-aided mathematics instruction with cooperative pairs of students on student achievement and attitudes. Sixty-five fifth-grade students were randomly assigned to either a cooperative group or an individual group and pre- and posttreatment achievement and attitudinal data were collected. The researcher found that students using computer-aided mathematics instruction in groups performed better on standardized tests and were more positive toward computer mathematics activities. The generalizability of the results may be limited to the size and grade level of the sample. Brush concluded that integrating cooperative learning with computer-aided mathematics instruction can have a positive effect on student achievement and attitudes toward mathematics.

Using a quasi-experimental design to investigate whether the positive benefits of cooperative learning on student achievement occur equally for Black and White students or whether it disproportionately benefits one race or the other, Slavin and Oickle (1981) studied race interactions involving 230 students in grades six through eight English classes, 33.9% of whom were Black and the rest White. Four treatment classes studied language mechanics for 12 weeks using a cooperative learning method, while six control classes studied the same curriculum materials but did not work in cooperative teams. Using a mixed methods approach, quantitative data on student achievement were collected using a standardized pre-/posttest of English achievement, and qualitative data on cross-racial friendships were collected by asking students who their friends were in the class. First, the researchers found that the cooperative learning groups gained significantly more in academic achievement than did the control classes, but this effect was due more to larger gains by Black students. There was a significant difference between the Team and Non-Team conditions in achievement gains ($p < 0.021$), but the treatment effects were non-significant for White students and strong for Black students ($p < 0.004$). Second, while there was a small positive effect of participating in the cooperative learning class on students' cross-racial friendships, the effect was due more to White students gaining Black friends ($p < 0.016$). The generalizability of the findings of this study may be limited to middle school students in English classes. Slavin and Oickle concluded that the use of cooperative learning can have an affirmative effect on cross-racial friendships without holding back the achievement of White students.

Utilizing a mixed methods approach, Webb (1982) explored the effects of group interaction on the individual achievement of 96 middle school mathematics students in grades seven through nine. The researchers collected quantitative data through a posttreatment achievement test and qualitative data through observations and student questionnaires. The questionnaire consisted of two parts: the extroversion-introversion scale on a personality inventory and an open-ended question asking the students to indicate whether they liked working in small groups. The observation instrument assessed interaction among students and between the teacher and students. Although replication of this study may be limited since students were not randomly assigned to groups, the researcher found that while introverted students were more likely than extroverted students to receive no answers to their questions, which had negative effects on their achievement, an individual's experience in the group can have a substantial effect on achievement. Moreover, a student's achievement and experience in group settings cannot be predicted based solely on the group's characteristics or the individual's characteristics. Webb concluded that group composition, student personality, and student ability helped predict interaction and achievement.

In conducting action research to examine the use of cooperative learning on students' success in undergraduate engineering classes, Mourtos (1997) cooperatively grouped students for projects, lecture-based discussion, and exam review. The researcher found that group study helped students learn and retain more information; when rewards for interdependence were added, the improvement in individual scores became significant. In addition, group performance in problem solving was found to be superior to even the individual work of the most expert group members. A student questionnaire showed that students rated cooperative learning favorably with respect to their enjoyment of the class and their understanding of content. Students expressed that cooperative learning made learning less stressful and that their grades improved as a result. This study may be limited in transferability since it involves one motivated college teacher's experience over several years. Mourtos concluded that the psychological benefits of cooperative learning improved both student learning and enjoyment of engineering class.

Implications. This review of the research on the effects of cooperative learning on student achievement reveals the following implications for this researcher's research. First, student achievement increases when cooperative learning is implemented properly (Nichols, 1996). Not only might this conclusion help to convince high school mathematics teachers to implement cooperative learning, but this conclusion also serves to remind teachers that to realize the benefits of cooperative learning, the techniques being used must be implemented with fidelity.

Second, group composition, student personality (whether a student is introverted or extroverted), and student ability help to predict student interaction and achievement (Webb, 1982). This conclusion was useful when coaching teachers through the management issues surrounding the implementation of cooperative learning. Third, the conclusion regarding the use of cooperative learning as having an affirmative effect on cross-racial friendships without holding back the achievement of White students may help to convince teachers to racially balance their cooperative groups (Slavin & Oickle, 1981).

Finally, finding that cooperative learning leads to improvement in student achievement and enjoyment of learning (Mourtos, 1997), and a deeper conceptual understanding of mathematics (Phelps & Damon), provided teachers a rationale for using cooperative learning, and principals a rationale for supporting their teachers to utilize it as an instructional strategy.

This review of the research on the effects of cooperative learning on student achievement has yielded the following implications for future research: to investigate the possible long-term effects of cooperative group instruction (Nichols, 1996); to determine whether cooperative learning can boost girls' achievement in spatial reasoning (Phelps & Damon, 1989); and to determine whether cooperative learning in computer-aided mathematics instruction can have a positive effect on student achievement (Brush, 1997), especially for high school students who utilize mathematics lab programs to "drop back in" to "virtual" school to catch up on missed credits needed for graduation. Implications for further research that may be addressed by this researcher's study include examining the benefits of audio recording classroom interactions to confirm observation results (Webb, 1982) and exploring why Black students especially seem to benefit from cooperative learning (Slavin & Oickle, 1981).

Cooperative Learning and Social Interaction

Overview. This researcher's selected review of the research on the effects of cooperative learning on students' social interaction included one experimental study, one quasi-experimental study, and five that utilized mixed methods. Three studies involved elementary students (two general education studies and one reading study) and three involved high school students (one general education study, and two mathematics studies).

Review. Utilizing an experimental design, Johnson and Johnson (1981) examined the effects of cooperative versus individualistic learning experiences on interethnic interaction among 51 fourth-grade students. Students were assigned on a stratified random basis, controlling for ethnicity, ability, and gender to either a cooperative or an individualistic class. Using a mixed methods approach, the researchers collected quantitative data using a time-sampling method to observe students' off-task behavior and cross-ethnic interaction during instruction and during students' free time. The researchers collected qualitative data using a questionnaire to measure students' attitudes, randomly selecting half of the students in each condition to be interviewed. The researchers found that there were more verbal interactions during instructional sessions between majority and minority students in the cooperative than in the individualistic condition ($p < 0.05$), that students in the cooperative condition indicated more cross-ethnic giving and receiving of help than did the students in the individualistic condition ($p < 0.01$), that there were more off-task behaviors in the individualistic than in the cooperative condition ($p < 0.01$), and that there were more cross-ethnic interactions during free time in the cooperative than in the individualistic condition ($p < 0.01$). The attitudinal measures indicated that students perceived cooperative interaction to be supportive and encouraging of both academic work and friendships. The results of this study indicated that cooperative learning experiences, compared with individualistic ones, promoted greater interaction between minority and majority students during instruction. This study may be limited by the age of the students studied and the curriculum materials used. Johnson and Johnson concluded, "…there is likely to be less off-task behavior when minority and majority students are placed in cooperative learning groups than when they are taught individualistically" (p. 448).

Using a quasi-experimental design, Leikin and Zaslavsky (1997) studied the effects on different types of students' interactions while learning mathematics in a cooperative small-group setting. Ninety-eight students from three ninth-grade classes engaged in learning mathematics using the jigsaw cooperative learning structure, and a fourth class served as a control group. Utilizing a mixed methods approach, the researchers collected data through classroom observations, students' written self-reports, and an attitude questionnaire, and the data were analyzed by focusing on students' activeness, interactions, and attitudes toward the jigsaw method. Findings indicated that the students who participated in cooperative learning experienced a 22% increase in active learning, and more than 75% of the students showed positive attitudes toward the cooperative learning method. Leikin and Zaslavsky indicated that while it is not clear from the results which mathematical topics best lend themselves to implementation of cooperative learning, they concluded that it is possible to facilitate students' mathematical communications in the classroom by implementing small-group cooperative learning.

Using a mixed methods approach to examine the frequency and quality of interaction processes and student outcomes in cooperative learning groups, Battistich, Solomon, and Delucchi (1993) collected qualitative data by administering questionnaires to 371 students engaged in cooperative learning in 18 fourth- through sixth-grade classrooms to determine their attitudes toward school; perceptions of classroom climate; intrinsic motivation; and social attitudes, skills, and values. The researchers collected quantitative data on students' reading achievement by examining students' reading comprehension performance on a standardized achievement test. In addition, data about the frequency and quality of students' participation in learning groups was collected through direct observation using a structured observation instrument. The researchers found that frequent "high-quality" group experiences, in which group members helped one another, showed concern for one another's welfare, and worked collaboratively were associated with increased standardized achievement test scores, positive classroom environment, improved liking for school, greater intrinsic motivation, concern for others, and self-esteem. According to Battistich, *et al*., "…frequent participation in learning groups was associated with positive student outcomes only when the quality of within-group interaction was rated by the observers as high. Conversely, frequent group work was associated with poorer outcomes when the quality of interaction was low" (p. 24). The researchers concluded that while data were collected at the class level and not at the student level and meaningful interactions between students may have been missed, student outcomes in cooperative learning groups depended on the quality of group interaction.

Using a mixed methods approach, Gillies (2006) studied the effects of cooperative learning on students' social interactions. Gillies studied 26 teachers and 302 Australian high school students over three school terms to determine whether teachers who implemented cooperative learning engaged in more facilitative verbal behaviors and learning interactions with their students than teachers who implemented group work without cooperative learning, and whether students in the cooperative groups engaged in more positive helping interactions with each other than students who worked in groups without cooperative learning. Teachers implemented cooperative learning in one unit of work (four to six weeks) each term. To collect qualitative data, the researcher audio recorded teachers and students and collected samples of the students' language as they worked in their groups. To collect quantitative data, the researcher observed and counted the frequency of students' and teachers' verbal interactions under cooperative learning conditions. Gillies found not only that teachers who implemented cooperative learning engaged in more mediated learning interactions and made fewer disciplinary comments, but also that their students modeled many of these interactions in their groups. One limitation to this study is that there were only two data collection points and this may have affected opportunities to see changes over time in the teachers' and students' verbal behaviors in the cooperative and group-work conditions. Gillies concluded that creating a cooperative classroom affects teachers' verbal behavior, their organizational structure, and students' helping behaviors toward each other.

Using a mixed methods approach, Gillies (2004) investigated the effects of cooperative learning on the group interactions of 223 ninth-grade students from Australia as they engaged in mathematics problem-solving activities. To collect quantitative data, categories of student behavior were observed and recorded at ten-second intervals over ten minutes. To collect qualitative data, students were videorecorded as they worked in either structured groups, and taught how to communicate and cooperate with each other, or in unstructured groups. In addition, students were given two questionnaires: a mathematics questionnaire designed to determine how they were constructing understandings and making connections between information they discussed in the group activities, and a questionnaire to measure students' perceptions of how well they worked in their small groups. The researcher found that students in the structured groups were more willing to work with and help others and performed better than the students in the unstructured groups. One limitation of this study may involve the fact that the three schools using structured groups had teachers who were trained in cooperative learning and who displayed a high commitment to cooperative learning. Gillies concluded, "This study's findings will help teachers understand how they can use cooperative group learning to help their students improve both their performance and their social skills" (p. 1).

Using a mixed methods approach, McManus and Gettinger (1996) observed 26 third-grade teachers and 38 students of two of these teachers to examine the interactive behaviors that occur among students during cooperative learning activities and to study students' reactions to working in cooperative groups. The researchers collected both quantitative and qualitative data through a teacher questionnaire to solicit information regarding their use and evaluation of cooperative learning procedures and a student questionnaire to solicit information regarding their reactions to working in groups. They found that both teachers and students attributed academic and social benefits to working in groups. Students reported positive change in attitudes toward school, and teachers identified an increase in students' self-esteem as a positive outcome of having children work in groups. In addition, students rated academic benefits highest, whereas teachers rated social benefits highest. The results of this study may be limited due to the reliance on teachers' self-report concerning their use of cooperative learning. McManus and

Gettinger concluded that both teachers and students attributed positive change in attitudes toward school, and an increase in self-esteem among students, to working in groups.

Implications. This review of the research on the effects of cooperative learning on students' social interactions reveals the following implications for this researcher's research. First, since many students are taught in an individualistic way, cooperative learning may help diverse classrooms, such as the ones this researcher has observed, achieve the goal of positive relationships between students of different ethnic groups (Johnson & Johnson, 1981). Second, whereas teachers may understand the social benefits that result from the use of cooperative learning, students may be more apt to see educational benefits (McManus & Gettinger, 1996). This researcher has studied high school students, and many high school students are unmotivated to participate in class solely for the "educational benefits," so it has proven important to coach the teachers into helping students understand both the academic and social benefits of helping each other learn mathematics.

Third, the effects of cooperative learning on students' social interactions depend on the quality of group interaction (Battistich, Solomon, & Delucchi, 1993) and the structure of the group interaction (Gillies, 2004), which taken together demonstrate the importance of coaching teachers on management strategies that enable positive and effective group interactions. Fourth, the implementation of cooperative learning may facilitate students' mathematical communications in the classroom (Leikin & Zaslavsky, 1997), which has been helpful in convincing teachers to utilize cooperative learning during problem-solving situations so that students can learn to communicate their thoughts during such situations. Finally, not only did teachers who implemented cooperative learning engage in more mediated learning interactions and make fewer disciplinary comments, but also their students modeled many of these interactions in their groups (Gillies, 2006). Therefore, as a classroom management strategy, this researcher has assisted teachers to look for and reinforce students who exhibit leadership characteristics such as modeling mediated learning interactions.

This review of the research on the effects of cooperative learning on students' social interactions has yielded the following implications for future research: to determine the long-term effects of cooperative learning on interethnic interaction (Johnson & Johnson, 1981); to examine how the content of student talk effects how peer groups function (McManus & Gettinger, 1996); to track same-group interactions over time (Battistich, Solomon, & Delucchi, 1993); to explore the impact that cooperative small-group learning has on the affective aspects of learning and the characteristics of the explanations that students offer each other (Leikin & Zaslavsky, 1997); and to study student group interactions in other content areas to determine whether the effects realized in one content area cross over into students' other classes (Gillies, 2006). One implication for further research that may be addressed by this researcher's study includes the recommendation made by Gillies (2004) to encourage students to work with and provide feedback to their peers, which may become a part of the coaching this researcher provides teachers in this study on classroom management strategies they can utilize to facilitate effective implementation of cooperative learning.

Cooperative Learning and Student Engagement

Overview. This researcher's selected review of the research on the effects of cooperative learning on student engagement included one experimental study, two quasi-experimental studies, two that utilized a mixed methods approach, one action research study, and four case studies. Three studies involved elementary students (one language study, one general education study, and one mathematics study), one involved both elementary and high school students (one elementary general education class, one high school health class, and one high school English class), one involved both middle and high school general education classes, and three involved high school students (one science study, one general education study, and one mathematics study).

Review. Using an experimental design, Slavin (1980) studied the effects on the achievement and time on task of 336 fourth- and sixth-grade students engaged in Student Teams-Achievement Divisions (STAD), which involves cooperative rewards, and group tasks. The researcher employed a focused schedule of instruction, which consisted of about 40 minutes of teacher lecture, 40 minutes of individual or team worksheet work (depending on the treatment), and a 20-minute quiz, for a total of two and one-half class periods. Classes were randomly assigned to treatments as intact groups, and studied language mechanics for nine weeks in one of five treatments. Two measures of academic achievement were used: one was a curriculum-specific measure and the second was a standardized test of language mechanics. A comparison group was pre- and posttested. Slavin utilized a 2 x 2 factorial design: reward structure (team reward vs. individual reward) and a task structure (team task vs. individual task). Data from both the curriculum posttest and observations of on-task behavior indicated significantly greater performance in cooperative than in traditional reward structures and significantly lower performance in group over individual task structures. The reward effect was in favor of team reward ($p < 0.01$), and the task effect was in favor of the individual task ($p < 0.01$).

No effects were found for the standardized test. The results also indicated that the experimental classes learned significantly more than the comparison classes ($p < 0.001$), which Slavin stated is “most probably due to the focused schedule of instruction” (p. 255). Furthermore, students in the team reward conditions were found to be on task significantly more than those in the individual reward conditions ($p < 0.001$). The task factor also had a significant effect on percent of time on task, but in a direction opposite to that hypothesized: students were off-task 6.2% of the time in the group task classes, and only 4.8% in the individual task classes ($p < 0.05$). Finally, students tutored more in the team reward classes (80.9% of their class time) than they did in the individual reward classes (75.6%, $p < 0.01$). Generalizability of the results is limited due to the content of the curriculum pre- and posttests. Slavin concluded that the team reward structure, and not task structure, is responsible for increased performance. However, given the instructional materials and tutoring structure used in this study, Slavin added that “…peer tutoring does not add to the effectiveness of team reward structures in increasing academic performance, and it may detract from the effectiveness of individual reward structures” (p. 257). This suggests that cooperative reward structures could increase student performance if students are given the opportunity to help each other.

In a quasi-experimental study, Gillies (2002) investigated how fifth-grade students worked in cooperative groups two years after they had been trained to work cooperatively. The researcher used momentary time sampling at 10-second intervals to observe 52 Australian fifth graders who had been trained two years prior to the study in cooperative group behaviors and 36 fifth graders who had not previously been trained in these behaviors. The researcher found that students trained in cooperative behaviors two years prior demonstrated more higher-level cognitive and language strategies, and were more task-oriented, cooperative, and helpful than their untrained peers, while the students untrained in these behaviors demonstrated more noncooperative and off-task behaviors. While it is possible that students in the control group may have acquired some of these same traits from various teachers in the past, Gillies concluded that when students work together, their sense of cooperation has long-term effects that enable them to stay on-task and to continue helping their classmates long after they had been directly taught how to do so.

In a three-year longitudinal study, Makar (2008, as cited in Fielding-Wells & Makar, n.d.) employed a quasi-experimental design to investigate the effects of inquiry-based learning on the instructional engagement of elementary-aged students in Australia. Four teachers utilized an inquiry-based learning program and four teachers utilized a traditional commercial mathematics program. The researcher collected and analyzed classroom observation and student survey data to detect students' interest and frustration levels in mathematics. The findings indicated that students who had experienced more than one year of inquiry-based learning had a higher rate of interest in and a lower rate of frustration with learning mathematics than those students experiencing the traditional commercial mathematics program. Students in the traditional commercial program reported frustration with learning mathematics and suggested that their teachers utilize more hands-on and interactive activities to make the mathematics easier to learn. Generalizability of these results is limited by the ethnic homogeneity and small size of the sample. Makar concluded that the increased level of interest and decreased level of frustration inspired by inquiry-based learning has the potential to improve low rates of student engagement in mathematics.

Pate-Clevenger, Dusing, Houck, and Zuber (2008) conducted action research at one elementary school and two high schools to improve student off-task behavior in the classroom through cooperative learning. The four teacher-researchers studied 92 third-grade students, tenth-grade health students, and eleventh-grade English students. Utilizing a mixed methods approach, the researchers used teacher surveys, student surveys, and a behavior checklist to determine off-task behavior. These surveys and checklists initially indicated 160 incidents of off-task behavior. The teacher researchers chose to reduce off-task behavior by implementing cooperative learning in order to involve all students, increase interactions among students, improve their social skills, and promote collaboration. As a result of implementing cooperative learning, data from the behavior checklists demonstrated a decrease in off-task behavior to 45 posttreatment incidents. In addition, student surveys indicated that cooperative learning helped them focus on their assigned tasks and that their social skills improved. The data from the study may not be replicable since the researchers admitted that their data collection instruments did not always yield reliable information. The teacher-researchers suggested that cooperative learning be implemented as an intervention to keep students on task and to promote positive social skills.

In conducting a case study, Yair (2000) collected data on students in 33 middle and high schools to assess the statistical effects of students' demographics and teachers' instructional strategies on students' engagement in and alienation from instruction. Students in 33 schools were randomly selected from class lists in grades 6, 8, 10, and 12, stratified by gender, race, and ability level. They answered a self-report questionnaire utilizing an experience sampling method, which is used to capture what students are doing, where they are located at specific times, and with whom they are interacting. The researcher found that, on average, students were engaged with their lessons only 54 percent of the time, and that students' engagement in and alienation from instruction is correlated with background and instructional characteristics. In addition, Yair found that race is a strong predictor of engagement with instruction: the Asian and White students were the most engaged (56.5% and 55.5%, respectively), and the Hispanic and African American students had the highest rates of alienation from instruction (50% and 50.6%, respectively). Third, the researcher found that as students progress through school, their rate of engagement decreases: the sixth-grade students were attentive 62% of the time while the twelfth-grade students were attentive only 49% of the time. Fourth, active learning experiences such as group work, laboratory explorations, and classroom discussions were found to have the highest rates of engagement with instruction. Finally, while lecture was the most prevalent instructional method (40%), this method produced the lowest rate of engagement (54%). Although students' rates of engagement during active learning ranged from 66.7 % to 73.7%, active learning was observed only 8% of the time. A limitation of this study is that the data were subjectively collected through students' self-reporting and not triangulated. Yair concluded that the absence of instructional methods that promote active learning—namely group work, laboratory explorations, and discussions—partly explains why many students, regardless of social background, tend to be alienated from instruction. In addition, at-risk students are more likely to be alienated from instruction when it is teacher-centered, and these students need more opportunities to participate in the active learning situations that are more likely to minimize any external factors that depress their achievement.

In a case study of two high school biology teachers, Anderson and Pecore (2009) investigated the personal impressions of teachers and students on student engagement during the implementation of cooperative learning. The researchers introduced the teachers to Kagan Cooperative Learning strategies and the teachers choose one strategy to integrate into their lessons. The researchers collected data by observing students for signs of engagement in the lesson, by interviewing student focus groups to determine their impressions of the lesson, and by interviewing the teachers for their perception of student engagement and academic success during the cooperative learning activities. Themes that emerged from the data were the perceived ease of working in groups, increased motivation and engagement when working collaboratively, relevance to the real world, increased confidence in the classroom, and a feeling of teacher connection to the needs and desires of students. Although the results of this study may be limited by the length of time (one class period) over which this case study was conducted, Anderson and Pecore concluded that student engagement, on-topic student discourse, and student inclination to work with their peers increased as a result of the use of the cooperative learning activities, and that low-income minority students in particular may benefit from participation in cooperative learning.

In a case study, Nardi and Steward (2003) sought to construct a profile of students' disengagement (what they termed "quiet disaffection") from mathematics and of what students believe to be effective mathematics instruction. Utilizing mixed methods, they observed and interviewed 70 students in three ninth-year mathematics classrooms in England. The interviews, which explored students' attitudes toward mathematics, were audio recorded, transcribed, and coded into categories of responses. From students' interview responses, they identified five major characteristics of students' quiet disaffection from mathematics instruction (*TIRED*): *Tedium*—students find mathematical tasks to be dull and unrelated to their lives and interests; *Isolation*—students are instructed to work alone and are given little opportunity for collaboration; *Rote learning*—students are required to solve multiple, repetitious, low-level problems using one prescribed method of which they often have no deep understanding; *Elitism*—students perceive the purpose of studying mathematics to be their placement in a social learning hierarchy, where students with high mathematical ability are placed at the top of the learning hierarchy and given the best teachers; and *Depersonalization*—students perceive mathematics instruction as not tailored to meet their individual needs. In their interviews, students mentioned characteristics of what they considered effective teaching, such as the use of games, collaborative discussions, and relevant project-based work. Replicability of the results may be limited due to the fact that the students had participated in previous research on disengagement, and thus the same results may not be found with a different group of students. Nardi and Steward suggested collaboration between researchers and practitioners to formulate student re-engagement and teacher preparation strategies that will make learning mathematics the challenging yet engaging experience for which students yearn.

Fisher (2009) conducted a case study and observed the use of instructional time in 15 high school classrooms by shadowing three tenth-grade students. Of the 2,475 minutes of class time observed, Fisher first found that these three students spent the majority of their school time participating in passive learning such as listening to lectures and watching films. Second, the next-most common use of students' time involved waiting while their teachers completed administrative tasks. Third, after waiting, the most common use of time students' time was participation in whole-class discussions. Fourth, independent work was very common across all of the students' classes, yet disproportionately so in their mathematics classes. The transferability of the results may be limited to a sample size of three students from one school and observations made in 15 classes. Fisher concluded that students in this study were most often passive recipients of content information, and recommended that high schools that want to increase student achievement and motivation should engage their students in more opportunities for active learning.

Implications. This review of the research on cooperative learning and student engagement reveals the following implications for this researcher's research. First, team reward structure, and not task structure, is responsible for increased performance (Slavin, 1980), and cooperation has long-term effects that enable students to stay on-task and to continue helping their classmates (Gillies, 2002). In addition, inquiry-based learning produces in students an increased level of interest and a decreased level of frustration, which has the potential to improve low rates of student engagement in mathematics (Makar, 2008, as cited in Fielding-Wells & Makar, n.d.) and to promote positive social skills (Pate-Clevenger, Dusing, Houck, & Zuber, 2008). As this researcher works with teachers, these conclusions have helped teachers to structure their cooperative activities to yield maximum student performance, engagement, and collaboration.

Second, the absence of active learning partly explains why many students, regardless of social background, tend to be alienated from instruction (Yair, 2000), and low-income minority students in particular may benefit from participation in cooperative learning (Anderson & Pecore, 2009). Since the teachers with whom this researcher has worked teach low-income minority students, these conclusions have helped to convince teachers that cooperative learning holds great promise for actively engaging their students in mathematics instruction.

Finally, high schools should engage their students in active learning in order to increase their achievement and motivation (Fisher, 2009), and collaboration between researchers and practitioners is needed to formulate student re-engagement strategies that make mathematics instruction engaging (Nardi & Steward, 2003). Therefore, this researcher’s study is designed to include collaboration with high school mathematics teachers, through the use of instructional coaching, in order to refine their instruction so that it engages students.

This review of the research on the effects of cooperative learning on student engagement has yielded the following implications for future research: to determine whether students learn cooperative skills in previous classroom settings, and in settings outside of the classroom, that may transfer to and improve engagement in current or future classroom settings (Gillies, 2002); to study whether student engagement is higher in enrichment courses (such as physical education and fine arts) over core courses and if so, what active learning techniques are used in these courses (Fisher, 2009); to study the means by which cooperative reward structures influence students to help each other succeed (Slavin, 1980); to explore whether cooperative learning more effectively increases the instructional engagement of elementary or high school students (Pate-Clevenger, Dusing, Houck, & Zuber, 2008); to investigate whether inquiry-based learning has the ability to reverse the pattern of student disengagement in mathematics instruction (Makar, 2008, as cited in Fielding-Wells & Makar, n.d.); and to study the long-term effects of cooperative learning on low-income students (Anderson & Pecore, 2009). Implications for further research that may be addressed by this researcher's study include giving minority and low-income students the opportunity to experience engaging instruction (Yair, 2000) and using the *TIRED* (*Tedium*, *Isolation*, *Rote learning*, *Elitism*, and *Depersonalization*) profile to formulate student re-engagement strategies in secondary mathematics (Nardi & Steward, 2003).

Cooperative Learning in Mathematics

Overview. This researcher's selected review of the research on the effects of cooperative learning activities on students' learning of mathematics included five quasi-experimental studies, three studies that utilized mixed methods, and one case study. Two studies involved elementary students (one fifth-grade mathematics study and one fifth- and sixth-grade mathematics study), one involved seventh-grade middle school mathematics students, two involved high school students (one general mathematics study and one Precalculus study) and one involved college-level introductory mathematics students.

Review. Using a quasi-experimental design, Vaughan (2002) examined the effects of cooperative learning on the mathematics achievement and attitude among students of color. Twenty-one fifth-grade students from Bermuda (18 Black, one Indian, and two Azorean) were taught mathematics using cooperative learning over a period of twelve weeks. Using a mixed methods approach, the researcher administered an achievement test and an attitude survey as pretests at the beginning of the semester and as posttests at the end of Weeks 5, 9, and 13. The results showed positive gains in attitudes and achievement, and significant differences were found between the pretest and posttests in all cases except one. Because the participants were a single intact group, differences on the posttests could have been caused by preexisting factors instead of by participation in cooperative learning. Vaughan concluded that cooperative learning had positive effects on the achievement and attitude levels in mathematics for these students of color.

Sherman and Thomas (1986) conducted a quasi-experimental study to investigate high school mathematics achievement in cooperative (using a group incentive structure for individual achievement) versus individualistic settings. The researchers studied two general mathematics classes: the teacher of the treatment class had been trained in the use of the STAD (Student Teams-Achievement Divisions) cooperative learning structure, which involves cooperation within competing teams. During a 25-day period of instruction, the students in the treatment class were divided into groups that were heterogeneously mixed according to ability and gender. A pre-/posttest design was used, and neither group was found to be significantly different from the other on the pretest. Although both groups obtained significant ($p < 0.05$) gains on their posttest scores, the cooperative classroom demonstrated significantly higher achievement posttest scores than the individualistic one. One limitation on the generalizability of the results is that students were studied as intact classes, rather than randomly assigned. In addition, the researchers admitted that length of the study (25 days) may not have been long enough to impact teaching practices. Sherman and Thomas concluded that their results support the position supported by Slavin (1983) that an incentive structure accounts for the ability of cooperative learning to impact student achievement in mathematics.

Using a quasi-experimental design, Whicker, Bol, and Nunnery (1997) investigated the effects of cooperative learning on student achievement and attitudes in two high school Precalculus classes. Students in one class studied in cooperative learning groups while students in the other class studied independently. Utilizing a mixed methods approach, three chapter tests measured student achievement, and a questionnaire assessed students' attitudes toward their cooperative learning experiences. The researchers found that cooperative learning promoted mathematics achievement and that students favorably evaluated cooperative learning as a learning strategy. One limitation to this quasi-experimental study is selection bias, and although the two groups did not differ on the pretest measure, they may have differed on other dimensions. In addition, the same teacher taught both sections of the class and her teaching style may have influenced the control class. Whicker, Bol, and Nunnery concluded that significant group differences on the achievement measure indicate that cooperative learning can be an effective instructional strategy to promote achievement in secondary mathematics classrooms.

Utilizing a quasi-experimental design, Duncan and Dick (2000) studied a collaborative problem-solving program for introductory college-level mathematics courses over five academic terms to determine the effectiveness of the program in helping students be more successful in their corresponding mathematics courses, as measured by course persistence and grades (course points earned on a 4-point scale). Students voluntarily self-selected into the college courses utilizing the collaborative problem-solving (treatment) program. Regression analyses revealed a significant effect on students' grade averages (0.671 grade points on a 4-point scale) favoring treatment students over non-treatment students. Even though the results of this study are limited due to the self-selection of subjects into the treatment group, Duncan and Dick concluded that this study provides supporting evidence that collaborative study programs can help students in making a successful transition to college mathematics study.

Using a quasi-experimental design, Mulryan (1995) studied 48 fifth- and sixth-grade mathematics students' responses in cooperative groups. In particular, this researcher examined the differences between whole-class and cooperative group settings on student time on task for all students, for high versus low achievers, and for girls versus boys. Utilizing a mixed methods approach, students' attention to and participation in cooperative learning activities were observed over seven weeks in small-group and whole-class settings. In addition, categorical observation data regarding students' attending behavior—whether on task engrossed, on task at work but not engrossed, or minimally on task—were collected at 20-second intervals. The findings revealed that students generally spent more time on-task and were more active participants in groups than in the whole-class setting, although girls and low achievers showed less involvement in activities than higher achievers. While students' previous school experience plays an important role in determining present school behavior, Mulryan concluded that teachers who use cooperative small-group instruction in mathematics class should take individual students' patterns of responding in small groups into consideration and make plans to support more active involvement by all students, especially by girls and low achievers.

Ross (1995) conducted a case study to determine the effects of feedback on student behavior in cooperative learning groups in a seventh-grade mathematics class. Eighteen students were audio recorded while working in cooperative learning groups on four occasions over a 16-week period. Students were given edited transcripts of their discussions, and were trained in how to interpret them and to use an instrument to assess the quality of their group processes one to two times per week. The researcher found that students' receipt of feedback on their participation in cooperative learning groups led to an increased frequency and quality of asking for and giving help, improvement in students' attitudes about asking for help, and enhanced students' self-efficacy. These results may be limited because of the small sample size. Ross concluded that feedback procedures improved students' skill in asking for and giving help in math class, and classroom helpfulness goals may enhance students' feelings of self-efficacy.

Implications. This review of the research on the effects of cooperative learning activities on students' learning of mathematics reveals the following implications for this researcher's study. First, cooperative learning has positive effects on the mathematics achievement and attitude levels for students of color (Vaughan, 2002), and teachers who use cooperative small-groups in mathematics instruction should plan for more active involvement by all students (Mulryan, 1995). Since many of the students of the teachers in this researcher's study include students of color, these conclusions have provided teachers with a rationale for utilizing cooperative learning in their high school mathematics classes.

Second, use of a team incentive structure accounts for the ability of cooperative learning to impact student achievement in mathematics (Sherman & Thomas, 1986), and teaching procedures for giving feedback to each other improves students' skill in asking for and giving help in mathematics class (Ross, 1995). These conclusions have provided teachers in this researcher's study with a basis for managing the structure of their cooperative groups.

Finally, cooperative learning promotes mathematics achievement in secondary mathematics classrooms (Whicker, Bol, & Nunnery, 1997), and creates a pathway for a successful transition to college mathematics study (Duncan & Dick, 2000). These conclusions have helped teachers in this researcher's study realize their school district's vision of preparing all students for success in college.

This review of the research on the effects of cooperative learning activities on students' learning of mathematics has yielded the following implications for future research: to determine whether differences in teachers' mathematics teaching ability (Sherman & Thomas, 1986) and teaching style (Whicker, Bol, & Nunnery, 1997) affect implementation of cooperative learning; to focus on the characteristics of students who thrive in collaborative situations in mathematics classes (Duncan & Dick, 2000); and to ascertain whether mathematics task difficulty interferes with group processes (Ross, 1995). Implications for further research that may be addressed by this researcher's study include deciding how to organize cooperative grouping in mathematics class so that all students can benefit from cooperative learning, and exploring how teacher expectations of low achieving mathematics students impact student participation in cooperative learning (Mulryan, 1995).

Cooperative Learning in Other Content Areas

Overview. This researcher's selected review of the research on the effects of cooperative learning activities on students' learning of other content besides mathematics included one experimental study, three quasi-experimental studies, and two case studies. Two studies involved elementary students (one third-grade science and one fourth- through sixth-grade reading study), one study involved eighth-grade geography and history, two studies involved high school students (one ninth-grade science study and one ninth-grade writing study), and one study involved students in a college-level mental health class.

Review. Using an experimental design, Bahar-Ozvaris, Cetin, Turan, and Peters (2006) introduced a cooperative learning structure into a problem-based, college-level mental health course, and measured the difference between this method and individualistic lecture-based learning. The researchers randomly assigned 150 fifth-year medical students to treatment (cooperative) and control (individualistic) groups. Treatment and control students received the same pre- and posttests, which were based on course learning objectives. They hypothesized that cooperative learning and assessment in problem-based learning would lead to higher achievement than individual learning and assessment. The researchers found that achievement was greatest in groups in which students reported the greatest cooperation, and the experimental students who scored lowest on the pretest made the greatest gains. A course satisfaction survey revealed that 83.5% of the experimental students agreed that ''during class discussions, group members helped me to master the content'' (p. 3). The study was of brief duration (one semester), which may have limited students' ability to form effective groups. Bahar-

Ozvaris *et al.* concluded that students who learned through a cooperative problem-based learning strategy and took part in a cooperative assessment gained more knowledge of the topic than students who learned through lectures and took an individual assessment.

Using an archival post-hoc quasi-experimental design, Freiberg, Huzinec, and Templeton (2009) studied the achievement effects of an instructional management program—Consistency Management and Cooperative Discipline (CMCD)—on elementary school students' reading and mathematics achievement. A total of 700 fourth-, fifth-, and sixth-grade low-income inner city students with state reading and mathematics achievement data were randomly selected, with 350 from 14 CMCD elementary schools and 350 from comparison schools. When both reading and mathematics achievement test results were analyzed, CMCD schools outperformed their control cohort with an effect size of 0.34 (an average percentile gain of 13 points) for reading and 0.42 (an average percentile gain of 16 points) for mathematics. Limitations of the study may include generalizability to older age groups and to students from higher socio-economic backgrounds. The researchers concluded that classroom management that supports effective and efficient use of instructional time and increased student engagement can lead to increased student achievement.

Shachar and Sharan (1994) utilized a quasi-experimental design to examine the effects of cooperative learning and whole-class instruction on 351 eighth-grade students' cognitive, social, and verbal behavior in Israel. Five out of nine classes in this study were taught with a cooperative learning method, and four classes were taught with a whole-class instructional method. The researchers measured students' academic achievement in geography and history as assessed by teacher-made tests and students' verbal behavior during 30-min videorecorded discussions. They found that the students in the cooperative-learning groups expressed themselves more frequently, used more words per turn of speech than did their peers from the whole-class learning group, and had higher achievement test scores than students in the classes taught with the whole-class method. The results may be limited since students were not randomly assigned to control and treatment groups, and students self-selected their own groups based on interest in particular topics to be studied. Shachar and Sharan concluded that researchers who study children's discourse "…should consider the impact of instructional method (group versus whole group) on children's language usage as a variable and not as a constant, as is frequently the case in research on the language of school-aged children" (p. 338).

Using a quasi-experimental nonequivalent control group design, Chang and Mao (1999) compared the effects of using cooperative learning strategies and traditional teaching methods on the achievement of ninth graders in twenty earth science classrooms in Taiwan. Students in ten classrooms engaged in cooperative learning activities (treatment group) and students in ten classrooms were taught by traditional lecture/discussion instruction (control group). The researchers found no significant differences between the treatment and control groups with respect to knowledge- and comprehension-level items on a test of science achievement. However, students who worked cooperatively performed significantly better ($p < 0.05$) on the application-level test items than students who worked alone. The generalizability of the results may be limited since treatment teachers received training in cooperative learning may have been more motivated to spend extra time on the classroom management techniques required for successful implementation of cooperative learning. Chang and Mao concluded that cooperative learning improves students' earth science achievement at the higher cognitive levels, while teacher-centered instruction may favor the learning of basic facts.

In a case study, Stright and Supplee (2002) examined differences between children's self-regulatory behaviors in teacher-directed, seatwork, and small-group contexts. The researchers observed fifty-one third-grade students for five 12-minute observation periods throughout the school year during science and mathematics lessons. Observations in each subject were divided equally between teacher-directed, seatwork, and small-group contexts. They found that during teacher-directed instruction, students were less likely to attend to instructions, monitor their work, and ask for help than during seatwork or small-group instruction. In contrast, students were more likely to be disorganized during seatwork or small-group instruction than during teacher-directed instruction. Almost two-thirds of the students never discussed their thinking during teacher-directed instruction (65%) or seatwork (62%), whereas only 27% of the students never discussed their thinking during small-group instruction. The researchers stated, "Because of the small sample size and the large number of variables, the cluster analysis should be considered exploratory" (p. 242). Stright and Supplee concluded that children are more self-regulated learners in small-group and seatwork contexts than in teacher-directed contents.

Dale (1994) conducted a case study to determine the factors that affect the success of collaborative writing groups in one ninth-grade classroom. The researcher conducted observations and students completed a questionnaire. Observations determined the amount and kinds of engagement during the writing process, the level of cognitive conflict, and the kinds of social interactions. Dale found that the most effective collaborative writing occurred among students in a positive social environment who were engaged with each other, the writing process, and the topic. A questionnaire was used to gain a sense of student perceptions on group processes. The researcher found that student groups collaborated to generate and discuss ideas and to plan effectively. The transferability of the results may be limited due to the small sample size (one classroom), and due to the need for an additional source of data to triangulate the observation and questionnaire data. Dale concluded that collaborative writing has the potential to foster engagement in writing and learning.

Implications. This review of the research on the effects of cooperative learning activities on students' learning of other content besides mathematics reveals the following implications for this researcher's study. First, students are more self-regulated learners in small-group contexts than in teacher-centered contexts (Stright & Supplee, 2002). In addition, classroom management that supports effective and efficient use of instructional time and increased student engagement can lead to increased student achievement (Freiberg, Huzinec, & Templeton, 2009). The implications of these conclusions for this researcher's study center around the need for teachers to develop classroom management skills to support the implementation of cooperative learning.

Second, cooperative settings can be used to promote student engagement, the acquisition and application of higher-level cognitive skills including writing (Dale, 1994) and science skills (Chang & Mao, 1999), and social interaction where students can be taught to assist each another (Shachar & Sharan, 1994). Moreover, groups that experienced greater cooperation tended to exhibit higher achievement and satisfaction with the course than students who experienced the individualistic lecture-based version of the same course (Bahar-Ozvaris *et al*., 2006). These conclusions highlight the cognitive and affective benefits of cooperative learning, and have become valuable to this researcher in soliciting teacher participation and principal support for this researcher's study.

This review of the research on the effects of cooperative learning activities on students' learning of other content besides mathematics has yielded the following implications for future research: to determine whether cooperative skills transfer from a class setting to a clinical teamwork setting (Bahar-Ozvaris *et al*., 2006); to ascertain how cooperative learning facilitates acquisition of higher-level cognitive skills (Chang & Mao, 1999); to explore how collaborative writing groups can help students write together productively (Dale, 1994); and to investigate individual differences related to students' self-regulation in different instructional contexts regarding student temperament, perception of control, and metacognitive skills (Stright & Supplee, 2002). Implications for further research that may be addressed by this researcher's study include to examine the role of classroom management in active learning environments (Freiberg, Huzinec, & Templeton, 2009) and to determine the implications of cooperative learning for multicultural classrooms (Shachar & Sharan, 1994).

Observing Student Engagement

Overview. This researcher's selected review of the research on observing student engagement included one quasi-experimental study, and five case studies—two of which utilized mixed methods. Three studies involved elementary students (one English language learner study, one science study, and one general education study), two studies involved high school students (one history study and one science study), and one study involved college-level students. In addition, three studies involved methodologies to observe student engagement, and three studies have served as exemplars upon which this researcher has designed a research study.

Review.

Methodology used to observe student engagement. The actor-observer effect emerges when an observer attributes an actor's behaviors to the actor's internal motivations or intentions, yet the actor attributes those same behaviors to external forces. For example, a teacher may attribute a student's staring off into the distance to daydreaming (*i.e*., to the student's lack of motivation), whereas the student may have attributed this behavior to his/her need to process an overload of information received from the teacher (*i.e.*, to external factors). Using a quasi-experimental design, Krueger, Ham, and Linford (1996) studied the actor-observer effect to determine whether actors, observers, or both are intuitively aware of this effect. The researchers studied 160 college freshmen and sophomores and paired them arbitrarily to be the actor or the observer. Within each actor-observer pair, both the actor and the observer described the actor on a series of trait adjectives (such as intelligent, happy, patient, *etc*.) and rated the consistency of relevant behavior. They then predicted the other person's ratings. The researchers found the actor-observer effect in action, but only the actors were aware that it had happened, even though actors and observers were equally prone to project their own ratings to their matched partners. In addition, actors on average correctly predicted that observers rated actors' behavior as more consistent than actors themselves did. Only the effect of the rater was reliable ($p < 0.001$), reflecting the finding that ratings made by observers were more positive than ratings made by actors. The results may be limited to the age of the subjects (college age), and possibly by observers' own self-images biasing their ratings of the actors. Applied to a classroom setting, these results point to the importance of triangulating observer data with other data points to confirm students' observed behavior.

In a case study, Waxman, Padrón, Franco-Fuenmayor, and Huang (2009) explored how perspectives of classroom instruction differ according to the focus or level where the observation occurs. They studied 113 English language learning students from twenty-one fourth- and fifth-grade classrooms at three inner-city elementary schools, and examined classroom instruction for these students from three different levels: low-inference instruments were used at both the student and teacher levels to observe generic instructional processes in the classroom, and a high-inference observation instrument was used that specifically focused on instructional practices at the classroom level. The researchers used three observation instruments to reveal different perspectives of classroom instruction, to triangulate observation data, and to provide a comprehensive picture of classroom instruction. First, researchers observed that teachers busily interacted with students, focused on the lesson's content, and remained task-oriented. On the other hand, student observations revealed a passive classroom setting, where students were not interacting with their teacher or other students, where they were either working on written assignments or watching and listening, and where whole-class instruction prevailed and students were on task only about 73% of the time. The overall classroom observation confirmed that active learning strategies, such as cooperative learning, that are effective with English language learners, were frequently not observed. In fact, the only strategies that the teachers used extensively were direct instruction and questioning.

Although the three observation instruments were designed to illustrate the importance of examining instruction from multiple perspectives, other instruments or methods of observation might reveal different aspects of classroom instruction. Waxman *et al.* concluded that the measures of classroom instruction from three different perspectives provided varying illustrations of the same classroom. In addition, the researchers concluded that providing teachers with observation data may help them become more aware of their own instructional behaviors and the behaviors of their students, and may help teachers improve their instructional practices.

In a case study, Lawrenz, Huffman, and Robey (2003) examined the interrelationships among observer, teacher, and student perceptions of what occurred during high school science lessons. This study, which utilized a mixed methods approach, involved the observation of approximately 2000 ninth-grade science students. Both teachers and students were asked to rate how often various activities occurred on a self-report questionnaire, and students were asked questions about their attitudes and beliefs about learning science. Students also completed two different science assessments: a multiple-choice test and a hands-on content-based laboratory station test. The researchers found that students and teachers viewed their classes differently and that classroom observations conducted by trained observers were the best predictors of student achievement. Specifically, "the most predictive measure was observation of teacher/authority centeredness, which was negatively associated with achievement, …(and) is in keeping with the standards movement, which emphasizes that teachers should use less teacher-directed methods" (p. 418). Transferability of these results may be limited to standards-based science and lab instruction. Lawrenz, Huffman, and Robey concluded that it is essential for educators to look closely at different perceptions of learning and instructional activities.

Research methodology exemplars. In an ethnographic case study, Mueller and Fleming (2001) examined the context in which children learn cooperatively, how they structure their work, and how they communicate with each other. They studied 29 elementary school students in a Vancouver, B.C. school over a period of five weeks. Throughout 11 cooperative work sessions, the researchers served as participant-observers who facilitated students' cooperative groups as they completed an inquiry-based science project. They utilized participant observation and student self-assessments followed by interviews to gain clarification on and confirmation of what students wrote. Additional data came from audio and video recordings, field notes, and analyses of sketches and drawings. Across all forms of data collection, the researchers listened for and noted students' group composition and dynamics, the purpose and language of students' work, and students' reflections on cooperative group work both during and after the project. Mueller and Fleming found that while there was some variability between groups, students reacted positively to cooperative learning and tended to use their discussions mainly to propose ideas, to organize tasks, and to assign roles. In addition, they found that students need time to get organized for the purposes of reaching a common goal. In their analysis of their findings, the researchers summarized what students identified as three criteria for effective group work: sufficient time to talk about the cooperative task with their group members; the opportunity to listen to each other and exchange ideas; and presenting what they had learned to the class. Furthermore, teachers need support and training to learn how to facilitate cooperative learning. The transferability of the results may be limited due to the number and age of the students (one class of elementary students). The researchers concluded with an observation that the teacher plays a central role in structuring cooperative learning, which may have implications for teacher education programs.

In a case study involving nine elementary school teachers at one inner-city school over the course of one year, Nath, Ross, and Smith (1996) observed the implementation of cooperative learning and examined teachers' attitudes toward cooperative learning, the academic successes and difficulties that students encountered while engaged in cooperative learning, and the effects of supports utilized to assist teachers with implementation. Utilizing a mixed methods approach, the researchers collected quantitative data through observations and questionnaires, and qualitative data through questionnaires, interviews, and discussions. The teachers viewed the researchers as participants in their cooperative learning project rather than as external evaluators, and meetings with them and the principal naturally generated new questions and additional discussion topics. Although the majority of teachers struggled initially and throughout the year, the researchers found that the teachers grew in their ability to implement cooperative learning. Moreover, the majority of teachers reported that cooperative learning had a positive impact on student achievement, attitude, communication, and use of time. The results may be limited due to the considerable principal support for implementation of cooperative learning that teachers in this studied experienced, which may not exist at other schools. Nath, Ross, and Smith concluded that teachers' attitudes improved as a result of increased student achievement, and that training, administrative support, and peer encouragement are all vital to the continued implementation of cooperative learning strategies.

In a case study, Brush and Saye (2000) explored the implementation of technology-enhanced, student-centered cooperative learning activities involving one teacher and twenty-one high school U.S. history students. Students worked in teams to gather and use electronic data to collaboratively solve situational problems in a historical context. The researchers conducted six 90-minute classroom observations and 45-minute student and teacher interviews to triangulate their data. First, researchers kept field notes of classroom observations and discussions, including their impressions of teacher interactions with students, student behaviors, and their own perceptions regarding the students' progress. Second, student and teacher interviews were semistructured and audio recorded, and explored students' understandings and teachers' perceptions of the technology-based cooperative problem-solving activities and their effect on student learning. The researchers found that a variety of issues impacted the implementation of these activities. For example, student issues included not understanding the problem to be studied, the inability to manage their time efficiently, and the lack of well-defined roles in the cooperative groups. Teacher issues included classroom management of cooperative learning, such as not providing a structure for student collaboration, not giving students the opportunity to practice cooperative learning prior to participating in the activities, and not understanding how to facilitate cooperative learning. The transferability of these results may be limited to the sample size of this case study. Brush and Saye concluded that analysis of student interview data tended to confirm the conclusions reached through analysis of the observation data: the success of cooperative problem solving depends upon the management and facilitation skills of the teacher.

Implications. This review of the research on observing student engagement reveals the following implications for this researcher's study. First, in a classroom application, these studies demonstrate the importance of triangulating observer data with other data points to confirm students' observed behavior (Krueger, Ham, & Linford, 1996), and to look closely at different perceptions of learning and instructional activities (Lawrenz, Huffman, & Robey, 2003; Waxman, Padrón, Franco-Fuenmayor, & Huang, 2009). Therefore, this researcher has triangulated observations of student engagement with student questionnaires and interviews to determine whether students confirm observation data.

Second, providing teachers with observation data may help them become more aware of their own instructional behaviors and the behaviors of their students, and may help teachers improve their instructional practices (Waxman, Padrón, Franco-Fuenmayor, & Huang, 2009). In the design of this researcher's study, a debriefing session with the teacher has been conducted after each lesson to use observation data to inform instructional decision making.

Third, teachers' attitudes toward cooperative learning improved as a result of increased student achievement, and teachers need the support of their peers and principal for successful implementation of cooperative learning strategies (Nath, Ross, & Smith, 1996). Therefore, in recruitment of teacher volunteers for this study, this researcher attempted to recruit multiple teachers from one campus so that they can support each other though their implementation of cooperative learning.

Finally, students were able to identify criteria for effective group work (Mueller & Fleming, 2001) and the success of cooperative problem solving depends upon the management and facilitation skills of the teacher (Brush & Saye, 2000). Taken together, these conclusions suggest that this researcher should plan to coach teachers how to successfully manage and facilitate cooperative learning, and that student voices should be heard in setting up cooperative learning for success.

This review of the research on observing student engagement has yielded the following implications for future research: to determine the extent to which the actor-observer effect is present between adults and children (Krueger, Ham, & Linford, 1996), and to examine the role of the principal in the implementation of cooperative learning (Nath, Ross, & Smith, 1996). Implications for further research that may be addressed by this researcher's study include to use a variety of qualitative methods, such as student surveys and interview data, in addition to classroom observations, to provide a diversity of perspectives on the context in which children learn cooperatively and how they structure and communicate their work (Mueller & Fleming, 2001; Waxman, Padrón, Franco-Fuenmayor, & Huang, 2009); to determine the most effective, yet economical mix of student perceptions and classroom observations needed to understand the effects of teaching practices on student learning (Lawrenz, Huffman, & Robey, 2003); and to examine the needs of the teacher to successfully manage and facilitate cooperative problem solving (Brush & Saye, 2000).

Summary

This researcher has reviewed thirty-eight studies relating to cooperative learning and achievement (16%), cooperative learning and social interaction (16%), cooperative learning and student engagement (20%), cooperative learning and mathematics (16%), cooperative learning and other content areas (16%), and observing student engagement (16%). The design of these studies included experimental (13%), quasi-experimental (37%), mixed methods (37%), case study (32%), and action research (5%). The content of these studies included mathematics (34%), general education (26%), English/reading (16%), science (18%), and social sciences (5%). The grade levels of the students studied included elementary school students (42%), middle school students (11%), high school students (37%), and college students (11%).

Taken together, these studies provide a variety of evidence that cooperative learning has positive effects on student achievement (Slavin & Oickle, 1981; Webb, 1982; Phelps & Damon, 1989; Nichols, 1996; Brush, 1997; Mourtos, 1997), social interaction (Johnson & Johnson, 1981; Battistich, Solomon, & Delucchi, 1993; McManus & Gettinger, 1996; Leikin & Zaslavsky, 1997; Gillies, 2004 and 2006), and classroom on-task engagement (Slavin, 1980; Yair, 2000; Gillies, 2002; Nardi & Steward, 2003; Makar, 2008, as cited in Fielding-Wells & Makar, n.d.; Pate-Clevenger, Dusing, Houck, & Zuber, 2008; Anderson & Pecore, 2009; Fisher, 2009) across all grade levels and core content areas.

In addition, the conclusions drawn from and implications of these studies provide support for this researcher to:

study the effects of classroom management of cooperative learning…

(Webb, 1982; Battistich, Solomon, & Delucchi, 1993; Brush & Saye, 2000; Stright & Supplee, 2002; Gillies, 2004, 2006; Freiberg, Huzinec, & Templeton, 2009) on student on-/off-task engagement in five high school mathematics classrooms…

(Sherman & Thomas, 1986; Nichols, 1996; Leikin & Zaslavsky, 1997; Whicker, Bol, & Nunnery, 1997; Nardi & Steward, 2003; Gillies, 2004; Fisher, 2009)

in a case study…

(Dale, 1994; Ross, 1995; Nath, Ross, & Smith, 1996; Brush & Saye, 2000; Yair, 2000; Mueller & Fleming, 2001; Stright & Supplee, 2002; Lawrenz, Huffman, & Robey, 2003; Nardi & Steward, 2003; Anderson & Pecore, 2009; Fisher, 2009; Waxman, Padrón, Franco-Fuenmayor, & Huang, 2009)

using a mixed methods approach…

(Slavin & Oickle, 1981; Johnson & Johnson, 1981; Webb, 1982; Battistich, Solomon, & Delucchi, 1993; Mulryan, 1995; Nath, Ross, & Smith, 1996; Leikin & Zaslavsky, 1997; Whicker, Bol, & Nunnery, 1997; Vaughan, 2002; Nardi & Steward, 2003; Lawrenz, Huffman, & Robey, 2003; Gillies, 2004 and 2006; Pate-Clevenger, Dusing, Houck, & Zuber, 2008)

and collecting data from multiple perspectives for triangulation…

(Krueger, Ham, & Linford, 1996; Nath, Ross, & Smith, 1996; Brush & Saye, 2000; Mueller & Fleming, 2001; Lawrenz, Huffman, & Robey, 2003; Waxman, Padrón, Franco-Fuenmayor, & Huang, 2009).

CHAPTER III: METHODOLOGY

Purpose

First, this study's social purpose is to enable teachers to engage their students in achieving both cognitive and affective learning goals in order to eliminate the achievement gap between American students and their foreign counterparts, and among students of different ethnic, racial, and economic backgrounds within the United States. Second, this study's practical purpose is to broaden an existing body of knowledge relating to student engagement in high school mathematics by exploring how classroom management of cooperative learning may affect on-/off-task student engagement in high school mathematics classrooms and by empowering students with a voice to provide feedback on classroom instruction. Third, this researcher's personal purpose for this study is to show that all students, regardless of ethnic, racial, or economic background, can learn mathematics at high levels of rigor through the use of active learning strategies, such as cooperative learning. In sum, this case study has assisted this researcher to understand the role that teachers, students, and classroom management play in the implementation of cooperative learning and to understand the contexts within which teachers utilize cooperative learning, a strategy that is supported by both research and teachers' organizations, to engage all high school students in mathematics instruction.

Research Questions

The literature reviewed in Chapter II suggests that while cooperative learning engages students in instruction and positively affects their achievement, self-esteem, and social skills, a limited number of secondary mathematics teachers utilize cooperative learning as a strategy. The results from a pilot study conducted by this researcher

(Kendall, 2010) indicated that when teachers employ strategies for managing active learning in cooperative groups, student off-task behavior decreases. However, students are not always as on-/off-task as they seem (Peterson, Swing, Stark, & Wass, 1984, as cited in Fredricks, Blumenfeld, & Paris, 2004) and researchers have demonstrated the need to triangulate student observation data (Freiberg & LaPointe, 2006; Waxman, Padrón, Franco-Fuenmayor, & Huang, 2009). Taken together, this evidence raises the following research questions:

1. Does classroom management of cooperative learning affect student on-/off-task engagement in five high school mathematics classrooms?
2. Do students from study classrooms confirm what observers report as on-/off-task behavior?

Organization of Chapter III

The remainder of Chapter III is organized in the following sequence:

i. Rationale for Mixed Methods Case Study
ii. Study Design
iii. Instrumentation and Data Collection Tools
iv. Pilot Study
v. Data Analysis and Synthesis
vi. Ethical Considerations
vii. Rigor
viii. Limitations
ix. Summary

Rationale for a Mixed Methods Case Study

Nath, Ross, and Smith (1996) posed the question, “If cooperative learning has been shown to be effective for learning, why is it not used more often?” (p. 118). In order to provide research that informs classroom practice, these researchers conducted a case study to examine how teachers’ skills and attitudes affected the implementation of a cooperative learning program by collecting both quantitative data through observations and questionnaires, and qualitative data through questionnaires, interviews, and discussions. Likewise, this researcher has used a mixed methods case study utilizing both quantitative and qualitative measures.

Definition of Mixed Methods Research

Mixed methods research involves “multiple ways of seeing” through the use of both quantitative and qualitative data (Plano Clark & Creswell, 2011, p. 4). In mixed methods research, the data, data collection techniques, and philosophical assumptions can be mixed. Moreover, this mixing can occur throughout data analysis and interpretation, in forming conclusions, and in discussing the implications of the findings (Creswell, 2008).

Mixed methods research sits in the middle of a continuum between quantitative and qualitative research (Johnson & Onwuegbuzie, 2004). Certain types of questions lend themselves to quantitative, qualitative, or mixed methods study. Questions that investigate the effects of one variable on an outcome or process call for a quantitative approach. On the other hand, questions that ask for the participant to validate the accuracy of findings call for a qualitative approach. Each of this study’s research questions calls for both quantitative and qualitative data sources; therefore, this researcher has utilized a mixed methods approach in order to draw upon the strengths of both quantitative and qualitative research to provide the best understanding of the research questions. In addition, qualitative approaches are particularly useful when a problem is yet to be understood because little research has been conducted on it (Creswell, 2009), as is the case with this researcher's study.

Mixed methods research has several advantages (Plano Clark & Creswell, 2011). Using quantitative data enables a problem to be seen from a general point of view and qualitative data enables a problem to be seen from a specific point of view. Quantitative methods favor generalizable findings and a single truth, whereas qualitative methods provide an understanding of the context in which a problem exists and favor individual interpretations and the possibility of multiple truths. Furthermore, the quantitative researcher operates in the background and his/her own biases are seldom discussed. On the other hand, while the qualitative researcher becomes the research instrument and operates in the problem situation, the results of qualitative research are subject to the interpretations of the researcher and the results, due to a limited sample size, may be difficult to generalize to a large group. Taken together, each methodology can be used to shore up the weaknesses of the other, and mixed methods research can provide a more comprehensive understanding of the problem than either method can provide alone (Plano Clark & Creswell, 2011). The strengths and weaknesses of quantitative, mixed, and qualitative methods are summarized in Table 3.

Table 3

Strengths and Weaknesses of Quantitative, Mixed, and Qualitative Methods (Johnson & Onwuegbuzie, 2004)

	Quantitative	Mixed Methods	Qualitative
Strengths	1. Research findings are generalizable when the data are based on random samples of sufficient size. 2. When confounding variables are eliminated, a direct causal relationship between variables can be determined. 3. Research results are independent of the researcher.	1. Both methods are used together to produce a more complete understanding. 2. Pictures and narrative can be used to add meaning. 3. Mixed methodology can answer a broader range of research questions because the researcher is not confined to a single method or approach.	1. Provides an understanding and description of people's personal experiences of phenomena in naturalistic settings. 2. Is useful in conducting in-depth studies of dynamic processes. 3. The researcher uses "grounded theory" to inductively generate theories.
Weaknesses	1. The researcher's underlying theoretical base may not reflect those of the actors. 2. The researcher may miss other phenomena because of the focus on the hypothesis. 3. Knowledge produced may be too general for direct application to specific contexts and individuals.	1. The researcher has to learn about multiple methods and approaches. 2. The researcher may require the assistance of a team to carry out two or more methods simultaneously. 3. The research community may not agree upon the details of how to structure and analyze a mixed methods study.	1. Knowledge produced may not be generalizable to other people or settings. 2. The results are more easily influenced by the researcher's personal biases. 3. Data collection and analysis can be time consuming.

Definition of Case Study

This researcher has used mixed methods for collecting data in a qualitative case study. A case study involves an in-depth analysis of a phenomenon, emphasizes the understanding of processes and contexts, and often involves the voices of the participants and researcher. In addition, "(i)nsights gleaned from case studies can directly influence policy, practice, and future research" (Merriam, 1998, as cited in Bloomberg & Volpe, 2008, p. 80). Moreover, patterns and themes that emerge may suggest a course of action for the researcher and/or participants. Based upon this understanding of a case study, this researcher has chosen to utilize case study to explore the role that teachers, students, and classroom management play in the implementation of cooperative learning, the processes that facilitate this implementation, and the context in which it takes place. A case study that involves mixed methods is necessary to elicit the rich data necessary to understand the research questions posed in this study.

Theoretical Background of Mixed Methods Research

The theoretical background of a research design can be studied through four salient components: its paradigm worldview, its theoretical lens, its methodological approach, and its methods of data collection (Creswell, 2008). First, mixed methods research embraces a pragmatic paradigm that encourages the use of multiple worldviews to understand and solve problems. In a mixed methods study, the world views of Postpositivism (top-down, detailed observations and measures of variables) and Constructivism (bottom-up understanding of phenomena from the participant's point of view) may be combined to form a pragmatic worldview, as articulated by John Dewey, that is problem-centered and looks for multiple meanings (Plano Clark & Creswell, 2011). This pragmatic worldview assumes that quantitative and qualitative methods can be combined to help the researcher gain an understanding of a problem or phenomenon (Akilli, n.d.).

Second, mixed methods research employs a transformative theoretical lens whereby the researcher attempts to explain a problem and answer a question in order to transform or change a social incongruity (Creswell, 2008). Such a transformative lens is incorporated into all phases of the research and permeates decision making by the researcher (Mertens, 2003, as cited by Creswell, 2008). Third, in mixed methods research, the methodology may employ multiple approaches to provide the foundation for different phases of the research, including data collection, data analysis and synthesis, interpretation, and discussion. Fourth, in mixed methods research, both qualitative and quantitative data and methods are used to provide the best understanding of the problem under investigation (Creswell, 2009). In summary, mixed methods research can involve a mixing of philosophical assumptions, worldviews, methodologies, approaches, data collection, analysis, interpretations, and/or understandings. Underlying the foundation of mixed methods research is the assumption that worldview, research questions, and methodology are tightly aligned, that each individual element of research can be polarized into quantitative and qualitative categories, and that the triangulation of data affords the opportunity for a more complete understanding of the context than any one source of data alone (Symonds & Gorard, 2007). A summary of how these four philosophical components are applied in this researcher’s study is summarized in Table 4.

Table 4

Four Philosophical Components of Research in This Study

Philosophical Component	Application to this Study
Paradigm Worldview	Multiple truths warrant multiple measures, and this study describes the truth as known by the participants at a given place and time
Theoretical Lens	Social Justice: all students, regardless of ability, ethnicity, or economic status should be equitably engaged in active learning and meaningful instruction
Methodology	Case study of five high school mathematics classrooms
Methods of Data Collection	Observation, field notes, survey, interviews

History of Mixed Methods Research

The evolution of mixed methods research can be traced back to psychological research and the multitrait-multimethod matrix used to triangulate quantitative and qualitative data sources (Jick, 1979, as cited in Creswell, 2009). Through the use of multiple sources to triangulate data, mixed methods research came to be recognized as a distinct method of inquiry in the 1970s (Freiberg, Prokosch, Triester, & Stein, 1990; Freiberg & LaPointe, 2006), and the research community has seen a steady increase in its use in educational research, public health research, social work in the 1990s and 2000s (Plano Clark & Creswell, 2011). For example, Freiberg (1998) demonstrated how the use of surveys, interviews, and checklists can be used to measure school climate and to identify areas in need of improvement, as well as to give students the opportunity to provide feedback on their own educational experience. "This feedback process allows students to become citizens, not tourists, in their school, as they realize they have a chance to participate in shaping the education process" (Freiberg, 1998, p. 24).

The 1980s witnessed the development of a justification for combining quantitative and qualitative research (Rossman & Wilson, 1985, as cited in Johnson, Onwuegbuzie, & Turner, 2007) as well as the discovery of various purposes for mixed methods research, including triangulation (Greene, Caracelli, & Graham, 1989). More recently, research has focused on articulating multiple rationales for conducting mixed research. In summary, research methodology in much of contemporary research in education and social sciences includes mixed methods—a pragmatic synthesis of its two sister methodologies, yet developed significantly to the point of securing its place as a methodology in its own right (Creswell, 2008).

Research Methodology Exemplars

Of the 38 studies reviewed by this researcher in Chapter II, seven studies utilized a mixed methods approach and 13 studies utilized a case study methodology. Of these studies, Nath, Ross, and Smith (1996), Brush and Saye (2000), Mueller and Fleming (2001), Lawrenz, Huffman, and Robey (2003), and Nardi and Steward (2003) emerged as studies most illustrative of this researcher's mixed methods approach, case study methodology, and type of quantitative and qualitative data collection tools. In particular, Nath, Ross, and Smith (2003) employed both a mixed methods approach and case study methodology, and utilized the same data collection tools (observation, field notes, survey, and interviews) as this researcher has used for this study. Table 5 shows a summary of these studies, the approach and methodology used, and the data collection tools used. Together, these studies support this researcher's methodology and design, provide a guide to data collection, analysis, synthesis, and interpretation, and provide insight into implications for action.

Table 5

Comparison of Illustrative Studies that Support This Researcher's Study Design

Research-ers	Description	Mixed Method	Case Study	Obser-vation	Survey	Field Notes	Inter-views
Nath, Ross, & Smith (1996)	Implementation of and teachers' attitudes toward cooperative learning	✓	✓	✓	✓	✓	✓
Mueller & Fleming (2001)	Context in which children learn cooperatively, how they structure their work, and how they communicate with each other	✓		✓	✓	✓	✓
Lawrenz, Huffman, & Robey (2003)	The interrelation-ships among observer, teacher, and student perceptions of what occurred during high school science lessons	✓		✓	✓		✓
Brush & Saye (2000)	Implementation of technology-enhanced, student-centered cooperative learning activities	✓		✓		✓	✓
Nardi & Steward (2003)	Students' disengagement from mathematics, and discussion of what they believe to be effective mathematics instruction	✓		✓		✓	✓

Pilot Study

Overview

Categorical observations are time based, are used in settings where events unfold, are based on preset classifications, and are used when the observer is recording smaller units of behavior that require low inference (Evertson & Green, 1986). In addition, behaviors are recorded at designated intervals and while events may be the focus of the observation, time sampling is the dominant procedure. Chapman's (2003) method of classroom observation, where observations of types of behaviors are rotated across students at five-minute intervals, is an example of a fixed-category observation and is similar to Freiberg's "GlanceAbout" observation that is part of his *Consistency Management & Cooperative Discipline*® program (Stallings & Freiberg, 1991; Freiberg, 2001). In a "GlanceAbout" observation, the observer makes visual sweeps of the classroom at five-minute intervals and collects data on the type and frequency of off-task behaviors exhibited by students. In addition, the observer notes the specific instructional behavior of the teacher at the time of each student's off-task behavior. The GlanceAbout is an example of an observation tool that measures micro (individual student) behaviors and that helps the teacher to make a connection between his/her instructional practices and student engagement in the lesson (Swank, Taylor, Brady, & Freiberg, 1989; Stallings & Freiberg, 1991). This researcher used the GlanceAbout to collect classroom observation data as part of course assignments in 2009-2010, which in effect served as a pilot study for this doctoral research study.

Data Collection and Analysis

In this pilot study, the GlanceAbout was used to observe a volunteer eighth-grade mathematics teacher on three separate occasions (Kendall, 2010). The observations were conducted at a middle school (grades six through eight) in a large urban school district in south-central United States. Although located in an urban district, this school is far from being located in the "inner city." In the 1980s, the student population was largely White and middle class; today, it is largely minority and economically disadvantaged. The teacher was a fourth-year teacher in the public school system, having previously been employed in the private sector in other mathematics-related fields. The teacher approached this researcher with a request for assistance so that s/he could improve on his/her craft. Coincidentally, this researcher needed a teacher with whom to work on the GlanceAbout class assignment, so a partnership was formed.

For each observation, the teacher employed cooperative learning as one instructional strategy. The purpose for conducting the observations was to collect data on student off-task behavior during cooperative learning activities and to present this data to the teacher during a post-observation debriefing session (see Table 9). After each of the three observations, the teacher and this researcher met to debrief the observation.

Table 9

Type and Number of Off-Task Behaviors Recorded in Pilot Study (Kendall, 2010)

GlanceAbout Observations	Total Number of Off-Task Behaviors	Number of Off-Task Behaviors That Occurred During CL[a]	Type and Number of Off-Task Behaviors That Occurred During CL	
Obs. 1	51	35	“Not engaged”	21
			“Waiting”	11
			“Other”[b]	3
Obs. 2	40	38	“Watching”	18
			“Waiting”	14
			“Other”	6
Obs. 3	11	9	“Waiting”	7
			“Other”	2

[a] “CL” = “Cooperative Learning”

[b] “Other” behaviors include talking, working on other work, taking care of personal needs, and dozing.

The observation data were analyzed according to the total number of off-task behaviors; the change and percent of change in the total number of off-task behaviors from one observation to the next, and from the first to last observations; the number of off-task behaviors that occurred during cooperative learning; and the change and percent of change in the number of off-task behaviors that occurred during cooperative learning from one observation to the next, and from the first to last observations (see Table 10).

Table 10

Analysis of Type and Number of Off-Task Behaviors Recorded in Pilot Study (Kendall, 2010)

Glance-About Observa-tions	Total Number of Off-Task Behaviors	Change in Total Number of Off-Task Behaviors	Percent Change in Total Number of Off-Task Behaviors	Number of Off-Task Behaviors That Occurred During CL [a]	Change in Number of Off-Task Behaviors That Occurred During CL	Percent Change in Number of Off-Task Behaviors That Occurred During CL
Obs. 1	51	--	--	35	--	--
Obs. 2	40	-11	-21.6%	38	+3	+7.9%
Obs. 3	11	-29	-72.5%	9	-29	-76.3%
Net change from Obs.1 to Obs. 3		-40	-78.4%		-26	-74.3%

[a] "CL" = "Cooperative Learning"

- In Observation 1, 51 instances of off-task behavior were observed, 16 during "direct instruction," and 35 during "cooperative learning." Of the 35 instances of off-task behavior observed during "cooperative learning" in Observation 1,

  - 21 occurred as students, while not disruptive, were “not engaged” (they had work to do and were not doing it);
  - 11 occurred while students were “waiting” (neither they nor their group had work to do); and
  - three occurred while students were “talking” (but not about the task at hand).
- In the Observation 2, 40 instances of off-task behavior were observed (a reduction of 21.6% from Observation 1), two instances during the “question/answer/discussion” periods, and 38 during “cooperative learning.” Of the 38 instances of off-task behavior (an increase of 7.9% from Observation 1) observed during “cooperative learning” in Observation 2,
  - 18 occurred as students were “watching” (they had no group role to play so they watched their group member perform his/her assigned task);
  - 14 occurred while students were “waiting” (neither they nor their group had work to do); and
  - six occurred while the students were “talking,” “dozing,” or “taking care of personal needs.”
- In Observation 3, 11 instances of off-task behavior were observed (a 72.5% reduction from Observation 2, and a 78.4% reduction from Observation 1), two instances during “instruction,” and nine during “cooperative groups.” Of the nine instances of off-task behavior (a reduction of 76.3% from Observation 2, and a reduction of 74.3% from Observation 1) observed during “cooperative groups” in Observation 3,

- seven occurred while students were “waiting,” and
- two occurred while students were “talking.”

Interpretation

First debriefing/coaching session. The first debriefing session began with the teacher silently reflecting on the lesson, responding in writing to the prompt, “…identify specific changes that you will make to maximize student learning and improve your instructional practice in the class…(with respect to) Physical Classroom Environment, Instructional Strategies/Procedures, Time/Organizational Management, and Discipline Management” (see Appendix A). Once the teacher finished the reflective writing, this researcher presented observation data to the teacher. At first, the teacher assumed that all off-task behavior stemmed from students’ failure to comply with classroom rules. After studying the data, the teacher came to realize that it was the nature of the task and group structure that led to the students’ off-task behavior. At this point, this researcher engaged the teacher in a series of questions to stimulate additional reflection, such as the following:

- “How could you increase the engagement of all students during the lesson?”
- “How could you enable students to reflect upon their own learning?”
- “How could you assign more roles to students to enable all students to participate in the activity?”
- “What other activities might students do to maximize instructional time up to the ringing of the bell?” (Kendall, 2010).

Through questioning and discussion, the teacher decided upon a few strategies for managing active learning in cooperative groups to implement before the next observation. These strategies included the teacher walking from group to group instead of standing at the front of the room to monitor; giving each student in the group tasks to complete but making the completion of all tasks the responsibility of the whole group; using a think-pair-share to structure group discussion; having a “placemat menu” on the table for students to refer with a list of activities from which to choose when they completed an assigned task; and the use of journaling or an exit ticket for students to complete at the end of class as a self-reflection and assessment of their learning.

Second debriefing/coaching session. The second debriefing session began like the first: teacher reflection on the lesson, followed by an analysis of the data and a series of questions to stimulate additional reflection and conversation around possible new strategies to implement. The main improvement from observation one to observation two consisted of students no longer being “not-engaged.” However, upon completion of all of their tasks, the students knew that they were responsible for the group’s final product, so they chose to “watch” the other students who were still working. Through the debriefing conversation, the teacher came to realize that while “watching” was indeed an improvement over “not-engaged,” there was a substantial amount of class time being underutilized by the students “watching.” The teacher explained that s/he had been planning activities so that all students became more engaged, but did not stop to realize what else students could be doing instead of “watching” their group mates. The teacher also shared that finding activities to keep students actively engaged for the entire class period was “wearing me out.” This researcher suggested that the teacher was working too hard and it was time to put the students to work: that is, the *teacher* does not always have to be the one to find activities to keep students actively engaged. For example, in addition to the “placemat menu” items and bonus activities that the teacher provided, the students could engage in an on-going group project (on a topic of their choosing) that they continue to work on whenever they have completed their assigned tasks.

Third debriefing/coaching session. Improvements in the teacher’s use of management methods showed in the third observation, where there were only nine instances of “waiting” during the entire period compared to 31 instances during the first observation. The teacher presented the group tasks so that students had to manage their time wisely in order to complete the tasks within the allotted time. In addition, students knew what to do next when they had completed a task. While the teacher cannot plan for and eliminate every opportunity for off-task behavior, this teacher employed a variety of planning and management strategies, such as having bonus activities to work on when students finished a task and giving each student specific roles to play in a group, to enable student on-task behavior. As a result, the teacher reduced by 78.4% (from 51 to 11) the number of off-task behaviors over the course of the six-month pilot study.

Implications for the Proposed Study

In this researcher’s pilot study, a fixed category observation system was used to collect data at five-minute intervals to categorically note instances of student off-task behavior and the corresponding instructional activity that occurred at the time of the off-task behavior. Through the use of organizational planning and classroom management strategies, the number of student off-task behaviors decreased over the course of the pilot study. However, this researcher realized that the credibility of the pilot study could be improved upon by a having trained, third-party observer to complete the observations. In addition, the dependability could be improved upon by asking students whether their perceptions of their own behavior matched those noted by the researcher during the observation rounds. Finally, the transferability of the results of the pilot study could be improved upon by observing teachers and students at other schools to determine whether similar results would occur. Thus, this researcher designed this study to expand the sample to five teachers from different schools, to use a trained third-party observer, and to utilize a student post-observation survey and interviews to triangulate the observation data.

Study Design

The Researcher's Role

This researcher has operated under the assumption that it would be difficult to obtain teachers' and students' points of view without interacting with them. Therefore, this researcher assumed the role of participant-researcher by conducting interviews with students and by holding post-observation debriefing/coaching conversations with teachers. In addition, this researcher has served as the primary research instrument and has used observations, survey, interviews, and field notes to gather data that would lead to an understanding of the classroom as an integrated and dynamic entity. In this case study, entry into each classroom has been gained by obtaining voluntary consent of the teacher to participate in this study and by collaboratively deciding with the teacher the dates and times during which the study has been conducted. In other words, this researcher has entered each classroom as a guest of the teacher.

Design

Overview. In this case study, a Mixed Methods Iterative Sequential Triangulation Design has been used (Creswell, Plano Clark, Gutmann, & Hanson, 2003). In such a design, the quantitative data are collected first, then the qualitative data are collected to search for confirmatory data and to develop a theory to explain the observed phenomenon based upon patterns and emerging themes. The data collection process was iterative in that is has been repeated for a total of three times in this study and understandings gained in one cycle have served to inform data collection and understandings gained in the next cycle.

Rationale for a qualitative dominant design. Johnson, Onwuegbuzie, & Turner (2007) offered a definition for qualitative dominant mixed methods research as a "…type of mixed research in which one relies on a qualitative, constructivist-poststructuralist-critical view of the research process, while concurrently recognizing that the addition of quantitative data and approaches are likely to benefit (the) research project" (p. 125). In this researcher's study, the qualitative aspect has had a greater weight than the quantitative aspect for four reasons. First, this researcher assumes that there are multiple versions of truth, and therefore this study represents a picture of the truth for each participant at a particular moment in time. Second, the quantitative observation data serve to inform the qualitative coaching intervention. Third, the quantitative survey and qualitative interview data serve to provide a triangulatory data set. Fourth, the qualitative field notes have served to provide input into a qualitative thematic interpretation that is typical of a case study.

A common characteristic of mixed method designs is their sequential character, where the results of the first method have been used to inform the development of the second, as is illustrated in Figure 1 (Creswell, 2008).

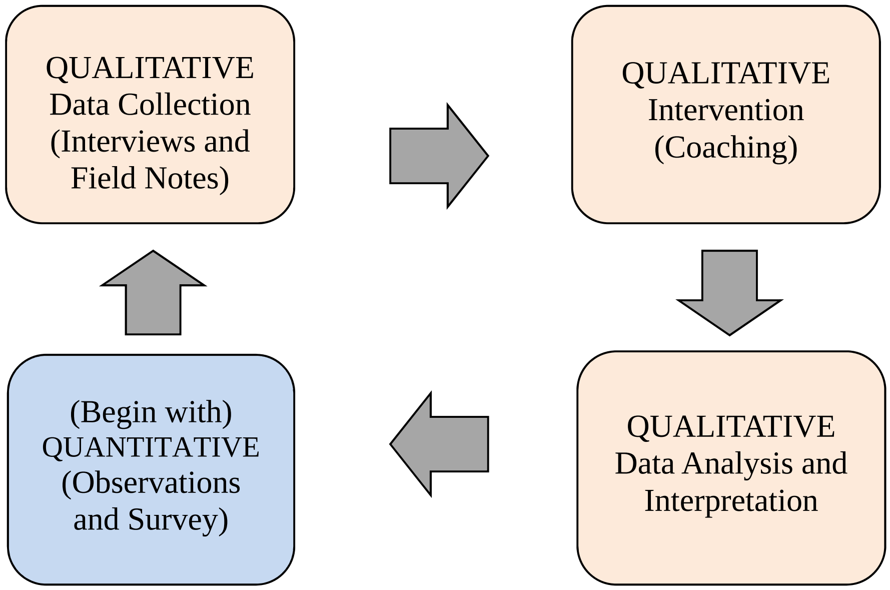


Figure 1. Mixed methods iterative sequential triangulation design (Adapted from Creswell, 2008).

Rationale for a case study methodology. This researcher conducted a multi-site case study of five mathematics teachers from four high schools to collect data that would lead to an understanding of the role of classroom management in facilitating the use of cooperative learning to engage students in high school mathematics classrooms. The case study design has enabled this researcher to study the participants in a classroom setting and to discover patterns between and among the participants' words and actions in this natural setting (McMillan, 2010). In this design, the unit of study is the classroom as an organism: teachers and students are essential and interdependent members of the organism, which together dance to a tune set forth by the collective truth embraced by these interdependent members.

Summary. This researcher conducted a qualitative case study that utilizes a Mixed Methods Iterative Sequential Triangulation Case Study design (Creswell, 2009) to facilitate an understanding of the contexts and processes involved with the implementation of cooperative learning in high school mathematics classrooms. In the role of participant-researcher, this researcher has gained entry into this study as a guest of the classroom teacher. Observations, field notes, interviews, and a survey have been conducted three times over an 11-week period (including 41 instructional days and 15 school holidays). The iterative data collection process have served as a basis for this researcher to search for patterns and develop an understanding of the roles that teachers and students play in the implementation of cooperative learning in high school mathematics classrooms.

Participants

Nath, Smith, and Ross (1996) conducted a mixed methods case study to examine the implementation of a cooperative learning program in an inner-city elementary school over a period of one year. Modifying their methodology to better suit this researcher's time constraints, this researcher designed a mixed methods case study involving three observations of five high school mathematics teachers at approximately three-week intervals over an 11-week period from November 2010 to February 2011. In the end, four of the five teachers taught three lessons; one teacher, after teaching the first lesson, experienced a series of health-related issues, and this researcher and the teacher mutually agreed that the teacher should withdraw from the study. Therefore, a total of 13 lessons were taught by these teachers for purposes of data collection by this researcher. Each of the teachers and this researcher collaboratively determined one class period to be observed, and a total of 134 students from five classes were observed during normal class time. All students were asked to participate in post-observation surveys, and all teachers were asked to participate in post-observation debriefing/coaching sessions. In addition, five students of each teacher were randomly sampled to participate in post-observation interviews.

As a former teacher and instructional coach, and now as a curriculum manager, this researcher has suggested to teachers the use of research-based strategies, such as cooperative learning, to increase student engagement in instruction. Quite frequently, one response to such suggestions from teachers has been, “yes, but that wouldn’t work in *my* school with *my* students.” In order to maximize the variation in schools and in students, and to reveal as much information as possible about the research questions, teachers were sought from a variety of high schools in this district to volunteer to participate in this study. Through network sampling (McMillan, 2010), curriculum and instructional specialists from the district’s mathematics department informed teachers to determine who might be interested in participating in this researcher’s study. This researcher then sent to those teachers a Letter of Consent (see Appendix E), which explained the study in detail. Five teacher volunteers (three female and two male) from four high schools that are representative of the variety of high schools in this district elected to participate in this study. The teachers had between four and 25 years of teaching experience and were representative of the ethnicities that comprise the students and teachers in the school district. The contextual and demographic information regarding the students and four high schools are summarized in Table 6.

Procedures

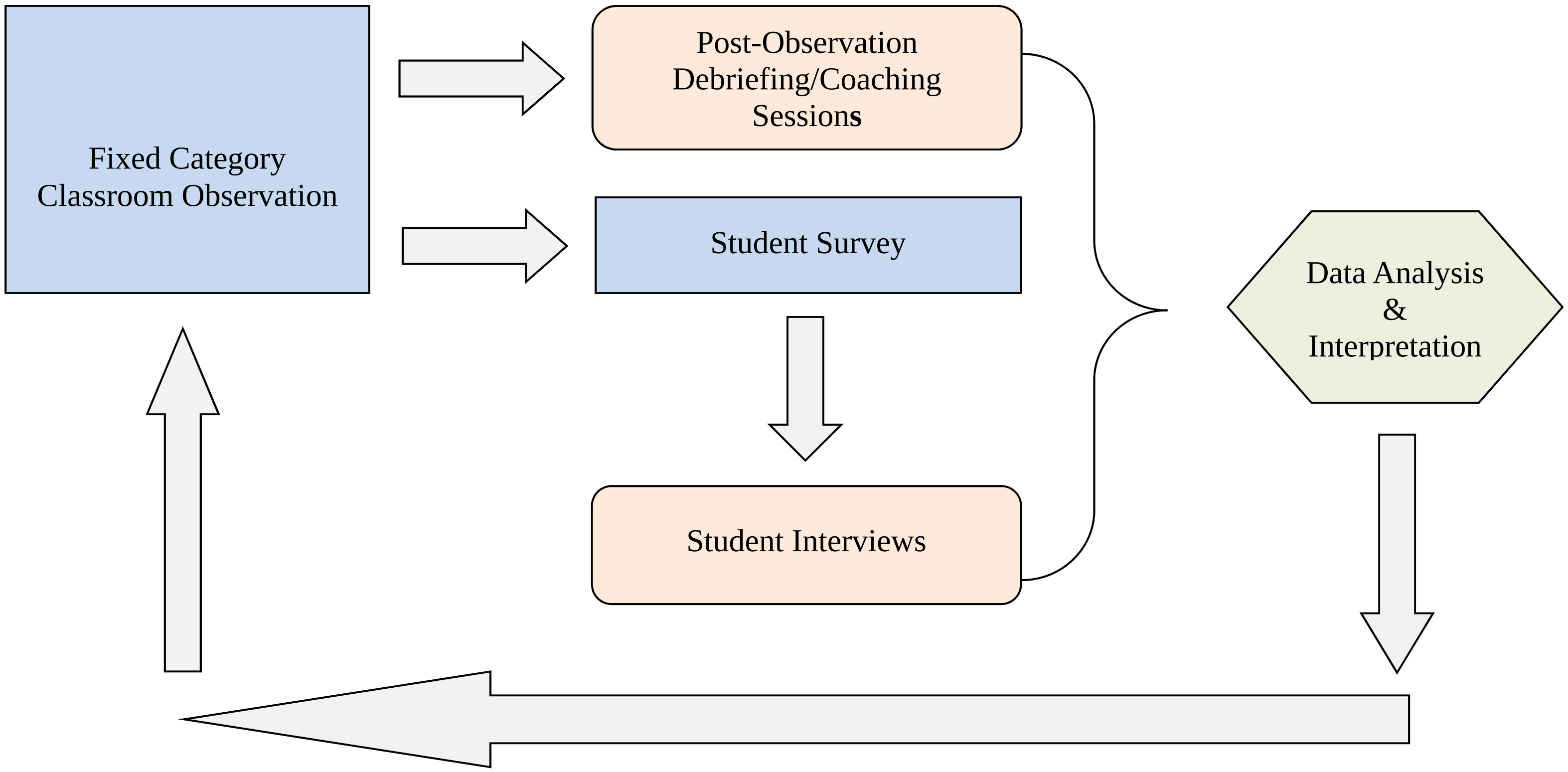
Overview. The research methods chosen should follow the research questions in a way that offers the best solution to obtaining answers. Therefore, this case study has followed a Mixed Methods Iterative Sequential Triangulation Design (Creswell, 2008). Quantitative data (observation) have been triangulated with quantitative (survey) and qualitative (interviews) data followed by qualitative field notes collected during the debriefing/coaching sessions. Data have been collected in an iterative process. Three rounds of data have been collected in sequence: observation→survey→interview→field notes, whereby each data source has combined with the others to inform the next round of data collection (Figure 2).

Data collection. Table 7 illustrates the connection of this researcher's study design and data collection tools back to the research questions. To investigate the first research question, "Does classroom management of cooperative learning affect student on-/off-task engagement in five high school mathematics classrooms?", quantitative data have been collected through classroom observations and qualitative data have been collected through this researcher's and teachers' reflections (field notes). The quantitative data collected from the classroom observations have been used to determine the relationship, if any, between classroom management of cooperative learning and student engagement in instruction and have provided information on the type and frequency of student off-task behavior during the corresponding teacher activity.

Table 6

Contextual and Demographic Information Regarding the High Schools Represented in This Study

School	Type of High School	Student Demographic Data	How Students are Chosen to Attend This High School	Course/ Grade Level Observed
District	-----	Female: 49% Male: 51% Asian: 3% Black: 27% Hispanic: 62% White: 8% Free/Reduced lunch: 80%	-----	-----
School A	Early college high school, located on the campus of a local community college	Female: 59% Male: 41% Asian: 5% Black: 20% Hispanic: 55% White: 20% Free/Reduced lunch: 58%	Students are selected via application	Advanced Mathematical Decision Making (12^{th} grade)
School B	Traditional comprehensive neighborhood high school with a small magnet component	Female: 48% Male: 52% Asian: 1% Black: 3% Hispanic: 95% White: 1% Free/Reduced lunch: 84%	Neighborhood students attend according to attendance zones; magnet students are selected via application	Algebra II (11^{th} and 12^{th} grade)
School C	Magnet high school	Female: 60% Male: 40% Asian: <1% Black: 26% Hispanic: 69% White: 5% Free/Reduced lunch: 76%	Students are selected via application	Geometry (9^{th} and 10^{th} grade)
School D	High school with an internal charter between the school district and local community college	Female: 55% Male: 45% Asian: 1% Black: 45% Hispanic: 50% White: 4% Free/Reduced lunch: 72%	Students are selected via application	Geometry (9^{th} and 10^{th} grade) and AP Statistics (11^{th} and 12^{th} grade)



Key:

Rectangles—Indicate Quantitative Data
Ovals—Indicate Qualitative Data
Hexagon—Indicates understanding formed from multiple perspectives of classroom events
Arrows—Indicates flow in an iterative input/feedback loop

Figure 2. Flowchart—Mixed methods iterative sequential triangulation design (Creswell, 2008).

Table 7

Correlation of Study Design to Research Questions

Research Question	Information Needed	Quantitative Data	Qualitative Data	Participants
Does classroom management of cooperative learning affect student on-/off-task engagement in five high school mathematics classrooms?	1a. Frequency and type of student off-task behavior during the corresponding teacher activity 1b. Teachers' perceptions of the contextual and instructional influences on students' off-task behavior during cooperative learning	1a. Classroom observation data (Fixed Category Observation)	1b. Field notes from post-observation debriefing/ coaching sessions with teachers	1a and 1b. Five volunteer mathematics teachers from a variety of representative high schools
Do students confirm what observers report as on-/off-task behavior?	2a. How students perceive their own behavior and learning experiences during cooperative learning activities 2b. Whether students confirm what observers report as on-/off-task behavior	2a. Student survey	2b. Student interviews	2a. All students of the participating teachers 2b. Five students, randomly chosen, from each observed class

After each classroom observation, the researcher conducted a post-observation debriefing/coaching session with each teacher. The purpose of these sessions was to allow the teacher and the researcher to reflect on the classroom instruction and observation data. Insights that the teachers gained from these sessions were then used to modify instruction for the next round of observations, with the goal being a decrease in the frequency of students' off-task behavior during cooperative learning. The qualitative data collected from field notes of post-observation debriefing/coaching sessions has assisted this researcher to explore the effect, if any, between classroom management of cooperative learning and student engagement in instruction and has provided information on the teachers' perceptions of the contextual and instructional influences on students' off-task behavior during cooperative learning.

To investigate the second research question, "Do students from study classrooms confirm what observers report as on-/off-task behavior?", quantitative data have been collected through a student survey and qualitative data have been collected through student interviews. The quantitative data collected from the student survey have been used to probe student behaviors in a cooperative learning situation and have provided information on how students perceive their own behavior and learning experiences during cooperative learning activities. The data collected from student interviews have also provided a confirmatory data set and have helped to determine whether students confirm what observers report as on-/off-task behavior. Together, both the quantitative and qualitative data have enabled this researcher to search for congruent findings and to develop a theory to explain the phenomena observed concerning students' engagement in cooperative learning in high school mathematics classrooms.

Instrumentation and Data Collection Tools

Overview

The use of multiple sources of data is crucial in this study in order to obtain both a triangulation of data and an in-depth understanding of students' engagement in cooperative learning in high school mathematics classrooms (Bloomberg and Volpe, 2008). Therefore, this researcher, acting as the research instrument, has used a variety of data collection tools, including fixed-category observations, a survey, interviews, and field notes. Advantages and limitation of each data collection instrument are outlined in Table 8, as well as steps this researcher has taken to minimize the limitations.

Classroom Observations

Guidance from research. One method for measuring student time on task is through direct observation. To obtain a representative sample of students' behavior over the full course of a lesson, observations may be rotated across students at pre-specified intervals (*e.g.*, every five minutes) so that each student is observed continuously for a few seconds at a time (Chapman, 2003). Fixed-category observations provide quantitative data regarding student on-/off-task engagement (Freiberg, 2001) and are useful when the observer is recording smaller units of behavior that require low inference (objective counts of discrete behaviors) (Evertson & Green, 1986).

Limitations of classroom observations include the chance that student participation may change from observation to observation and observer bias may skew observation data (McMillan, 2010). In addition, while observation techniques where observers rate students' engagement can be effective measures of student engagement in instruction, they may provide limited information on the quality of the students' effort, participation, or thinking (Fredricks, Blumenfeld, & Paris, 2004). Some students judged to be on-task by observers reported in subsequent interviews that they were not thinking about the material. In contrast, many of the students who appeared to be off-task were actually highly cognitively engaged; that is, they were trying to relate new ideas to what they had already learned (Peterson, Swing, Stark, & Wass, 1984, as cited in Fredricks, Blumenfeld, & Paris, 2004).

Table 8

Advantages and Limitations of Each Data Collection Instrument Used in This Study

Data Collection Method	Context/ Time Allotment	Advantages	Limitations	Steps Taken to Minimize the Limitations
Fixed-category Observations	A trained third-party observer has conducted fixed-category observations of five teachers consisting of 10 rounds at four-minute intervals.	1. Fixed-category observations provide quantitative data regarding student on-/off-task engagement (Freiberg, 2001). 2. Fixed-category observations are useful when the observer is recording smaller units of behavior that require low inference (Evertson & Green, 1986).	1. The actor-observer effect may be present (Krueger, Ham, & Linford, 1996). 2. Observer bias may skew observation data (McMillan, 2010).	1. Student interviews have been conducted to provide feedback on the observer's account of student on-/off-task engagement. 2. Use of a trained, third-party observer has minimized observer bias.
Closed-ended Surveys	After each classroom observation, students responded to a six-item survey, designed to take no more than five to 10 minutes to administer and complete.	1. Surveys are unobtrusive and private, and provide straightforward quantitative data to analyze (Bloomberg & Volpe, 2008). 2. Surveys ensure uniformity of response and serve to make measurement of responses more precise (Colorado State University, 2010).	1. Students may misinterpret survey questions (Bloomberg & Volpe, 2008). 2. Standardization ignores context (Colorado State University, 2010).	1. This researcher has utilized survey questions that have previously been analyzed for internal reliability (Freiberg, 2001). 2. Contextual differences have been addressed through student interviews.

Table 8, continued

Advantages and Limitations of Each Data Collection Instrument

Data Collection Method	Context/ Time Allotment	Advantages	Limitations	Steps Taken to Minimize the Limitations
Semi-structured Interviews	After each observation, this researcher conducted afive- to 10-minute interview with five randomly chosen students.	1. Interviews help to understand events from the students' point of view (Bloomberg & Volpe, 2008). 2. Interviews can be used to confirm observation data and to clarify survey responses (McMillan, 2010). 3. Students' responses (verbal and non-verbal) are valuable to understanding the context (Bloomberg & Volpe, 2008).	1. Quality of responses may be dependent upon researcher's skill and respondent's memory (Bloomberg & Volpe, 2008). 2. Interviewer's non-verbal cues may guide the respondent (Opdenakker, (2006).	1. This researcher first began with a standardized interview question designed to allow students to confirm or disconfirm observation data; second, survey items were read back to the students allowing them to elaborate upon their original response; third, students were asked to give their overall opinion about learning in cooperative groups. 2. Audiorecorded interview responses have ensured that patterns and themes interpreted by the researcher are actually supported by the students' own words.

Table 8, continued

Advantages and Limitations of Each Data Collection Instrument

Field Notes	This researcher has collected field notes during the post-observation debriefing/coaching sessions.	1. Field notes facilitate insight into contexts and behaviors. 2. Field notes provide a means to collect authentic data in a way that other devices cannot (NSF, 2010).	1. Field notes are time consuming to collect. 2. Field notes are inherently subject to the writer's bias (NSF, 2010).	1. This researcher has member-checked field notes by asking teachers for feedback on their accuracy. 2. This researcher has taken the role of co-learner with the participants.

"Observations do not take place in a vacuum: they are functions of environments—social, psychological, political, organizational, and physical. All of these environments co-occur and impact what happens in the classroom" (Evertson & Burry, 1988, p. 2-3). The "actor-observer effect" is a complicating variable involved when observing students. In the actor-observer effect, actors (students) primarily attend to the situational context in which a behavior occurs, whereas the observers attend to the student as the source of behavior (Storms, 1973, as cited in Krueger, Ham, & Linford, 1996). For example, an observer may believe that a student is off-task because s/he is choosing to daydream, while the student may choose to look away from the action for a private moment to process recently learned information. One reason for the discrepancy is that students know better than observers what they tend to do in certain situations, while observers are less familiar with the situation (Prentice, 1990, as cited in Krueger, Ham, & Linford, 1996). If observers could understand the behavior as the student sees it, then the potential for the discrepancy decreases.

Procedures for this study. In this study, five teachers were observed. Four of the teachers were observed three times over an 11-week period (including 41 instructional days and 15 school holidays). One teacher was observed once, and then withdrew from the study due to health issues. To minimize observer bias in this study, a trained third-party observer conducted fixed-category observations consisting of 10 rounds at four-minute intervals (see Appendix A for the data collection tool, **"**Fixed Category Observation Record").

Survey

Guidance from research. Triangulation of data is one technique for helping to ensure the validity of student observations (Freiberg, Prokosch, Triester, & Stein, 1990; Freiberg, 1998; Lawrenz, Huffman, & Robey, 2003; Freiberg & LaPointe, 2006). "Student perceptions are based on many experiences over time and not just on a limited number of observations" (Fraser & Walberg, 1981, as cited in Lawrenz *et al.*, 2003, p. 410). One way to determine if students confirm observers' ratings is by using surveys. Lawrenz *et al.* (2003) advised that combining student ratings with observations "would allow the opportunity for better understanding but also allow for efficient data collection" (p. 419). Responding to a survey requires that "…students reflect on what they are putting into and getting out of…" their learning experience (Kuh, 2000, p. 2). Kuh stated that "(f)or many indicators of educational practice, such as how students use their time, student reports are often the only meaningful source of data" (p. 3). Advantages to the use of surveys include that they are unobtrusive and private, and provide straightforward quantitative data to analyze (Bloomberg & Volpe, 2008). Surveys also ensure uniformity of response and serve to make measurement of responses more precise (Colorado State University, 2010). Limitations to the use of surveys include the concern that students may misinterpret survey questions (Bloomberg & Volpe, 2008), and that the standardization of forced survey responses may ignore the context of the classroom environment (Colorado State University, 2010).

Procedures for this study. After each classroom observation, students have been asked to respond to a six-item closed survey, designed to take no more than five to 10 minutes to administer and complete. Survey questions for this study were designed to probe student behaviors in a cooperative learning situation, to determine whether students confirm what observers determine to be on/off-task behavior, and have employed a Likert-type format. To minimize the potential limitations of a survey, this researcher has utilized survey questions that had previously been analyzed for internal reliability (Freiberg, 2001), and contextual differences have been addressed through student interviews (see Appendix B for the data collection tool, "Fixed Category Classroom Observation Student Survey Questions").

Interviews

Guidance from research. An interview is a directed conversation with a person for the purpose of eliciting extended response, and interviews can give the interviewee the liberating opportunity to speak his/her mind (University of Texas at Austin, 2010). Interviews can help to understand events from the interviewee's point of view and his/her responses (verbal and non-verbal) are valuable to understanding the context (Bloomberg

& Volpe, 2008). In addition, interviews can be used to confirm or clarify other data sources, such as observation and survey data (McMillan, 2010).

Limitations to interviews include that the quality of responses may be dependent upon researcher's skill (Bloomberg & Volpe, 2008) and respondent's memory. Furthermore, an interviewer's non-verbal cues may guide the respondent (Opdenakker, 2006). Finally, the results collected from interviews are personal to the interviewee and may not be generalizable to a group (University of Texas at Austin, 2010).

Procedures for this study. After each classroom observation, this researcher conducted a five-minute semi-structured interview with five randomly chosen students. To minimize the potential limitations to collecting interview data with these students, this researcher standardized the interviews by conducting them in three parts. First, the researcher shared with the student the observer's report regarding the student's classroom behavior by stating, "today in class, you were observed to be on-task the entire period" or "today in class, you were observed to be engaged in the off-task behaviors of ___." Then, this researcher asked the student, "was this a correct observation," and the student's response was noted as either confirming or not confirming the observer's report. Second, the six survey items were read back to the student and each student was allowed to elaborate upon their original response. Finally, students were asked to share any other thoughts or opinions they may have about learning in cooperative groups. These audiorecorded interview responses have ensured that patterns and themes interpreted by the researcher are actually supported by the students' own words (see appendix C for the data collection tool, "Fixed Category Classroom Observation Student Interview Prompts").

Field Notes

Guidance from research. Field notes are descriptions of settings, people, activities, and sounds that may include drawings or maps, photographs, and may be hand-written, audio- or videorecorded (Hoepfl, 1997). Field notes facilitate insight into contexts and behaviors and provide a means to collect authentic data in a way that other devices cannot (NSF, 2010). Limitations to the use of field notes as a data collection device include the fact that they are time consuming to write or collect and are inherently subject to researcher bias (NSF, 2010).

Procedures for this study. This researcher has collected field notes during the post-observation debriefing/coaching sessions in order to facilitate and gain an understanding of the process teachers went through as they attempted to apply insights gained from observation data to their instructional practice. Field notes collected included written reflections of both this researcher and teachers. To minimize potential limitations to the use of field notes, this researcher has member-checked field notes by asking teachers for feedback on their accuracy. In addition, this researcher has taken the role of co-learner with the teachers in an attempt to remain a neutral listener as teachers discuss their insights from their classroom experience (see Appendix D for the data collection tool, “Fixed Category Classroom Observation Reflection: Teacher and Coach”).

Data Management

This researcher has taken the following steps to manage data collected in this study (Taylor-Powell & Renner, 2003):

1. Code participants and schools for confidentiality.

2. Member check for accuracy.

3. Organize and place data into a spreadsheet, noting the source of data by individual, site, and date.

4. Keep hard and electronic copies and backup data at every turn.

Summary

This case study of five high school mathematics teachers has followed a Mixed Methods Iterative Sequential Triangulation Design to address the following questions: (1) Does classroom management of cooperative learning affect student on-/off-task engagement in five high school mathematics classrooms? (2) Do students from study classrooms confirm what observers report as on-/off-task behavior? Quantitative and qualitative measures have been utilized to investigate each question. To determine the effects, if any, of classroom management of cooperative learning on student on-/off-task engagement, quantitative data from fixed category classroom observations and qualitative data from this researcher's field notes during post-observation debriefing sessions have been collected. To determine whether students confirm what observers report as on-/off-task behavior, quantitative data from a student survey employing Likert-type items designed to probe student behaviors in a cooperative learning situation and qualitative data from audiorecorded student interviews have been collected. The observation data and field notes, combined with the student survey and interview data, have been used to triangulate the information combating possible actor-observer effects. During post-observation debriefing sessions, this researcher has taken the role of participant-researcher by presenting teachers with observation data and providing instructional coaching on classroom management of cooperative learning.

Data Analysis and Synthesis

Data Analysis in a Case Study

A case study is research that is grounded in a constructivist theoretical framework and studies the ways in which the world is experienced, interpreted, and understood in a particular place, context, and time. This understanding comes from the researcher entering the participants' world to create a holistic picture of the phenomenon in question (Bloomberg & Volpe, 2008). The researcher examines the patterns of meaning which emerge from the data and these are often presented in the participants' own words. Figure 3 presents a progression of the inductive logic used throughout a case study (Creswell, 2009).

In applying this progression to this researcher's case study, first this researcher has gathered information using the data collection tools of observation, field notes, survey, and interviews. Second, this researcher has asked open-ended questions during the student interviews (which have been audiorecorded) and during the post-observation debriefing/coaching sessions with the teachers (during which field notes, in the form of written reflections, have been collected). Third, this researcher has analyzed the data to determine categories and themes. Fourth, this researcher has looked within and across categories and themes for broader patterns. Finally, this researcher has offered recommendations and proposals for future research and action that give an understanding to the problem.

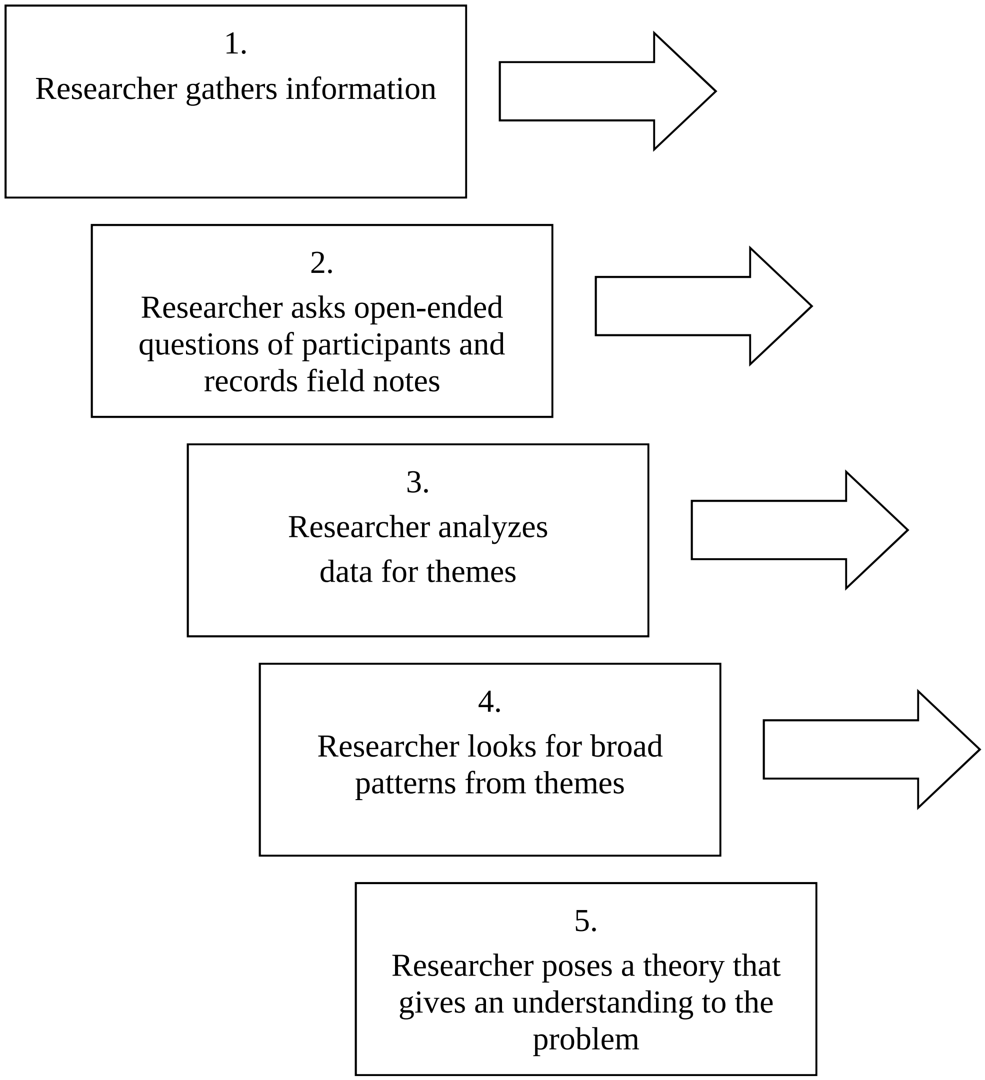


Figure 3. Inductive logic of research in a case study (Creswell, 2009).

Data Analysis in Mixed Methods Research

One purpose for mixed methods research is triangulation of data collected from different sources. When data are collected for purposes of triangulation, then all data sources, both quantitative and qualitative, should be analyzed independently and compared (Greene, Caracelli & Graham, 1989). A second purpose for mixed methods research is to understand a phenomenon from multiple perspectives, where quantitative and qualitative data are used for complementary purposes. One strategy for data analysis in mixed methods research is data transformation, where quantitative data may be "transformed to narrative and included with qualitative data in thematic or pattern analysis" (Caracelli & Greene, 1993, p. 197).

This researcher has employed a three-layer process to analyze and synthesize the data (Bloomberg & Volpe, 2008). First, this researcher has analyzed the data collected from this study by coding and then transforming all sets of data to narrative in order to determine whether the student survey and interview data confirm the observation data. Second, this researcher has examined and compared themes and patterns across types and categories of data. Third, the findings have been broadened by relating them back to the problem and need for the study as described in Chapter I and by comparing and contrasting with findings from the literature reviewed in Chapter II. Based on this broadening, this researcher has considered wide-ranging implications of this study and has offered proposals for future action and research.

Quantitative Data Analysis. This researcher has employed descriptive statistics to describe and analyze the quantitative data. For example, the data from the fixed category observations have been be tabulated according to the type and relative frequency (as a percent) of off-task behaviors during cooperative learning. In addition, survey data have been tabulated according to the percent of students who respond "Strongly Agree," "Agree," "Disagree," or "Disagree" to each of the six survey questions. The quantitative data have been transferred into narrative and analyzed for themes and patterns.

Qualitative data analysis. This researcher has utilized a burrowing process—going deeply into participants' experiences to find the larger meanings they bring to bear on the study at hand—to analyze qualitative data (Taylor-Powell & Renner, 2003) (see Figure 4).

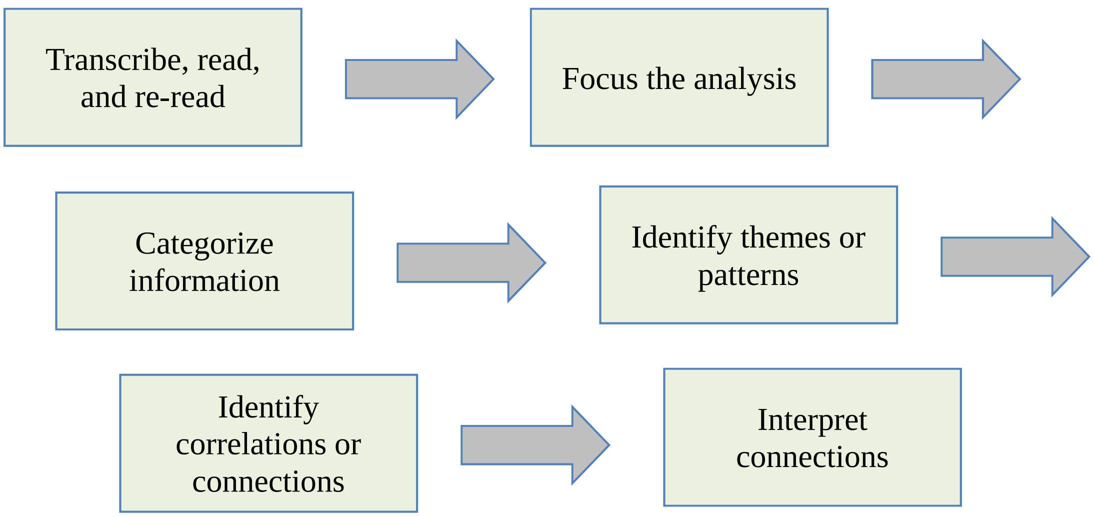


Figure 4. Process for analyzing qualitative data (Adapted from Taylor-Powell & Renner, 2003).

First, this researcher has transcribed, read, and re-read the transcription of interview responses and field notes in order to become familiar with the data. Second, this researcher has focused the analysis of the data first by research question and then by other categories that have emerged based on responses. Third, this researcher has categorized and coded the data first by pre-set codes (for example, by participant response) and then by other codes that have logically unveiled themselves as the analysis progressed. Moreover, to “check” this researcher’s thinking, all decision-making processes have been shared with colleagues or advisors. Fourth, this researcher has searched within and between categories to identify themes or patterns based on ideas, concepts, behaviors, interaction, incidents, terminology, or phases used by participants. In addition, this researcher has also looked for outliers and responses that countervail the common themes. Fifth, this researcher has identified connections between and among themes and broadened findings into logical categories. Sixth, this researcher has interpreted these connections for meaning or understanding related to the research questions. Finally, this researcher has summarized by looking for major lessons, for clarification, and for explanation of the changes occurring from one classroom observation to the next (Taylor-Powell & Renner, 2003).

Summary. This researcher has conducted a mixed methods case study. In all research, it is crucial for the researcher to continuously correlate the data collection and analysis back to the design of the study and research questions. Table 11 summarizes how this researcher’s quantitative and qualitative data collection and analysis correlate to the research questions.

Ethical Considerations

Guidelines for conducting ethically acceptable research with human participants include informed consent, freedom to withdraw, anonymity and confidentiality, potential risk and benefits, and data security (University of Texas at Austin, 2010). To ensure the safety of all participants, investigators have the responsibility to ensure participant confidentiality and to avoid harm. In this researcher’s study, teachers and their students have been solicited as volunteers to participate in the study. In addition, teacher and parental consent, and student assent (see Appendices E, F, & G) was obtained to ensure that teacher and student participation is both voluntary and informed.

Table 11

Correlation of Data Collection and Data Analysis to the Research Questions

Research Question	Quantitative Data	Data Analysis	Qualitative Data	Data Analysis
Does classroom management of cooperative learning affect student on-/off-task engagement in five high school mathematics classrooms?	1a. Classroom observation data (Fixed Category Observation)	Descriptive Statistics (*e.g.* type and percent of off-task behaviors during cooperative learning), followed by narrative analysis for themes and patterns.	1b. Field notes from post-observation debriefing/ coaching sessions with teachers	After data collection was completed, an initial coding, followed by focused coding, of categories was developed logically from the field notes. The researcher then analyzed data for themes and patterns.
Do students confirm what observers report as on-/off-task behavior?	2a. Student survey	Descriptive Statistics (percent of students who respond "Strongly Agree," "Agree," "Disagree," or "Disagree" to each of six survey questions) followed by narrative analysis for themes and patterns.	2b.Student interviews	Interviews were audio-recorded and transcribed. After data collection was completed, an initial coding, followed by focused coding, of categories was developed logically from the responses. The researcher then analyzed data for themes and patterns.

Data collected from observations, surveys, and debrief/coaching written reflections first existed in paper form, which were then transcribed into digital form and then password protected. The interview data first existed in audiorecorded form and then were transcribed into digital form and then password protected. Confidentiality of teachers' participation, and of their students' participation in this project, has been maintained as follows: first, deception has *no* role in this researcher's study. Second, teachers' and students' names were paired with a code number, and this code number will appear on all written materials and in any subsequent publications. The list pairing each participant's name to the assigned code number will be kept separate from all research materials and will be available only to this researcher. In addition, field notes and transcripts have been coded and void of participants' personal identities. The University of Houston's policy on data retention requires that research data be maintained for a minimum of three years by this researcher after completion of the project.

Finally, there should be reciprocity between what participants and researchers give and receive in a research situation (duToit, 2006). This researcher has intended to become a co-learner along with the participants, to be an effective listener, and to provide feedback on the results of the study as a form of recognition and gratitude for their participation in the study.

Rigor

Rigor has been said to be "one of the cornerstones of high-quality academic research" (Biggs & Buchler, 2007, p. 1), and can be defined as the strength of the argument that a researcher makes for his/her chain of logic from the choice of a methodology paradigm and theoretical basis, to the research questions, data collection, data analysis, interpretation, theories generated, and conclusions drawn. Each different research approach has adopted its own terms for rigor: in a quantitative approach, rigor is defined as "validity"; in a qualitative approach, it is defined as "trustworthiness" (Lincoln & Guba, 1985). In the mixed methods approach, "legitimation" (Onwuegbuzie &

Johnson, 2006, p. 48) and “inference quality” (Tashakkori & Teddlie, 2003, p. 36) have been offered by current mixed methods researchers to define rigor. This researcher has taken a pragmatic approach to the issue of rigor and has applied the standards appropriate for a qualitative case study that utilizes both quantitative and qualitative data collection tools. Rigor of research can be determined through four criteria (Key, 1997): truth value, applicability, consistency, and neutrality. In qualitative research, these criteria translate respectively to credibility, transferability, dependability, and confirmability. In quantitative research, these criteria translate respectively to internal validity, external validity, reliability, and objectivity. Table 12 summarizes the methods used by this researcher to minimize the limitations.

On the qualitative side, this researcher has ensured trustworthiness in the following ways. First, credibility has been ensured by constructing the case study according to a constructivist worldview, and through longevity and the use of time-sampling (three observations collected over an 11-week period). Second, transferability has been ensured by conducting the study at multiple sites (a variety of the types of high schools in the district) and by developing a thick, rich description of the participants and context through field notes. Third, dependability has been ensured by audiorecording interviews. Fourth, confirmability has been ensured through the use of member checking and connecting data to the context (Bloomberg & Volpe, 2008).

Table 12

Methods Used by This Researcher to Methods Used by This Researcher to Minimize Limitations (Key, 1997)

Criterion	Qualitative Approach “Trustworthiness”	Quantitative Approach “Validity”
Truth Value	Credibility • Use of time-sampling (three observations conducted over an 11-week period (which included 41 instructional days and 15 school holidays) • Application of Constructivist theory to study design and data analysis/synthesis	Internal Validity • Use of standardized procedures for collecting and organizing classroom observation data • Random assignment of students to be interviewed
Applicability	Transferability • Develop a thick, rich description of the participants and context through field notes • Use of multiple sites at which to conduct the study	External Validity • Utilization of similar methodology and tools as other researchers have used
Consistency	Dependability • Use of audiorecorded interviews	Reliability • Use of multiple sources of data for triangulation
Neutrality	Confirmability • Use of member checking • Persistence in connecting data to the context	Objectivity • Use of a trained, third-party observer for all classroom observations

On the quantitative side, this researcher has ensured validity in the following ways. First, internal validity has been ensured by standardizing the procedures for collecting and organizing classroom observation data and by randomly assigning students to be interviewed (Freiberg, 2001). Second, external validity has been ensured by utilizing similar methodology and tools as other researchers have used (Mulryan, 1995; Nath, Ross, & Smith, 1996; Brush & Saye, 2000; Mueller & Fleming, 2001; Nardi &

Steward, 2003). Third, reliability has been ensured through the use of multiple sources of data for triangulation (Krueger, Ham, & Linford, 1996; Nath, Ross, & Smith, 1996; Brush & Saye, 2000; Mueller & Fleming, 2001; Lawrenz, Huffman, & Robey, 2003; Waxman, Padrón, Franco-Fuenmayor, & Huang, 2009). Fourth, objectivity has been ensured through the use of a trained, third-party observer for the classroom observations and through the use of a standardized observation instrument (Freiberg, 2001; Goodwin, 2009).

Limitations

A study conducted according to a mixed methods case study design may be limited in a variety of ways. First, bias exists in the selection of the study design. For example, an assumption underlying qualitative case study methodology is that "…there are multiple realities represented by the participants' perspectives" (McMillan, 2010, p. 11). Furthermore, design issues such as the method of sampling and the size of the sample has limited the study. In this researcher's study, the balancing of time has been a challenge: this researcher had a limited amount of it, yet there needed to be enough time devoted to the study to observe patterns of change but not so much that the participants would grow weary of the study or that this researcher would run out of time. Finally, the use of a small number of volunteers (five teachers and 134 students) who were recruited through network sampling, while appropriate for a case study, have nevertheless limited the generalizability of the conclusions that have been derived from the data collected in this study.

Second, bias exists in the researcher as the research instrument and in the fact that this researcher has taken the role of participant-researcher in this study. Moreover, in a qualitative case study, it is desirable for the researcher to state his/her bias and assumptions upfront. This researcher's success as a teacher for 18 years and as an instructional coach for seven years in using cooperative learning to engage students in mathematics instruction serve as a source of bias in this study. Furthermore, this researcher has conducted this study while operating under the following assumptions: (1) learning best occurs in social environments where students are active participants in a constructive learning process; (2) the active learning strategy of cooperative learning positively impacts student engagement in instruction; (3) student engagement can be measured through observations of on- and off-task student behavior; and (4) teachers may be reluctant to use cooperative learning because they lack the classroom management skills to effectively facilitate its use.

This researcher has minimized the limitations of the bias and assumptions of this study, and has attempted to develop an environment of trust with the participants and with the research community, by ensuring transparent methodological practices, by stating personal biases and assumptions, by using a third-party observer, and by taking the attitude of a "co-learner." Another limitation of this study is that time sampling was used to collect the observation data. This limitation has been minimized by sharing the observation data with the teacher during the debriefing coaching session (Evertson & Green, 1986) and by selecting "very short intervals" (every four minutes) at which to collect the data (Johnston & Pennypacker, 2009, p. 133).

Conclusion

This researcher has conducted a mixed methods iterative sequential triangulatory case study design to determine the effects, if any, of classroom management of cooperative learning on student on-/off-task engagement in five high school mathematics classrooms. The results from a pilot study conducted by this researcher (Kendall, 2010) demonstrated that when teachers employ strategies for managing active learning in cooperative groups, student off-task behavior decreases. Specifically, this study of five high school mathematics teachers from four high schools over a period of approximately 11 weeks has addressed the following questions: (1) Does classroom management of cooperative learning affect student on-/off-task engagement in five high school mathematics classrooms? (2) Do students confirm what observers report as on-/off-task behavior?

By conducting classroom observations utilizing a fixed category observation system, by utilizing a third-party observer to minimize bias, and through debriefing/coaching sessions with each teacher, this researcher has sought to determine the effect, if any, of classroom management of cooperative learning on student on-/off-task behavior. By collecting data after each observation—through a student survey, audiorecorded interviews of a randomly selected sample of students, and field notes (written reflections from the debriefing/coaching sessions)—this researcher has sought to determine whether students confirm what observers report as on-/off-task behavior. Student survey items have been designed to probe student behaviors in a cooperative learning situation and have employed a Likert-type format. The student survey and interview data have been used to triangulate the observation data, thus limiting any possible actor-observer effect, and to provide a confirmatory process in the findings.

Table 13 provides a summary of the participants and the information they provided this researcher in Chapters IV and V; Figure 5 shows the study and the participants in the various milieus in which this study has been conducted. Through this study, this researcher has been able to better understand the roles that teachers and students play in the implementation of cooperative learning in high school mathematics (see Appendix H for an overview of this researcher's timeline).

Table 13

Summary of Participants and the Information They Have Provided This Researcher in Chapters IV and V

Research Questions	Participants	Information Provided
Does classroom management of cooperative learning affect student on-/off-task engagement in five high school mathematics classrooms?	• Teachers • Students • Researcher and neutral third-party observer	• Teachers' and students' perceptions of the contextual and instructional influences on students' off-task behavior during cooperative learning • This researcher's and neutral third-party observer's perceptions of the contextual and instructional influences on students' off-task behavior during cooperative learning
Do students confirm what observers report as on-/off-task behavior?	• Students • Researcher	• How students perceive their own behavior and learning experiences during cooperative learning activities and whether they confirm what observers report as on-/off-task behavior

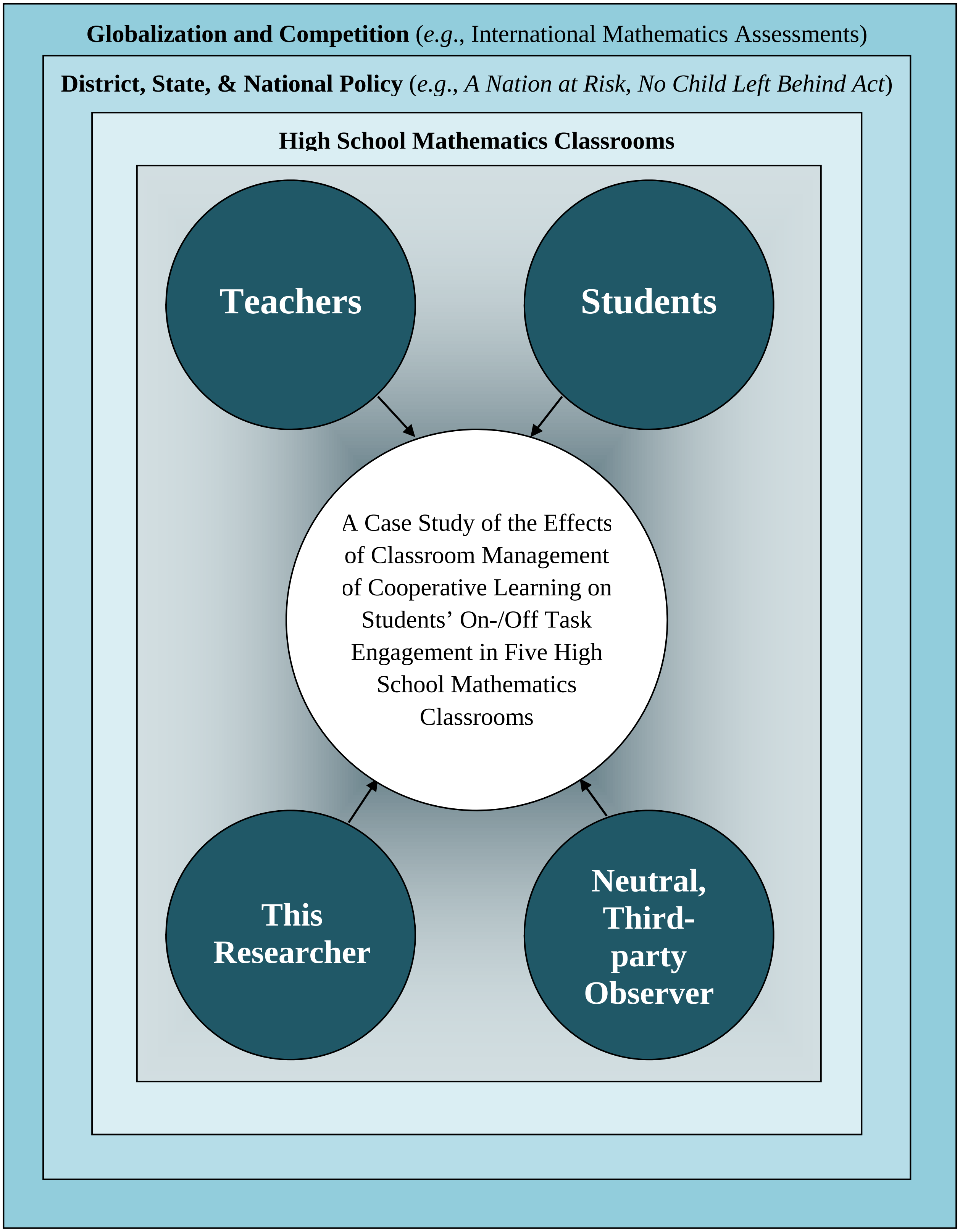


Figure 5. The various milieus in which this study has been conducted.

CHAPTER IV: RESULTS

Overview

After briefly reviewing the research questions, this author offers a rationale for shifting the voice of this narrative from third to first person. Presented next is an overview of the data collection sequence utilized in this study. Following that, a summary of the results related to each research question is revealed with additional data provided in the Appendices. Finally, the limitations of the study, and the methods employed to minimize those limitations, are discussed.

Research Questions

The literature reviewed in Chapter II suggests that while cooperative learning engages students in instruction and positively affects their achievement, self-esteem, and social skills, a limited number of secondary mathematics teachers utilize cooperative learning as a strategy. The results from a pilot study conducted by this researcher (Kendall, 2010) indicated that when teachers employ strategies for managing active learning in cooperative groups, student off-task behavior decreases. However, students are not always as on-/off-task as they seem (Peterson, Swing, Stark, & Wass, 1984, as cited in Fredricks, Blumenfeld, & Paris, 2004) and researchers have demonstrated the need to triangulate student observation data (Freiberg & LaPointe, 2006; Waxman, Padrón, Franco-Fuenmayor, & Huang, 2009) with other data collection devices such as surveys, interviews, and field notes (in this study, written reflections from debriefing/coaching sessions). Taken together, this evidence raises the following research questions:

1. Does classroom management of cooperative learning affect student on-/off-task engagement in five high school mathematics classrooms?

2. Do students from the study classrooms confirm what observers report as on-/off-task behavior?

Shift from Third to First Person Narrative

This researcher has written Chapters I – III of this thesis in the third person. On the other hand, in-depth qualitative analysis requires relating an account of events as they have unfolded. As such, this researcher has taken an active role as a participant-researcher in this study. From this point forward, Chapters IV and V represent a shift to writing this doctoral thesis in the first person. My "I" was implicated in the data collected and responded to via qualitative means—that is, from this point onward, I am now the research instrument and as such decide which tools are used where and when.

Overview of Methodology

A case study involves an in-depth analysis of a phenomenon, emphasizes the understanding of processes and contexts, and often involves the voices of the participants and researcher (Bloomberg & Volpe, 2008). This multi-site case study involves a mixed methods design that incorporates multiple viewpoints to triangulate, if any, the effects of classroom management of cooperative learning on student on-/off-task engagement in five high school mathematics classrooms. In this case study, I have used observations, field notes, a survey, and student interviews to gather data that give an understanding of the classroom as an integrated and dynamic whole. Finally, this multi-site case study design has enabled the study of participants in a classroom setting and the discovery of patterns between and among the participants' words and actions in their natural setting (McMillan, 2010).

Participants

Participating in this case study were three female and two male high school mathematics teachers, whose years of teaching experience ranged from four to 25 years. These teachers represent ethnicities that mirror the diverse student population in the district: African American, Asian, Caucasian, and Hispanic.

Each teacher originally committed to teaching three lessons, spaced apart at approximately three-week intervals (15 instructional days) over an 11-week period (including 41 instructional days and 15 school holidays) from November 2010 to February 2011 (see Figure 6 in Appendix I, “The Number of Elapsed Instructional Days between Observations for each Teacher”). On average, there were nine more elapsed days between Observation 1 and 2 than between Observation 2 and 3. This can be explained by the fact that the semester changed occurred between Observation 1 and 2: the time during the “dead” week of final exams to end of the Fall semester before Winter Break, and the first week to start the Spring semester after Winter Break, provided only two “optimal” instructional days for observation purposes. Since my goal was to add as little disruption as possible to the teachers’ workflow, scheduling constraints, such as teachers’ preferences for day of the week for an observation to occur or their attendance at training, caused some variation in the number of days that lapsed between observations for each teacher.

In the end, four of the five teachers each taught three lessons; one teacher, after teaching the first lesson, experienced a series of health-related issues, and the teacher and I mutually agreed that s/he should withdraw from the study. This teacher was one of two teachers from the same school who had agreed to participate in the study; thus, when this teacher withdrew, there were still four different school sites represented. In sum, a total of

13 lessons were taught by these teachers for data collection purposes. Each of these teachers knew me as the district's curriculum manager for secondary mathematics for the past five years, and a teacher-coach bond was established through this relationship.

Each of the teachers and I collaboratively determined one class period to be observed, and a total of 134 students from five classes were observed over the course of the study during their normal class time. These classes consisted of ninth- through twelfth-grade students enrolled in Geometry, Algebra II, Advanced Placement (AP) Statistics, or Advanced Quantitative Decision Making (a post-Algebra II course).

Classroom Context

For each lesson, the teachers participating in this study employed cooperative learning as one instructional strategy. During pre-study discussions with each teacher, it was determined that each teacher had received training at some time during his/her career related to the implementation of cooperative learning. For the purposes of this study, "cooperative learning" has been operationally defined as active student interaction in heterogeneous groups where students work together to achieve a common goal and are held individually accountable for achieving that goal (Johnson, Johnson, & Holubec, 1993, as cited in Putnam, 1997). I made no attempt to dictate the structure of the lesson other than to request that cooperative learning be used as one instructional strategy during the lesson. This meant that the teachers invoked their personal interpretations of cooperative learning and expressed those interpretations within the context of their individual teaching practices. These interpretations are revealed in the description of each observation and debriefing session (see Appendices K – O).

Ten of the 13 lessons occurred over a 90-minute class period, and three occurred over an 85-minute time period. Within this time frame (85 or 90 minutes), three data collections occurred. First, a third-party observer conducted 10 four-minute fixed-category observations of student behavior and instructional activity per lesson. Second, I administered a survey (which averaged six minutes in duration). Third, I randomly selected five students to interview. The interviews lasted approximately six minutes each, including interview time and wait time between students. Upon agreement with the teachers, principals, and district, all three data collections were required to take place entirely within the class period and students were not to be kept after class. Therefore, I requested that each teacher structure his/her lesson plan so that the cooperative learning portions of the lesson would occur during the first 40 minutes of class to ensure adequate time for the survey and interviews to take place.

After each observation, the teacher and I met at the teacher's discretion as to time and place to debrief, during which I provided instructional coaching designed to facilitate teachers' classroom management of cooperative learning. At this debriefing/coaching session, observation data were presented to the teacher, and field notes, in the form of the teacher's and my own written reflections (as instructional coach), were discussed. To ensure confirmability, the teacher and I shared copies of our reflections as a form of member checking. To preserve students' confidentiality, specific student survey and interview data were not shared with the teachers, although themes and patterns I observed in the survey and interview data provided insight upon which to pose questions and suggest strategies during the debriefing/coaching process.

Thus, the data collection process was both sequential and iterative: sequential in that the observations occurred first, followed by the student survey, student interviews, and debriefing/coaching sessions with the teacher; and iterative in that this data collection sequence occurred three times and data collected from each round informed the next.

Confidentiality

To preserve the anonymity and maintain the confidentiality of both students and teachers in this study, I have taken care in this narrative to provide neither the names of participants, schools, and school district, nor contextual clues, such as course content, grade levels, type of school, physical descriptors, or other elements that may serve to unintentionally reveal the identities and connection of a teacher or students to a particular school in this district.

Research Question I: Classroom Management of Cooperative Learning

To answer the Research Question I, "Does classroom management of cooperative learning affect student on-/off-task engagement in five high school mathematics classrooms?", observations of classrooms were conducted and field notes, in the form of both the teacher's and my written reflections, were collected to provide information regarding teachers' perceptions of the contextual and instructional influences on students' off-task behavior during cooperative learning.

Observations

In this case study, four teachers taught three high school mathematics lessons and one teacher taught one high school mathematics lesson, each lesson involving cooperative learning. Ten four-minute fixed-category observations were conducted by a trained, third-party observer in order to collect quantitative data in an attempt to provide information that would answer Research Question I. The observation protocol used by the third-party observer was adapted from *Consistency Management & Cooperative Discipline*®, an existing research project that has been previously utilized and tested in hundreds of classrooms (Stallings & Freiberg, 1991; Freiberg, 2001, pp. 1 – 4) (see Appendix A). While the third-party observer collected data, I was present for, but did not participate in, the data collection and class activities. In addition, neither the third-party observer nor I interacted with the students or teachers during any lesson.

Each observation provided quantitative information on the type and frequency of student off-task behavior and the instructional activity during which it occurred (see Table 14). First, next to each student's position on a seating chart, which was provided to the third-party observer by the teacher, the observer noted the observation round, a code for the off-task behavior observed (if any), and a code for the corresponding instructional activity during which the off-task behavior occurred. Second, I completed a table that listed each student by number, codes showing observed off-task behavior, if any, during each observation round, and codes showing the corresponding instructional activity for that round (see Appendix A). In addition, I completed another table to display the number and type of each off-task behavior during each observation round, and the number and type of off-task behavior occurring during each instructional activity (see Appendix A). Finally, five additional questions were answered regarding the observation data (see Appendix A):

1. During which intervals in the lesson did the greatest number of off-task behaviors occur?
2. Identify the top two off-task behaviors.

3. For each interval identified in #1, record the top two off-task behaviors, the number of times they occurred, and the corresponding learning activity.
4. Name the students who were off task the most during the lesson.
5. Record anything else that could impact instruction or student performance.

Debriefing/Coaching Sessions

After observations had been conducted, surveys administered, and students interviewed, I met with each teacher on the same day to debrief the lesson. The time and place for each debriefing/coaching session were determined by the teacher. Nine of the 13 sessions took place in the teacher's classroom during his/her planning time. One session took place in the hallway outside the teacher's classroom during the class period immediately following the observation (the teacher was giving a test and had a monitor come to proctor the test while the session took place). Three sessions took place in the teacher's classroom after school. Sessions ranged in length from 20 to 55 minutes, and averaged 33 minutes. The sessions that took place during the teachers' conference period ranged in length from 20 to 45 minutes, and varied in length depending on what else the teacher needed to accomplish that period in addition to meeting with me. The sessions that took place after school varied in length from 25 to 55 minutes and were limited only by the length of time that the teacher was willing to stay after school to discuss the lesson with me. (Table 15 in Appendix J describes the time and location for each debriefing/coaching session.)

Table 14

Operational Definitions of Observed Student Off-task Behaviors and Instructional Activities

Student Behavior	**Operational Definition**
Distracted	The student has a task to complete and is disengaged from the learning activity, but is not disrupting other students.
Dozing	The student rests his/her head on the desk and/or falls asleep during class.
Interrupting	The student interrupts the teacher and causes a cessation in the flow of the lesson or instructional activity.
Taking Care of Needs	The student takes care of personal needs such as getting up to sharpen a pencil or throw away trash, applying makeup, eating or drinking, etc.
Talking	The student is talking about something else besides the content of the assigned task.
Texting	The student sends text messages via his/her cell phone.
Waiting	The student is not engaged in any activity because s/he is waiting to receive a task to complete.
Instructional Activity	**Operational Definition**
Cooperative Learning	Active student interaction in heterogeneous groups where students work together to achieve a common goal and are held individually accountable for achieving that goal.
Game	An activity with rules where a winner is determined.
Independent Work	An activity where students are expected to work, alone and without talking, on an assignment.
Instruction	Direct teaching by the teacher where students are expected to attend only to the teacher and to not speak unless given permission or requested to do so.
Oral Reading	Either the student or teacher is reading aloud to the class.
Organizing	The teacher conducts administrative tasks such as preparing instructional materials, passing out papers, taking attendance, etc.
Question/ Answer/ Discussion	A discussion, led by the teacher, which was initiated by a question posed by either the student or teacher.
Transition	The period of time in a lesson where the teacher shifts from one activity to another.

The reflection tool used to facilitate the debriefing/coaching sessions was adapted from the *Consistency Management & Cooperative Discipline*® research project (Stallings & Freiberg, 1991; Freiberg, 2001, p. 5 - 6) (see Appendix D), and is grounded in the ideas of Carl Rogers' Client-Centered Therapy model, which supports the transformation of a classroom from a teacher-centered to a person-centered environment. It facilitates teachers to consider their instruction from the student's perspective, and emphasizes how person-centered classroom management promotes a social-emotional emphasis, school connectedness, positive classroom and school climate, and student self-discipline (Freiberg & Lamb, 2009). Each post-observation debriefing session began with the teacher silently reflecting on the lesson, responding in writing to the prompt on the reflection tool, "…identify specific changes that you will make to maximize student learning and improve your instructional practice in the class… (with respect to) Physical Classroom Environment, Instructional Strategies/Procedures, Time/Organizational Management, and Discipline Management." As the teacher completed the reflective writing, I reflected on the lesson as well by writing questions and strategies for the teacher to consider about each of the categories above. The questions I posed and strategies I suggested were based on both research and my personal experiences as a teacher, instructional coach, professional developer, and a school district curriculum manager.

Once the teacher and I finished our reflective writing, I debriefed the observation data with the teacher. According to Freiberg and Driscoll (2005, p. 127), "'Advancework' in education is about preventing problems before they begin through effective information gathering, rather than solving problems once they have occurred because of a lack of understanding of the learner, content, and context." The intended outcome of these post-observation debriefing/coaching sessions was to assist the teacher during this information gathering process to analyze observation data and to employ strategies for planning instruction in order to minimize off-task behavior.

Together, the teacher and I read over and discussed the observation data. Afterwards, the written reflections were discussed one category at a time: the teacher read aloud his/her reflections, and I posed questions for further discussion and offered strategies the teacher could consider for modifying future instruction. As a result, the teacher committed to implementing a change in his/her instruction for the next observed lesson. Each teacher and I closed every session by sharing our electronic files of the written reflections.

Summary of Teacher A Observation Data and Debriefing/Coaching Sessions

Context for cooperative learning. Observation 1 began seven minutes into the class period due to the fact that no students had yet arrived to class when the bell rang, and it took seven minutes before all students arrived and the teacher could begin class. The observation ended at eight minutes into a cooperative card “matching” activity, which began late due to the teacher using the warm-up time to prepare the card activity. This cooperative activity engaged 24 students in the learning of new content while using a cooperative learning structure with which students were familiar. Observation 2 began with instructions for the cooperative learning activity. Over the next 36 minutes, the students cooperatively worked in their groups on a task involving the use of manipulatives. It quickly became evident that some students were unfamiliar with these particular manipulatives (the teacher assumed that students had prior knowledge of the use of these manipulatives). However, the students helped each other and by observation round 7, the class had settled down to completing the assigned tasks. This lesson engaged 22 students in the learning of new content while using a cooperative learning structure with which students were unfamiliar. In Observation 3, the teacher gave the students a real-world problem to cooperatively investigate in their groups. Each student had a role and the group had a clear task to accomplish. Throughout the lesson, the teacher alternated between cooperative groups (eight minutes) and direct instruction (eight minutes), during which the teacher discussed the students' progress up to that point. This pattern repeated until the end of the observation. Like Observation 2, this lesson engaged 26 students in the learning of new content while using a cooperative learning structure with which students were unfamiliar. (Additional information regarding the classroom context for each observation can be found in Appendix K.)

Observation results. Overall, there were 65 off-task behaviors during cooperative learning compared to 53 during other instructional activities (see Table 16). Talking (57) was the most observed off-task behavior over all three observations, and 61% of observed off-task talking occurred during cooperative learning. Texting (32) was the second most observed off-task behavior over all three observations, and 44% of observed texting occurred during cooperative learning. Across all three observations, six of the 33 (21%) students (A2, A4, A5, A6, A21, and A27) listed on this teacher's roster over the three observations were observed as eliciting 45% of all off-task behaviors.

Table 16

Teacher A: Type and Number of Off-task Behaviors

Type and # Off-task Behaviors that Occurred During Cooperative Learning					Type and # of Off-task Behaviors that Occurred During Other Instructional Activities[a]				
Off-task Behavior	Obs. 1	Obs. 2	Obs. 3	Total	Off-task Behavior	Obs. 1	Obs. 2	Obs. 3	Total
Talking	2	14	19	35	Talking	15	1	6	22
Distracted	0	8	0	9	Distracted	0	0	0	0
Texting	0	7	7	14	Texting	7	1	10	18
Waiting	0	2	1	3	Waiting	7	0	2	9
Taking care of needs	0	2	1	3	Taking care of needs	3	0	1	4
Dozing	0	2	0	2	Dozing	0	0	0	0
Interrupting	0	0	0	0	Interrupting	0	0	0	0
Total # Off-Task Behaviors	2	35	28	65	Total	32	2	19	53
Total # Students	24	22	26	33[b]	Total # Students	24	22	26	33[b]

[a] Games, Instruction, Independent Work, Organizing, Question/Answer/Discussion, Reading, or Transition

[b] This number represents the unduplicated count of students present during any or all of the observed lessons.

For Teacher A, there was an average of 3.2 off-task behaviors during cooperative learning per four-minute observation round, with rounds 3 – 7 (minutes 12 – 28) having higher occurrences of off-task behavior than the mean (see Figure 7). For this teacher, observation rounds 3 and 8 (minutes 12 and 32) generally signaled transition time to or from cooperative learning activities, with students' lack of focus mid-way through the cooperative learning activity resulting in an increase in off-task behavior during rounds 5 – 7 (minutes 20 – 28).

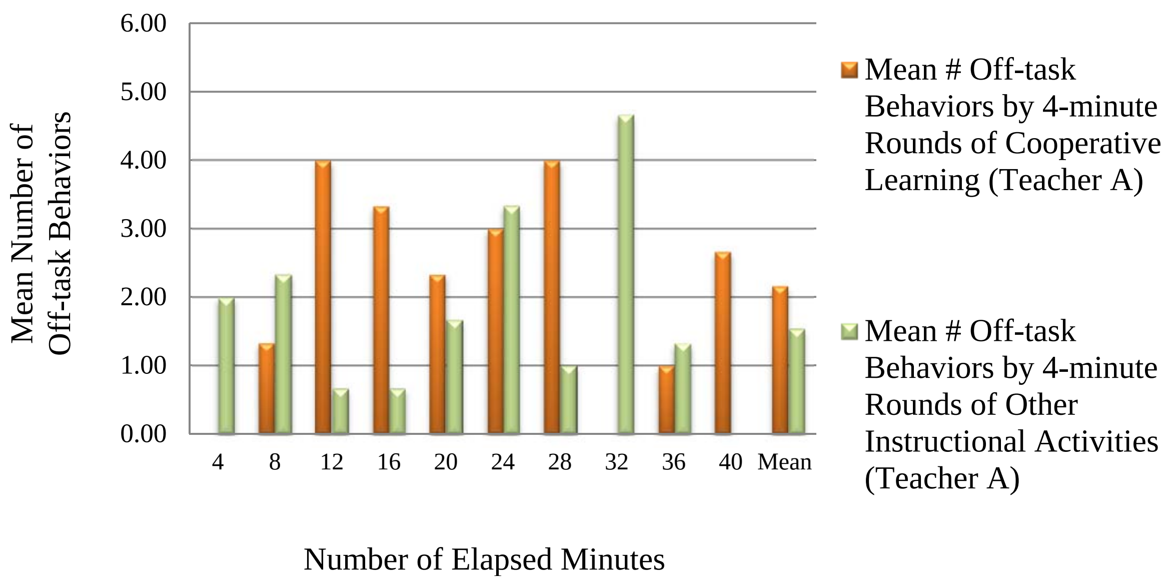


Figure 7. Teacher A: Mean number of off-task behaviors during cooperative learning across all three observations by four-minute rounds.

For this teacher, the number of off-task behaviors during cooperative learning increased from Observation 1 (two) to Observation 2 (35), and then decreased from Observation 2 to Observation 3 (28). Likewise, the number of off-task behaviors during cooperative learning per group of four students also increased from Observation 1 (0.33) to

Observation 2 (6.36), and then decreased from Observation 2 to Observation 3 (4.31) (see Table 17). (Additional data analysis for Teacher A is presented in Appendix K.)

Table 17

Teacher A: Analysis of Off-task Behaviors During Cooperative Learning

Observation	# Off-task Behaviors Observed During Cooperative Learning	# Students	# Groups of Four Students	# Off-task Behaviors Per Group of Four Students
Obs. 1	2	24	6.0	0.33
Obs. 2	35	22	5.5	6.36
Obs. 3	28	26	6.5	4.31
Total Obs. 1 - 3	65	72	18	3.61

Results from the debriefing/coaching sessions. One change that this teacher made over the three observations was that of starting class on time in Observations 2 and 3. In the written reflections after Observation 1, the teacher wrote, "I should provide students with a warm-up and have it available to them when they first walk in the door." By Observation 3, most students were present and on task when the bell rang, compared to Observation 1 where no students were present when the bell rang. By starting class on time with a meaningful and timed warm-up assignment, students could see the value in arriving on time. This ultimately resulted in students taking their class time seriously and utilizing the cooperative groups to teach each other so that the task was completed and students had each learned the lesson content. Another change was that the teacher included the study of real-world situations in Observation 3. In the written reflection after Observation 2, the teacher wrote, "I would like to use more real-world problems to bring a connection to what the students are learning." While more off task during the investigation of the real-world problem, the students were engaged in effective discussion and assisted each other in understanding the investigation so that the task was successfully completed.

A third change that the teacher made from Observation 2 to Observation 3 was that of breaking the cooperative learning activity into smaller chunks of time, interspersed with direct instruction. However, the teacher's misdiagnosis of student misunderstanding of the real-world problem caused students to show their frustration via off-task behavior. It seemed that the students had learned how to learn when working in groups on a cooperative task to the point that they were learning more, even though more off task, during cooperative groups than during direct instruction, where for the most part they were less disruptive but not as engaged in the learning. It is possible that the teacher tried to make too many changes in Observation 3—that is, incorporating the investigation of a real-world problem into the cooperative group task in addition to breaking the activity into smaller chunks of time, with direct instruction in between. (Additional analysis of the debriefing/coaching sessions is provided in Appendix K.)

Results related to research question I. For Teacher A, the number of off-task behaviors during cooperative learning increased from Observation 1 to Observation 2, and then decreased from Observation 2 to Observation 3, as did the number of off-task behaviors per student during cooperative learning. It should be noted that the teacher tried new cooperative learning structures, while also teaching new content, in both Observations 2 and 3, which showed an increase in off-task behaviors when compared with Observation 1. Finally, observation rounds 3 – 7 (minutes 12 – 28) had higher occurrences of off-task behavior than the mean.

Summary of Teacher B Observation Data and Debriefing/Coaching Sessions

Context for cooperative learning. In Observation 1, students worked independently on the warm-up for eight minutes and then spent the next 12 minutes in groups explaining the warm-up to each other and going over the answers. Over the next four minutes, the teacher gave directions for a cooperative activity and then the students excitedly transitioned into the activity. For the next 20 minutes, students worked cooperatively to prepare each other for a quiz to be given later in the period. This lesson engaged 13 students in reviewing previously learned content while using a cooperative learning structure with which students were familiar. The teacher directed students to make sure that, at the end of the cooperative review session, everyone in the group could present any problem to the class. At the end of the 20 minutes, students kept working while the teacher randomly called one student from each group to present a problem at the board. Students stopped working briefly to observe the presenting student's board work, and then redirected themselves back to preparing for the quiz.

Once the daily announcements had finished, Observation 2 began as the teacher gave instructions for the cooperative learning activity. This lesson engaged 15 students in the learning of new content while using a cooperative learning structure with which students were unfamiliar. Over the next 36 minutes, the students cooperatively worked in their groups on a task involving analyzing data and creating a poster to present their results. In Observation 3, the teacher began the class with instructions for the cooperative learning activity. This lesson engaged 15 students in the learning of new content while using a cooperative learning structure with which students were unfamiliar. Over the next 36 minutes, the students cooperatively worked in their groups on a task involving the analysis of data. The students were assigned the following roles: “communicator,” “calculator,” and “recorder.” The “communicator” was the group representative, who would walk around to other groups asking for help, if needed, or who would help other “communicators” who came to the group asking for help; the “calculator” performed the calculations as the task required; the “recorder” recorded answers as the “calculator” announced them for the group report. The mathematics of the activity were challenging and it appeared that the students who were capable of completing the activity did so, while the students who were challenged beyond their level of comfort gave up and let the others take over. The students fulfilled their roles, but did not appear to work cooperatively to complete the task—only to fulfill their roles. In each group, the “calculator” took tacit responsibility for completing the task while the “recorder” waited for the “calculator” to provide the information for the group report and the “communicator” bowed out, since his/her role was no longer necessary towards the end of the activity.

Observation results. Overall, there were 75 off-task behaviors during cooperative learning compared to eight during other instructional activities (see Table 18). During cooperative learning, talking was the most observed off-task behavior over and 89% of observed talking occurred during cooperative learning. Distracted behavior was the second most observed off-task behavior over all three observations, and 95% of observed distracted behavior occurred during cooperative learning**.** Across all three observations, six of the 16 (37.5%) students (students B2, B5, B9, B10, B11, and B12) listed on this teacher’s roster over the three observations were observed as eliciting 67% of all off-task behaviors.

Table 18

Teacher B: Type and Number of Off-task Behaviors

Type and # Off-task Behaviors that Occurred During Cooperative Learning					Type and # of Off-task Behaviors that Occurred During Other Instructional Activities[a]				
Off-task Behavior	Obs. 1	Obs. 2	Obs. 3	Total	Off-task Behavior	Obs. 1	Obs. 2	Obs. 3	Total
Talking	13	28	8	49	Talking	3	1	2	6
Distracted	0	2	17	19	Distracted	0	0	1	1
Texting	0	0	0	0	Texting	0	0	0	0
Waiting	0	4	0	4	Waiting	0	0	0	0
Taking care of needs	0	0	1	1	Taking care of needs	0	0	1	1
Dozing	0	0	2	2	Dozing	0	0	0	0
Interrupting	0	0	0	0	Interrupting	0	0	0	0
Total # Off-Task Behaviors	13	34	28	75	Total # Off-Task Behaviors	13	34	28	75
Total # Students	13	15	15	16[b]	Total # Students	13	15	15	16[b]

[a] Games, Instruction, Independent Work, Organizing, Question/Answer/Discussion, Reading, or Transition

[b] This number represents the unduplicated count of students present during any or all of the observed lessons.

For Teacher B, there was an average of 2.5 off-task behaviors during cooperative learning per four-minute observation round, with rounds 3, 5, 8, 9, and 10 (minutes 12, 20, and 28 – 40) having higher occurrences of off-task behavior than the mean (see Figure 8). For this teacher, observation rounds 3 and 9 (minutes 12 and 36) generally signaled transition time to or from cooperative learning activities, with students' lack of focus mid-way through the long cooperative learning activity resulting in an increase in off-task behavior during rounds 6 and 7 (minutes 24 – 28).

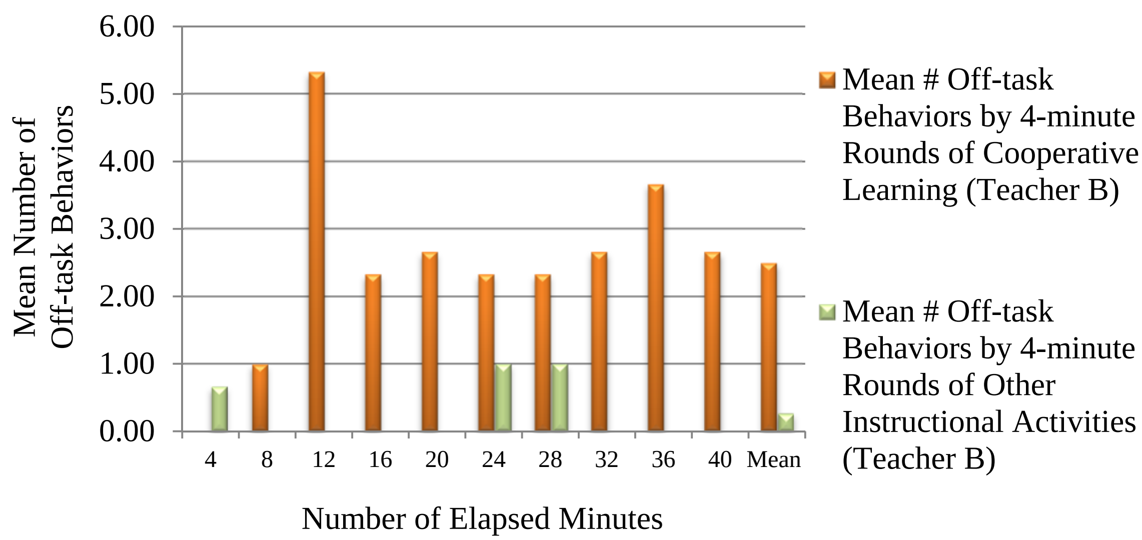


Figure 8. Teacher B: Mean number of off-task behaviors during cooperative learning across all three observations by four-minute rounds.

For this teacher, the number of off-task behaviors during cooperative learning increased from Observation 1 (13) to Observation 2 (34), and then decreased from Observation 2 to Observation 3 (28). Likewise, the number of off-task behaviors during cooperative learning per group of four students also increased from Observation 1 (4.00) to

Observation 2 (9.07), and then decreased from Observation 2 to Observation 3 (7.47) (see Table 19). (Additional data analysis for Teacher B is presented in Appendix L.)

Table 19

Teacher B: Analysis of Off-task Behaviors During Cooperative Learning

Observation	# Off-task Behaviors Observed During Cooperative Learning	# Students	# Groups of Four Students	# Off-task Behaviors Per Group of Four Students
Obs. 1	13	13	3.25	4.00
Obs. 2	34	15	3.75	9.07
Obs. 3	28	15	3.75	7.47
Total Obs. 1 - 3	75	43	10.75	6.98

Results from the debriefing/coaching sessions. Teacher B seemed to have a balance point between the expectations for student performance and the amount of off-task behavior allowed. In other words, the teacher tolerated talking and distracted behavior as long as "the work gets done"; yet the teacher admitted to being two months behind in the curriculum. In Observation 3, the teacher began to show awareness of the connection between off-task behavior and the toll it was taking on instruction when s/he reflected the need to "(m)ap out short time increments on my lesson plans," in addition to giving students roles, to help keep them focused.

This teacher tried a new cooperative learning structure in both Observation 2 and Observation 3. For Observation 2, the new structure was group poster presentations of the results of the cooperative investigation and for Observation 3, the new structure involved giving students roles and breaking up the lesson into smaller chunks of time. During round 7 of Observation 3, the teacher briefly stopped the students' work to remind them of the task and to give them a 15-minute deadline, thus breaking up the learning activity into smaller chunks. After the observation rounds were completed, the teacher repeated this again, and wrote in the reflective writing, “Having periodic stopping points to pull people together is definitely an improvement.” The number of off-task behaviors was greater in Observations 2 and 3 than in Observation 1 when the teacher utilized a cooperative learning structure with which students were familiar to review previously learned material, and the use of time management in Observation 3 helped lead to a decrease in off-task behaviors during cooperative learning from Observation 2. (Additional analysis of the debriefing/coaching sessions is provided in Appendix L.)

Results related to research question I. For Teacher B, the number of off-task behaviors during cooperative learning increased from Observation 1 to Observation 2, and then decreased from Observation 2 to Observation 3, as did the number of off-task behaviors per group of four students during cooperative learning. It should be noted that the teacher tried new cooperative learning structures, while also teaching new content, in both Observations 2 and 3, which showed an increase in off-task behaviors when compared with Observation 1. Finally, rounds 3, 5, 8, 9, and 10 (minutes 12, 20, and 28 – 40) had higher occurrences of off-task behavior than the mean.

Summary of Teacher C Observation Data and Debriefing/Coaching Sessions

Context for cooperative learning. In Observation 1, the teacher began with eight minutes of instruction regarding the investigation. Over the next four minutes, students had time to read and discuss the directions for the activity with their partner. For the next eight minutes, the teacher led the class in a question/answer discussion about the directions they read and then gave the students additional instruction. For the remainder of the activity, the teacher cycled between four-minute question/answer discussion periods and eight-minute cooperative learning periods. This lesson engaged 11 students in learning new content while using a cooperative learning structure with which students were familiar. The cooperative investigation was related to the students' interests and involved real-world situations, and they appeared to be fully engaged in the activity. Their goal was to conduct an investigation relating to real-world data and present their findings to the class at the end of the period.

As the bell rang to start class in Observation 2, most of the students had arrived at the "GO" center. The "GO" center was a small room, and students were crowded. In spite of the cramped quarters, over the next 40 minutes, the students cooperatively worked in pairs on a task involving the analysis of data. Each pair of students shared one computer. This lesson engaged 12 students in the review of previously learned content while using a cooperative learning structure with which students were unfamiliar. Their goal was to complete an investigation utilizing real-world data found on the Internet. The choices of data that students made during each part of the investigation guaranteed that each pair would have a unique product to present at the end of class. Each student in the pair had a role to perform: one was the computer user and the other was the recorder, and students kept these roles throughout the class period.

As the bell rang to start class for Observation 3, all students were present and began their warm-up. This lesson engaged 12 students in the review of previously learned content while using a cooperative learning structure with which students were unfamiliar. Each group of four received a scenario and a graph on a poster. Students were given 30 minutes to analyze the scenario and graph, write their analysis on chart paper, and post it for a Gallery Walk. By 10 minutes into the class period, the teacher, third-party observer, and I had met to discuss the lesson context, and the 40-minute observation began with 10 rounds occurring at four-minute intervals. Four minutes into the activity, the teacher stopped the class for a quick question/answer/discussion session to clarify the goals for the lesson and details for the assignment. Over the next 20 minutes, the students, working in their assigned roles, cooperatively completed the task.

When time was called, students were given a few minutes to post their chart paper, and the teacher gave the directions for the Gallery Walk: as they walked around and viewed each other's posters, students wrote questions and feedback on post-it notes and attached them to the posters. Later in the period, students would revise their posters according the questions and feedback received from their peers. The lesson ended by each group presenting its poster to the class. The 40-minute observation ended eight minutes into the Gallery Walk.

Observation results. Overall, there were 16 off-task behaviors during cooperative learning compared to four during other instructional activities (see Table 20). During cooperative learning, talking (five) was the most observed off-task behavior over all three observations, and 55% of observed talking occurred during cooperative learning. Distracted behavior (four) and taking care of needs (four) were the second most observed off-task behaviors over all three observations during cooperative learning, and 100% of these occurred during cooperative learning**.** Across all three observations, two of the 15 (13.3%) students (students C11 and C14) listed on this teacher's roster over the three observations were observed as eliciting 50% of all off-task behaviors.

Table 20

Teacher C: Type and Number of Off-task Behaviors

Type and # Off-task Behaviors that Occurred During Cooperative Learning					Type and # of Off-task Behaviors that Occurred During Other Instructional Activities[a]				
Off-task Behavior	Obs. 1	Obs. 2	Obs. 3	Total	Off-task Behavior	Obs. 1	Obs. 2	Obs. 3	Total
Talking	0	4	1	5	Talking	3	0	1	4
Distracted	0	0	4	4	Distracted	0	0	0	0
Texting	0	0	0	0	Texting	0	0	0	0
Waiting	0	1	2	3	Waiting	0	0	0	0
Taking care of needs	0	3	1	4	Taking care of needs	0	0	0	0
Dozing	0	0	0	0	Dozing	0	0	0	0
Interrupting	0	0	0	0	Interrupting	0	0	0	0
Total # Off-Task Behaviors	0	8	8	16	Total # Off-Task Behaviors	3	0	1	4
Total # Students	11	12	12	15[b]	Total # Students	11	12	12	15[b]

[a] Games, Instruction, Independent Work, Organizing, Question/Answer/Discussion, Reading, or Transition

[b] This number represents the unduplicated count of students present during any or all of the observed lessons.

For Teacher C, there was an average of less than one (0.53) off-task behaviors per observation round, with rounds 4 – 7 and 9 (minutes 12 – 28 and 36) having higher occurrences of off-task behavior than the mean (see Figure 9). For this teacher, observation rounds 3 and 9 (minutes 12 and 36) generally signaled transition time to or from cooperative learning activities, with some students' lack of focus mid-way through the long cooperative learning activities resulting in a peak in off-task behavior during round 6 (minute 24).

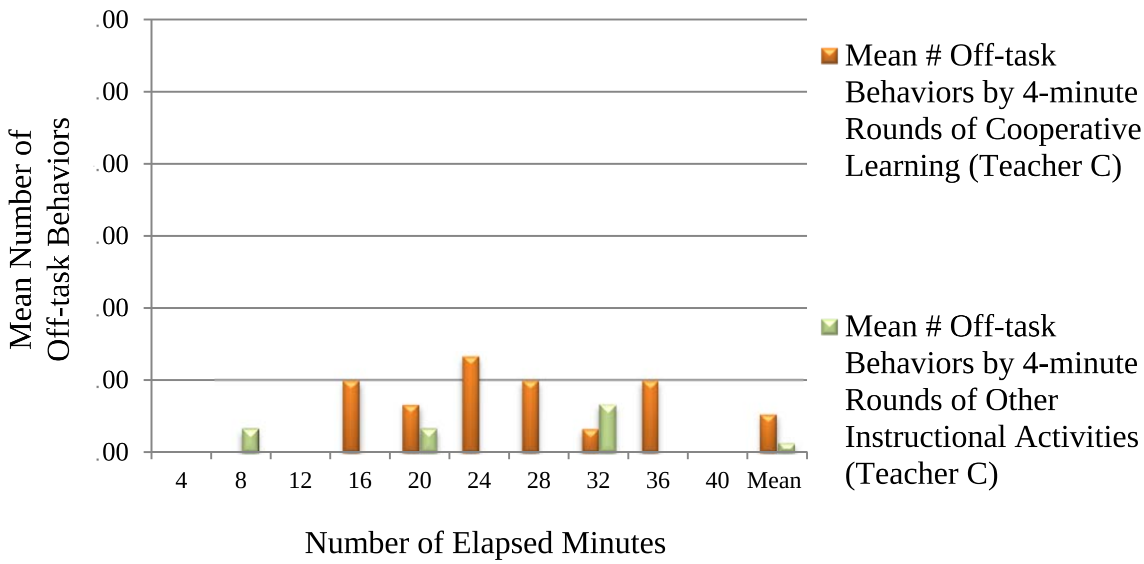


Figure 9. Teacher C: Mean number of off-task behaviors during cooperative learning across all three observations by four-minute rounds.

For this teacher, the number of off-task behaviors during cooperative learning increased from Observation 1 (zero) to Observation 2 (eight), and then remained the same from Observation 2 to Observation 3 (eight). Likewise, the number of off-task behaviors during cooperative learning per group of four students also increased from Observation 1 (0.00) to Observation 2 (2.67), and then remained the same from Observation 2 to Observation 3 (2.67) (see Table 21). (Additional data analysis for Teacher C is presented in Appendix M.)

Table 21

Teacher C: Analysis of Off-task Behaviors During Cooperative Learning

Observation	# Off-task Behaviors Observed During Cooperative Learning	# Students	# Groups of Four Students	# Off-task Behaviors Per Group of Four Students
Obs. 1	0	11	2.75	0.00
Obs. 2	8	12	3	2.67
Obs. 3	8	12	3	2.67
Total Obs. 1 - 3	16	35	8.75	1.82

Results from the debriefing/coaching sessions. In Observation 1, no off-task behaviors were observed during cooperative learning. In contrast, Observation 2 involved only cooperative learning, and there were eight instances of off-task behavior: talking (four), taking care of needs (three), and waiting (one). The teacher did not redirect their off-task behavior because students soon corrected their own behavior and got back to work. In both Observations 2 and 3, the lesson engaged students in the review of previously learned content while using a cooperative learning structure with which students were unfamiliar.

While there were only eight off-task behaviors observed in Observation 2 during cooperative learning, all of these off-task behaviors occurred during rounds 4 – 9 (minutes 16 – 36). One change that the teacher made from Observation 2 to Observation 3 was to have an activity, the “Gallery Walk,” where students could get up and move around from poster to poster, instead of staying seated for the entire 85-minute period. Although the number of off-task behaviors (eight) during cooperative learning remained the same from Observation 2 to Observation 3, the top off-task behavior changed from talking (four) in Observation 2 to distracted behavior (four) in Observation 3. This distracted behavior was a result of changes in the physical set-up of the classroom (to make room for the Gallery Walk activity) and changes in the materials required for the activity.

The number of off-task behaviors was greater in Observations 2 and 3 than in Observation 1 when the teacher utilized a cooperative learning structure with which students were familiar. Nonetheless, the teacher showed evidence of consistently working with students on developing and maintaining norms for student behavior and academic performance. The students were comfortable with working together and teaching each other through asking questions and giving constructive feedback, and the quality of their final products during each cooperative learning session remained in agreement with the posted norms and expectations. (Additional analysis of the debriefing/coaching sessions is provided in Appendix M.)

Results related to research question I. For Teacher C, the number of off-task behaviors during cooperative learning increased from Observation 1 to Observation 2, and then remained the same from Observation 2 to Observation 3, as did the number of off-task behaviors per group of four students during cooperative learning. In Observation 1, the teacher taught new content using a familiar cooperative learning structure. In contrast, in Observations 2 and 3, the teacher used familiar content to teach new cooperative learning structures, which resulted in slightly higher incidences of off-task behavior (from zero to 2.67 off-task behaviors per group of four students). Finally, rounds 4 – 7 and 9 (minutes 12 – 28 and 36) had higher occurrences of off-task behavior than the mean.

Summary of Teacher D Observation Data and Debriefing/Coaching Sessions

Context for cooperative learning. Observation 1 began eight minutes into the class as the students worked cooperatively on the warm-up activity. This lesson engaged 26 students in the learning of new content while using a cooperative learning structure with which students were unfamiliar. The teacher gave the printed instructions to each group of students as they became ready to begin the activity. The investigation consisted of taking measurements, recording the measurement data, and summarizing the findings to draw conclusions. During the last four minutes of the observation, the teacher engaged the students in a question/answer/discussion period about the group investigation. Student groups reported and compared their findings.

In Observation 2, the students worked independently on the warm-up for six minutes, which was a review of the mathematics that students would encounter in the cooperative group activity that the teacher had planned for the lesson. This lesson engaged 22 students in the previously learned content while using a cooperative learning structure with which students were unfamiliar. After the teacher spent eight minutes debriefing the warm-up, students worked in groups to participate in a relay activity: each student received a card with a four-step problem; students completed the first step, and then passed the card to the right. The second step was completed on the newly received card and then that card was passed to the right. This process was continued until all of the steps had been completed for each card. The teacher and students then debriefed the activity to ensure that all four problems had been answered correctly. Students then received a new set of cards to repeat the activity.

In Observation 3, the students worked independently on the warm-up for the first four minutes. This lesson engaged 16 students in the learning of new content while using a cooperative learning structure with which students were familiar. In this lesson, the teacher used the same cooperative learning structure as in Observation 2, only this time the content was new. The teacher stopped students’ work on the warm-up and over the next 12 minutes, the teacher reviewed the homework from the previous class and gave direct instruction on new content. For the next four minutes, students were given a practice problem and all students successfully completed the practice problem. Over the next eight minutes, the class transitioned to the cooperative learning activity and the teacher gave directions and engaged students in a question/answer/discussion period. (Additional information regarding the classroom context for each observation can be found in Appendix N.)

Observation results. Overall, there were 33 off-task behaviors during cooperative learning compared to eight during other instructional activities (see Table 22). Talking (16) was the most observed off-task behavior, and 75% of observed off-task talking occurred during cooperative learning. Waiting (16) was the second most observed off-task behavior over all three observations, and 100% of observed texting occurred during cooperative learning. Across all three observations, three of the 44 (7%) students (D2, D25, and D 30) listed on this teacher's roster over the three observations were observed as eliciting 27% of all off-task behaviors.

Table 22

Teacher D: Type and Number of Off-task Behaviors

Type and # Off-task Behaviors that Occurred During Cooperative Learning					Type and # of Off-task Behaviors that Occurred During Other Instructional Activities[a]				
Off-task Behavior	Obs. 1	Obs. 2	Obs. 3	Total	Off-task Behavior	Obs. 1	Obs. 2	Obs. 3	Total
Talking	14	2	0	16	Talking	1	0	3	4
Distracted	0	1	0	1	Distracted	2	0	1	3
Texting	0	0	0	0	Texting	0	0	0	0
Waiting	12	0	0	12	Waiting	0	0	0	0
Taking care of needs	3	0	1	4	Taking care of needs	0	0	0	0
Dozing	0	0	0	0	Dozing	0	0	1	1
Interrupting	0	0	0	0	Interrupting	0	0	0	0
Total # Off-Task Behaviors	29	3	1	33	Total # Off-Task Behaviors	3	0	5	8
Total # Students	26	22	16	44[b]	Total # Students	26	22	16	44[b]

[a] Games, Instruction, Independent Work, Organizing, Question/Answer/Discussion, Reading, or Transition

[b] This number represents the unduplicated count of students present during any or all of the observed lessons.

For Teacher D, there was an average of 1.10 off-task behaviors during cooperative learning per four-minute observation round, with rounds 2, 6, 8, and 9 (minutes 8, 24, 32, and 36) having higher occurrences of off-task behavior than the mean (see Figure 10). For this teacher, observation rounds 2 and 9 (minutes 8 and 36) generally signaled transition time to or from cooperative learning activities, with students' lack of focus mid-way through the cooperative learning activity resulting in an increase in off-task behavior during rounds 6 , 8, and 9 (minutes 24, and 32 – 36).

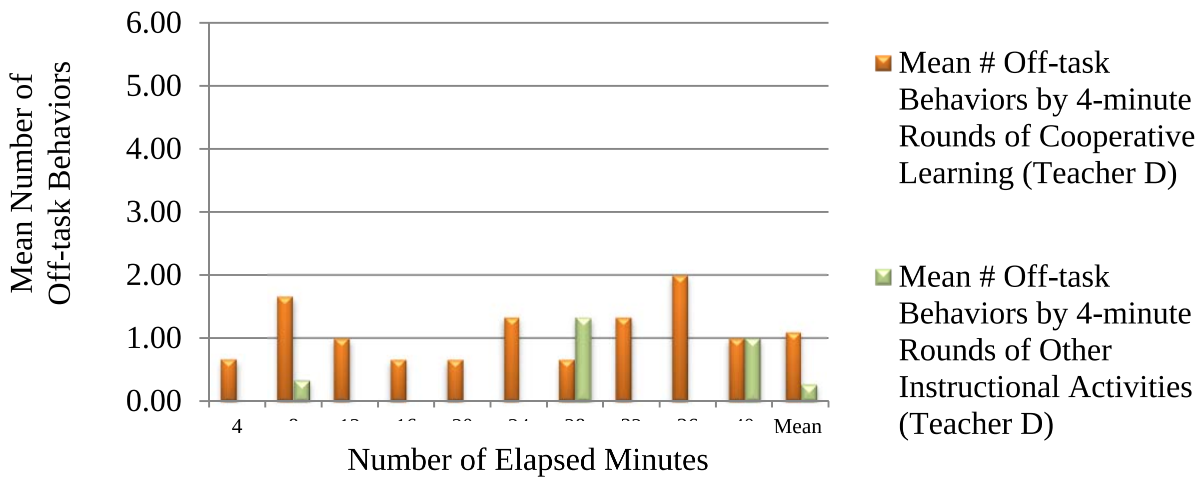


Figure 10. Teacher D: Mean number of off-task behaviors during cooperative learning across all three observations by four-minute rounds.

For this teacher, the number of off-task behaviors during cooperative learning decreased from Observation 1 (29) to Observation 2 (three), and then decreased again from Observation 2 to Observation 3 (one). Likewise, the number of off-task behaviors during cooperative learning per group of four students also decreased from Observation 1 (4.46) to Observation 2 (0.55), and then decreased again from Observation 2 to Observation 3 (0.25) (see Table 23). (Additional data analysis for Teacher D is presented in Appendix N.)

Table 23

Teacher D: Analysis of Off-task Behaviors During Cooperative Learning

Observation	# Off-task Behaviors Observed During Cooperative Learning	# Students	# Groups of Four Students	# Off-task Behaviors Per Group of Four Students
Obs. 1	29	26	6.5	4.46
Obs. 2	3	22	5.5	0.55
Obs. 3	1	16	4.0	0.25
Total Obs. 1 - 3	33	64	16	2.06

Results from the debriefing/coaching sessions. From Observation 1 to Observation 2, the teacher made two changes that reduced the number of off-task behaviors in Observation 2. First, in Observation 2, the teacher taught a new cooperative learning structure using familiar content. Second, the teacher had students turn their desks facing each other, in contrast to Observation 1 when the desks were just in proximity but not facing each other. The teacher wrote in his/her reflections to "Keep the groups facing each other," since students were better able to work together in this configuration, which reduced the instances of waiting from 14 to zero. In Observation 3, the teacher repeated the same cooperative group activity from Observation 2 to teach new content. The teacher wrote, "Teaching the lesson right before the activity seems to work better than using the group activity to review previously learned topics." In addition, when the students entered the room, the desks were facing each other, thus reducing the time spent, and off-task behaviors caused, while moving desks around. (Additional analysis of the debriefing/coaching sessions is provided in Appendix N.)

Results related to research question I. For Teacher D, the number of off-task behaviors during cooperative learning decreased from Observation 1 to Observation 2, and then decreased again from Observation 2 to Observation 3, as did the number of off-task behaviors per group of four students during cooperative learning. It should be noted that the teacher tried a new cooperative learning structure, while also teaching new content, in Observation 1, which resulted in the highest off-task behavior of the three lessons. Finally, rounds 2, 6, 8, and 9 (minutes 8, 24, 32, and 36) had higher occurrences of off-task behavior than the mean.

Summary of Teacher E Observation Data and Debriefing/Coaching Sessions

Context for cooperative learning. When the bell rang to start class, all but five of the students had arrived and the teacher directed them to begin the warm-up, which was written on the front board. Due to a unique scheduling system at this campus, five additional students arrived about 20 minutes into class. This lesson engaged 26 students in learning. As soon as the groups had completed their warm-up, they began the investigation. Students' learning throughout the investigation was facilitated by the use of manipulatives, with which students were familiar, and culminated by displaying their results on chart paper. (Additional information regarding the classroom context for each observation can be found in Appendix O.)

Observation results. In this observation, there were 11 off-task behaviors during cooperative learning (see Table 24). (This teacher withdrew from the study before Observations 2 and 3 could be conducted.) Talking (six) was the most observed off-task behavior, followed by distracted behavior (two), taking care of needs (two), and interrupting (one). During this observation, two of the 26 (8%) students (E5 and E13) elicited 45% of all off-task behaviors.

Table 24

Teacher E: Type and Number of Off-task Behaviors

Type and # Off-task Behaviors that Occurred During Cooperative Learning					Type and # of Off-task Behaviors that Occurred During Other Instructional Activities[a]				
Off-task Behavior	Obs. 1	Obs. 2[b]	Obs. 3[b]	Total	Off-task Behavior	Obs. 1	Obs. 2[b]	Obs. 3[b]	Total
Talking	6	--	--	6	Talking	0	--	--	0
Distracted	2	--	--	2	Distracted	0	--	--	0
Interrupting	1	--	--	1	Texting	0	--	--	0
Waiting	0	--	--	0	Waiting	0	--	--	0
Taking care of needs	2	--	--	2	Taking care of needs	0	--	--	0
Dozing	0	--	--	0	Dozing	0	--	--	0
Interrupting	1	--	--	--	Interrupting	0	--	--	0
Total # Off-Task Behaviors	11	--	--	11	Total # Off-Task Behaviors	0	--	--	0
Total # Students	26	--	--	26	Total # Students	26	--	--	--

[a] Games, Instruction, Independent Work, Organizing, Question/Answer/Discussion, Reading, or Transition

[b] This teacher withdrew from the study after Observation 1

For Teacher E, there was an average of 1.10 off-task behaviors during cooperative learning per four-minute observation round, with rounds 2, 5, and 6 (minutes 8, 20, and 24) having higher occurrences of off-task behavior than the mean (see Figure 11). For this teacher, observation round 2 (8 minutes) signaled transition time to cooperative learning activities, with students' lack of focus mid-way through the cooperative learning activity resulting in an increase in off-task behavior during rounds 5 and 6 (minutes 20 and 24).

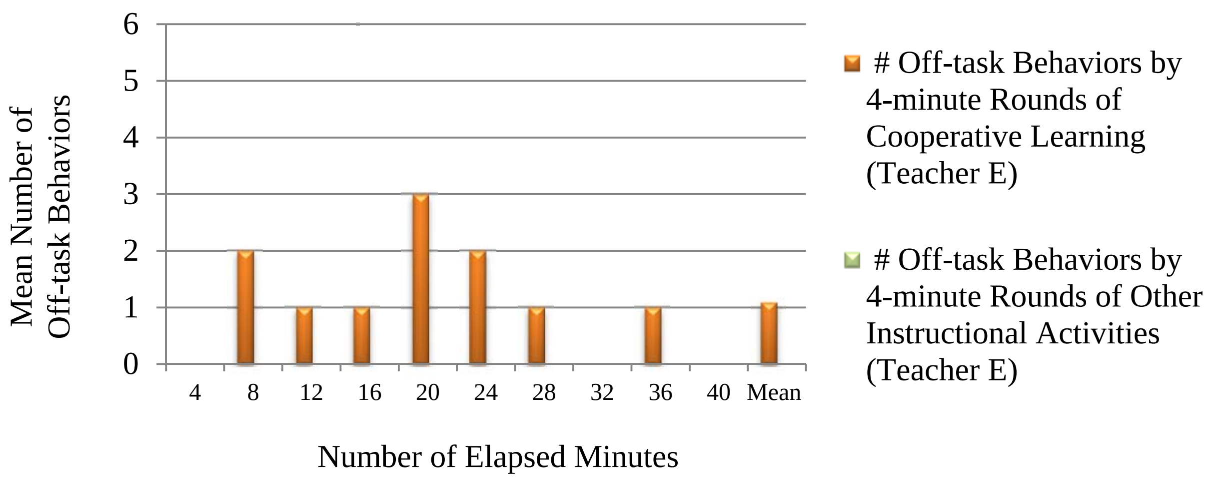


Figure 11. Teacher E: Number of off-task behaviors during cooperative learning by four-minute rounds.

Results related to research question I. Since Teacher E participated in only one observation, then this teacher will be compared to the others for Observation 1 only. For Teacher E, 11 off-task behaviors were observed during cooperative learning, and all 40 minutes of the observation were devoted to cooperative learning. In comparison, the mean number of off-task behaviors across Teachers A – D was also 11; therefore, Teacher E's observation data had no effect on the average number of off-task behaviors for Observation 1 across all teachers.

The number of off-task behaviors during cooperative learning per group of four students for Teacher E was 1.69 (11 off-task behaviors per 6.5 groups of four students). In comparison, the average number of off-task behaviors during cooperative learning per group of four students for Teachers A – D was 2.20. The average of all five together was 2.10; thus, Teacher E's observation data did not have a significant effect on the overall average of the data from Observation 1.

Summary of Observation and Debriefing/Coaching Data for Teachers A, B, C, D, and E

Summarization of data analysis across all observations. After completing the analysis of the data collected from the 13 observations, the following questions were considered in exploring trends across all teachers.

Was there a change in the number of off-task behaviors from Observation 1 to 3, Observation 1 to 2, or Observation 2 to 3? On average, the number of off-task behaviors during cooperative learning increased from Observation 1 to Observation 2 (from 11 to 20), and then decreased from Observation 2 to Observation 3 (from 20 to 16) (see Figure 12). Since each teacher taught a different number of students from one observation to the next, the mean number of off-task behaviors per every group of four students during cooperative learning was analyzed: there was an increase from Observation 1 to 2 (from 2.10 to 4.66) and a decrease from Observation 2 to 3 (from 4.66 to 3.67) (see Figure 13).

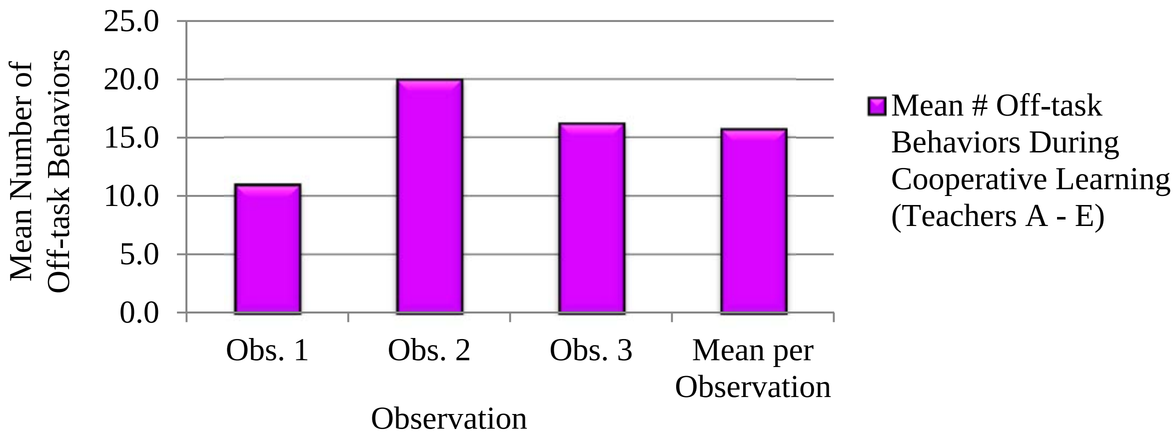


Figure 12. Teachers A – E: Mean number of off-task behaviors during cooperative learning.

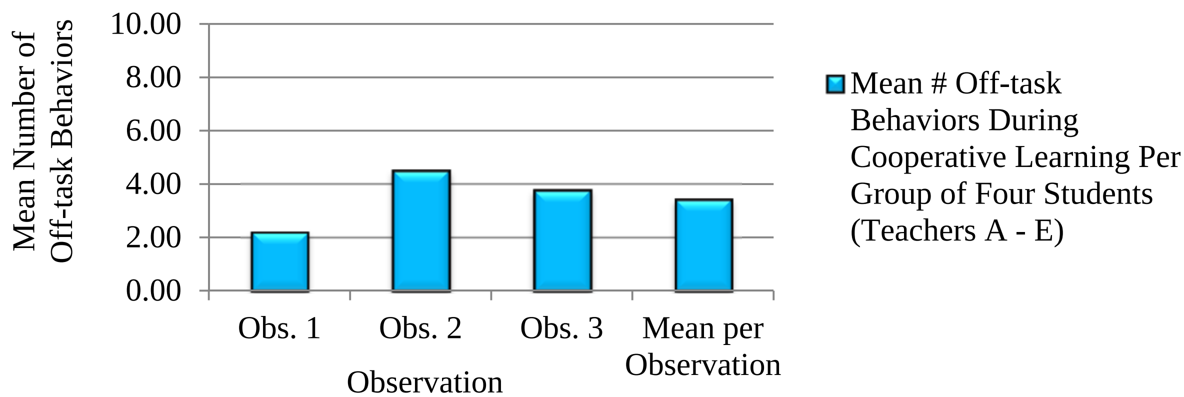


Figure 13. Teachers A – E: Mean number of off-task behaviors during cooperative learning per group of four students.

What effect did teaching new content with a new cooperative learning structure have on the number of off-task behaviors during cooperative learning? The use of cooperative learning will have a greater chance of success if a teacher allows students to learn the cooperative skills with content that is already familiar to them. "When the students have grown comfortable with the dynamics and expectations of cooperative learning, they will be ready to work with content of any kind" (Shindler, 2010). Therefore, off-task behavior was analyzed by examining the combination of content and cooperative learning structure and whether each was new or familiar to students (see Figure 14).

In five of the 13 lessons observed, the teachers used a new cooperative learning structure to teach new content, which resulted in a mean off-task behavior rate of 6.33 off-task behaviors during cooperative learning per group of four students. In contrast, in eight of the 13 lessons observed, the teachers taught new content using a familiar cooperative learning structure, familiar content using a new cooperative learning structure, or familiar content using a familiar cooperative learning structure, which resulted in a mean off-task behavior rate of 1.56 off-task behaviors per group of four students during cooperative learning.

Lesson Description				Mean # Off-task Behaviors per Group of Four Students	# Lessons Observed
New Content?		New Cooperative Learning Structure?			
Yes	No	Yes	No		
✓		✓		6.33	5
✓			✓		
	✓	✓			
	✓		✓	1.56	8
Mean Across All 13 Observations				3.39	13 (Total)

Figure 14. *Lesson Description vs. Mean # Off-task Behaviors per Group of Four Students During Cooperative Learning.*

Was there a trend across all teachers regarding the number of off-task behaviors during each observation round? To answer this question, the average number of off-task behaviors for each four-minute observation round during cooperative learning and during other instructional activities was analyzed (see Figure 15). The number of off-task behaviors during cooperative learning was generally above the mean during observational rounds 3 through 9, peaking at round 3 (12 minutes), rounds 6/7 (24 – 28 minutes) and at round 9 (36 minutes). In contrast, the number of off-task behaviors during other instructional activities peaked at round 6 (24 minutes) and again at round 8 (32 minutes). The number of off-task behaviors during both cooperative learning and other instructional activities were above the mean in rounds 6 and 7 (24 – 28 minutes). While there were more off-task behaviors during cooperative learning than other instructional activities, the number of off-task behaviors during cooperative learning tended to decrease from round 3 (12 minutes) to round 9 (36 minutes) and the number during other instructional activities tended to increase over the same period of time.

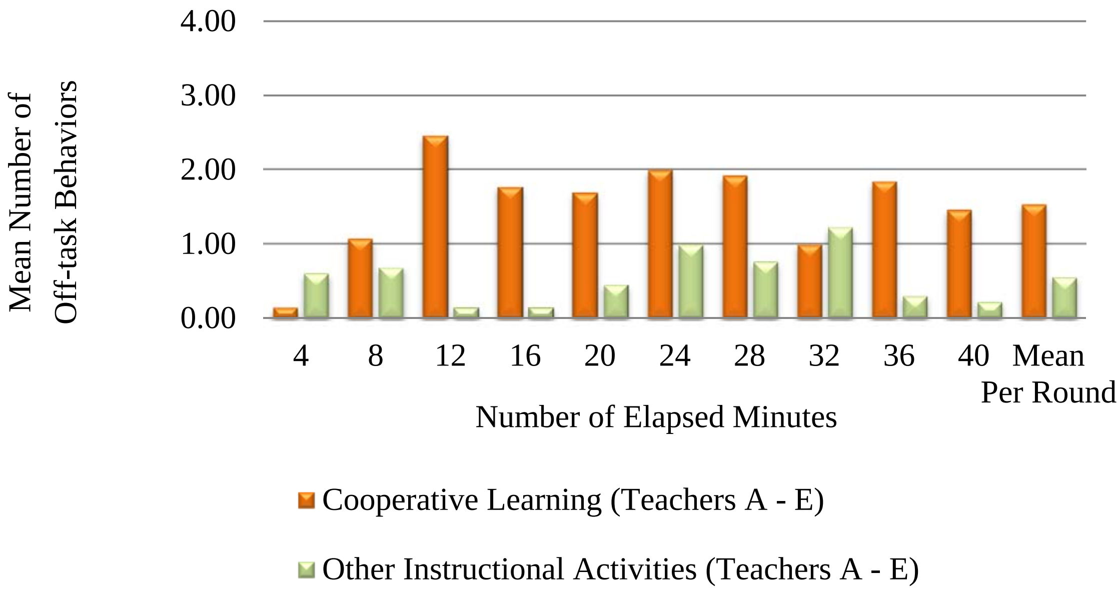


Figure 15. Mean number of off-task behaviors per four-minute observation round.

Summary of results related to research question I. The data gathered from the classroom observations and post-observation debriefing/coaching sessions have provided information to understand teachers' and students' roles in cooperative learning, and to address the research question, "Does classroom management of cooperative learning affect student on-/off-task engagement in five high school mathematics classrooms?" The findings gleaned from this data are summarized below:

1. The mean number of off-task behaviors during cooperative learning and the mean number of off-task behaviors per group of four students during cooperative learning increased from Observation 1 to 2 and then decreased from Observation 2 to 3. In addition, teachers who used a new cooperative learning structure to teach new content experienced higher incidences of off-task behavior compared to teaching new content

with a familiar cooperative learning structure, teaching familiar content with a new cooperative learning structure, or teaching familiar content with a familiar cooperative learning structure.

2. Across all observation rounds, the mean number of off-task behaviors during cooperative learning peaked at approximately 12-minute intervals. The highest number of off-task behaviors peaked at 12 minutes and tended to decrease over the remainder of the lesson.

Research Question II: Triangulation of Observation Data

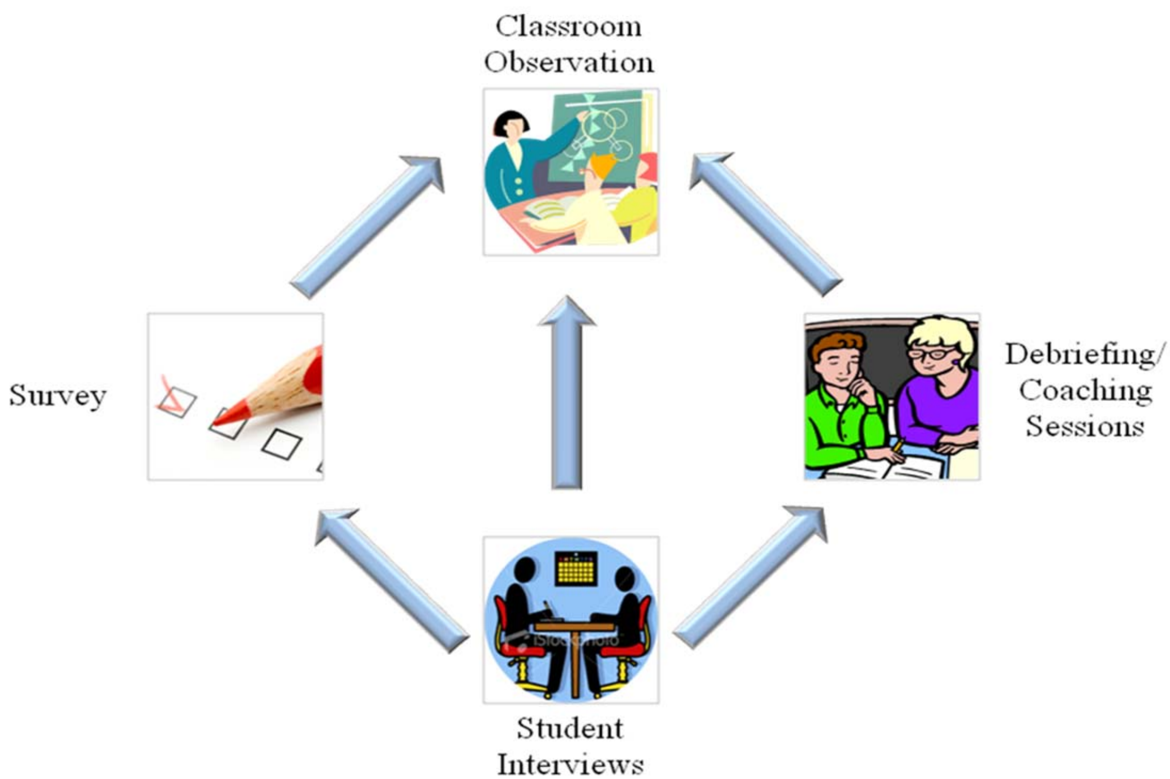
Methodology

This mixed methods case study has involved the collection of student survey data and audiorecorded student interviews to provide, along with the written debriefing/coaching written reflections (field notes), a confirmatory data set that triangulates with the observation data to answer Research Question II, "Do students from the study classrooms confirm what observers report as on-/off-task behavior?"

Measures of classroom instruction taken from different perspectives provide varying illustrations of the same classroom (Waxman, Padrón, Franco-Fuenmayor, & Huang, 2009), and triangulation of data is one technique for helping to ensure the validity of student observations (Freiberg, Prokosch, Triester, & Stein, 1990; Freiberg, 1998; Lawrenz, Huffman, & Robey, 2003; Freiberg & LaPointe, 2006). Taken together, this body of research provides support for investigating the following questions regarding the triangulation of data collected in this study (see Figure 16): (1) Did students' survey responses confirm the observation data? (2) Did students' interview responses confirm their survey responses? (3) Did students' interview responses confirm the observation data? (4) Did students' interview responses confirm the written debriefing/coaching reflections? (5) Did the written debriefing/coaching reflections confirm the observation data? Note that in Figure 16, questions 1, 2, and 3 form the basis of one triangle and questions 3, 4, and 5 form the basis of another triangle, both of which serve to confirm question 3.

Did Students' Survey Responses Confirm the Observation Data?

Methodology. "Student perceptions are based on many experiences over time and not just on a limited number of observations" (Fraser & Walberg, 1981, as cited in Lawrenz *et al*., 2003, p. 410). In this case study, survey data have been collected and used to confirm the observation data. After each classroom observation, students were asked to respond to a six-item closed survey, designed to take no more than five to ten minutes to administer and complete (see Appendix B, "Fixed Category Classroom Observation Student Survey Questions."). A total of 222 responses were collected to the survey, which was printed on 8½ x 11-inch white paper and distributed to students at the end of each 40-minute observation. The survey contained six items to which students responded by selecting "strongly agree," "agree," "disagree," or "strongly disagree:" (1) I like working with other students in this class to achieve goals. (2) This teacher is prepared for class. (3) I like working in groups. (4) I am actively involved in the lessons in this class. (5) When my classmates and I have problems with each other, we try to work them out together. (6) In this class, I am frequently involved in working in groups on class projects.



Secondary Data Source	confirms	Original Data Source
Survey Responses	→	Observation Record
Interview Responses	→	Survey Responses
Interview Responses	→	Observation Record
Interview Responses	→	Written Debriefing/Coaching Reflections
Written Debriefing/Coaching Reflections	→	Observation record

Figure 16. Confirmatory data sources for triangulation of data in this mixed methods case study. Note that in this figure there are two triangles, both of which show confirmation of the observation data. Students had been informed that I would be the only person to read their

survey responses. Thus, the teacher stayed to the side of the room while students completed, and I collected, all surveys. The average length of time to administer the survey was six minutes.

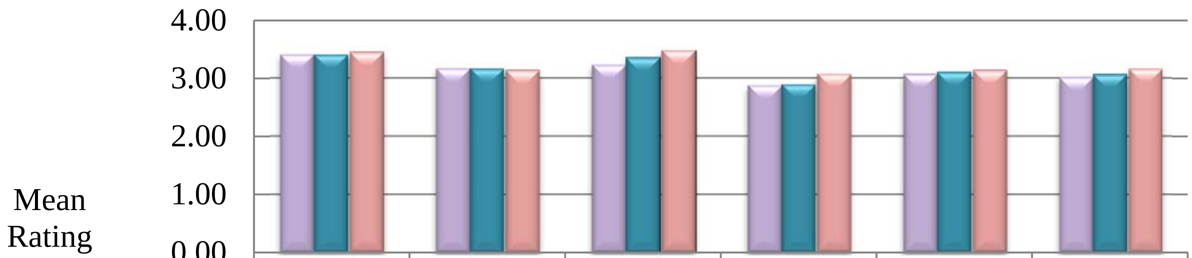
Analysis. First, it was necessary to establish the survey as a source of valid information regarding students' perceptions of cooperative learning. Therefore, I used the following as guiding questions to organize and analyze the survey data: (1) Did students' ratings change over the course of the three observations, a time period of approximately 11 weeks? (2) Did the survey items measure students' perceptions of their participation in cooperative learning?

Did students' ratings change over the course of the three observations, a time period of approximately 11 weeks? To determine the average rating per survey item, the response for each item was coded according to the following four-point scale: a response of "Strongly Agree" was given a value of four, a response of "Agree" was given a value of three, a response of "Disagree" was given a value of two, a response of "Strongly Disagree" was given a value of one, and no response was given a value of zero. The responses were entered into a spreadsheet and the mean rating per item was determined for each observation and for all three observations combined (see Figure 17). (Additional data related to the survey is provided in Appendix P, "Student Survey Responses.")

The survey data indicated a change over the 11-week period of the classroom observations, with a change of +1.3% in the mean ratings from Observation 1 to 2, a change of +2.4% in the mean ratings from Observation 2 to 3, and an overall change in the mean ratings of +3.6% from Observation 1 to Observation 3. Items #3, 4, and 6 proved to be outliers with higher than the mean in percent change, and the student interview responses will be examined later in this chapter to determine if students provide any insight regarding these outliers.

Did the survey items measure students' perceptions of their participation in cooperative learning? To examine the internal structure of a set of survey items, a factor analysis can be used to determine whether the items measure a single construct (is one-dimensional), or measures multiple constructs (is multidimensional) (Johnson & Christensen, 2011). The survey items were designed to probe students' perceptions about cooperative learning. An exploratory factory analysis using a principal component analysis showed that items #1 – 6 loaded onto one factor with a Cronbach's alpha of 0.712. An alpha of 0.700 or greater is considered to be an "acceptable reliability" (University of California at Los Angeles, 2011, n.p.), and thus there is evidence for all six items loading onto one factor, indicating that the survey measures students' perceptions of cooperative learning. (Additional information regarding the factor analysis is provided in Appendix R.)

Did students' survey responses confirm the observation data? Students' responses to survey item #4, "I am actively involved in the lessons in this class" were analyzed to determine if these responses provide a data set that confirms the third-party observer's record of student off-task behaviors during each observation. After examining both the survey and the observation data, it was determined that 63.1% of students' responses to item #4 "matched" the observation record regarding "active involvement" in class (see Appendix S, "Procedures for Determining Whether Students' Responses to Survey Item #4 Confirmed the Observation Record Regarding Student Off-Task Behavior").



	Item #1	Item #2	Item #3	Item #4	Item #5	Item #6
Obs. 1 Mean Rating (N = 90)	3.42	3.18	3.24	2.89	3.08	3.03
Obs. 2 Mean Rating (N = 65)	3.42	3.18	3.37	2.91	3.12	3.08
Obs. 3 Mean Rating (N = 67)	3.46	3.15	3.49	3.09	3.15	3.18
Mean rating over all three Observations (N = 222)	3.43	3.16	3.36	2.96	3.11	3.08
Percent change from Obs. 1 to Obs. 2	0.0%	0.0%	4.0%	0.7%	1.3%	1.7%
Percent change from Obs. 2 to Obs. 3	1.2%	-0.9%	3.6%	6.2%	1.0%	3.2%
Percent change from Obs. 1 to Obs. 3	1.2%	-0.9%	7.7%	6.9%	2.3%	5.0%
Survey Item:	I like working with other students in this class to achieve goals.	This teacher is prepared for class.	I like working in groups.	I am actively involved in the lessons in this class.	When my classmates and I have problems with each other, we try to work them out together.	In this class, I am frequent-ly involved in working in groups on class projects.

Figure 17. Mean survey item ratings for each Observation and percent change in survey ratings.

One outlier in this data is the fact that 38 (17.1%) students responded “disagree” or “strongly disagree” to the statement, “I am actively involved with the lessons in this class” and yet were observed as off task only once or not at all. It is possible that these students interpreted “actively involved” in a different manner than I intended for this analysis, and the interview data will be analyzed later in this chapter for insight into explaining this anomaly.

Relationship of survey results to research question II. The survey items were found, through a factor analysis, to load onto one factor. In addition, three of the six survey items showed a percent increase that was above the mean for all three observations. Finally, 63.1% of students’ responses to survey item #4 were determined to match the observation data regarding their involvement in class.

Did Students’ Interview Responses Confirm Their Survey Responses?

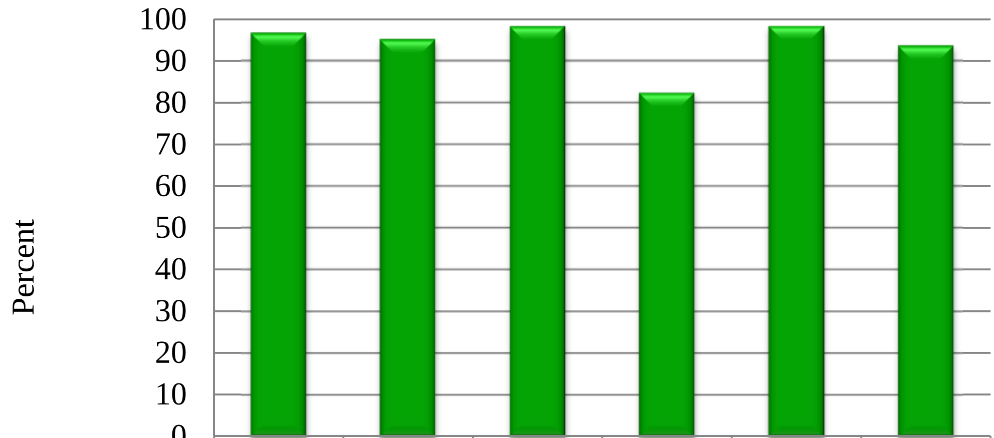
Methodology. In this case study, interview data have been collected as a potential confirmatory data set of the classroom observation data. After I administered and collected the survey, five students in each class were randomly chosen to participate in a five- to 10- minute semi-structured interview. First, I began with a standardized interview question designed to allow students to confirm or disconfirm the observation data. Second, I read the survey items back to the students and asked them to elaborate upon their original response. Third, students were asked to share additional thoughts or opinions about learning in cooperative groups. (Additional information regarding the student interview procedures is provided in Appendix T: “Procedures for Conducting Student Interviews.”)

To determine whether students would confirm their survey responses during part II of the interview, I informed students, “Now, I will read back the survey items, and you may elaborate on your responses and explain why you chose your answer." "Confirmation of survey response" was operationally defined as one of the following:

- If a student responded "agree" or "strongly agree" to a survey item and either "agreed" or "strongly agreed" to that same survey item when read aloud during the interview, then this student was recorded as having confirmed the survey response. Interview responses such as "yes" or "that's correct" were interpreted as "agree."
- If a student responded "disagree" or "strongly disagree" to a survey item and either "disagreed" or "strongly disagreed" to that same survey item when read aloud during the interview, then this student was recorded as having confirmed the survey response. Interview responses such as "no" or "not true" were interpreted as "disagree." If a student's survey response contradicted his/her interview response, that is, responding "agree" or "strongly agree" to one and "disagree" or "strongly disagree" to the other, then this student was recorded as having disconfirmed the survey response.

Results. In this study, students confirmed their survey ratings to all survey items with a mean interobserver agreement of 94% (see Figure 18); a proficient interobserver agreement has been operationally defined at 80% (Evertson & Green, 1986; Swank, Taylor, Brady, & Freiberg, 1989; Shapiro & Kratochwill, 2002) (see Appendix U, "Analysis of Students' Interview Responses Regarding Their Survey Responses").

Survey items #3, 4, and 6 revisited. During the investigation of whether students' survey responses confirmed the observation data, three outliers in the survey data were marked for further review through the lens of students' interview responses (see Appendix V, "Survey Items #3, 4, and 6 Revisited Through Interview Responses").



	% Confirmed Survey Item #1	% Confirmed Survey Item #2	% Confirmed Survey Item #3	% Confirmed Survey Item #4	% Confirmed Survey Item #5	% Confirmed Survey Item #6
Average Obs. 1 - 3 (N = 62)	97	95	98	82	98	94
Obs. 1 (N = 24)	100	92	100	88	96	88
Obs. 2 (N = 19)	95	95	95	84	100	95
Obs. 3 (N = 19)	95	100	100	74	100	100

Figure 18. Percent of students whose responses to the interview, part II, confirmed their answers to the survey items #1 – 6.

*Item **#3.*** The first of these anomalies was survey item #3, "I like working in groups," which showed a change of +7.7% in ratings from Observation 1 to Observation 3, compared to the mean of +3.6% for all survey items. Of the students interviewed, I found three students whose survey responses to item #3 increased from Observation 1 to Observation 2 and three students whose responses to this item increased from Observation 2 to Observation 3. Then I examined the interview transcripts to determine what these students said about item #3 during the interview after Observations 1 or 2. These students gave very practical reasons for their increased rating for item #3: "it makes everything easier," "it's a great opportunity to practice," "I like having different opinions," and "I learn from each person." These students' responses suggest it is possible that students may have originally interpreted the item, "I like working in groups" from a different point of view (for example, "it's fun to work in groups") but after more thought, time, and experience with working in groups, found practical reasons to like working in groups and to increase their rating on this survey item.

Item #4. The second of these outliers was survey item #4, "I am actively involved in the lessons in this class" which showed a change of +6.9% from Observation 1 to Observation 3 compared to the mean change of +3.6%. I examined interview transcripts and survey responses to find interviewees whose ratings on this item increased from either Observation 1 to 2 or from Observation 2 to 3. As I read over their responses, I was struck by the maturity of the students' responses after Observation 3 compared to those after Observation 2. By Observation 3, no student hedged with "most of the time, it depends on what kind of lesson it is." Instead, they answered with "I always try" or "I want to learn." It is possible that students' mean rating on item #4, "I am actively involved in the lessons in this class," represents a slight growth in maturity over the course of this study.

Another outlier involving survey item #4 concerns the confirmation of the observation data. Although 63.1% of students' responses to item #4 "matched" the observation record regarding "active involvement" in class, 17.1% of students responded "disagree" or "strongly disagree" with the statement, "I am actively involved with the lessons in this class" and yet were observed as off task either once or no times. I examined the interview data for insight from the students' elaborations on their survey data in order to investigate this anomaly. For example, student C9 clarified his/her understanding of "involved in the lesson" as answering questions that the teacher asks: "I feel like I could be more involved. I don't speak up as much as I could because I'm afraid that what I have to say is wrong." Thus, this student, while not being off task, believed s/he was still not "involved" because s/he does not volunteer to answer questions. Student D15 added, "If I know the answer, I'll raise my hand. If I don't, I'll probably say the wrong answer, but s/he will correct it." Student C12 followed along with this theme of sitting quietly and not answering questions: "Yes, but if there is something I am lost or confused about, I'm just there waiting to see if there is someone else who can say it so I don't have to say anything." "Somewhat," stated student D8. "I'm involved when it comes to doing class work, but not in participating. I don't like to raise my hand. I don't feel like it's important." Together, these statements show that it is possible that students define "active involvement" in the lesson as answering the teacher's questions and not as participating in the other lesson activities as well. Thus, a student may be observed as on task, but the student may not agree that s/he is involved in the lesson.

*Item #6***.** The third outlier involved survey item #6, "In this class, I am frequently involved in working in groups on class projects," which showed a change of +5.0% from Observation 1 to Observation 3 compared to the mean increase of +3.6%. I examined interview transcripts and survey responses to find interviewees whose ratings on this item increased from either Observation 1 to 2 or from Observation 2 to 3. Students B8, B11, C6, C12, and D11 indicated that they had started to work in groups more, with B11 and D11 emphasizing, "I'm starting to like it (working in groups) more."

Relationship of survey results to research question II. Through analysis of the students' responses to the prompt, "Now, I will read back the survey items and you may elaborate on your responses and explain why you chose your answer," and by comparing these responses to students' written survey responses, the mean confirmation rate of all survey items by students' interview responses was determined to be 94%.

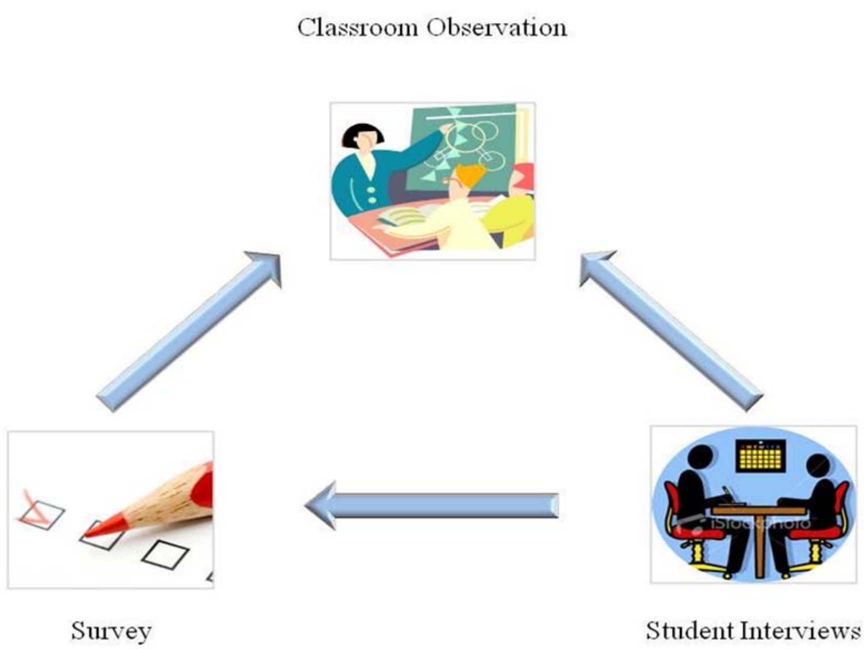
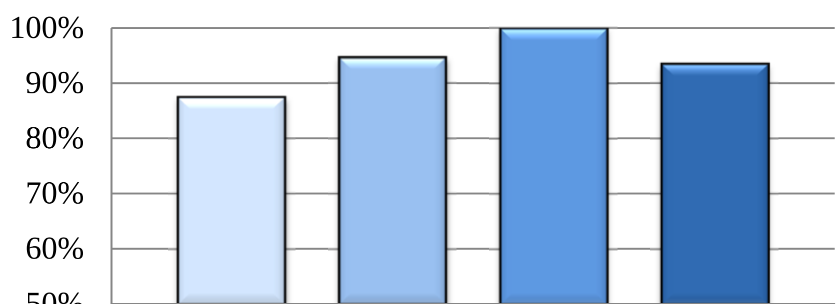


Figure 19. Triangulation of classroom observation data with survey and interview data.

Did Students' Interview Responses Confirm the Observation Data?

Methodology. To complete the triangulation of the observation data with the survey and interview data (see Figure 19), I audiorecorded students' responses to this interview question: "Today in class, we observed how students worked together in groups. We observed that you were _____< on task the entire class period, or talking, texting, waiting, taking care of needs, interrupting, distracted, or dozing)>. Is this a correct observation?" Students' responses were noted as "confirming observed off-task behavior," "confirming observed on-task behavior," "disconfirming off-task behavior," or "disconfirming on-task behavior."

Results. The percent of students who confirmed the observation data was determined to be 94% (see Figure 20).



	Percent of Students Whose Interview Responses Confirmed Observation Data
Obs. 1 (N = 24)	88%
Obs. 2 (N = 19)	95%
Obs. 3 (N = 19)	100%
Mean Confirmation Percentage Across All Three Observations (N = 62)	94%

Figure 20. Percent of students whose interview responses confirmed the observation data.

Analysis. During the interview after Observation 1, 21 out of 24 students (88%) confirmed the observer's data regarding their on-/off-task engagement during the lesson (see Appendix W, "Themes from Students' Interview Responses Regarding Confirmation of Observation Data"). During the interview after Observation 2, 18 out of 19 students (95%) confirmed the observer's data regarding their on-/off-task engagement. During the interview after Observation 3, 19 out of 19 students (100%) confirmed the observer's data regarding their on-/off-task engagement, thus giving a mean confirmation rate of 94% (58 out of 62) over the three interview sessions.

Of the 62 students who were randomly sampled to be interviewed, 33 (53.2%) were observed as off task, compared to 52.5% of all students who were observed as off task. This illustrates that the random sample chosen for the interviews was representative of the students in this study. Of these, 29 (88%) confirmed the observed off-task behavior and four (12%) disconfirmed the observed off-task behavior. Of those who confirmed the off-task observation reports, 12 students replied, "Yes, that's true" (or other similar, short confirmatory replies—see Appendix Q, "Students' Interview Responses") and 17 students provided an explanation for their off-task behavior. For example, student B4 responded, "Yes. I was talking about jokes…probably things people have seen on the Internet and Facebook." Of the four students who disconfirmed the off-task observation report, three students replied with a reason why the observation was incorrect, and one student just stated that the observation was incorrect. For example, student C1 responded, "No. We were talking about the lesson."

Of the 29 interviewed students who were observed as on task, 100% confirmed the observed on-task behavior. Of the 29 students who confirmed the on-task observation reports, 26 students replied, “Yes, it is correct” (or other similar, short confirmatory replies—see Appendix Q, “Students’ Interview Responses”) and three students provided an explanation for their on-task behavior. For example, student C9 responded, “One of the rules in class is you must stay on task and you can’t get off topic and talk about things that don’t involve the topic.”

Summary of results related to research question II. The mean confirmation rate by student interviewees of observation data over all three interviews was 94% (58 out of 62 students interviewed confirmed, and four disconfirmed, the observation data). The confirmation rates increased over the three observations, respectively, from 88% (21 out of 24 confirmed observation data) to 95% (18 out of 19 confirmed observation data) to 100% (all interviewees confirmed observation data)**.**

Did Students’ Interview Responses Confirm the Written Debriefing/Coaching Reflections?

In the previous section, the student interview data was shown to have a 94% confirmation rate of the classroom observation data. In this section, evidence will be presented regarding whether the students’ interview responses confirm the written debriefing/coaching reflections. In the final section of this chapter, evidence will be presented regarding whether the written debriefing/coaching reflections confirm the observation record (see Figure 21), thus informing Research Question II by completing the triangulation of the classroom observation data.

Methodology. Students’ interview responses were reviewed and compared to the reflections from the debriefing/coaching session. Specifically, I placed the interview transcripts (see Appendix Q, “Student’s Interview Responses”) next to the written reflections (see Tables 25 – 37 in Appendices K - O). I read specific events described in the written reflections and searched through the interview transcripts for students’ responses that would confirm this debriefing/coaching data. A "confirmation" was defined as a student interview response that addressed an issue raised by either the teacher or the coach in a particular category of the written reflection (see Table 41 in Appendix X: "Did Students' Interview Responses Confirm the Written Debriefing/Coaching Reflections?").

Analysis. All three parts of the interview provided evidence to confirm the written reflections, and it was found that students' interview responses addressed 51 out of 54 teacher or coach reflections, a confirmation rate of 94%. A few examples are provided in this narrative and additional examples are presented in Appendix X.

Teacher A. In my written reflection, I asked the teacher, "What is your policy on texting?" Student A9 admitted, "… yes, I was texting." In Observation 3, the teacher, a bit frustrated, wrote, "Some of the students were off task by talking, looking at their cell phone, and listening to headphones."

Teacher B. In my written reflection, I asked, "What changes can be made for the next cooperative lesson that would keep students on task for more of the lesson?" The teacher wrote that he/she needed to reorganize and "Take time for groups to present and interpret" each other's work. Students B13 and B15 agreed. Working in groups is "more interactive" responded student B13, and student B15 added, "having them explain (things) to me brings fresh ideas and perspectives to look through."

Teacher C. In my written reflection, I noted, "Not one moment of class time was unstructured." This teacher's students also noted how prepared this teacher is for class. When asked to elaborate on the survey item, "This teacher is prepared for class," student C4 shared, "I agree, but I should have put ‘strongly agree’ because we always have something prepared for class.”

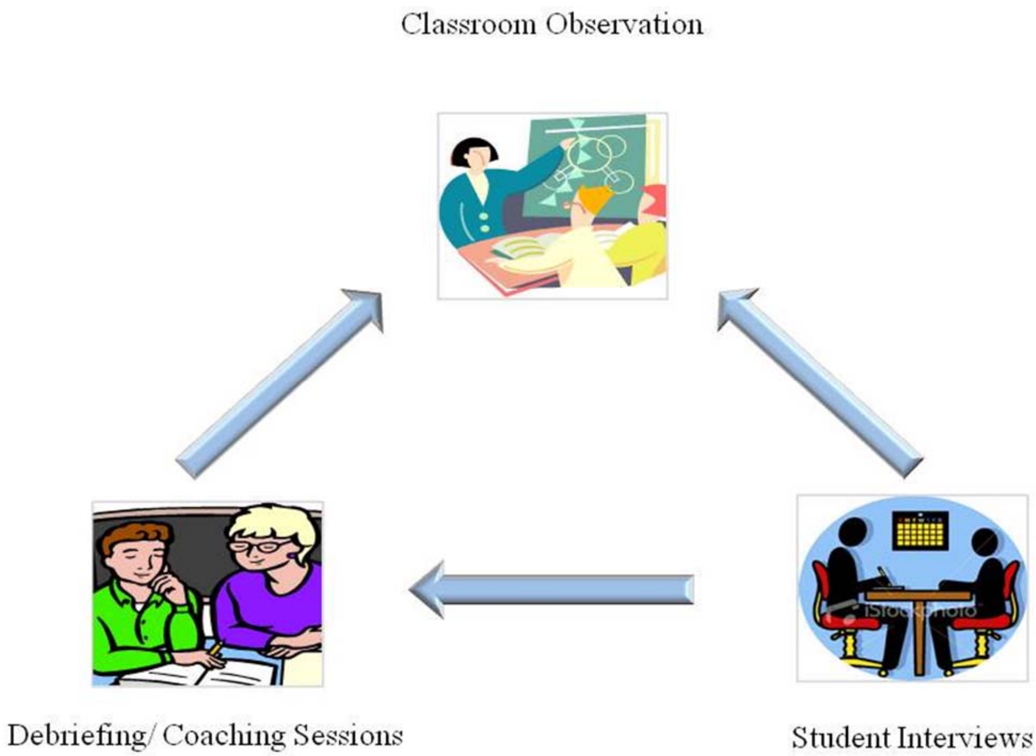


Figure 21. Triangulation of classroom observation data with debriefing/coaching and interview data.

Teacher D. In Observation 1, the teacher noted in his/her reflection, “While the group recorder was collecting data, the other group members were doing nothing, which led to idle chit chat and off-task behavior.” Likewise, student D3 admitted, “Yes. There were times that we were off task, but we also did talk about the lesson.”

Teacher E. I asked the teacher in my written reflection, "Did students have assigned roles throughout this investigation?" and "Did the students have clear expectations of what to accomplish?" In fact, the teacher concurred: "There were clear directions for the most part, but I could have done better by writing down the steps on the board." This was confirmed by student E5 who, when asked about two instances of distracted behavior, informed me, "Yeah, I didn't really have an assigned task."

Summary of results related to research question II. Comments shared by students during the interview process provided a 94% confirmation rate of the written reflections from the post-observation debriefing/coaching sessions.

Did the Written Debriefing/Coaching Reflections Confirm the Observation Data?

Methodology. The classroom observation data (see Tables 16, 18, 20, 22, and 24) and written debriefing/coaching reflections (Tables 24 – 37) were examined to determine the percent of observed behaviors that were confirmed by the written debriefing/coaching reflections. A "confirmation" was defined as either the teacher or coach writing about a particular type of student off-task behavior or teacher instructional activity (see Table 42 in Appendix Y, "Did the Written Debriefing/Coaching Reflections Confirm the Observation Data?").

Analysis. Many examples occurred where, for each teacher, the written reflections corroborated the observation data. An example for teach teacher is included in this narrative and additional examples can be found in Appendix Y. This examination found that 70% of student off-task behaviors and 87% of teacher instructional activities, or an overall percent of 77% of the observation data, were discussed and thus confirmed by the written reflections.

Teacher A. Seventeen instances of texting were observed in Observation 3. The teacher's writing confirmed this: "Some of the students were off task by talking, looking at their cell phone, and listening to their headphones."

Teacher B. During Observation 3, the observation record data indicated that students were placed into groups of three, a different arrangement from their usual groups of four. This arrangement took more time than usual to position the desks and the students were clearly uncomfortable with both their new group size and their new roles to which they had been assigned. This was confirmed in the written record where I asked, "How else could you arrange the desks to minimize 'desk rearranging time?'" In agreement, the teacher wrote, "(I) need to create and practice a procedure for going to and coming from groups."

Teacher C. In Observation 2, the observation record showed students in pairs, crowded in an oval shape around a bank of computers in a conference room that had been converted to a college "GO" center. This was confirmed in the teacher' written reflection, "A bit restrictive in terms of space. Students were crowded around each computer, and some students were seated in a manner that prevented them from seeing the computer at all."

Teacher D. The observation data noted that in round three, students were off-task due to waiting and taking care of needs when it was time to move the desks around so that students could face each other. This was confirmed by the teacher writing, "Because of the large size of the class, it was often difficult for the students to have group discussion," and my writing, "The room is very close and cramped and yet must fit 26 students—there was no room for a teacher desk or for the observer and me to sit."

Teacher E. Two students were observed as taking care of needs because they were unprepared with the correct materials needed for the activity. To prevent this in the future, the teacher decided to "Write the steps on the board" so that students would know what to expect.

Summary of results related to research question II. In sum, the teachers' and my written reflections have provided evidence for a 77% confirmation of the observation data for each teacher's lesson. This evidence, when combined with that of the previous section showing that students' interview responses confirmed the written debriefing/coaching record, strengthens the argument that the written debriefing/coaching reflections have triangulated with student interviews to provide a confirmatory data set to support the classroom observation data.

Limitations

Bias

A study—such as this one—conducted according to a mixed methods case study design may be limited in a variety of ways. First, bias exists in the selection of the study design. For example, an assumption underlying qualitative case study methodology is that "…there are multiple realities represented by the participants' perspectives" (McMillan, 2010, p. 11). Furthermore, design issues such as the method of sampling and the size of the sample have limited the study. Finally, the use of a small number of volunteers who were recruited through network sampling, while appropriate for the case study genre of research, nevertheless limited the generalizability of the conclusions derived from the quantitative data collected in this study.

Second, bias exists in the researcher as the research instrument and in the fact that this researcher has taken the role of participant-researcher in this study. Moreover, in a qualitative case study, it is desirable for the researcher to state his/her bias and assumptions upfront. My success as a teacher for 18 years and as an instructional coach for seven years in using cooperative learning to engage students in mathematics instruction serves as a source of bias in this study. Moreover, there is the assumption that my role as an instructional coach would have a favorable impact upon the teachers' classroom management of cooperative learning.

Furthermore, this study has been conducted under the following assumptions: (1) learning best occurs in social environments where students are active participants in a constructive learning process; (2) the active learning strategy of cooperative learning positively impacts student engagement in instruction; (3) student engagement can be measured through observations of on- and off-task student behavior; and (4) teachers may be reluctant to use cooperative learning because they lack the classroom management skills to effectively facilitate its use.

Limitations of Data Collection Devices

Each data collection device is inherently limited as to the validity of the information it can provide. Limitations of classroom observations include the chance that student participation may change from observation to observation and observer bias may skew observational data (McMillan, 2010). In addition, while observation techniques where observers rate students' engagement can be effective measures of student engagement in instruction, they may provide limited information on the quality of the students' effort, participation, or thinking (Fredricks, Blumenfeld, & Paris, 2004).

Limitations to the use of surveys include the concern that students may misinterpret survey questions (Bloomberg & Volpe, 2008), and that the standardization of forced survey responses may ignore the context of the classroom environment (Colorado State University, 2010). Limitations to interviews include the quality of responses may be dependent upon researcher's skill (Bloomberg & Volpe, 2008) and respondent's memory. Furthermore, an interviewer's non-verbal cues may guide the respondent (Opdenakker, 2006), and the results collected from interviews are personal to the interviewee and may not be generalizable to a group (University of Texas at Austin, 2010). Limitations to the use of field notes as a data collection device includes the fact that they are time consuming to write or collect and are inherently subject to researcher bias (National Science Foundation, 2010).

Minimization of Limitations

Freiberg (1998) described how the use of student concerns surveys, entrance and exit interviews, and ambient-noise checklists to measure school climate could be used to identify areas needing improvement. "The feedback process also allows students to be citizens rather than tourists in their school, as they realize that they have an opportunity to participate in shaping the education process" (p. 24). Not only have the surveys and interviews conducted in this study allowed students to have a voice in shaping mathematics instruction, but they have also provided a confirmatory data set to triangulate with the observation data. This triangulation of observation data has been employed as one strategy to minimize the aforementioned limitations of this study. In addition, the limitations of bias and assumptions of this study have been minimized by ensuring transparent methodological practices, by stating personal biases and assumptions upfront, and by taking the attitude of a "co-learner."

Furthermore, the following methods have been used by this researcher to minimize the limitations of this study: (1) application of Constructivist theory to study design and data analysis/synthesis; (2) utilization of similar methodology and tools as other researchers have used; (3) use of multiple sites at which to conduct the study; (4) random assignment of students to be interviewed; (5) use of a third-party observer; (6) use of standardized data collection procedures; (7) use of audiorecorded interviews; and (8) use of member checking. Another limitation of this study is that time sampling was used to collect the observation data. This limitation has been minimized by sharing the observation data with the teacher during the debriefing coaching session (Evertson & Green, 1986) and by selecting "very short intervals" (every four minutes) at which to collect the data (Johnston & Pennypacker, 2009, p. 133). Through these means, this researcher has attempted to develop an environment of trust with the participants and with the research community.

Summary of Chapter IV: Findings

The data gathered from the classroom observations and post-observation debriefing/coaching sessions have provided information to understand teachers' and students' roles in cooperative learning and to determine the effect, if any, of classroom management of cooperative learning on student on/-off-task engagement. First it was found that the mean number of off-task behaviors during cooperative learning and the mean number of off-task behaviors per group of four students during cooperative learning increased from Observation 1 to 2 and then decreased from Observation 2 to 3. Furthermore, teachers who used a new cooperative learning structure to teach new content experienced higher incidences of off-task behavior compared to teaching new content with a familiar cooperative learning structure, teaching familiar content with a new cooperative learning structure, or teaching familiar content with a familiar cooperative learning structure. Second, across all observation rounds, the mean number of off-task behaviors during cooperative learning peaked at approximately 12-minute intervals. The highest number of off-task behaviors during cooperative learning peaked at 12 minutes and tended to decrease over the remainder of the lesson.

In addition, students were surveyed and interviewed to determine whether they confirm what observers reported as off-task behavior. While students' survey responses provided 63% confirmation of the observation data, the students' interview responses provided 94% confirmation of the students' survey responses and 94% confirmation of the observation data. Moreover, students' interview responses provided 94% confirmation of the written debriefing/coaching reflections, which also provided 77% confirmation of the observation data. Thus, the survey and student interview data combined with the written debriefing/coaching reflections to triangulate with the observation data.

CHAPTER V: CONCLUSIONS, INTERPRETATIONS, AND RECOMMENDATIONS

Overview

After reviewing the research questions, methodology, and findings from this study, this author presents conclusions supported by selected literature, lessons learned from this case study, and recommendations for both future research and practice.

Review of Research Questions, Methodology, and Findings

Research Questions

Cooperative learning is one active learning strategy that creates an opportunity for students to work together to acquire both cognitive and affective skills, and which is supported by numerous researchers (Rogers & Freiberg, 1994; Hendrix, 1996; Johnson & Johnson, 1998; Cohen, Lotan, Scarloss, & Arellano, 1999). Nevertheless, observations of secondary classrooms reveal that students seldom experience cooperative learning, especially in mathematics instruction (Slavin, 1990; Whicker, Bol, & Nunnery, 1997; Johnson, Johnson, & Stanne, 2000). Moreover, when they do, classroom management often becomes a barrier to student academic engagement (Fellers, 1996; Freiberg, 2002). This multi-site case study has included data collection of five high school mathematics teachers from four high schools over an 11-week period to address the following research questions: (1) Does classroom management of cooperative learning in five high school mathematics classrooms affect student on-/off-task engagement? (2) Do students from the study classrooms confirm what observers report as on-/off-task behavior?

Methodology

Each of this study's research questions calls for both quantitative and qualitative data sources. Therefore, a Mixed Methods Iterative Sequential Triangulation Design (Creswell, Plano Clark, Gutmann, & Hanson, 2003) has been utilized in order to draw upon the strengths of both quantitative and qualitative research to provide the best understanding of the research questions. The data collection process has been both sequential and iterative: sequential in that the observations occurred first, followed by the student survey, student interviews, and debriefing/coaching sessions with the teacher; and iterative in that this data collection sequence occurred three times and data collected from each round informed the next. The case study design has enabled this researcher to study the participants in a classroom setting and to discover patterns between and among the participants' words and actions in this natural setting (McMillan, 2010). Furthermore, this researcher has operated under the assumption that it would be difficult to obtain teachers' and students' points of view without interacting with them.

In order determine the effects, if any, of classroom management of cooperative learning on student on-/off-task engagement, I assumed the role of participant-researcher by collecting field notes (written reflections) during post-observation debriefing/coaching sessions with teachers. I also administered a student survey and conducted student interviews to provide data for the triangulation of results in order to determine whether students in the study classrooms confirmed the observation data. A third-party observer collected the fixed category classroom observation data. The protocols for the observations, debriefing/coaching sessions, survey, and student interviews were adapted from *Consistency Management & Cooperative Discipline*® (Freiberg, 1983) and existing research projects that have been previously utilized and tested in hundreds of classrooms (Stallings & Freiberg, 1991; Freiberg, 2001, pp. 1 – 4) (see Appendix A). The survey, interview, and debriefing/coaching session data triangulated with the observation data to provide a confirmatory data set and to provide an understanding of students' perspectives on cooperative learning.

Findings

To answer Research Question I, the results of this case study indicated that classroom management of cooperative learning resulted in the following effects on student on-/off-task engagement in high school mathematics classrooms:

1. The mean number of off-task behaviors during cooperative learning and the mean number of off-task behaviors per group of four students during cooperative learning increased from Observation 1 to 2 and then decreased from Observation 2 to 3. Furthermore, teachers who used a new cooperative learning structure to teach new content experienced higher incidences of off-task behavior compared to teaching new content with a familiar structure, teaching familiar content with a new structure, or teaching familiar content with a familiar structure (see Figure 14, presented in Chapter IV).
2. Across all observation rounds, the mean number of off-task behaviors during cooperative learning peaked at approximately 12-minute intervals. The highest number of off-task behaviors peaked, on average, 12 minutes into the cooperative learning lesson and tended to decrease over the remainder of the lesson.

To answer Research Question II, the results of this case study indicated that students in the study classrooms confirmed what observers reported as off-task behavior. While students' survey responses provided 63% confirmation of the observation data, the students' interview responses provided 94% confirmation of their survey responses and 94% confirmation of the observation data. Furthermore, students' interview responses provided 94% confirmation of the written debriefing/coaching reflections, which in turn provided 77% confirmation of the observation data.

Research Question I:

Conclusions, Connections to the Literature, Lessons Learned, and Implications

Conclusion 1: The implementation of cooperative learning showed an initial increase, followed by a subsequent decrease, in student off-task behavior. This finding reflects the coaching process and the use of the fixed category system of observations to provide feedback to the teacher regarding the times that the students were most on or off task during the lesson.

While there can be several factors that affect the implementation of cooperative learning, such as whether the teacher has received adequate training and is prepared for complex instruction, whether groups are socially prepared for cooperative learning, whether the task is appropriate for the content, how the task is structured (*e.g.*, to include roles), and composition of the group (Freiberg & Driscoll, 2005), the findings of this study have led to the conclusion that using a new cooperative learning structure to teach new content is associated with an increase in student off-task behavior. It appears that the use of cooperative learning will have a greater chance of success if a teacher allows students to learn the cooperative skills with content that is already familiar to them. For example, Teacher D taught new content with a new cooperative learning structure in Observation 1, which resulted in a high number of off-task behaviors (29). During the interview after this lesson, student D2 observed, "Sometimes, s/he doesn't have time to take the lesson forward and explain it more." In contrast, this teacher used a new cooperative structure with familiar content in Observation 2 (with three off-task behaviors during cooperative learning) and a familiar structure with new content in Observation 3 (with one off-task behavior during cooperative learning). The teacher attributed the drop in off-task behavior to his/her belief that "If something works, modify it and improve it through reflection." Thus, situations where either the content or cooperative structure (or both) was familiar led to minimizing student off-task behavior. Shindler (2010) advises:

> Let students work with content that is at least a little familiar and not too threatening when you ask them to focus primarily on developing cooperative learning skills. When the students have grown comfortable with the dynamics and expectations of cooperative learning, they will be ready to work with content of any kind (p. 232).

Given that the number of off-task behaviors eventually decreased—both within each lesson and from Observation 2 to 3—this decrease may have been a function of not only teachers modifying their instruction to be more active and person-centered, but also of students' increasing familiarity with cooperative learning. Changing from teacher- to learner-centered involves making instructional choices from the perspective of a student to create learning that is relevant, thus increasing students' interest in learning (Freiberg & Driscoll, 2005). In fact, "(w)hen (students) do not see the relevance in the learning, are bored, or have high anxiety over the material, (they) tend to drop out mentally" (Tileston, 2004, p. 5). Student B8 concurred, "If it's just the teacher talking on and on, I get really bored and start zoning out. But if I'm in a group, then I'm hands-on the activity."

Lessons learned. One lesson learned from this finding is that trying to use unfamiliar cooperative learning structures to teach new content results in an escalation of off-task behavior. It is important to prepare students for cooperative learning by teaching the cooperative learning structures to the students. Implementation of change is more likely to be successful when students have "…more practice (experience) with the strategies" and have "…been provided direct instruction in component model skills" (Joyce & Showers, 2002, p. 87). In addition, Joyce and Showers found that "(i)ntroducing a new procedure or teaching strategy into an existing repertoire of instructional behaviors generally creates dislocation and discomfort" (p. 80). Such discomfort was voiced by student C4, who said after Observation 1, "In our class, if others get off topic, they frustrate me. If you go off topic when something really, really needs to be done, I don't like that."

Another lesson learned from this finding is that "the process of reflection takes time and most certainly precedes any changes in a person's actions" (Rogers & Freiberg, 1994, p. 249). It is possible that the decrease in the number of off-task behaviors in Observation 3 indicates that the study was conducted for too short a time; if it were continued over a longer period of time, the number of off-task behaviors may have continued to decrease. Student B11 observed, "Ever since we had this survey (this researcher's study), we started working in groups more, and I'm starting to like it more."

Recommendations. Based on the discussions I had with the teachers during the coaching debriefing sessions, I recommend first that teachers either introduce a new cooperative learning structure while teaching familiar mathematics content or utilize a familiar cooperative learning structure while teaching new mathematics content. Teacher D commented that before using a new cooperative learning structure, s/he found it important to “(d)emonstrate a problem by myself and then have them (students) work on the sample problems” before beginning the cooperative activity. Second, I recommend that an instructional coach monitor the number of changes that a teacher attempts to make from one lesson to the next. The fact that the teachers and I discussed four areas of instruction (physical environment, instructional strategies, time/organizational management, and discipline management) during the debriefing/coaching session may have given the teachers the impression that they had to change all four of them at once. While teachers may be eager to try new strategies—as Teacher B stated, “I need to learn new strategies”—it is nevertheless important for the coach to carefully monitor the implementation of new strategies. The complex interaction between these four areas of instruction may be too complicated for all teachers to implement at once and care should be given to assisting teachers with implementing such changes as they become equipped to manage them within their instruction.

Nonetheless, the teachers did incorporate some changes that led to a reduction in off-task behavior. Teacher A made this comment regarding preparation: “Be better prepared...provide students with a warm-up and have it available to them when they first walk in the door.” Teacher B continued with this theme of preparation by adding that s/he needed to spend “(m)ore prep time planning roles and group activity.” Teacher D agreed with the importance of planning roles for each student: “Include additional steps for the non-group recorders to take so that everyone is helping.” Additionally, all teachers spoke on the significance of setting up the physical space to accommodate cooperative learning. For example, Teacher D stated the importance of “(c)hanging the placement of the desks to make group discussion and collaboration more efficient." I recommend that the instructional coach stay mindful of the tendency for off-task behaviors to increase initially: teachers need to remain patient and reflective through this time of learning as students (and the teacher) become more familiar with how to learn mathematics, and how to work with each other, during cooperative learning. Student D2 summed this up by arguing that during cooperative learning, "(s)ometimes, we get off task ... but we still get our work done."

Implications. One implication based on this finding is that teachers need observation data that will help them become more aware of their own instructional behaviors and the behaviors of their students. A second implication based on this finding is that teachers need "training, administrative support, and peer encouragement" (Nath, Ross, & Smith, 1996, p. 117) when implementing new strategies, and principals need to provide opportunities for teachers to share and reflect on successful implementation of cooperative learning strategies. A third implication based on this finding suggests that "(i)t takes time to learn" how to implement cooperative learning (Cohen, Brody, & Shevin, 2004, p. 176). Brody and Davidson continued: "Two to three years may be the average amount of time required to become a skilled user of cooperative learning procedures" (1998, p. 230). To support teachers in acquiring these skills, these researchers suggested that teachers participate in "weekly collegial teaching team meetings (to) help group members continue to implement cooperative learning" (*ibid*, p. 241).

A final implication based on this finding is that in addition to instructing students on cooperative learning structures before teaching new content, the teacher needs to provide students with structures that enable them to give each other feedback on their group performance (Gillies, 2004). In an interview response, student D10 showed an understanding of one benefit to giving each other feedback in a group setting: "I think working in groups is a good thing. If you get something and someone else doesn't, you can help each other out…you feel good after you help someone out."

Conclusion 2: The optimal length of time for cooperative learning is approximately 12 to 15 minutes based on the average point when student-off task behaviors increase from 1.08 to 2.46 off-task behaviors per group of four students (mean = 1.54). The peak in off-task behavior during cooperative learning at 12 minutes generally corresponded to students settling into the cooperative activity and accomplishing a reasonable task within the first 15 minutes of a typical high school mathematics lesson. However, at the 24th- and 36th-minute periods, students lost focus on the activity. In a mathematics class, time is precious and active learning is important. Too much of any one instructional strategy—including cooperative learning—can reach a point of diminishing returns. This conclusion is supported by the interview responses of students who were off-task during these peak intervals. They gave the following explanations for their off-task behavior at this time: "I got distracted with the kid next to me (student B2)," "I was waiting for them to do the work (student D5)," and "…we were dealing with so many numbers. We needed to clear our heads (student C8)."

High school students have attention spans of around 15 minutes (McLeod, Fisher, & Hoover, 2003). "Since there is a finite capacity to short-term memory, new material just learned can displace material learned just minutes earlier" (Jeffries & Huggett, 2010, p. 19). Therefore, stopping every 12 to 15 minutes to allow students to discuss newly learned material with a partner may help students to not only refocus, but also to solidify new learning and to quickly clear up misunderstandings. Student A1 explained, "I like having someone else I can ask if I have questions or if I am lost, they can guide me through it."

Lessons learned. One lesson learned from this finding is that while cooperative learning engages students in instruction, by itself it cannot keep students engaged for long periods of time. All of the students in this study were involved in 85- or 90-minute lessons, long enough for the teacher to intersperse six of what Jensen (2008) calls "brain breaks" at 12- to 15-minute intervals to allow for review and consolidation of learning (p. 166). Student C8 reported that "we got tired" after a long stint of working with numerical data, and his/her teacher reflected, "(a)s the students were working, I considered the possibility of giving the students a two-minute stretch break during the lesson–I know I needed one!" In addition, the lesson content must be relevant to students and built around their interests. Student D2 responded, "(I am actively involved) sometimes, if they catch my interest...if the teacher makes the lesson into an activity, in a fun way. If the teacher lectures, that doesn't catch my interest. It puts me into a sleeping mode."

Recommendations. In addition to the possibility of diminishing returns, cooperative learning may not be effective for all students. However, when implemented effectively, cooperative learning can actively engage most students. Student D2 explained, "(I am actively involved)...if the teacher makes the lesson into an activity, in a fun way. If the teacher lectures, that doesn't catch my interest. It puts me into a sleeping mode." Based on the discussions I had with the teachers during the coaching debriefing sessions, I recommend first that teachers get to know their students so that they can design their lessons to meet their students' needs and interests. For example, Teacher C and I discussed that if students like to work alone, then they can be given a menu of options from which to choose, which might include working alone or working with their choice of partner.

A second recommendation is best summed up by Teacher C, who found it successful to vary activities. In addition to setting up desks to facilitate cooperative group discussions, this teacher advised, “set up desks to create a ‘common area’ for entire class discussions.” In Observation 3, Teacher B periodically changed activities and found that “(h)aving periodic stopping points to pull people together is definitely an improvement.” However, the changing of activities should not happen in reaction to students becoming restless; instead, it takes planning to proactively change activities at strategic intervals to prevent off-task behavior during cooperative learning. Teacher B concluded that s/he needed to “(m)ap out short time increments on my lesson plans.”

A final recommendation is to realize that students want—and need—to learn mathematics in a hands-on manner that is relevant to them. Teacher A found this to be of importance in the third lesson: “I would like to use more real-world problems to bring a connection to what the students are learning.” This is echoed by student C1, who professed, “Working in groups is pretty beneficial. I’ve also learned a lot of things because it’s a hands-on thing. You’re seeing it and then you’re doing it and it gets stuck in your head.”

Implications. One implication based on this finding is that teachers need to know strategies for implementing instructional changes that shift from teacher-directed to person-centered instruction (Freiberg & Templeton, 2009). “Person-centered classroom management advances the facilitative conditions needed to encourage active participation in a cooperative learning environment” (Rogers & Freiberg, 1994, p. 239). Such person-centered management includes allowing students the opportunity to "…become an integral part of the management of the classroom" resulting in students who are more self-disciplined (*ibid*., p. 240). A second implication based on this finding is that teachers need to know how to write lesson plans to minimize off-task behavior and maximize instructional time. "Planning allows for purposeful instruction. It helps with self- and classroom management and allows for easier decision making about what and how to teach" (Freiberg & Driscoll, 2005, p. 22). In fact, students notice whether their teachers are prepared for class, and it matters to them. Student C9 explained, "This teacher is the only teacher here who knows the lesson plan front to back every day. I've had bad experiences in the past where the teachers don't even understand their own lesson plan." A third implication based on this finding is teachers need to design instruction that is relevant to the 21st century global marketplace in which students live (T. Weeden, personal conversation, March 10, 2011). Student C8 supported this conclusion by observing, "(w)orking together with other students helps me be prepared to work with others in real life." Thus, teachers need training and time to plan for and implement person-centered management strategies that facilitate relevant learning through cooperative learning.

Research Question II:

Conclusions, Connections to the Literature, Lessons Learned, and Implications

Conclusion 3: Students' survey and interview responses confirmed the observation data, and the survey, interviews, and written reflections triangulated with the observation data to provide a confirmatory data set.

In contrast to the 94% confirmation rate for the interview responses of the observation, survey, and written reflection data, the survey and written reflections confirmed the observation data at rates of only 63% and 77%, respectively. To determine whether the survey responses confirmed the observation data, a student's response to survey item #4, "I am actively involved in the lessons in this class" was compared to the number of times a student was off task. One explanation for the survey having a lower confirmation rate than the student interviews could be that during the interview, students had the opportunity to clarify their response, but did not have this opportunity during the survey. Thus, survey item #4 may not have been an accurate match to observed off-task behavior and students, in responding to the survey, could not (assuming they wanted to) qualify their response in any way. In addition, the students' interview responses indicated different interpretations of survey item #4. For example, some students, such as student C5, stated, "I always pay attention in class and I always work together." Other students, such as student C9, clarified his/her understanding of lesson involvement as answering questions that the teacher asks: "I feel like I could be more involved. I don't speak up as much as I could because I'm afraid that what I have to say is wrong." Thus, while this student was not observed as off-task, this student believed that s/he was not "involved in the lesson" because s/he did not volunteer to answer questions posed by the teacher during class.

To determine whether the written reflection data confirmed the observation data, the off-task behaviors and instructional activities discussed during the debriefing/coaching sessions were compared to the observation data. One explanation for the written reflection data having only a 77% confirmation of the observation data lies in the fact that some off-task behaviors were not as disruptive as others and thus not mentioned in the written reflections. For example, during Observation 2 for Teacher A, 14 of 35 off-task behaviors during cooperative learning involved talking, while only two involved taking care of needs. The latter was not as disruptive as the 14 off-task behaviors and thus not written about by either the teacher or me in the written reflections. Likewise, a teacher may have utilized several instructional activities, only one of which was cooperative learning. For example, Teacher D utilized five instructional activities during Observation 3, but only two were discussed. Upon closer inspection, "independent work" time was not discussed because students were not off task during this time. In contrast, while only one off-task behavior was observed during cooperative learning, it was a much more interesting topic of discussion in light of the fact that in Observation 1, this teacher had 29 instances of off-task behavior.

The use of multiple sources of data is crucial in this study in order to obtain both a triangulation of data and an in-depth understanding of students' engagement in cooperative learning in high school mathematics classrooms. "Gathering data from multiple resources and by multiple methods yields a fuller and richer picture of the phenomenon under review" (Bloomberg & Volpe, 2008, p. 86). Many of the themes that students generated through their survey and interview responses (*e.g.*, "It makes the work easier," "I enjoy working in groups," "(Working in groups) is more like the real world," and "I work better working with other people") were confirmed by themes found by other researchers: students who worked in groups showed higher attitudes toward cooperative learning (Leikin & Zaslavsky, 1997), increased motivation (Nichols, 1996), increased ease of working in groups (Anderson & Pecore, 2009), and increased appreciation for the relevance of mathematics to the real world (*ibid*).

Lessons learned. One lesson learned from this finding is that when presented with the opportunity to have a voice in shaping their educational experiences, students can provide valid feedback on these experiences. This is important because "(c)hoice, managing one's time, setting goals and priorities, and maintaining a sense of order are part of self-discipline" (Rogers & Freiberg, 1994, p. 222). For example, student C9 noted, "We have a rule that we set up in class that we have to listen to each other." Student D3 added, "I feel like we should always work in groups unless we are taking a test." Comments such as these illustrate that when a person-centered environment is structured for active learning, high school students are ready to collaborate with the teacher in facilitating their learning experiences.

A second lesson learned is that while it true that multiple data sources facilitated the triangulation of the observation data from multiple perspectives, no single data source in this study trumped the student interview regarding its confirmability rate. As a teacher, I believed that the best way to determine what students knew was to ask them. This belief has been verified through this study: although not as practical as observation and survey as data collection devices, students' interview responses were the most reliable data source for understanding their behavior in cooperative learning situations.

Recommendations. Education is a business with many customers—students chief among them. Based on the results of the interviews of the students in this study, I recommend that students be asked for feedback on their educational experience. Throughout this study, I found that students gave insightful comments that helped to understand their behavior. For example, when student C10 was asked to confirm the observer's report of talking, s/he responded, "Yes, I get distracted easily, but I do come back to it." Without feedback like this, a teacher might observe off-task behavior during cooperative learning and use that as a reason not to use the strategy again. The bottom line is that while mathematics is a crucial subject, it is also a difficult one—and teachers need every strategy possible to help students achieve. Student C7 explained: “I strongly agree...math is a difficult subject for me and working in groups gives me another perspective on things. Working with my peers instead of just listening to the teacher lecture helps me to understand what’s going on.” Without this type of feedback from the student, a teacher may never fully understand how important it is to actively engage their students through cooperative learning.

Implications. One implication based on this finding is that students’ voices need to be heard when tailoring instruction to meet their needs (T. Weeden, personal conversation, March 10, 2011). For example, student A11 stated, “Working in groups is a good idea. If you don’t understand the teacher, maybe your classmate does and can explain it more.” In contrast, student D7, observed, “I don’t really get (this math class) and I don’t like the way s/he teaches. S/he goes really fast and doesn’t really slow down.” As a result, teachers should design person-centered instruction to engage students as “citizens” in their learning (Freiberg, 1996, p. 32; Freiberg & Templeton, 2009). For example, student C1 explained, “Yeah, from day one we...started working on how we define groups and what our groups should do as a whole, not ‘You’re the group leader so you should do it all,’ or ‘You’re the group leader so appoint someone to do all the work.’” As a result, “(s)tudent voices in planning can change a lesson that is detached from the lives of students to a lesson that is engaged. When students become part of planning a lesson…, they have a much greater stake in its success” (Freiberg & Driscoll, 2005, p. 25).

A second implication based on this finding is that all students (including students of poverty and color, boys and girls, English language learners, and those who wish to work alone) need to have a voice in structuring a safe environment for cooperative learning (T. Weeden, personal conversation, March 10, 2011). “For students and adults from poverty, the primary motivation for their success will be in their relationships” (Payne, 2005, p. 112). Student B10 noted,

> “Sometimes I don’t understand and the other students are paying attention. Sometimes I am not paying attention. You can’t always do it by yourself. I am in sports and I can relate this to teams. When you’re in teams, you do much more better. If you’re both dedicated to achieve the same goal, then you can actually get the goal achieved.”

Thus, the relationships that students build when working in cooperative teams may prove to be vital to their academic success.

Limitations and Suggestions for Future Research

First, these conclusions are limited to the context of this case study: five volunteer high school mathematics teachers and 134 high school mathematics students, who were recruited through network sampling, who reflect a range of ethnic and socioeconomic backgrounds represented in the district, and who were studied over a period of 11 weeks. Additional research is needed to determine whether the findings of this study may be replicated if teachers and students in other contexts were studied over longer period of time.

Second, these conclusions are limited to the subjective interpretations of the teachers, the third-party observer, and myself as a participant-researcher of the events of the lessons and subsequent debriefing/coaching sessions as they unfolded. Additional research is needed to determine whether my presence as a participant researcher during the interviews and debriefing sessions may have influenced the findings. Another limitation of this study is that time sampling was used to collect the observation data. This limitation has been minimized by sharing the observation data with the teacher during the debriefing coaching session (Evertson & Green, 1986) and by selecting "very short intervals" (every four minutes) at which to collect the data (Johnston & Pennypacker, 2009, p. 133). Third, although I attempted to take the role as a “co-learner” and not as an “expert,” the teachers knew me as the mathematics curriculum manager for the district and they may have been prone to react to my presence in that capacity. Additional research is needed to determine whether the context under which the teachers know the researcher may impact the findings of this study.

Fourth, these conclusions are limited by the teachers’ and my assumptions about and experiences with teaching and learning. Additional research is needed to determine whether the questions posed and strategies suggested during the debriefing/coaching sessions were valid and in what ways, if any, they may have impacted the findings of this study. In addition, an assumption underlying the debriefing/coaching sessions was that teachers’ reflective practice would lead to positive classroom change, and additional research is needed to test this assumption.

Furthermore, this case study has examined the effects of classroom management of cooperative learning on student on-/off-task engagement. Given the current global educational context described in Chapter I that demands improvement in student achievement, additional research is needed to examine the effects, if any, of classroom management of cooperative learning on student achievement.

Finally, our future depends on the success of students of color and diverse languages. The state of Texas is already a minority-majority state, and Census Bureau projections predict that the minorities of 2010 will become the majority population in the U.S. by 2050 (Dougherty, 2010, n.p.). In fact, "...minority births (in the U.S.) will soon eclipse births of whites of European ancestry, which could happen as early as 2011" (*ibid*, n.p.). For example, in 2010, 40% of Texas students were Spanish speaking; by 2040, 66% of Texas students are predicted to be Spanish speaking (Combs, 2011a). Between 2011 and 2040, the Hispanic population in Texas will grow by nearly 100% percent to 19 million due to high birth rates and immigration from non-English speaking countries (Combs, 2011b). This doubling in the Hispanic population in Texas mirrors that of Spanish-speaking students in the U.S.: as of 2010, there were 15 million (28%) Spanish-speaking students in the U.S., and the Census Bureau projects that by 2050 there will be close to 33 million (45%) Spanish-speaking students in the U.S. (U.S. Census Bureau, 2008). Cooperative learning provides an opportunity for all students to meet face to face and discuss important issues of the day. Furthermore, cooperative learning allows for greater comprehensible input for English language learners because the student "…has the luxury of adjusting speech to the level appropriate to the listener to negotiate meaning, (a) luxury not available to the teacher speaking to a whole class" (Kagan, 1995, p. 2). As English language learners will not only comprise an increasing share of our student population but also consumers who drive the nation's economic success, additional research is needed to examine the effects, if any, of classroom management of cooperative learning on the instructional engagement of this important group of learners.

Proposals

Teacher Professional Development

In order to provide teachers with support for the implementation of cooperative learning, a model is proposed that incorporates instructional coaching, learning walks, and lesson study.

Instructional Coaching. Instructional coaching has been shown to facilitate teacher growth and change, and to facilitate the transfer of learning received from professional development into the classroom. Joyce and Showers (2002) found that teachers who received instructional coaching "experimented with new instructional strategies in their own curriculum areas more quickly than uncoached teachers, and shared lessons and materials with each other early in the coaching process" (p. 86). The following instructional coaching model is proposed as an outcome of the insights gained from this study. This model assumes that the teacher has been trained on the use of cooperative learning and that a degree of trust has been established between the teacher and coach.

1. First, the coach collects observation data on student behavior and teacher instructional activity using a fixed categorical observation protocol such as the "GlanceAbout" (Freiberg, 2001) (see Appendix A) used in this study.
2. Second, the instructional coach collects student feedback on the lesson, using surveys or interviews, and also collects student work samples for formative assessment of the learning taking place.
3. The teacher conducts a self-assessment, which allows for the possibility of "creating change from within" (Freiberg & Driscoll, 2005, p. 458). For example, a Low Interference Self-Assessment Measure (LISAM) may be used which utilizes

audiorecording to allow the teacher to focus on classroom talk to assess him/herself on six areas of instruction, including questioning, teacher/student talk, set and closure, wait time, praise and encouragement, and the use of student ideas (*ibid*, p. 485).

4. The teacher and instructional coach engage in a "debriefing/coaching session" where all observation, reflection, student feedback, and student formative and teacher self-assessment data are gathered and examined by the teacher and coach.
5. The instructional coach provides input on the teacher's growth as a facilitator of learner-centered instruction. This would include, but not be limited to, providing methods for teaching students new cooperative learning structure before implementing new content; examining formative assessment and student work data to diagnose causes of student misunderstanding and devising remedies for intervention; and designing cooperative activities to include student roles and a reward structure.
6. The teacher decides on one action to take for the next lesson and the instructional coach guides the teacher to incorporate this action into his/her lesson plans so that the change is manageable and involves previously learned content.
7. The process begins again with the instructional coach collecting observation data as the teacher implements the planned changes.

Learning Walks. In addition to providing teachers with observation data to assist them in informing and changing their practices, I propose, on a broader scale, that schools conduct learning walks for the purpose of facilitating school growth and change (T. Weeden, personal conversation, March 10, 2011). Learning walks provide a protocol for observing classroom instruction across a school and benchmarking teachers' instructional practice. They involve five-minute visits to a set of classrooms and focus on gathering information by questioning students and examining their work. They do not involve evaluating teachers, but instead focus on assessing teaching and learning so that schools can take informed action that will support change (Kerr, Marsh, Ikemoto, Darilek, & Barney, 2006).

A learning walk team consists of three to four teachers who rotate on and off the team, in collaboration with the principal and external observers. After each five-minute learning walk, team members move away from the observed classroom to quickly debrief before moving on to the next classroom. Once the final observation has been conducted, the team debriefs the overall experience and then discusses next steps. Finally, the principal and teachers share the results with the entire school staff for feedback, continued reflection, and commitment to action (Green River Regional Educational Cooperative, n.d.).

Lesson Study. In order to provide support to the teachers to implement what they have learned from the instructional coaching and learning walks, to collaboratively plan a lesson, and to reflect upon the impact that the lesson has had on student achievement, I propose that teachers participate in an on-going lesson study. Lesson study, through a cycle of collaborative planning, lesson demonstration/observation, reflection, and lesson modification, enables professional learning to be shaped according to the needs of the classroom teacher. In conducting a lesson study, "teachers work together with a common purpose and draw from one another's experience and expertise to…build a shared body of professional knowledge" (Chokshi & Fernández, 2004, p. 521).

A lesson study is job-embedded professional learning, conducted during the school day, which provides a structure for teachers to collaboratively write a lesson, provide feedback on the lesson, revise the lesson, conduct the final lesson, and publish the final, revised lesson. A suggested lesson plan is the research-based 7E model (Eisenkraft, 2003) which includes the following components: (1) *eliciting* students' background knowledge; (2) *engaging* students' motivation and interest in the learning; (3) *exploring* new concepts through hands-on investigations; (4) *explaining* new content by connecting to vocabulary and mathematical principles; (5) *elaborating* on new learning through application and questioning; (6) *extending* new learning by connecting to other content and concepts; and (7) *evaluating* new learning, both formatively and summatively. When such lesson plans call for cooperative learning to engage students in new learning, the plans could be collaboratively reviewed for structures that would minimize student off-task behavior, maximize instructional time, provide for clearly defined roles in group settings, and engage students in relevant and rigorous learning that will ensure their success in a 21st century global society.

The ultimate goal of a lesson study is to give teachers time and structure to use this reflective practice to increase their level of transfer of new learning to the classroom from "routine" to "executive control"—the level of knowledge that generates consistent and appropriate use of new skills and strategies for classroom instruction (Joyce & Showers, 2002, p.71). Joyce and Showers continued: "…(t)he issue of time to learn and work collaboratively toward shared goals is a critical component that, if ignored, will defeat all efforts to follow" (p. 186).

Student Voice

In recent years, interest in engaging students in dialogue concerning their educational experiences has escalated, and research has provided evidence that "students are most likely to be engaged in learning when they are active and given some choice and control over the learning process" (Rogers and Freiberg, 1994; Cornelius-White, 2007; Fletcher, 2011, n.p.). Furthermore, students' voices have become critical to successful academic reforms, both at the instructional level and at the school level. While Fletcher reported that student empowerment must involve meaningful experiences in service to the community, I believe it must begin in the classroom between the teacher and student.

Person-centered instruction. A person-centered classroom gives students a voice in the daily classroom decisions that affect them. Proposed actions for teachers to take that would empower students' voices in a person-centered classroom include: (1) sharing leadership and responsibilities with students; (2) engaging students in writing a classroom constitution; (3) allowing students to complete job applications for positions as student classroom managers; and (4) forming partnerships with business and community groups to enrich and broaden the learning opportunities for students (Rogers & Freiberg, 1994, p. 240; Freiberg, 1996, p. 34; Freiberg & Templeton, 2009).

Student-to-student feedback. Collaboration skills must be taught, and in order for students to improve their performance in a collaborative situation, they must receive feedback on their performance (Gillies, 2004). In order for the feedback to be relevant to the situation and to the relationships being formed in the group, the feedback must come from their peers instead of from the teacher. To engage students in providing feedback on each other's performance in a group situation, the following are example of questions that could be used to begin a discussion or that could be used as prompts for journal writing or exit tickets (adapted from What Kids Can Do, 2003):

1. "Today during our cooperative learning session, I think _____ worked really well because we were able to _____."
2. "The next time we conduct group work, I would like to have the role of _____ because _____."
3. "Today, a student in my group taught me something new: I learned _____ from _____. Also, I was able to teach something new: I taught _____ to ____. This made me feel _____ because _____."

Structuring a safe environment for cooperative learning. As was revealed in this study, interviews provide a process for giving students a voice in the day-to-day operations of their learning experiences. When I conducted interviews for this study, students appreciated the fact that their responses would be kept confidential, which enabled them to express their thoughts and opinions in a safe environment. The following are examples of questions for a semi-structured interview that would allow students to have a voice in structuring a safe environment for cooperative learning (adapted from What Kids Can Do, 2003):

1. "In today's cooperative group lesson, I felt _____ about this lesson and I acted _____. The teacher could change this by doing _____."
2. "I like working with most people, but when other students do ____, it makes me feel _____."
3. "I don't like working in groups because _____, but if the teacher did _____, it would be OK."

4. “What I like best about working in groups is _____. What I like least about working in groups is _____. If the teacher did _____, working in groups would be better.”
5. “When two students in my group are having a problem with each other, these students should do _____, I should do_____, and the teacher should do _____.”

Summary: From *TIRED* to *SWIFT*

“School learning will not improve markedly unless we give teachers the opportunity and support they need to advance their craft by increasing the effectiveness of the methods they use” (Stigler & Hiebert, 2003). The effectiveness of these methods can be measured in a variety of ways, including actively seeking student feedback on their learning experiences. “(We have) not been listening much to children in these recent years…(t)he voices of children, frankly, have been missing from the whole discussion” (Kozol, 1991, p. 5, as cited in Fletcher, 2011). Nardi and Steward (2003) used students’ words, taken from their interview responses, to create an acronym, which, for those students, summed up mathematics instruction. To these students, mathematics was ***TIRED****:* **T**edious, **I**solated, **R**ote, **E**litist, and **D**epersonalized.

In contrast, the teachers and students who provided their voice to this study have proposed, in their own words, an alternative acronym to sum up cooperative learning in mathematics instruction as ***SWIFT***: **S**uccessfully **W**orking and **I**nteracting in **F**un **T**eams!

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APPENDIX A

FIXED CATEGORY OBSERVATION RECORD

APPENDIX A: Fixed Category Observation Record, Page 1

Observation Recording Sheet		**Student Off-Task Behaviors**		**Instructional Activity Codes**	
Date:	**Teacher**:	**D**	Distracted	**C**	Cooperative Group Activities
Room:	**Class Period**:	**I**	Interrupting	**G**	Games
Start time:	**End time**:	**N**	Taking Care of Needs	**In**	Instruction
Time Intervals: **Observers**:		**T**	Talking	**IW**	Independent Work
		W	Waiting	**O**	Organizing
		Z	Dozing	**Q/A**	Question/Answer/Discussion
		Tx	Texting	**R**	Reading
				Tr	Transition

Directions: provide a schematic representation of the class seating chart and students' first name/last initial in the space below. Indicate the interval number, the off-task behavior code, and the learning activity code next to the student's name in the seating chart.

Fixed Category Observation Record, Page 2

Teacher:				**Date:**			**# Minutes per Observation Round:**			
Student #	**1)**	**2)**	**3)**	**4)**	**5)**	**6)**	**7)**	**8)**	**9)**	**10)**
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
Total										

Student Off-Task Behaviors: **D**-Distracted **I**-Interrupting **N**-Taking care of needs **T**-Talking **Tx**-Texting **W**-Waiting **Z**-Dozing
Learning Activity: **C**-Cooperative Groups **G**-Games **In**-Instruction **IW**-Independent Work **O**-Organizing **Q/A**-Question/Answer/Discussion **R**-Reading **Tr**-Transitions

Fixed Category Observation Record, Page 3

Instructions: I. Record the number of off-task behaviors that occurred during each observation.
II. Record the number of times each off-task behavior occurred.
III. Record the number of off-task behaviors that occurred during each learning activity.

I. Interval	**Observation Round**	**# Students**
1st	**1**	
1st	**2**	
2nd	**3**	
2nd	**4**	
3rd	**5**	
3rd	**6**	
4th	**7**	
4th	**8**	
5th	**9**	
5th	**10**	
	Total	

II. Student Off-task Behavior	**# Students Eliciting Indicated Off-task Behavior**
(D) Distracted	
(I) Interrupting	
(N) Taking Care of Needs	
(T) Talking	
(**W**) Waiting	
(Z) Dozing	
(Tx) Texting	
Total	

III. Instructional Activity	**# Students Eliciting Off-task Behavior**
(C) Cooperative Groups	
(G) Games	
(In) Instruction	
(IW) Independent Work	
(O) Organizing	
(Q/A) Question/Answer/Discussion	
(R) Reading	
(Tr) Transitions	
Total	

Fixed Category Observation Record, Page 4

1. During which interval(s) in the lesson did the greatest number of off-task behaviors occur?

2. Identify the top two off-task behaviors:

3. For each interval identified in #1, record the top two off-task behaviors, the number of times they occurred, and the corresponding learning activity.

Interval	**Top Two Off-Task Behaviors**	**# times**	**Instructional Activity**

4. Name the students who were off task the most during the lesson:

APPENDIX B

FIXED CATEGORY CLASSROOM OBSERVATION

STUDENT SURVEY QUESTIONS

APPENDIX B: Fixed Category Classroom Observation Student Survey Questions

This is not a test. The statements in this survey are meant to describe this class. Your responses will be confidential—NO ONE AT OUR SCHOOL WILL KNOW YOUR RESPONSES. All student responses will be tabulated and a summary of the responses will be provided to your school.

Please respond to each of the statements in this section by filling in the oval that matches your level of agreement or disagreement with each statement. Please use a #2 pencil or ink pen to complete this survey.

The information you provide is extremely important, so please tell us how you truly feel. Thank you in advance for your participation!

Statement	Strongly Disagree	Disagree	Agree	Strongly Agree
1. I like working with other students in this class to achieve goals.	⬭	⬭	⬭	⬭
2. This teacher is prepared for class.	⬭	⬭	⬭	⬭
3. I like working in groups.	⬭	⬭	⬭	⬭
4. I am actively involved in the lessons in this class.	⬭	⬭	⬭	⬭
5. When my classmates and I have problems with each other, we try to work them out together.	⬭	⬭	⬭	⬭
6. In this class, I am frequently involved in working in groups on class projects.	⬭	⬭	⬭	⬭

APPENDIX C

FIXED CATEGORY CLASSROOM OBSERVATION

STUDENT INTERVIEW PROMPTS

APPENDIX C: Fixed Category Classroom Observation Student Interview Prompts

Students will be asked to listen to the observers' written records and of their off-task behavior during the lesson, and then will be asked to either confirm or correct observers' observations.

First, students were asked, "Today in class, we observed how students worked together in groups. We observed that you were _____< on task the entire class period, or talking, texting, waiting, taking care of needs, interrupting, distracted, or dozing)>. Is this a correct observation?"

Second, students were prompted, "Now, I will read back the survey items, and you may elaborate on your responses and explain why you chose your answer."

Third, students were prompted, "What other thoughts or opinions would you like to add about working in groups."

APPENDIX D

FIXED CATEGORY CLASSROOM OBSERVATION REFLECTION:

TEACHER AND COACH

APPENDIX D: Fixed Category Classroom Observation Coach's Reflection, Page 5

Reflect on the data analysis to identify questions and strategies that will assist the teacher in decreasing student off-task behavior.

Physical Classroom Environment Questions: Strategies:	Instructional Strategies/Procedures Questions: Strategies:
Time/Organizational Management Questions: Strategies:	Student Discipline Management Questions: Strategies:
Date:	Teacher:
Coach:	Class Period Observed:
Coaching Start Time:	Coaching End Time:

Appendix D: Fixed Category Classroom Observation Teacher's Reflection, Page 6

Reflect on the data analysis to identify specific changes that you will make to maximize student learning and decrease student off-task behavior. Refer to specific behaviors that you want to eliminate or reinforce.

Physical Classroom Environment Reflections: Actions to Take:	Instructional Strategies/Procedures Reflections: Actions to Take:
Time/Organizational Management Reflections: Actions to Take:	Student Discipline Management Reflections: Actions to Take:
Date:	Teacher:
Coach:	Class Period Observed:
Coaching Start Time:	Coaching End Time:

APPENDIX E

TEACHER CONSENT TO PARTICIPATE IN A RESEARCH STUDY

APPENDIX E: Teacher Consent to Participate in a Research Study

UNIVERSITY OF HOUSTON
CONSENT TO PARTICIPATE IN RESEARCH

TEACHER CONSENT TO PARTICIPATE IN A RESEARCH STUDY

PROJECT TITLE:

A Case Study of the Effects of Teacher Management of Cooperative Learning on Student On-/Off-task Engagement in Five High School Mathematics Classrooms.

You are invited to participate in a research project conducted by Mrs. Monica Kendall, the Manager of Secondary Mathematics for Houston ISD, who is also a doctoral student in the College of Education at the University of Houston. This project will be conducted as part of Mrs. Kendall's doctoral thesis under the supervision of Dr. H. Jerome Freiberg, Professor of Education at the University of Houston.

NON-PARTICIPATION STATEMENT

Your participation is voluntary and you may refuse to participate or withdraw at any time without penalty or loss of benefits to which you are otherwise entitled. You may also refuse to answer any question. In addition, your students' participation is voluntary and your students may refuse to participate or withdraw at any time without penalty or loss of benefits to which they are otherwise entitled. Your students may also refuse to answer any questions.

PURPOSE OF THE STUDY

We believe that when students learn in cooperative groups with other students, they are able to help each other learn more mathematics. In our research, first we want to learn about how teachers' classroom management affects how students learn in cooperative groups. Second, we want to gain insight into what students are thinking about during a lesson that involves cooperative learning.

PROCEDURES

This study will be conducted over a three-month period during the 2010-2011 school year. A total of five teachers and approximately 150 students from five high schools in Houston ISD will be asked to participate in this project. Your students will be approximately 30 of these 150 students.

You will be asked to teach three lessons that involve cooperative learning groups. Researchers will be in the class to observe and audiorecord each lesson. Each lesson should be designed to last about 50 minutes. After each lesson, Mrs. Kendall will present the observation data to you in a debriefing/coaching session, which should last about 50 minutes. Each debriefing/coaching session will take place in your classroom or other room of your choice at your school, and your total time commitment will be no more than 150 minutes over the duration of the study.

After each lesson, your students will be asked to answer a survey with questions about the lesson. These questions will be designed to help us understand how your students work together in cooperative groups. It should take your students about 10 minutes to complete the survey questions.

Five students in your class will be selected at random to participate in audiorecorded interviews (audio recordings will be stored in a water- and fire-resistant safe box in this researcher's home office, and then will be destroyed after three years). The interview questions will help to understand what your students were thinking while working in cooperative groups. You will neither listen to nor participate in the interviews. The interview will take place in a classroom at your school and will last no more than 10 minutes.

CONFIDENTIALITY

Confidentiality of your participation and your students' participation in this project will be maintained as follows: your name and each student's name will be paired with a code number, and this code number will appear on all written materials. The list pairing each participant's name to the assigned code number will be kept separate from all research materials and will be available only to the Mrs. Kendall.

RISKS/DISCOMFORTS

First, if your students are not accustomed to learning in cooperative groups, they may experience new interaction patterns. You will be asked to remain flexible in your response to students' behavior in these new cooperative settings.

Second, if you are not accustomed to other professionals observing your teaching and offering coaching to help you reflect on your practice, you may feel shy at first. Remember that <u>you do not have to answer any questions that make you feel uncomfortable</u>.

Finally, only the researchers and Mrs. Kendall have access to the data collected in this study. If we share your responses or your students' responses with others, we will remove everyone's names so that <u>no one</u>—you, administrators, or parents—will know the responses came from a particular teacher, student, or school. <u>The identity of the school/district, students, and teacher will remain confidential</u>.

BENEFITS

What we learn from this research may help to design learning activities that will engage students during cooperative learning activities. In addition, you and your students will have the opportunity to participate in the research process.

ALTERNATIVES

Either you or your students can choose at any time to not participate in this study. You and your students may choose to not answer any question with which you or they are uncomfortable in answering.

PUBLICATION STATEMENT

The results of this study may be published in professional and/or scientific journals. They may also be used for educational purposes or for professional presentations. However, the identity of the school/district, students, and teacher will remain confidential.

SUBJECT RIGHTS

1. I understand that informed consent is required of all persons participating in this project.
2. All procedures have been explained to me and all my questions have been answered to my satisfaction.
3. Any risks and/or discomforts have been explained to me.
4. Any benefits have been explained to me.
5. I understand that, if I have any questions, I may contact Mrs. Monica Kendall at 713.556.7133. I may also contact Dr. H. Jerome Freiberg, faculty sponsor, at 713.743.4953.
6. I have been told that I may refuse to participate or to stop my participation in this project at any time before or during the project. I may also refuse to answer any question.
7. This project has been reviewed by the University of Houston Committee for the Protection of Human Subjects 713.743.9204.

ANY QUESTIONS REGARDING MY RIGHTS AS A RESEARCH SUBJECT MAY BE ADDRESSED TO THE UNIVERSITY OF HOUSTON COMMITTEE FOR THE PROTECTION OF HUMAN SUBJECTS (713.743.9204). ALL RESEARCH PROJECTS THAT ARE CARRIED OUT BY INVESTIGATORS AT THE UNIVERSITY OF HOUSTON ARE GOVERNED BY REQUIREMENTS OF THE UNIVERSITY AND THE FEDERAL GOVERNMENT.

All information that is obtained in connection with this project and that can be identified with me will remain confidential as far as possible within legal limits. Information gained from this study that can be identified with me may be released to no one other than Mrs. Kendall and Dr. Freiberg. The results may be published in scientific journals, professional publications, or educational presentations without identifying me by name.

I HAVE READ (OR HAVE HAD READ TO ME) THE CONTENTS OF THIS CONSENT FORM AND HAVE BEEN ENCOURAGED TO ASK QUESTIONS. I HAVE RECEIVED ANSWERS TO MY QUESTIONS. I GIVE MY CONSENT TO PARTICIPATE IN THIS STUDY. I HAVE RECEIVED (OR WILL RECEIVE) A COPY OF THIS FORM FOR MY RECORDS AND FUTURE REFERENCE.

Study Subject (print name): ____

Signature of Study Subject: ____

Date: ________________________

I HAVE READ THIS FORM TO THE SUBJECT AND/OR THE SUBJECT HAS READ THIS FORM. AN EXPLANATION OF THE RESEARCH WAS GIVEN AND QUESTIONS FROM THE SUBJECT WERE SOLICITED AND ANSWERED TO THE SUBJECT'S SATISFACTION. IN MY JUDGMENT, THE SUBJECT HAS DEMONSTRATED COMPREHENSION OF THE INFORMATION.

Principal Investigator (print name and title): ____________________________________

Signature of Principal Investigator: ____

Date: _______________________

APPENDIX F

STUDENT ASSENT TO PARTICIPATE IN A RESEARCH STUDY

APPENDIX F: Student Assent to Participate in a Research Study

UNIVERSITY OF HOUSTON

STUDENT ASSENT TO PARTICIPATE IN A RESEARCH STUDY

PROJECT TITLE:

A Case Study of the Effects of Teacher Management of Cooperative Learning on Student On-/Off-task Engagement in Five High School Mathematics Classrooms.

You are invited to participate in a research study conducted by Mrs. Monica Kendall, the Manager of Secondary Mathematics for Houston ISD, who is also a doctoral student at the University of Houston. You can say no if you do not want to participate in this study. If you agree to participate in the study now, but change your mind about it later, you can stop being in the study, and no one will be mad at you.

WHAT IS RESEARCH?

Research is a way to learn information about something. Researchers study different subjects in the same way that you study English or math as a subject in school. There are many reasons people choose to be in a research study. Sometimes people want to help researchers learn about ways to help people or make programs better.

You should understand why you would say yes to being a research participant. Take the time you need to decide if you want to be in this study. You can ask Mrs. Kendall and your math teacher any question you have about the study.

WHY ARE WE DOING THIS RESEARCH?

We believe that when students learn in cooperative groups with other students, they are able to help each other learn more mathematics. In our research, we want to learn about how teachers' classroom management affects how students learn in cooperative groups.

WHAT WILL HAPPEN DURING THE STUDY?

A total of approximately 150 students from five high schools in Houston ISD will be asked to participate in this project. You will be one of approximately 30 students asked to participate at this campus.

Your math teacher will be asked to teach three lessons that involve cooperative learning groups. Researchers will be in the class to observe and audiorecord the lesson. Each lesson will last about 50 minutes. After each lesson, Mrs. Kendall will present the observation data to the teacher in a debriefing/coaching session, which should last about 50 minutes. Each debriefing/coaching session will take place in the teacher's classroom or other room of his/her choice at your school, and the total time commitment for the teacher will be no more than 150 minutes over the duration of the study.

After each lesson, you will be asked to answer some survey questions, which will help us understand how groups worked together throughout the lesson. It should take about 10 minutes to answer the survey questions.

Then, five students in your class will be selected at random to participate in audiorecorded interviews (audio recordings will be stored in a water- and fire-resistant safe box in this researcher's home office, and then will be destroyed after three years). You may or may not be selected to participate in the interview. The interview questions will help to clarify your survey responses and will help us to understand your thinking throughout the lesson. Your teacher will neither listen to nor participate in the interview. The interview will take place in a classroom at your school and will last no more than10 minutes.

COULD GOOD THINGS HAPPEN TO ME FROM BEING IN THIS STUDY?

Yes. You will learn about the research process, and your participation may inform mathematics teaching and learning.

COULD BAD THINGS HAPPEN TO ME FROM BEING IN THIS STUDY?

No. First, no penalties will result from your participation in this research study. Second, you do not have to answer any questions that make you feel uncomfortable.

Finally, only the University of Houston researchers and Mrs. Kendall will read your survey answers and hear your interview responses. If we share your responses with others, we will remove your name so that no one—teachers, administrators, or parents—will know the responses came from you. Your identity will remain confidential.

DO I HAVE OTHER CHOICES?

Yes. You can choose at any time to not participate in this study. If at any time you choose not to participate, you will not be penalized.

WHAT IF I HAVE QUESTIONS?

If you have any questions or worries about the research, you can ask Mrs. Kendall at 713.556.7133 before, during, or after your completion of the survey and interview. If you wish to talk to someone else or have questions about your rights as a participant, call the University of Houston Committee for the Protection of Human Subjects at 713.743.9204.

DOCUMENTATION OF PARTICIPANT'S ASSENT

I agree to participate in this study called: A Case Study of the Effects of Teacher Management of Cooperative Learning on Student On-/Off-task Engagement in Five High School Mathematics Classrooms. This project has been reviewed by the University of Houston Committee for the Protection of Human Subjects (713.743.9204).

YES__________ NO__________

I agree to participate in the audiorecorded interview:

YES__________ NO__________

Signature of minor participant: ____

ANY QUESTIONS REGARDING MY RIGHTS AS A RESEARCH SUBJECT MAY BE ADDRESSED TO THE UNIVERSITY OF HOUSTON COMMITTEE FOR THE PROTECTION OF HUMAN SUBJECTS (713.743.9204). ALL RESEARCH PROJECTS THAT ARE CARRIED OUT BY INVESTIGATORS AT THE UNIVERSITY OF HOUSTON ARE GOVERNED BY REQUIREMENTS OF THE UNIVERSITY AND THE FEDERAL GOVERNMENT.

APPENDIX G

PARENTAL CONSENT TO PARTICIPATE IN A RESEARCH STUDY

APPENDIX G: Parental Consent to Participate in a Research Study

UNIVERSITY OF HOUSTON
CONSENT TO PARTICIPATE IN RESEARCH
PARENTAL PERMISSION FOR STUDENT'S PARTICIPATION IN A RESEARCH STUDY

PROJECT TITLE:
A Case Study of the Effects of Teacher Management of Cooperative Learning on Student On-/Off-task Engagement in Five High School Mathematics Classrooms.

Your child is invited to participate in a research project conducted by Mrs. Monica Kendall, the Manager of Secondary Mathematics for Houston ISD, who is also a doctoral student in the College of Education at the University of Houston. This project is will be conducted as part of Mrs. Kendall's doctoral thesis under the supervision of Dr. H. Jerome Freiberg, Professor of Education at the University of Houston.

NON-PARTICIPATION STATEMENT
Your child's participation is voluntary and you or your child may refuse to participate or withdraw at any time without penalty or loss of benefits to which your child is otherwise entitled. Your child may also refuse to answer any questions he/she does not wish to answer.

PURPOSE OF THE STUDY
We believe that when students learn in cooperative groups with their peers, they are able to help each other learn more mathematics. In our research, we want to learn about how teachers' classroom management affects how students learn in cooperative groups.

PROCEDURES
This study will be conducted over a three-month period during the 2010-2011 school year.

A total of approximately 150 children from five high schools in Houston ISD will be asked to participate in this project. Your child will be one of approximately 30 students asked to participate at this campus.

Your child's math teacher will be asked to teach three lessons that involve cooperative learning groups. Researchers will be in the class to observe and audiorecord the lesson. Each lesson will last about 50 minutes. After each lesson, Mrs. Kendall will present the observation data to the teacher in a debriefing/coaching session, which should last about 50 minutes. Each debriefing/coaching session will take place in the teacher's classroom or other room of his/her choice at your child's school, and the total time commitment for the teacher will be no more than 150 minutes over the duration of the study.

After each lesson, your child will be asked to answer survey questions about the lesson. These questions will be designed to help us understand how students work in cooperative groups. The survey should take about 10 minutes to complete.

Then, five students will be selected at random to participate in audiorecord interviews (audio recordings will be stored in a water- and fire-resistant safe box in this researcher's home office, and then will be destroyed after three years). Your child may or may not be selected to participate in the interview. The interview questions will help to clarify students' survey responses and will help us to understand how student groups work together. The teacher will neither listen to nor participate in the interview. The interview will take place in a classroom at your child's school and will last no more than 10 minutes.

CONFIDENTIALITY

Confidentiality of your child's participation in this project will be maintained as follows: your child's name will be paired with a code number. This code number will appear on all written materials. The list pairing of your child's name to the assigned code number will be kept separate from all research materials and will be available only to the Mrs. Kendall.

RISKS/DISCOMFORTS

First, your child will encounter no penalties as a result of participation in this research study.

Second, he/she does not have to answer any questions that make him/her feel uncomfortable.

Third, only the University of Houston researchers and Mrs. Kendall will read your child's survey answers and hear his/her interview responses. If we share his/her responses with others, we will remove his/her name so that no one—teachers, administrators, or parents—will know the responses came from him/her. Your child's identity will remain confidential.

BENEFITS

We believe that when students are on-task and engaged in the lesson activities, and when they are helping each other learn in cooperative groups, they will learn more mathematics. What we learn from this research may assist in the design of learning activities that will engage your child in learning mathematics. In addition, as a result of participating in this study, your child will learn about the research process.

ALTERNATIVES

Either you or your child can choose for your child to not participate in this study, and the choice to not participate can be made without penalty at any time before or during the study.

PUBLICATION STATEMENT

The results of this study may be published in professional and/or scientific journals. They may also be used for educational purposes or for professional presentations. However, your child's identity will not be revealed at any time and will remain confidential.

SUBJECT RIGHTS

1. I understand that parental consent is required of all persons under the age of 18 participating in this project. I understand that my child will also be asked to agree to participate.
2. All procedures have been explained to me and I have been provided an opportunity to ask any questions I might have regarding my child's participation.
3. Any risks and/or discomforts have been explained to me.
4. Any benefits have been explained to me.
5. I understand that, if I have any questions, I may contact Mrs. Monica Kendall at 713.556.7133. I may also contact Dr. H. Jerome Freiberg, faculty sponsor, at 713.743.4953.
6. I have been told that my child or I may refuse to participate or to stop his/her participation in this project at any time before or during the project. My child may also refuse to answer any question.
7. ANY QUESTIONS REGARDING MY RIGHTS AS A RESEARCH SUBJECT MAY BE ADDRESSED TO THE UNIVERSITY OF HOUSTON COMMITTEE FOR THE PROTECTION OF HUMAN SUBJECTS (713.743.9204). ALL RESEARCH PROJECTS THAT ARE CARRIED OUT BY INVESTIGATORS AT THE UNIVERSITY OF HOUSTON ARE GOVERNED BY REQUIREMENTS OF THE UNIVERSITY AND THE FEDERAL GOVERNMENT.
8. All information that is obtained in connection with this project and that can be identified with my student will remain confidential as far as possible within legal limits. Information gained from this study that can be identified with my child may be released to no one other than the Mrs. Kendall and Dr. Freiberg. The results may be published in scientific journals, professional publications, or educational presentations without identifying my child by name.
9. This project has been reviewed by the University of Houston Committee for the Protection of Human Subjects (713.743.9204).

NAME OF STUDENT: ____

I agree to allow my child to participate in this research project:

YES__________ NO__________

I agree to allow my child to participate in the audiorecorded interview:

YES__________ NO__________

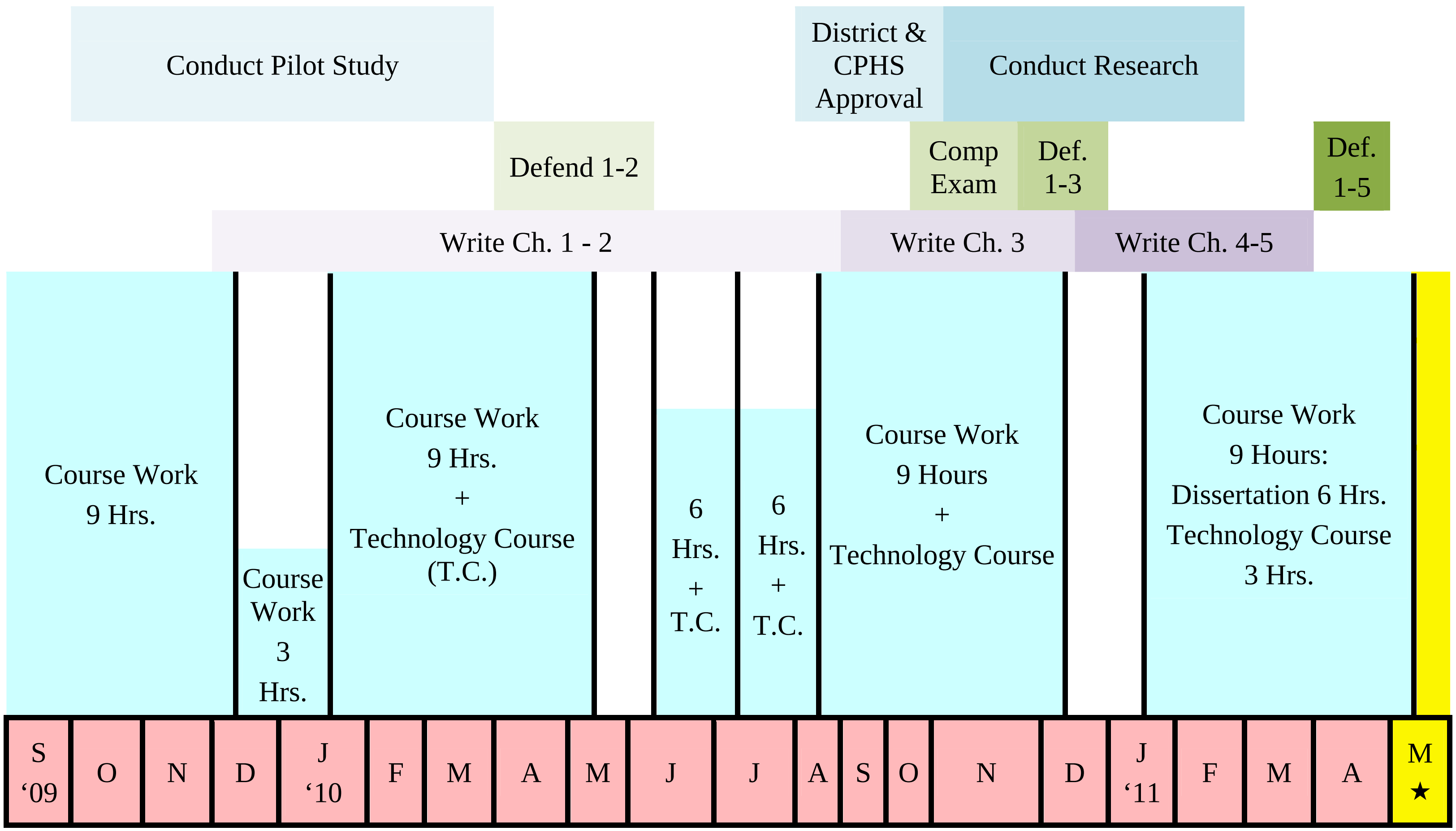
Signature of Parent/Guardian: ____

APPENDIX H

OVERVIEW OF THE RESEARCH TIMELINE

APPENDIX H: Overview of the Research Timeline

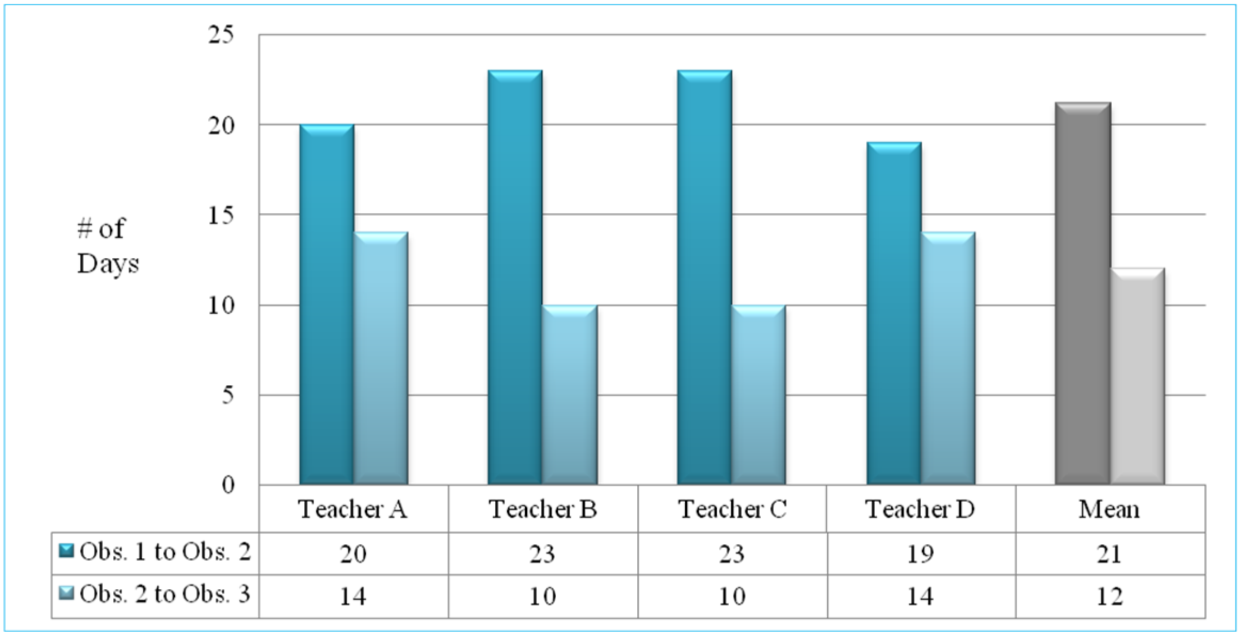
Timeline for Completion of Doctoral Research and Thesis



APPENDIX I

THE NUMBER OF ELAPSED INSTRUCTIONAL DAYS BETWEEN OBSERVATIONS

APPENDIX I: The Number of Elapsed Instructional Days between Observations



	Teacher A	Teacher B	Teacher C	Teacher D	Mean
Obs. 1 to Obs. 2	20	23	23	19	21
Obs. 2 to Obs. 3	14	10	10	14	12

Figure 6. The number of elapsed instructional days between observations for each teacher[a].

[a] The fifth teacher (E) was observed only once and thus not included in this figure.

APPENDIX J

LOCATION, TIME OF THE SCHOOL DAY, AND LENGTH OF EACH

DEBRIEFING/COACHING SESSION

APPENDIX J: Location, Time of the School Day, and Length of Each Debriefing/Coaching Session

Table 15

Location, Time of the School Day, and Length of Each Debriefing/Coaching Session

Teacher	Observation	Location of Debriefing/Coaching Session	Time of the School Day during which Session was Conducted	Session Length (in minutes)	Mean Session Length
A	1	Teacher’s Classroom	Teacher’s Planning Period	20	
	2	Teacher’s Classroom	Teacher’s Planning Period	25	
	3	Teacher’s Classroom	Teacher’s Planning Period	40	28
B	1	Teacher’s Classroom	Teacher’s Planning Period	40	
	2	Teacher’s Classroom	Teacher’s Planning Period	25	
	3	Teacher’s Classroom	Teacher’s Planning Period	45	37
C	1	Teacher’s Classroom	Immediately After School	55	
	2	Hallway	Next Class Period	30	
	3	Teacher’s Classroom	Immediately After School	25	37
D	1	Teacher’s Classroom	Teacher’s Planning Period	30	
	2	Teacher’s Classroom	Teacher’s Planning Period	25	
	3	Teacher’s Classroom	Teacher’s Planning Period	25	
E[a]	1	Teacher’s Classroom	Immediately After School	40	40
Mean A - E					33

[a]Teacher E was observed only one time and then withdrew from the study.

APPENDIX K

TEACHER A OBSERVATION DATA AND DEBRIEFING/COACHING SESSIONS

APPENDIX K: Teacher A Observation Data and Debriefing/Coaching Sessions

Observation 1 context. My activity during this 90-minute class proceeded in the following manner:

Minutes 0 – 6:	The third-party observer and I waited for class to begin.
Minutes 7 – 47:	The third-party observer conducted the classroom observation (10 four-minute rounds).
Minutes 48 – 55:	I administered and collected the student survey.
Minutes 56 – 82:	I organized observation data, set up interview space, and conducted sequential interviews in the hallway outside the classroom.
Minutes 82 – 90:	I began preparations for the post-observation debriefing/coaching session with the teacher by analyzing observation data using the "Fixed Category Observation Record" (see Appendix A).

Post-observation debriefing.

Presentation of the observation data. After our individual written reflections had been completed, I shared with the teacher the observation data presented in Table 16 and the "Fixed Category Observation Record" (see Appendix A), which included the following analysis of the observation data:

1. *During which intervals in the lesson did the greatest number of off-task behaviors occur?* The fourth interval (observation rounds 7 and 8) had a total of 14 off-task behaviors.
2. *Identify the top two off-task behaviors.* Of the 34 off-task behaviors observed during this lesson, two occurred during cooperative learning and 32 occurred during other

instructional activities. The top two off-task behaviors observed were talking, which was observed 17 times, and waiting and texting were each observed seven times.

3. *For each interval identified in #1, record the top two off-task behaviors, the number of times they occurred, and the corresponding learning activity*. In the fourth interval (observation rounds 7 and 8), talking was observed once during instruction and four times during transition time, while waiting occurred seven times during transition time.
4. *Name the students who were off task the most during the lesson*. (Names are omitted to preserve student confidentiality.) One student was off task seven times, one student was off task five times, two students were off task three times, four students were off task two times, eight students were off task once, and nine students were not observed as off task.
5. *Record anything else that could impact instruction or student performance.* When the bell rang to begin class, no students were present. It took students about seven minutes to enter class and begin the warm-up assignment. The teacher did not seem surprised about the instances of students talking (17) and texting (seven) throughout the lesson and correctly predicted the students who talked and texted the most, but did seem surprised at the instances of waiting (seven), especially during the transition time from the warm-up to the cooperative activity. The teacher admitted that this was due to not having the materials ready for the activity and did not fully realize the impact this would have on student behavior. However, once it began, there were only two instances of off-task behavior (talking) during the cooperative activity; during the last four minutes of the observation, no off-task behaviors were observed.

Reflection sharing. Once the observation data were shared with the teacher, the teacher and I shared our reflections with each other (see Table 25).

Physical classroom environment. The physical classroom environment was ready for and conducive to cooperative learning: the desks were set in groups of four, and the classroom climate was inviting. Student cooperative group products were proudly displayed around the room. While the teacher stated, “I should post more posters and student work,” s/he really just needed to update the walls with recent work.

Instructional strategies/procedures. I asked the teachers to structure their lessons so that the cooperative group activity would occur during the first 40 minutes of the class period so that it could be observed during the window of time planned for the 10 four-minute observation rounds. However, this teacher spent time during the warm-up cutting up the cards for the cooperative activity. The fact that the activity was not ready explains why the cooperative activity did not start until 32 minutes into class.

Being prepared with organized materials increases the amount of time spent on learning (Stronge, 2007). I suggested to the teacher that all materials be ready as soon as students entered the room, but the teacher responded that the machine s/he needed to make the cards for the activity was not available. The warm-up took 28 minutes for the students to complete and the teacher to review. If the warm-up had taken only 10 minutes to complete and review, an additional 18 minutes could have been available for learning new content. Under the “Discipline Management” section of the reflection page, the teacher noted that students were frequently asking to leave class to take care of their needs. I suggested that the teacher look at the situation from the students’ perspective: not having materials ready caused the students to wait, so students took advantage of the down time to take care of their needs. Therefore, one action that the teacher promised to take was to “be better prepared” so that students would see the need for remaining on task throughout the lesson.

Table 25

Teacher A and Coach Reflections Observation 1

Reflection Category	Teacher's Written Reflections and Actions to Take	Coach's Written Questions and Strategies
Physical Classroom Environment	**Reflection**: "I think the physical classroom environment was inviting." **Action**: "I should post more posters and student work."	**Question**: None needed; the classroom and physical environment were conducive to cooperative learning. **Strategy**: None.
Instructional Strategies/ Procedures	**Reflection**: "I didn't have the cards cut (for the cooperative activity) because only one machine can make the card stocks. That machine was not available until this morning." **Action**: "Be better prepared."	**Question**: What could be done during transition time to minimize "waiting"? **Strategy**: Have the handouts and materials ready as soon as students enter the room.
Time/ Organizational Management	**Reflection**: "I allow a two minute grace period because of the tardy issues we have at this school. I should start class immediately when the tardy bell rings." **Action**: "I should provide students with a warm-up and have it available to them when they first walk in the door."	**Question**: What could be done during independent work time (warm-up) to engage the students and shorten the time? **Strategy**: Allow students to work with their partner; make the warm-up into a puzzle format so that students will be motivated to work the puzzle and get the answer in a given period of time.
Discipline Management	**Reflection**: "Some students get off task easily, but with encouragement they start to refocus." **Action**: "At the beginning of the year, I told them to take care of their personal needs prior to getting in class. I need to stick to my original plan."	**Question**: What could be done during instructional time to minimize talking? **Strategy**: Use proximity to get closer to the students instead of standing at the board and ask students to put their work up on the board.

Time/organizational management. I asked the teacher, “What could be done during independent work time (warm-up) to engage the students and shorten the time?” After nearly a semester of allowing students to be five to seven minutes late to class, getting students to arrive on time could prove to be a challenge. The teacher admitted, “I should start class immediately when the tardy bell rings.” In addition, I suggested allowing students to work with their partner on the warm-up, or making the warm-up into a puzzle or game format so that they will be motivated to arrive to class on time and be engaged in the warm-up activity. The teacher mentioned that s/he needed “tighter classroom management” and vowed to take action with regard to starting class on time and being prepared with materials needed for the lesson.

Discipline management. The most frequently occurring off-task behavior observed in this lesson was talking. I asked, “What could be done during instructional time to minimize talking?” During the conversation, the teacher mentioned, “Some students get off task easily, but with encouragement, they start to refocus.” One strategy that I suggested was to use proximity to get closer to the students and to have students put their work up on the board so that the teacher does not have to be tied to the front of the room. This teacher noted the need to be more consistent in his/her discipline management and acknowledged, “I need to stick with my original plan.”

Observation 2 context. My activity during this 90-minute class proceeded in the following manner:

Minutes 0 – 9: The third-party observer and I waited for the students to arrive and for the teacher to distribute materials.

Minutes 10 – 50: The third-party observer conducted the classroom observation (10 four-minute rounds).

Minutes 60 – 65: I administered and collected the student survey.

Minutes 71 – 90: I organized observation data, set up interview space, and conducted sequential interviews in the hallway outside the classroom.

Post-observation debriefing.

Presentation of the observation data. After our individual written reflections had been completed, I shared with the teacher the observation data presented in Table 16 and the "Fixed Category Observation Record" (see Appendix A), which included the following analysis of the observation data:

1. *During which intervals in the lesson did the greatest number of off-task behaviors occur?* The third interval (observation rounds 5 and 6) had a total of 16 off-task behaviors.
2. *Identify the top two off-task behaviors.* Of the 37 off-task behaviors observed during this lesson, 35 occurred during cooperative learning and two occurred during other instructional activities. The top two off-task behaviors observed were talking, which was observed 15 times, and distracted behavior and texting, which were each observed eight times.
3. *For each interval identified in #1, record the top two off-task behaviors, the number of times they occurred, and the corresponding learning activity.* In the third interval (observation rounds 5 and 6), talking was observed five times and distracted behavior was observed four times, both during cooperative learning.
4. *Name the students who were off task the most during the lesson.* (Names are omitted to preserve student confidentiality.) One student was off task five times, two students were

off task four times, four students were off task three times, four students were off task two times, four students were off task once, and seven students were not observed as off task.

5. *Record anything else that could impact instruction or student performance.* The teacher did not begin instruction until 10 minutes into the class period, as some students were not present when the bell rang to begin class. In addition, due to the semester change, five new students were entered and seven students were transferred to another class. Finally, students were asked to use manipulatives that the teacher assumed they knew how to use, but it was evident that many had no prior knowledge of these manipulatives.

A comparison of the number of off-task behaviors during cooperative learning from Observation 1 to Observation 2 revealed the following:

- Each type of off-task behavior showed an increase from Observation 1 to Observation 2.
- The number of off-task behaviors during cooperative learning increased from two in Observation 1 to 35 in Observation 2.The number off-task behaviors during cooperative learning increased from approximately 0.33 off-task behaviors per group of four students in Observation 1 to approximately 6.36 off-task behaviors per group of four students in Observation 2.

Reflection sharing. Once the observation data were shared with the teacher, the teacher and I shared our reflections with each other (see Table 26).

Physical classroom environment and instructional strategies/procedures. I have combined these two categories for analysis purposes because in this observation, the physical classroom environment and the instructional strategies and procedures were extensively intertwined. The physical classroom environment was friendly and students were noticeably more at ease when learning in groups as opposed to answering questions from the teacher during direct instruction.

The fact that the desks were arranged in groups of four allowed students to help each other navigate through and teach each other the manipulative activity while allowing the teacher to walk around and help the groups. I asked the teacher how the groups were formed and suggested that s/he try allowing students to choose a partner and placing partners with others to form groups of four. By assigning student pairs to groups of four, and by giving students role responsibilities, the teacher could reduce off-task talking and help students to focus while allowing them some control over their choice of partner.

In addition, this lesson engaged students in the learning of new content while using a cooperative learning structure with which students were unfamiliar. “The lesson…must match the learner, content, and context of the teaching situation. Designing a lesson that ignores the needs and previous learnings of the students or that poorly integrates the content with the strategies is doomed to failure” (Freiberg & Driscoll, 2005, p. 43). Since planning facilitates both management and instruction, this teacher could plan to access students’ background knowledge: for example, at the end of the one lesson, the teacher could give students a preview of the next lesson and check in advance for their background knowledge of the particular manipulatives that would be used in the next lesson. In this way, the teacher would be informed to match the appropriate learning strategies to the students’ abilities and prior knowledge (Stronge, 2007).

Table 26

Teacher A and Coach Reflections Observation 2

Reflection Category	Teacher's Written Reflections and Actions to Take	Coach's Written Questions and Strategies
Physical Classroom Environment	**Reflection**: "The desks were in groups of four and the students were allowed to work together." **Action**: "I should consider grouping the students myself and not always allow the students to pick their own groups."	**Question**: Do you always allow students to choose their own seats? **Strategy**: Allow students to choose a partner, and then place the partners into groups of your choosing.
Instructional Strategies/ Procedures	**Reflection**: "I incorporated hands-on manipulatives. The students worked in groups and used these manipulatives together." **Action**: "I would like to use more real-world problems to bring a connection to what the students are learning."	**Question**: How could you plan in advance for students who had not used these manipulatives before? **Strategy**: Ask students in advance if they have used these manipulatives. In general, at the end of a lesson, give students a preview of the next lesson and check for their background knowledge.
Time/ Organizational Management	**Reflection**: "The material and manipulatives were ready when the students came in the door. I should have pushed the students to work a little harder and not be off task." **Action**: "I can be more consistent with making sure the students are finishing their work in a timely manner."	**Question**: Is tardiness a school-wide problem? **Strategy**: Begin class when the bell rings and give incentives for attending on time; this will add back all of the time for instruction.
Discipline Management	**Reflection**: "Some students were off task at some point but for the most part, they worked really well. I had to redirect several students several times." **Action**: "I should have consequences available for the students who have to be constantly reminded of their behavior."	**Question**: What is your policy on texting? **Strategy**: Use texting in a cooperative environment so that students can help each other. Then, have everyone turn off their phones and turn them over on top of the desk when texting time is over.

Time/organizational management. The teacher reported that s/he made one change from Observation 1 to Observation 2: the manipulatives and materials were out on the desks and ready for student use as soon as they entered the classroom. Most students started looking through the materials and began working on the tasks before the teacher gave formal directions. The teacher agreed that the students were to be commended for helping each other learn how to use the manipulatives. Yet, the number of off-task behaviors increased from Observation 1 to Observation 2. The teacher stated, “I can be more consistent with making sure the students are finishing their work in a timely manner.” Since many students were still not on time to class, I inquired, “Is tardiness a school-wide problem?” I asked this question so that the teacher would not feel defensive if it were not a school-wide problem, but s/he explained that it was. Thus, I suggested that one way to help students to finish their work in a timely manner is to “Begin class when the bell rings and give incentives for attending on time; this will add back all of the time for instruction.” The teacher resolved to take action to get more students to class on time in order to increase instructional time.

Discipline management. Even though students finished the task and were successful in learning the objective for the lesson, a considerable number of students were off task. The teacher and I discussed how much more time could be saved by students staying on task and finishing earlier, thus allowing the teacher to cover more material in the same time period. The teacher reflected, “I should have consequences available for the students who have to be constantly reminded of their behavior.” I responded that the length of the activity made it difficult for students to stay focused and they showed this by engaging in distractions, such as texting, from time to time. Planned mental breaks, such as think-pair-share or putting work up on the board, might break the activity into manageable chunks for the students. A strategy for dealing with excessive texting is to make it a “legal” activity by using it as a planned form of collaboration between groups.

This teacher mentioned a strategy that could reduce student off-task behavior when s/he wrote, “I would like to use more real-world problems to bring a connection to what the students are learning.” It is important to incorporate real-world experiences that are “culturally and contextually relevant” into instruction in order to make new learning experiences more applicable to students’ daily lives (Blank & Kershaw, 2008, p. 155).

Observation 3 context. My activity during this 90-minute class proceeded in the following manner:

Minutes 0 – 9:	The third-party observer and I waited for the teacher to complete organizational duties and to prepare a seating chart for the observer to use.
Minutes 10 – 50:	The third-party observer conducted the classroom observation (10 four-minute rounds).
Minutes 55 – 60:	I administered and collected the student survey.
Minutes 66 – 89:	I organized observation data, set up interview space, and conducted sequential interviews in the hallway outside the classroom.

Post-observation debriefing.

Presentation of the observation data. After our individual written reflections had been completed, I shared with the teacher the observation data presented in Table 16 and the “Fixed Category Observation Record” (see Appendix A), which included the following analysis of the observation data:

During which intervals in the lesson did the greatest number of off-task behaviors occur? The second interval (observation rounds 3 and 4) had a total of 15 off-task behaviors.

1. *Identify the top two off-task behaviors.* Of the 47 off-task behaviors observed during this lesson, 28 occurred during cooperative learning and 19 occurred during other instructional activities. The top two off-task behaviors observed were talking, which was observed 25 times, and texting occurred 17 times.
2. *For each interval identified in #1, record the top two off-task behaviors, the number of times they occurred, and the corresponding learning activity*. In the second interval (observation rounds 3 and 4), talking was observed 11 times and texting was observed four times, both during cooperative learning.
3. *Name the students who were off task the most during the lesson*. (Names are omitted to preserve student confidentiality.) One student was off task six times, three students were off task five times, two students were off task four times, one student was off task three times, five students were off task two times, five students were off task once, and nine students were not observed as off task.
4. *Record anything else that could impact instruction or student performance.* The observation did not begin until 10 minutes into the class period, as the observer waited for the teacher to organize paperwork and provide a seating chart that could be used for data collection purposes. In this lesson, the students were asked to apply what they learned from the previous class period to investigating a real-world problem. Students worked in cooperative groups to complete the task.

A comparison of the number of off-task behaviors during cooperative learning from Observation 2 to Observation 3 revealed the following:

- The instances of talking (14) in Observation 2 increased to 19 in Observation 3.
- The instances of texting (seven) remained constant from Observation 2 to 3.
- The instances of the following behaviors decreased from Observation 2 to 3: distracted (from eight to zero); waiting and texting (from two to one); and dozing (from two to zero).
- The number of off-task behaviors during cooperative learning increased from two in Observation 1 to 35 in Observation 2, and then decreased to 28 in Observation 3.
- The number of off-task behaviors per group of four students during cooperative learning increased from approximately 0.33 in Observation 1 to approximately 6.36 in Observation 2, and then decreased to approximately 4.31 in Observation 3.

Reflection sharing. Once the observation data were shared with the teacher, the teacher and I shared our reflections with each other (see Table 27).

Physical classroom environment. The students were placed in groups of four and appeared to work comfortably with their group mates to investigate the real-world problem. In the teacher's reflection, s/he wondered if it would be necessary to group students into pairs instead of into groups of four. We discussed evidence from the literature that indicates that the "complexity of the task or assignment or the magnitude of the product required of the group" should determine the size of the group (Speck, 2003, as cited in Freiberg & Driscoll, 2005, p. 305). I could see that the teacher was becoming a bit frustrated, so I asked, "What would help teachers to not become discouraged when students talk more in groups than they do during instruction?" The teacher responded that not all off-task talking could be eliminated from group activities. I agreed, and recommended that s/he may want to debrief a lesson with the students, allowing them to talk about the lesson and make suggestions for what worked, what could be improved, and what might keep them more on task.

Instructional strategies/procedures. Attempting to make the learning relevant for the students, this teacher made a change from the previous two observations and included a real-world problem for students to investigate in cooperative groups. This lesson engaged students in the learning of new content while using a cooperative learning structure with which students were unfamiliar. At first, the teacher thought that students were more off task in this lesson because they did not understand the real-world problem. However, after we discussed how the students tackled the problem, the teacher understood that the students' frustration was not with the problem, but with the mathematics. In other words, after analyzing the problem they knew what needed to be done, but were unsure of how to correctly apply the mathematics to answer the question. Eventually, students referred to the notes they had made during the previous class and were able to make their way through the problem together. As an action statement, the teacher reflected, "I should provide more guided practice with the students to help them more."

Time/organizational management. The teacher began this class when the bell rang, and unlike Observation 1, most students were present when class started. The teacher mentioned that s/he had been working on getting students to class on time by starting on time, and the students complied. The teacher realized that if students have a meaningful task to complete when they arrive, and if they have a time limit set on the warm-up, then they would try to arrive on time.

Table 27

Teacher A and Coach Reflections Observation 3

Reflection Category	Teacher's Written Reflections and Actions to Take	Coach's Written Questions and Strategies
Physical Classroom Environment	**Reflection**: "The students were in groups of fours and they were allowed to work together." **Action**: "I will change the student desks and place in groups of twos in order to have smaller groups."	**Question**: What would help teachers to not become discouraged when students talk more in groups than they do during instruction? **Strategy**: Encourage students to talk about the lesson. As long as students are productive and redirect themselves, a small degree of off-task talking is to be expected.
Instructional Strategies/ Procedures	**Reflection**: "I integrated science and a real-world problem. The students had to complete patterns and use problem solving." **Action**: "I should provide more guided practice with the students to help them more."	**Question**: When do students learn more, and when are they less off task? **Strategy**: Students may learn more in cooperative groups even though they are more off task.
Time/ Organizational Management	**Reflection**: "When the students came into the room, the warm-up was on the board. I think the time and organization was okay, but maybe a little time was wasted on handing out papers." **Action**: "I should have given the students all of the handouts at once."	**Question**: What was the effect of starting class on time today? **Strategy**: The late students saw the urgency of getting to work since the class had started without them.
Discipline Management	**Reflection**: "Some of the students were off task by talking, looking at their cell phone, and listening to their headphones." **Action**: "I should post rules identifying off task behaviors that are not acceptable."	**Question**: Is listening to music off task? Does it keep students from learning, even if they are participating? **Strategy**: Listening to music through earphones may help students stay on task.

Another change this teacher made from the second to third observation was that of breaking the lesson into smaller chunks, alternating between cooperative groups and direct instruction, during which the teacher discussed the students' progress up to that point. By listening to students each time their group discussion began after the teacher's instruction, I could hear that students were frustrated at times with the teacher's instruction breaking up their group discussion. Some students showed their frustration by behaving off task, such as talking, texting, or silently waiting for the teacher to finish.

Discipline management. It appeared to me that this teacher had in mind a "balance" point between student learning and student off-task behavior: that is, this teacher tolerated off-task behavior, especially talking and texting, which largely went uncorrected as long as students accomplished their assigned tasks. The students seemed to take more responsibility for their own and group members' learning in Observation 3, which positively reinforced this teacher's notion of "balance." They asked each other questions and discussed answers, and kept trying to learn, in spite of their frustrations. When there was disagreement, they did not automatically ask the teacher. Instead, they tried to work the problem out together.

APPENDIX L:

TEACHER B OBSERVATION DATA AND DEBRIEFING/COACHING SESSIONS

APPENDIX L: Teacher B Observation Data and Debriefing/Coaching Sessions

Observation 1 context. My activity during this 90-minute class proceeded in the following manner:

Minutes 0 – 4: The daily announcements were presented over the intercom and third-party observer and I waited for class to begin.

Minutes 5 – 45: The third-party observer conducted the classroom observation (10 four-minute rounds).

Minutes 46 – 53: I administered and collected the student survey.

Minutes 54 – 72: I organized observation data, set up interview space, and conducted sequential interviews in the walkway outside the classroom.

Minutes 73 – 90: I began preparations for the post-observation debriefing/coaching session with the teacher by analyzing observation data using the "Fixed Category Observation Record" (see Appendix A).

Post-observation debriefing.

Presentation of the observation data. After our individual written reflections had been completed, I shared with the teacher the observation data presented in Table 18 and the "Fixed Category Observation Record" (see Appendix A), which included the following analysis of the observation data:

1. *During which intervals in the lesson did the greatest number of off-task behaviors occur?* The second interval (observation rounds 3 and 4) had a total of eight off-task behaviors.
2. *Identify the top two off-task behaviors.* Of the 16 off-task behaviors observed during this lesson, 13 occurred during cooperative learning and three occurred during other

instructional activities. The highest-occurring off-task behavior was talking, which was observed 16 times and was the sole type of off-task behavior.

3. *For each interval identified in #1, record the top two off-task behaviors, the number of times they occurred, and the corresponding learning activity*. In the second interval (observation rounds 3 and 4), talking, which was the only observed off-task behavior, was observed eight times and occurred during cooperative learning.
4. *Name the students who were off task the most during the lesson*. (Names are omitted to preserve student confidentiality.) Two students were off task three times, two students were off task two times, six students were off task once, and three students were not observed as off-task.
5. *Record anything else that could impact instruction or student performance.* Students were working on practice problems for a quiz that covered "mock" high-stakes, state test items. Some students made it clear that they did not want to participate, preferring to work on the curriculum for the course. Nonetheless, the principal had mandated a series of these quizzes to help students prepare for the state test, and the teacher complied. The teacher did not seem surprised about the instances of students talking (16) throughout the lesson and correctly predicted the students who were observed as talking the most. The teacher admitted that with a small class size (13 students), s/he had a "loose" classroom management style and permitted more off-task talking as long as students completed their assignments.

Reflection sharing. Once the observation data were shared with the teacher, the teacher and I shared our reflections with each other (see Table 28).

*Physical classroom environment***.** The physical classroom environment was inviting and the teacher had nurtured a positive climate for learning. While the desks were arranged in a manner conducive for lecture or direct instruction, students on the front row could easily turn their chairs to collaborate in groups with the students behind them. Student cooperative group products from recent activities were proudly displayed around the room.

Instructional strategies/procedures and discipline management. I have combined these two categories together for purposes of this analysis since the instructional strategy directly influenced students' off-task behavior during this lesson. The most frequently occurring off-task behavior observed in this lesson was talking. I asked, "How could the activity be structured differently so that students' off-task talking is not distracting?" However, the teacher had written in his/her reflection, "The students were great; I see no discipline issues with this class." Therefore, I proceeded judiciously, since the teacher stated that talking was acceptable as long as the "work was being done."

This lesson engaged students in the review of previously learned content while using a cooperative learning structure with which students were familiar. The students were given the following task: work together on the packet of review problems for the quiz and teach each other how to solve them, with the goal being that any one student chosen at random could be able to present the problem on the board.

I asked the teacher whether the students' roles were clearly defined, as being unsure about expectations could have added anxiety to the task. "When (students) do not see the relevance in the learning, are bored, or have high anxiety over the material, (they) tend to drop out mentally" (Tileston, 2004, p. 5). Perhaps if there had been only one or two problems, then in 12 minutes they could have solved the problem and had each member of the group determine how s/he would present the solution. I noticed that once the 12-minute review period was complete and the teacher started calling students to the board, the off-task talking eventually stopped: the students felt more comfortable with their groupmates' ability to present the problem, so the anxiety of the task was reduced. Although students still had to ensure that each other could present, as their confidence in each other grew, the off-task talking decreased. While the teacher did not explicitly agree that the excessive off-task talking was disruptive, s/he did agree that it was a sign that the instruction needed be modified.

*Time/organizational management***.** After the lesson, I conducted student interviews on the walkway outside the classroom, and then returned to the classroom. There were about 17 minutes remaining until the end of class. Students had just finished their quiz and were chatting quietly at their desks with no assigned task. Given the importance of maximizing instructional time and student on-task behavior to student achievement (Marzano, 2007), I asked the teacher, "How could you make more effective use of the end of the class time?" The teacher responded, "I need a handy sponge activity that is fun enough that students will still do it even after an assessment." The teacher and I discussed that as an alternative to another activity or assignment, s/he instead could consider reading aloud to the class or having a student read aloud to the class. After the reading, the teacher could engage the students in a discussion and then have students write an Exit Ticket to reflect on the discussion. The teacher stated that s/he likes to give the students some unstructured time as a reward, but acknowledged that the students may enjoy this kind of structured time as well.

Table 28

Teacher B and Coach Reflections Observation 1

Reflection Category	Teacher's Written Reflections and Actions to Take	Coach's Written Questions and Strategies
Physical Classroom Environment	**Reflection**: "I am happy with the physical environment except that I am unable to adequately separate students for assessments." **Action**: "I can purchase or make privacy screens or dividers of some sort."	**Question**: None needed; the room was adequately arranged up for cooperative learning. **Strategy**: None.
Instructional Strategies/ Procedures	**Reflection**: "The review was effective. While this strategy seemed adequate for review, it is not a good strategy for new learning." **Action**: "I need to learn new strategies. I'll be at two days of workshops featuring (a researcher's) strategies next week."	**Question**: Were the students' tasks and roles clearly defined? **Strategy**: The students were given a list of practice problems to complete. Perhaps giving groups one or two problems at a time may help students to focus better on the task. Too many problems on which to focus may have caused some students to become off task.
Time/ Organizational Management	**Reflection**: "I was happy with the timing. The quiz was a little shorter than I expected but shorter is better than longer." **Action**: "I need a handy sponge activity that is fun enough that students will still do it even after an assessment."	**Question**: How could you make more effective use of the end of the class time? **Strategy**: The students had finished the quiz early with time remaining in the class. One suggestion for an end-of-the period sponge activity is to read aloud from math storybooks to the students.
Discipline Management	**Reflection**: "The students were great; I see no discipline issues with this class." **Action**: None.	**Question**: How could the activity be structured differently so that students' off-task talking is not distracting? **Strategy**: Give students one or two problems at a time, instead of 15 minutes to work on all problems. By shortening the time and number of problems, students will manage their time better and off-task talking will decrease.

Observation 2 context. My activity during this 90-minute class proceeded in the following manner:

Minutes 0 – 14:	The third-party observer and I waited for the daily announcements to end so that the teacher could start class.
Minutes 15 – 55:	The third-party observer conducted the classroom observation (10 four-minute rounds).
Minutes 56– 60:	I administered and collected the student survey.
Minutes 61 – 86:	I organized observation data, set up interview space, and conducted sequential interviews in the walkway outside the classroom.
Minutes 87 – 90:	I began preparations for the post-observation debriefing/coaching session with the teacher by analyzing observation data using the "Fixed Category Observation Record" (see Appendix A).

Post-observation debriefing.

Presentation of the observation data. After our individual written reflections had been completed, I shared with the teacher the observation data presented in Table 18 and the "Fixed Category Observation Record" (see Appendix A), which included the following analysis of the observation data:

1. *During which intervals in the lesson did the greatest number of off-task behaviors occur?* The fourth interval (observation rounds 7 and 8) had a total of 12 off-task behaviors.
2. *Identify the top two off-task behaviors.* Of the 35 off-task behaviors observed during this lesson, 34 occurred during cooperative learning and one occurred during other instructional activities. The highest-occurring off-task behavior was talking, which was observed 29 times, followed by waiting, which was observed four times.

3. *For each interval identified in #1, record the top two off-task behaviors, the number of times they occurred, and the corresponding learning activity.* In the fourth interval (observation rounds 7 and 8), talking occurred nine times, and waiting occurred two times.
4. *Name the students who were off task the most during the lesson.* (Names are omitted to preserve student confidentiality.) Four students were off task five times, one student was off task four times, four students were off task two times, three students were off task once, and three students were not observed as off task.
5. *Record anything else that could impact instruction or student performance.* The teacher employed a new cooperative learning structure s/he learned from a training the week before, that of students making group poster presentations to the class on the assigned cooperative task.

A comparison of the number of off-task behaviors during cooperative learning from Observation 1 to Observation 2 revealed the following:

- The instances of talking, waiting, and distracted behavior increased from 13, zero, and zero in Observation 1 to 28, four, and two, respectively in Observation 2.
- The number of off-task behaviors during cooperative learning increased from 13 in Observation 1 to 28 in Observation 2.
- The number off-task behaviors during cooperative learning increased from 4.00 off-task behaviors per group of four students in Observation 1 to approximately 9.07 off-task behaviors per group of four students in Observation 2.

Reflection sharing. Once the observation data were shared with the teacher, the teacher and I shared our reflections with each other (see Table 29).

Physical classroom environment. When the group activity began, students were placed into groups of four. Shortly thereafter, three students entered the class and eventually joined the existing groups of four to make groups of five. This required the students to move the desks around to accommodate the additional group member. Group composition is critical to the success of the group, and "(t)he size of the task and the number of component responsibilities involved in the assignment may determine group size" (Freiberg & Driscoll, 2005, p. 304). Thus, I asked the teacher to consider whether the number of students in a group had any effect on the increase in off-task talking behavior. The teacher stated, "I'm not sure, since I didn't have students assigned to roles today."

Instructional strategies/procedures and discipline management. For purposes of this analysis, I have combined the reflection categories of instructional strategies/procedures with discipline management because in this observation, the lesson activity had a direct bearing on student off-task behavior. This lesson engaged students in the learning of new content while using a cooperative learning structure with which students were unfamiliar. The teacher discussed the fact that s/he had been off-campus the prior week to attend a mandatory training. Although the teacher was eager to try the new cooperative learning structure (group poster presentations of the results of the cooperative investigation), s/he wrote in the reflection, "I think this type of mechanical/calculation lesson would have been better done as direct instruction. We were not prepared for group work because I have not seen this class in over a week."

Due to the importance of planning for effective teaching (Freiberg & Driscoll, 2005), I asked how s/he might plan his/her instruction differently in future. The teacher replied that s/he needed to spend "more prep time planning roles" for the group activity. This paralleled the suggestion I wrote under the "discipline management" section to assign roles to students, which would provide them with structures for communicating their thinking and clarifying their processes, thus reducing the likelihood of off-task talking. However, "(s)tudents may need to work through a few activities before they are comfortable with all of the roles" (Schwartz & Willing, 2001, p. 17).

"What evidence (is) there that the teacher truly understands the needs of the students?" (Lunenburg & Ornstein, 2008, p. 450). A teacher can show an understanding of the needs of the students by varying the manner in which s/he interacts with his/her students and adjusting the flow of instruction accordingly. I asked the teacher, "How could the activity be restructured to provide a variety of teacher-whole class interaction?" The teacher and I discussed planned mental breaks, such as think-pair-share or putting work up on the board, as a means to vary teacher-student interactions. I offered that the length of the activity (36 minutes observed with no break) made it difficult for students to stay focused and they showed this by engaging in off-task talking. Based on high school students' attention spans of about 15 minutes (McLeod, Fisher, & Hoover, 2003), the teacher could structure the activity into 15-minute segments of activity followed by a few minutes of silent reflection, question/answer, or students working at the board.

In summary, the structure of the lesson activity had a direct influence on student discipline. Considering that both the teacher and the students expressed concern that they were behind in the pacing of the curriculum for the class, the teacher could take measures to structure the activity to match the students' needs, thus maximizing instructional time by minimizing off-task behavior.

Table 29

Teacher B and Coach Reflections Observation 2

Reflection Category	Teacher's Written Reflections and Actions to Take	Coach's Written Questions and Strategies
Physical Classroom Environment	**Reflection**: "Groups were seated in a somewhat linear fashion. I encouraged the rearrangement of desks, which helped some." **Action**: "Finish putting tennis balls on desk and chair legs so desks and chairs can be more easily arranged into groups."	**Question**: What is an optimal number of students per group? **Strategy**: Consider whether the number of students (five) in a group has an effect on student participation in the activity—due to the fact that three new students entered class after the groups had started as groups of four.
Instructional Strategies/ Procedures	**Reflection**: "I think this type of mechanical/calculation lesson would have been better done as direct instruction. We were not prepared for group work because I have not seen this class in over a week." **Action**: "More prep time planning roles and group activity."	**Question**: How could the activity be restructured to provide a variety of teacher-whole class interaction? **Strategy**: Consider breaking the assignment into parts and giving a time limit for each part.
Time/ Organizational Management	**Reflection**: None. **Action**: None.	**Question**: The students were learning, but could have accomplished more. What was the biggest drain on instructional time today? (Teacher responded, "Scheduling and interruptions.") **Strategy**: Consider having emergency "sponge activities" on hand to keep students engaged while urgent paperwork is conducted.
Discipline Management	**Reflection**: "Break group work into short intervals." **Action**: None.	**Question**: What changes can be made for the next cooperative lesson that would keep students on task for more of the lesson? **Strategy**: Break group work into shorter segments and assign students roles.

Time/organizational management. While I agreed with the teacher that students were successful in completing the activity and conducting their poster presentations, I wondered if students could have learned more. I also wondered if the teacher made the connection between students' off-task talking and the drain this had on learning time. When I asked the teacher what s/he considered to be the greatest drain on instructional time in that class, the teacher responded, "Scheduling and interruptions." It is true that adding three new students to the class roll caused not only interruptions as they each came in, but also additional, unplanned administrative paperwork for the teacher to complete. Nonetheless, I was beginning to see a pattern with this teacher: on one hand, the teacher resented the administrative tasks and interruptions that took from his/her instructional time; on the other hand, if the students completed what the teacher expected them to complete, then any extra time belonged to the students as "reward" time and not to the teacher as "found" instructional time.

Observation 3 context. My activity during this 90-minute class proceeded in the following manner:

Minutes 0 – 9:	The third-party observer and I waited for the daily announcements to end so that the teacher could start class.
Minutes 10 – 50:	The third-party observer conducted the classroom observation (10 four-minute rounds).
Minutes 51 – 60:	I administered and collected the student survey.
Minutes 61 – 83:	I organized observation data, set up interview space, and conducted sequential interviews in the school library.

Minutes 84 – 90: I began preparations for the post-observation debriefing/coaching session with the teacher by analyzing observation data using the "Fixed Category Observation Record" (see Appendix A).

Post-observation debriefing.

Presentation of the observation data. After our individual written reflections had been completed, I shared with the teacher the observation data presented in Table 18 and the "Fixed Category Observation Record" (see Appendix A), which included the following analysis of the observation data:

1. *During which intervals in the lesson did the greatest number of off-task behaviors occur?* Two of five intervals accounted for more than 50% of the 32 off-task behaviors observed during this lesson: the third interval (observation rounds 5 and 6) and the fifth interval (observation rounds 9 and 10) each had nine off-task behaviors.
2. *Identify the top two off-task behaviors.* Of the 32 off-task behaviors observed during this lesson, 28 occurred during cooperative learning and four occurred during other instructional activities. The highest-occurring off-task behaviors observed were distracted behavior, which was observed 18 times, and talking, which was observed 10 times.
3. *For each interval identified in #1, record the top two off-task behaviors, the number of times they occurred, and the corresponding learning activity*. In the third interval (observation rounds 5 and 6), distracted behavior was observed five times and talking was observed two times, both during cooperative learning. In the fifth interval (observation rounds 9 and 10), distracted behavior was observed seven times and talking was observed two times, both during cooperative learning.

4. *Name the students who were off task the most during the lesson*. (Names are omitted to preserve student confidentiality.) One student was off task eight times, one student was off task seven times, four students were off task three times, one student was off task twice, and three students were off task once.
5. *Record anything else that could impact instruction or student performance.* The lesson occurred on a day that was unusually cold and icy, and this environmental stress may have had an effect on student behavior (Cohn, 1990). In addition, the teacher tried a new time management strategy, that of stopping the students periodically to review the task and to give them a deadline for completion of the next segment of the task. The teacher also assigned roles to students.

A comparison of the number of off-task behaviors during cooperative learning from Observation 2 to Observation 3 revealed the following:

- The instances of distracted behavior, taking care of needs, and dozing increased from two, zero, and zero, respectively in Observation 2 to 17, one, and two, respectively in Observation 3.
- The instances of talking and waiting decreased from 28 and four, respectively, in Observation 2 to eight and zero, respectively in Observation 3.
- For Teacher B, the number of off-task behaviors increased from 13 in Observation 1 to 34 in Observation 2, then decreased to 28 in Observation 3.
- The number of off-task behaviors per group of four students during cooperative learning increased from 4.0 in Observation 1 to approximately 9.07 in Observation 2, then decreased to approximately 7.47 in Observation 3.

Reflection sharing. Once the observation data were shared with the teacher, the teacher and I shared our reflections with each other (see Table 30).

Physical classroom environment. The students were placed in groups of three and did not appear to comfortably work in their groups. The teacher planned the task to involve groups of three with three specific roles, "communicator," "calculator," and "recorder." It took longer than usual for students to get into their group configurations, and one reason for this may have been that students usually worked in groups of four but for this lesson, the teacher rearranged the groups into threes. When I suggested that the teacher consider having the desks already arranged in a group formation when students came to class, the teacher explained that rows work better for lecture format. The arrangement of desks in rows is the one s/he uses most of the time, but agreed that some students arrive early and could be asked to assist in arranging desks into groups before class begins.

Instructional strategies/procedures. This lesson engaged students in the learning of new content while using a cooperative learning structure with which students were unfamiliar. The teacher reflected that, "In the groups, there was too much focus on the mechanics of the calculations and not enough on the interpretation" and that an action to take in the future would include, "Take time for groups to present and interpret."

By having students present their work and focus on the interpretation of the data, not only would they practice social skills by presenting to their peers, but they also would make meaningful connections to the real world through the interpretation of their data and possibly increase their motivation in the task. An appreciation for the value of learning "…is more likely to develop if (students) perceive the learning as relevant to their personal agendas" (Brophy, 2010, p. 271).

Table 30

Teacher B and Coach Reflections Observation 3

Reflection Category	Teacher's Written Reflections and Actions to Take	Coach's Written Questions and Strategies
Physical Classroom Environment	**Reflection**: "The room continues to get easier to rearrange although it's still pretty crowded for rearranging desks." **Action**: "Need to create and practice a procedure for going to and coming from groups. Moving desks to and from a preassigned place."	**Question**: How else could you arrange the desks to minimize "desk re-arranging time?" **Strategy**: Have students practice changing the desk arrangements, or have them arranged as groups for most of the time.
Instructional Strategies/ Procedures	**Reflection**: "In the group, there was too much focus on the mechanics of the calculations and not enough on the interpretation." **Action**: "Take time for groups to present and interpret."	**Question**: How could you use groups to help get caught up in the curriculum? **Strategy**: Have students work as partners to learn material and present it to the class. Have a "data" day where students bring in data to study.
Time/ Organizational Management	**Reflection**: "Having periodic stopping points to pull people together is definitely an improvement." **Action**: "Map out short time increments on my lesson plans."	**Question**: Was the use of giving students "timelines" throughout the lesson effective? **Strategy**: Perhaps have the "communicator" also be the "timekeeper."
Discipline Management	**Reflection**: "Two disengaged students: one smart kid who likes to do as little as possible, but learns as much as anyone. The other was withdrawing and may have had outside issues on his/her mind." **Action**: "Private conference with the second student."	**Question**: What can be done to engage the silently distracted students? **Strategy**: Have the students create a goal for the day and work together to achieve it. Also, place together the students who normally do not pull their fair share of the work and enable them create a leader amongst themselves—allowing them to "step up to the plate" for a change.

During the debriefing for Observation 2, the teacher stated that s/he was behind in the curriculum for the course. This time, I discussed with him/her some strategies for getting “caught up.” During that debriefing, I mentioned time management as a strategy for finding more instructional time, so this time, I offered the instructional strategy of involving students in the teaching: for example, the teacher could have a “data” day where students bring in data to study, and then have students work as partners to learn and present a new data analysis technique related to the data they brought. Finally, the teacher and I discussed “asking the students” for their feedback on how to get caught up, as their insights could guide the teacher in how to proceed from this point forward. The teacher responded positively to these suggestions and vowed to act on them.

Time/organizational management. The teacher made a change from Observation 2 to Observation 3: during observation round 7, the teacher briefly stopped the students’ work to remind them of the task and to give them a 15-minute deadline, thus breaking up the learning activity into smaller chunks. After the observation rounds were completed, the teacher repeated this again, and wrote in the reflective writing, “Having periodic stopping points to pull people together is definitely an improvement.” The teacher commented that s/he would continue to “Map out short time increments on my lesson plans.” These comments mirrored my own reflection of the timelines, as they served to focus students on a goal. I also suggested that since there were only three students to a group, the teacher could assign the student who was the “communicator” to the additional role of “timekeeper” in order to help the group stay focused. We also discussed the advantages to switching roles frequently throughout the lesson, thus giving all students the opportunity to experience each aspect of the lesson and to evaluate themselves in each role (Schwartz & Willing, 2001).

Discipline management. Giving students roles to perform and timelines to observe helped students focus on their task and served as one factor in decreasing student off-task talking from Observation 2 to Observation 3. However, there were 18 observed instances of distracted behavior. In the reflective writing, the teacher wrote that there were “Two disengaged students: one smart kid who likes to do as little as possible, but learns as much as anyone. The other was withdrawing and may have had outside issues on his/her mind.” I asked the teacher what could be done to engage the students who were constantly distracted, and s/he shared that s/he engaged in a private conference with one of the students. When I pressed the discussion further to include the engagement all distracted students, the teacher indicated that s/he was not sure why there were so many distracted students. In addition to changing the role structure of the groups, I suggested that to help students focus, have them create a goal for the day and work together to achieve it. I also mentioned that in each group, there appeared to be one student, usually the “calculator,” who took responsibility for making sure the group’s task was complete. Therefore, it might be effective to place together the students who normally do not pull their fair share of the work and enable them create a leader amongst themselves—allowing them to “step up to the plate” for a change.

The teacher closed our last debriefing sessions by sharing this thought: **“**I have been hearing for years that group work is good. In the past, it did not work out. I have learned how to do it successfully—the mechanics of it—and will continue to practice until I get good at it. I will increase the frequency of group work. I have enjoyed having someone (this researcher) to talk to.”

APPENDIX M:

TEACHER C OBSERVATION DATA AND DEBRIEFING/COACHING SESSIONS

APPENDIX M: Teacher C Observation Data and Debriefing/Coaching Sessions

Observation 1 context. My activity during this 85-minute class proceeded in the following manner:

Minutes 0 – 2:	The students began work on a warm-up while the teacher prepared the third-party observer and me with an overview and logistics for the lesson.
Minutes 3 – 43:	The third-party observer conducted the classroom observation (10 four-minute rounds).
Minutes 44 – 47:	I administered and collected the student survey.
Minutes 48 – 74:	I organized observation data, set up interview space, and conducted sequential interviews in the hallway outside the classroom.
Minutes 75 – 85:	I began preparations for the post-observation debriefing/coaching session with the teacher by analyzing observation data using the “Fixed Category Observation Record” (see Appendix

Post-observation debriefing.

Presentation of the observation data. After our individual written reflections had been completed, I shared with the teacher the observation data presented in Table 20 and the “Fixed Category Observation Record” (see Appendix A), which included the following analysis of the observation data:

1. *During which intervals in the lesson did the greatest number of off-task behaviors occur?* The fourth interval (observation rounds 7 and 8) had a total of two off-task behaviors.

2. *Identify the top two off-task behaviors.* Of the three off-task behaviors observed during this lesson, one occurred during instruction and two occurred during question/answer/discussion. The highest-occurring off-task behavior was talking, which was observed three times and was the sole off-task behavior.
3. *For each interval identified in #1, record the top two off-task behaviors, the number of times they occurred, and the corresponding learning activity.* In the fourth interval (observation rounds 7 and 8), talking, which was the only observed off-task behavior, was observed twice during question/answer/discussion.
4. *Name the students who were off task the most during the lesson.* (Names are omitted to preserve student confidentiality.) Three students were off task once each.
5. *Record anything else that could impact instruction or student performance.* This teacher made very efficient use of class time and did not allow students' behavior to sidetrack the lesson. The lesson flowed smoothly, and the lesson context and content met the learner's needs. There were only three instances of talking, once during instruction, and twice during question/answer/discussion. These instances of talking were not disruptive and the teacher did not allow them to alter the lesson flow or timeline. This teacher had control over his/her class.

Reflection sharing. Once the observation data were shared with the teacher, the teacher and I shared our reflections with each other (see Table 31).

Physical classroom environment. The physical classroom environment was inviting and the teacher had nurtured a positive climate for learning. While the desks were initially arranged in a manner conducive for lecture or direct instruction, students could easily move their desks for pair work. Student-created posters with class "norms" and performance expectations were displayed on the wall and students behaved according to these norms and expectations. Due to the small class size (11 students), the teacher stated that next time s/he had students in pairs, s/he would set up a “common area” in the middle of the room to bring students together for full-class discussion, allowing students to venture out to other places in the classroom for partner work.

Instructional strategies/procedures. This lesson engaged students in learning new content while using a cooperative learning structure with which students were familiar. The teacher seemed concerned that s/he was spending more time with students on one side of the room than the other. We discussed that this may have been because certain students needed more of his/her help. I asked if all of the students successfully completed their group task, and the teacher responded affirmatively. In contrast, I wondered if the teacher might consider giving the students more autonomy, perhaps in choosing their own strategy for conducting and presenting an investigation. The teacher agreed, and we discussed a book s/he had read recently regarding students’ use of protocols to guide their own class discussions. S/he decided to try something from the book in the future.

Time/organizational management. The teacher and students used every minute of class time on the planned activity. When I asked the teacher if s/he could think of anything to do differently, s/he replied that it would be helpful to project a timer on the screen so that students could manage their own time.

Table 31

Teacher C and Coach Reflections Observation 1

Reflection Category	Teacher's Written Reflections and Actions to Take	Coach's Written Questions and Strategies
Physical Classroom Environment	**Reflection**: "The desks are easy to set up for pairs. Maybe I could have had a group of desks set up as a 'common area' for whole class discussions. Little attention was given to pairing by gender." **Action**: "Set up desks to create a 'common area' for entire class discussions."	**Question**: The room was very well organized and conducive to the activity. **Strategy**: None needed.
Instructional Strategies/ Procedures	**Reflection**: "I tried to spend an equal amount of time visiting each group during paired discussions, but seem to remember focusing a little more time on the left side of the classroom than the right." **Action**: "Make sure I spend my time equally at each group."	**Question**: I wonder how the teacher might give students more control over their learning activity. **Strategy**: Allow the students to choose a protocol (for example, jigsaw, or gallery walk) and present their investigation to the class.
Time/ Organizational Management	**Reflection**: "Students were given specific lengths of time to work on questions, but a time clock was not displayed to let students know how much time was left." **Action**: "Set up a time clock to display during group work."	**Question**: None. Not one moment of class time was unstructured. **Strategy**: None.
Discipline Management	**Reflection**: "In my judgment, there was really not a discipline problem that needed to be managed." **Action**: None.	**Question**: None. Very few students were off task and the few who were very quickly redirected themselves back on task. **Strategy**: Perhaps the students may be ready to have a voice in structuring tasks so that they can learn to regulate their own behavior.

Discipline management. There were only three off-task behaviors, none occurring during cooperative group time. The teacher wrote, “In my judgment, there was really not a discipline problem that needed to be managed.” I inquired whether this was due to the structure of the lesson, or to the maturity or motivation of the students, the teacher discussed that it was partly due to the culture of the school, and students creating and living up to their own norms for classroom behavior and expectations. The teacher closed the discussion by promising to think of ways to allow students to have a voice in structuring lesson activities.

Observation 2 context. My activity during this 85-minute class proceeded in the following manner:

Minutes 0 – 9:	The third-party observer and I waited for the students to arrive and get organized for class in the “GO” center.
Minutes 10 – 50:	The third-party observer conducted the classroom observation (10 four-minute rounds).
Minutes 51 – 64:	I administered and collected the student survey.
Minutes 65 – 87:	I organized observation data, set up interview space, and conducted sequential interviews in the hallway outside the “GO” center.
Minutes 87 – 90:	I began preparations for the post-observation debriefing/coaching session with the by analyzing observation data using the “Fixed Category Observation Record” (see Appendix A).

Post-observation debriefing.

Presentation of the observation data. After our individual written reflections had been completed, I shared with the teacher the observation data presented in Table 20 and the

"Fixed Category Observation Record" (see Appendix A), which included the following analysis of the observation data:

1. *During which intervals in the lesson did the greatest number of off-task behaviors occur?* The third (observation rounds 5 and 6) and fifth intervals (observation rounds 9 and 10) each had three off-task behaviors.
2. *Identify the top two off-task behaviors.* All eight instances of off-task behavior occurred during cooperative learning since the activity was planned to take the entire class period. The highest-occurring off-task behavior was talking, which was observed four times, followed by taking care of needs, which was observed three times.
3. *For each interval identified in #1, record the top two off-task behaviors, the number of times they occurred, and the corresponding learning activity.* In the third interval (observation rounds 5 and 6), talking occurred twice, and taking care of needs occurred once. Similarly, in the fifth interval (observation rounds 9 and 10), talking occurred twice, and taking care of needs occurred once.
4. *Name the students who were off task the most during the lesson.* (Names are omitted to preserve student confidentiality.) One student was off-task twice (talking and taking care of needs); six students were off-task once; five students were not observed as off-task.
5. *Record anything else that could impact instruction or student performance.* This lesson engaged students in the learning of familiar content while using a cooperative learning structure with which students were unfamiliar. The teacher employed a new cooperative learning structure by allowing students to work in pairs at a computer on a problem-solving investigation where the students had to make choices along the way that would

affect the outcome of the investigation. The activity was planned to take the entire period.

A comparison of the number of off-task behaviors during cooperative learning from Observation 1 to Observation 2 revealed the following:

- The number of off-task behaviors increased from zero in Observation 1 to eight in Observation 2.
- The instances of talking, waiting, and taking care of needs increased from zero in Observation 1 to four, one, and three, respectively in Observation 2.
- The number off-task behaviors increased from zero off-task behaviors per group of four students in Observation 1 to approximately 2.67 off-task behaviors per group of four students in Observation 2.

Reflection sharing. Once the observation data were shared with the teacher, the teacher and I shared our reflections with each other (see Table 32).

Physical classroom environment. As soon as students arrived to the “GO” center, students were seated in pairs around a computer. With 11 students, the teacher, the third-party observer, and I, the space was very crowded. The teacher wrote in his/her reflection, “It was a bit restrictive in terms of space. Students were crowded around each computer, and some students were seated in a manner that prevented them from seeing the computer at all.” I suggested that having students switch roles (computer user and recorder) throughout the lesson might have enabled all students to fairly inhabit the cramped space.

Instructional strategies/procedures. This lesson engaged students in the review of previously learned content while using a cooperative learning structure with which students were unfamiliar. Based on our debriefing discussion after Observation 1, the teacher tried a new cooperative learning structure for Observation 2, designed to give students more control over the lesson for the day. In the roles of “computer user” and “recorder,” students were to make a series of decisions within the investigation and present the final product at the next class meeting. After examining the students’ work, I agreed with the teacher that the activity went as planned and that students were making reasonable mathematical decisions along the way.

Discipline management and time/organizational management. For purposes of this analysis, I have combined the reflection categories of time/organizational management with discipline management because in this observation, the teacher’s time management had a direct bearing on student off-task behavior. I noticed that students appeared to be getting restless about halfway through the lesson, but they regrouped and got themselves back on task. I asked the teacher if the fact that students redirected themselves so quickly due to the technology or to the culture, norms, and expectations of the school. The teacher responded all of the above, but attributed their ability to quickly refocus to the engaging characteristics of the technology. However, the teacher wrote, “As the students were working, I considered the possibility of giving the students a two-minute stretch break during the lesson – I know I needed one!”

Table 32

Teacher C and Coach Reflections Observation 2

Reflection Category	Teacher's Written Reflections and Actions to Take	Coach's Written Questions and Strategies
Physical Classroom Environment	**Reflection**: "A bit restrictive in terms of space. Students were crowded around each computer, and some students were seated in a manner that prevented them from seeing the computer at all." **Action**: "Perhaps I'll check on reserving a computer lab classroom where there is more space."	**Question**: Did all students have room to participate? Was the "GO" center an optimal setting? **Strategy**: Students were cramped around the computer…what if you had them switch roles (computer user and recorder) throughout the activity?
Instructional Strategies/ Procedures	**Reflection**: "The strategy was to have students work in pairs to complete a technology-based lesson. The procedures called for students to select three sets of data to analyze from among seven choices. I believe the procedures went as planned." **Action**: None.	**Question**: What was the goal of the activity? The goal was not stated, but students knew what to do, so this must have been discussed previously (I found out in the debrief that it was). **Strategy**: Consider giving a brief reminder involving students of what the goal for the lesson was to be, followed up with closure at the end.
Time/ Organizational Management	**Reflection**: "As the students were working, I considered the possibility of giving the students a two-minute stretch break during the lesson – I know I needed one!" **Action**: "Incorporate a 'Gallery Walk' protocol as part of the lesson to give the students a 'productive' mental break!"	**Question**: Students appeared to be getting restless about halfway through the lesson, but they regrouped and got themselves back on task. Is this due to the technology or to the culture, norms, and expectations? (Teacher said all of the above, but attributed this more to the technology for engaging the students.) **Strategy**: Give students a mental break or change of pace every 15 minutes.
Discipline Management	**Reflection**: "I didn't really see much discipline problems. One student came to class late; another came to class with a pizza. I allowed the student to keep the pizza in a box and not throw it away." **Action**: "Reinforce to students that eating in the classroom, or bringing food in for that matter, is not appropriate."	**Question**: Three of the off-task behaviors were "taking care of needs," which is unusual. One student brought pizza and coffee to class. One student got up to get his/her sweater only to hang it on the back of his/her chair. Another student went fishing through his/her backpack. Did students need a break? **Strategy**: Teacher was not sure. S/he does not notice unless it keeps students off task and from learning. I observed students' work and they were successful.

Planned mental breaks, combined with breaking the activity into manageable chunks with time limits, could help students remain focused on the task. The teacher's reflection statement under the time/organizational management category mirrored this idea. I offered that the length of the activity (40 minutes observed with no break) made it difficult for students to maintain focus. "One key factor in planning a lesson is to consider the attention span of your students" (McLeod, Fisher, & Hoover, 2003, p. 28). Based on high school students' attention spans of about 15 minutes, the teacher could structure the activity into 15-minute segments of activity, then at some point, allow partners to "mix it up" for a few minutes so that one person from each pair goes out to see how the other investigations are proceeding in comparison. Later on, this could be repeated with the other partner going out to observe the other groups' work.

Although the teacher wrote that s/he did not notice many discipline problems in this class period, I noted that three of the eight off-task behaviors were "taking care of needs," which is statistically unusual. One student brought pizza and coffee to class. One student got up to get his/her sweater only to hang it on the back of his/her chair. Another student went fishing through his/her backpack. I asked the teacher, "Did students need a break?" In his/her reflection, the teacher wrote that s/he needed to "Reinforce to students that eating in the classroom, or bringing food in for that matter, is not appropriate." In addition, one action that s/he planned to take for a future lesson was to "Incorporate a 'Gallery Walk' protocol as part of the lesson in order to give the students a 'productive' mental break!"

Observation 3 context. My activity during this 90-minute class proceeded in the following manner:

Minutes 0 – 9: The students began work on a warm-up while the teacher prepared the third-party observer and me with an overview and logistics for the lesson.

Minutes 10 – 50: The third-party observer conducted the classroom observation (10 four-minute rounds).

Minutes 55 – 60: I administered and collected the student survey.

Minutes 69 – 86: I organized observation data, set up interview space, and conducted sequential interviews in the hallway outside the classroom.

Post-observation debriefing.

Presentation of the observation data. After our individual written reflections had been completed, I shared with the teacher the observation data presented in Table 20 and the "Fixed Category Observation Record" (see Appendix A), which included the following analysis of the observation data:

1. *During which intervals in the lesson did the greatest number of off-task behaviors occur?* Two of five intervals accounted for more than two-thirds of the nine off-task behaviors observed during this lesson: the third interval (observation rounds 5 and 6) and the fourth interval (observation rounds 7 and 8) each had three off-task behaviors. All six of these behaviors came from four students in the same group who were ready early to begin the Gallery Walk.
2. *Identify the top two off-task behaviors.* Of the nine off-task behaviors observed during this lesson, eight occurred during cooperative learning and one occurred during other

instructional activities. The highest-occurring off-task behaviors observed were distracted behavior, which was observed four times, and waiting, which was observed twice.

3. *For each interval identified in #1, record the top two off-task behaviors, the number of times they occurred, and the corresponding learning activity.* In the third interval (observation rounds 5 and 6), distracted behavior was observed twice and taking care of needs was observed once, both during cooperative learning. In the fourth interval (observation rounds 7 and 8), waiting was observed twice and talking was observed once, both during cooperative learning.
4. *Name the students who were off task the most during the lesson.* (Names are omitted to preserve student confidentiality.) Two students were off task three times, one student was off task twice, and one student was off task once.
5. *Record anything else that could impact instruction or student performance.* The teacher tried a new cooperative learning structure: that of allowing students to participate in a Gallery Walk protocol to give and receive feedback from their peers on their group task.

A comparison of the number of off-task behaviors during cooperative learning from Observation 2 to Observation 3 revealed the following:

- The instances of distracted behavior and waiting increased from zero and one, respectively, in Observation 2, to four and two, respectively, in Observation 3.
- The instances of talking and taking care of needs decreased from four and three, respectively, in Observation 2, to two and one, respectively, in Observation 3.

- The number of off-task behaviors during cooperative learning (eight) and per group of four students during cooperative learning (2.67), remained the same from Observation 2 to Observation 3.

Reflection sharing. Once the observation data were shared with the teacher, the teacher and I shared our reflections with each other (see Table 33).

Physical classroom environment. The students were placed in groups of three and appeared to work comfortably in their groups. The teacher wrote the desk configuration was distracting; however, the students "made the situation work" by using the desks in the middle of the room as work stations when it came time for them to revise their posters.

Instructional strategies/procedures. This lesson engaged students in the review of previously learned content while using a cooperative learning structure with which students were unfamiliar. During the Gallery Walk, students walked around the room to examine each other's posters and provided questions and feedback on post-it notes that were affixed to the posters. The teacher wrote in his/her reflection that the Gallery Walk went "well." When I asked for elaboration, the teacher replied that the final posters were much improved over the initial drafts, and that the students taught each other through the Gallery Walk protocol. I suggested to the teacher that since this was a new cooperative learning structure, s/he should ask students for their feedback on the protocol in general and ways in which it could be improved for future use. The teacher replied that s/he would do this as a warm-up for the next class meeting.

Table 33

Teacher C and Coach Reflections Observation 3

Reflection Category	Teacher's Written Reflections and Actions to Take	Coach's Written Questions and Strategies
Physical Classroom Environment	**Reflection**: "The classroom was set up to accommodate group work activity. The empty desks in the center of the room were a little distracting at first, but then became work stations for the groups as the class progressed." **Action**: "None."	**Question**: Was the physical space conducive to both cooperative grouping and gallery walk? **Strategy**: Ask students to help you rearrange the desks to accommodate the traffic flow of the Gallery Walk.
Instructional Strategies/ Procedures	**Reflection**: "The Gallery Walk went well." **Action**: "None."	**Question**: Was there enough time to debrief the learning as well as the strategy of gallery walk? **Strategy**: Ask students to reflect on the Gallery Walk at the beginning of the next class as a warm-up.
Time/ Organizational Management	**Reflection**: "The pacing went better than I expected. There was one point where I didn't have the material at hand before I distributed them, and I inwardly panicked a bit before I remembered where I had the worksheets." **Action**: "Place all hand-outs in a labeled folder and have them in a single place, all the time."	**Question**: Was there anything about the lesson that might be distracting to students? **Strategy**: Have materials out at each desk ahead of time so that students only have to concentrate on the Gallery Walk.
Discipline Management	**Reflection**: "Some of the students came in late and were sent out to get tardy slips. Also, some of the students were eating candy (suckers) during class." **Action**: "Emphasize to the students the importance of not eating in the classroom, especially since college professors will not allow such behavior."	**Question**: What can you do to engage students who prefer to work alone? **Strategy**: Give students a menu of choices for participating in the lesson, and occasionally ensure that there are opportunities for students to work by themselves.

Time/organizational management. Given that advance planning of materials helps to maximize learning time (Freiberg & Driscoll, 2005), I asked the teacher if there were anything about the Gallery Walk that was distracting to the students. The teacher mentioned that this lesson was materials-heavy with posters, markers, post-its, worksheets with the scenarios, and graph paper. S/he wrote, "The pacing went better than I expected. There was one point where I didn't have the materials at hand before I distributed them, and I inwardly panicked a bit before I remembered where I had put the worksheets." The teacher's written action to take mirrored my suggestion to have the materials ready and in place so that the students could focus on the activity.

Discipline management. The teacher commented on the fact that students were eating candy during the activity, which, as s/he reflected, "college professors won't allow this behavior." This comment led me to thinking that many college professors do not employ cooperative learning, so I asked the teacher if s/he believed that all students like working in groups. S/he replied that there are some who do not. However, the expectations of the school are that students must come prepared to collaborate with their classmates. My suggestion for differentiating instruction to meet the needs of those who prefer group work and those who prefer to work alone would be to give students a menu of choices for participating in the lesson, and occasionally ensure that there are opportunities for students to work by themselves. In this way, the context and content of the lesson can be structured to meet the needs of all learners.

APPENDIX N:

TEACHER D OBSERVATION DATA AND DEBRIEFING/COACHING SESSIONS

APPENDIX N: Teacher D Observation Data and Debriefing/Coaching Sessions

Observation 1 context. My activity during this 90-minute class proceeded in the following manner:

Minutes 0 – 7:	The students began work on a warm-up while the teacher prepared the third-party observer and me with an overview and logistics for the lesson.
Minutes 8 – 48:	The third-party observer conducted the classroom observation (10 four-minute rounds).
Minutes 51 – 56:	I administered and collected the student survey.
Minutes 57 – 82:	I organized observation data, set up interview space, and conducted sequential interviews in the hallway outside the classroom.
Minutes 83 – 90:	I began preparations for the post-observation debriefing/coaching session with the teacher by analyzing observation data using the "Fixed Category Observation Record" (see Appendix A).

When the bell rang to start class, most of the students had arrived and the teacher directed them to begin the warm-up, which was projected onto the front board. A few students came in late at various points during the lesson. By eight minutes into the class period, the 40-minute observation began with ten rounds occurring at four-minute intervals. The students worked cooperatively on the warm-up activity. Upon completion of the group task, the students turned their work in to the teacher and began the next cooperative task. This lesson engaged students in the learning of new content while using a cooperative learning structure with which students were unfamiliar. The teacher gave the printed instructions to each group of students as they became ready to begin the activity. The investigation consisted of taking measurements, recording the measurement data, and summarizing the findings to draw conclusions. During the last four minutes of the observation, the teacher engaged the students in a question/answer/discussion period about the group investigation. Student groups reported and compared their findings.

In order to inform Research Question I, the observation data were organized to show the type and number of off-task behaviors (Table 22) and the number of off-task behaviors per group of four students during cooperative learning (Table 23)

Post-observation debriefing.

Presentation of the observation data. After our individual written reflections had been completed, I shared with the teacher the observation data presented in Table 22 and the "Fixed Category Observation Record" (see Appendix A), which included the following analysis of the observation data:

1. *During which intervals in the lesson did the greatest number of off-task behaviors occur?* The fifth interval (observation rounds 9 and 10) had a total of nine off-task behaviors.
2. *Identify the top two off-task behaviors.* Of the 32 off-task behaviors observed during this lesson, 29 occurred during cooperative groups and three occurred during question/answer/discussion. The highest-occurring off-task behavior was talking, which was observed 15 times.
3. *For each interval identified in #1, record the top two off-task behaviors, the number of times they occurred, and the corresponding learning activity*. In the fifth interval (observation rounds 9 and 10), waiting occurred five times, while talking and distracted behavior each occurred twice.

4. *Name the students who were off task the most during the lesson*. (Names are omitted to preserve student confidentiality.) Three students were off task four times, one student was off task three times, three students were off task twice, 11 students were off task once, and eight students were not observed as off task.
5. *Record anything else that could impact instruction or student performance.* Today was the "homecoming" game for the students and they were excited about the festivities surrounding this event.

Reflection sharing. Once the observation data were shared with the teacher, the teacher and I shared our reflections with each other (see Table 34).

Physical classroom environment. Even though physically small, the physical classroom environment was inviting and the teacher had nurtured a positive climate for learning. The desks were initially arranged in a manner conducive for lecture or direct instruction, and they were not easily moved into group configurations, simply because of constricted space. The teacher wrote that s/he would like to consider "Changing the placement of the desks to make group discussion and collaboration more efficient." We discussed a few ideas but each one was dismissed due to the space limitations.

Instructional strategies/procedures, time/organizational management, and discipline management. For purposes of this analysis, I have combined discussion of these three categories since the teacher's instructional procedures directly impacted the management of students' time and discipline. This lesson engaged students in the learning of new content while using a cooperative learning structure with which students were unfamiliar. From the beginning, it was clear that the teacher was frustrated with this group activity. S/he wrote, "Students had to be reminded what to do. I had to repeat myself and continuously monitor them so that they would be aware of the steps." As a result, the teacher wrote that an action to take would be to have "(p)rinted directions" in addition to projecting the directions up on the "smart" board.

Second, some students were late to class and trickled in throughout the period. The teacher reflected, "Time was an issue, especially when some group members were late." When students eventually got to class, the group leader was instructed to tell group members who were late what they should be doing. I asked the teacher if everyone really knew what to do. The teacher wrote that s/he would "Think of alternative steps if not all group members have arrived."

During this lesson, there were 12 instances of waiting, and the teacher wrote, "While the group recorder was collecting data, the other group members were doing nothing, which led to idle chit chat and off-task behavior." I asked the teacher if every student had a role, since the only roles that were observed were group leader and recorder. The teacher verified that these were the only assigned roles. The recording process took a while and this resulted in students waiting for the recorder to get caught up so that s/he could record more data. In addition, groups who had four students were waiting on groups of three to finish their investigation and record their data. Since "assigning roles to every student in the group helps keep everyone engaged," (Williams, 2002, p. 32), I suggested that additional roles be assigned. The teacher reflected that s/he would "Include additional steps for the non-group recorders to take so that everyone is helping." Since graphic organizers are useful for helping students "to identify and summarize information systematically" (Bellanca, 2007, p. 39), I suggested that the teacher might also consider reorganizing the recording process by giving students a graphic organizer to assist them in recording their measurements.

Table 34

Teacher D and Coach Reflections Observation 1

Reflection Category	Teacher's Written Reflections and Actions to Take	Coach's Written Questions and Strategies
Physical Classroom Environment	**Reflection**: "Because of the large size of the class, it was often difficult for the students to have group discussion." **Action**: "Changing the placement of the desks to make group discussion and collaboration more efficient."	**Question**: The room is very close and cramped and yet must fit 26 students. There was no room for a teacher desk or for the observer and me to sit. **Strategy**: None, there is not much that can be done to relieve the situation.
Instructional Strategies/ Procedures	**Reflection**: "Students had to be reminded what to do. I had to repeat myself and continuously monitor them so that they would be aware of the steps." **Action**: "Printed directions in addition to the smart board directions."	**Question**: Students were observed in two roles: group leader and recorder. Did every student have a role? **Strategy**: Have an assistant recorder to facilitate the recording process since it took so long.
Time/ Organizational Management	**Reflection**: "Time was an issue, especially when some group members were late." **Action**: "Think of alternative steps if not all group members have arrived."	**Question**: Students were kept on task through the use of a timer; the group leader was instructed to tell group members who were late what they should be doing. All materials were prepared and ready for students. Did all students know what they should have been doing? **Strategy**: Give students printed directions. Organize the group-recording process through the use of a graphic organizer to record measurements.
Discipline Management	**Reflection**: "While the group recorder was collecting data, the other group members were doing nothing, which led to idle chit chat and off-task behavior." **Action**: "Include additional steps for the non-group recorders to take so that everyone is helping. Or assign an assistant group recorder to assist the recorder with the information."	**Question**: Many students were observed to be waiting. Why would students be waiting? <The teacher replied that students were supposed to take notes when done. In addition, some groups had fewer members and the others were waiting for them to finish.> **Strategy**: Place work on chart paper to display while the recorder is writing. This will help the other group students to see the results.

Overall, the ability of the students' to complete the group investigation was slowed by late students not understanding what to do, by not all students having an assigned role in the investigation, by students waiting for one person to complete the data recording process, and by groups with four students waiting for the groups of three to finish their investigation. The teacher could have reduced the number of instances of waiting and talking and maximized the use of instructional time by giving clear directions, assigning all students a role, and organizing the data recording process for the students.

Observation 2 context. My activity during this 90-minute class proceeded in the following manner:

Minutes 0 – 6: The students began work on a warm-up while the teacher and I discussed logistics for the lesson.

Minutes 7 – 47: The third-party observer was absent without explanation, so I conducted the observation without the third-party observer. In order not to inconvenience the teacher by my showing up and not following through with the observation, and to honor the teacher's preparation for the lesson observation, I decided that I would conduct the classroom observation (10 four-minute rounds). In all of the other observations, the third-party observer's data agreed with my own observations of which behavior was considered "off task," so I was confident that my observation reflected a reliable sample of the students' behavior. During the debriefing, I asked the teacher if my observation record accurately reflected students' behavior, and s/he agreed that it did.

Minutes 48 – 54: I administered and collected the student survey.

Minutes 56 – 75: I organized observation data, set up interview space, and conducted sequential interviews in the hallway outside the classroom.

Minutes 76 – 90: I began preparations for the post-observation debriefing/coaching session with the teacher by analyzing observation data using the "Fixed Category Observation Record" (see Appendix A).

Post-observation debriefing.

Presentation of the observation data. After our individual written reflections had been completed, I shared with the teacher the observation data presented in Table 22 and the "Fixed Category Observation Record" (see Appendix A), which included the following analysis of the observation data:

1. *During which intervals in the lesson did the greatest number of off-task behaviors occur?* During the fifth interval, (observation rounds 9 and 10), three off-task behaviors occurred.
2. *Identify the top two off-task behaviors.* There were three instances of off-task behavior observed in this lesson: talking occurred twice and distracted behavior occurred once. All three occurred during cooperative learning.
3. *For each interval identified in #1, record the top two off-task behaviors, the number of times they occurred, and the corresponding learning activity.* In the fifth interval (observation rounds 9 and 10), talking occurred twice and was the only off-task behavior observed.
4. *Name the students who were off task the most during the lesson.* (Names are omitted to preserve student confidentiality.) Three students were off-task once.

5. *Record anything else that could impact instruction or student performance.* The students were quiet the entire class period. When they did speak, I could easily hear their conversations and off-task talking was rare.

A comparison of the number of off-task behaviors during cooperative learning from Observation 1 to Observation 2 revealed the following:

- The instances of talking decreased from 14 in Observation 1 to two in Observation 2.
- The instances of waiting and taking care of needs decreased from 12 and three, respectively, in Observation 1 to zero each in Observation 2.
- The number off-task behaviors during cooperative learning decreased from approximately 4.46 off-task behaviors during cooperative learning for every group of four students in Observation 1 to less than one (0.55) for every group of four students in the Observation 2.

Reflection sharing. Once the observation data were shared with the teacher, the teacher and I shared our reflections with each other (see Table 35).

Physical classroom environment. For Observation 2, the student desks were arranged in groups of four with the desks facing each other, instead of desks arranged in rows where two students would have to rotate their desks to face the other two students in the group. "Working in groups facing each other," reflected the teacher, "seemed to produce a much better working environment for the groups. I will probably keep the groups facing each other instead of just in close proximity." "How we use our time and space directly affects student learning" (Cummings, 2000, p. 31), and this one change increased the time available for instructional activities, thus reinforcing for the teacher the connection between efficient use of physical space and increased learning time.

Instructional strategies/procedures. In Observation 2, the teacher used a new cooperative learning activity to review previously learned content. The teacher indicated, "The students were very quick to catch on to the activity. The biggest challenge to the activity was when a groupmate answered the previous step(s) incorrectly and thus led the current group member on an incorrect path." The teacher vowed to "Be more active in monitoring to see if cards are piling up on one particular group member."

Throughout the observation, I noticed that students were struggling with the academic vocabulary associated with the content of the cooperative task and asked the teacher, "What questioning strategies you might use to help students better understand the vocabulary?" I suggested that the teacher use questioning to probe students' knowledge about the proportions in the formulas being studied, and have students write out the proportion "in words" before substituting the numerical values into the proportion. This strategy would model for students the thinking involved in solving problems involving these vocabulary words, thus equipping students to work through them successfully on their own. "By modeling strategic thinking for their students, teachers are instructing students on the kinds of questions they should be asking themselves…" (Anstrom, 2007, p. 29).

Table 35

Teacher D and Coach Reflections Observation 2

Reflection Category	Teacher's Written Reflections and Actions to Take	Coach's Written Questions and Strategies
Physical Classroom Environment	**Reflection**: "Working in groups facing each other seemed to produce a much better working environment for the groups. I will probably keep the groups facing each other instead of just in close proximity. It helped to keep them involved and talking to one another about the activity." **Action**: "Keep the groups facing each other."	**Question**: What is keeping you from having student desks arranged in groups the entire time? **Strategy**: Keep the groups in this configuration.
Instructional Strategies/ Procedures	**Reflection**: "The students were very quick to catch on to the activity. The biggest challenge to the activity was when a groupmate answered the previous step(s) incorrectly and thus led the current group member on an incorrect path." **Action**: "Be more active in monitoring to see if cards are piling up on one particular group member."	**Question**: What questioning strategies you might use to help students better understand the vocabulary? **Strategy**: Use questioning to probe students' knowledge about the proportions in the formulas being studied, and have students write out the proportion "in words" before substituting the numerical values into the proportion.
Time/ Organizational Management	**Reflection**: "By demonstrating the types of problems as two warm up problems, the students did not struggle as much completing the cards as they might have if we had not reviewed. They did take too long on the sample problem, which is a concern, but I chalk it up to them being behind all the other classes because of a time constraint." **Action**: "Demonstrate a problem by myself and then have them work on the sample problems."	**Question**: How could you shorten the warm-up? **Strategy**: The warm-up does not always have to be completed in class (e.g., Start the problems in class and then put them away to be finished later in that class or next class. In addition, have students work together on the warm-up.)
Discipline Management	**Reflection**: "I had no discipline management challenges since this class is quite well behaved." **Action**: "None."	**Question**: What are some ways to engage students when they finish their work? **Strategy**: Change the name of "homework" to "assignment" or "exit ticket" so that students will work on it in class.

Time/organizational management. "By demonstrating the types of problems as two warm-up problems," the teacher reflected, "the students did not struggle as much completing the cards as they might have if we had not reviewed. They did take too long on the sample problem, which is a concern, but I chalk it up to them being behind all the other classes because of a time constraint." I asked the teacher what might make the warm-up take less time. S/he suggested demonstrating a problem for the students and then letting them work on the warm-up. I offered that students may become dependent upon the teacher to remind them of recently reviewed content and suggested that the teacher allow students to work together on the warm-up so they could learn from each other. In addition, if the warm-up is not completed within the given time, it could be put aside and finished at a later time or during the next class meeting.

After the observation, I left the room to conduct student interviews and returned with about 14 minutes remaining in the class period. With three exceptions, students remained on task throughout the entire observation, and their efficient use of class time meant that there was time left over at the end of entire lesson. The teacher was attempting to get students to work on their homework assignment with the remaining class time, pointing out to students that this class period was shorter than the others and extra time was rare for this class period. Yet, students did not want to take advantage of the class time to work on homework. I suggested to the teacher that in addition to planning for activities to engage students during extra class time (Freiberg & Driscoll, 2005), the teacher could consider changing the name "homework" to "classwork" or "exit ticket," thus communicating an expectation upfront that "this assignment is to be completed in class," and decrease student resistance to completing homework during class.

Discipline management. For Observation #2, the teacher provided written directions and a graphic organizer for students to record information, which helped students to finish the task quickly. In contrast to Observation 1, students in Observation 2 knew both their roles and tasks. In addition, the teacher balanced the groups with four to a group and students were engaged during the entire class period. The teacher agreed that this lesson proceeded more smoothly than in Observation 1, and wrote, "I had no discipline management challenges since this class is quite well behaved."

Observation 3 context. My activity during this 90-minute class proceeded in the following manner:

Minutes 0 – 3: The students began the warm-up and the third-party observer and I prepared for the lesson.

Minutes 4 – 44: The third-party observer conducted the classroom observation (10 four-minute rounds).

Minutes 55 – 60: I administered and collected the student survey.

Minutes 59 – 77: I organized observation data, set up interview space, and conducted sequential interviews in the hallway outside the classroom.

Minutes 76 – 90: I began preparations for the post-observation debriefing/coaching session with the teacher by analyzing observation data using the "Fixed Category Observation Record" (see Appendix A).

When the bell rang to start class, only 16 students of the 24 on the teacher's class roll were present: it was a cold and icy day and weather reports had warned to expect winter storm and snow conditions that afternoon and into the next day. Many parents, anticipating that an early dismissal might be called by district administrators thus leaving some students with a long wait in the cold for their parents to pick them up after work hours, chose to keep their children at home for the day. This lesson engaged students in the learning of new content while using a cooperative learning structure with which students were familiar. For the first four minutes of the observation, the students worked independently on the warm-up. Then the teacher stopped students' work on the warm-up and over the next 12 minutes, the teacher reviewed the homework from the previous class and gave direct instruction on new content. For the next four minutes, students were given a practice problem and all students successfully completed the practice problem. Over the next 8 minutes, the class transitioned to the cooperative learning activity and the teacher gave directions and engaged students in a question/answer/discussion period. The observation ended with 12 minutes of cooperative learning activity. In this observation, the teacher used the same cooperative learning structure as in Observation 2, only this time the content was new.

In this lesson, there were six instances of off-task behavior, three more than in Observation 2. The top off-task behaviors in Observation 3 were talking (three), followed by distracted behavior, taking care of needs, and dozing (once each), compared to Observation 2 which had two instances of talking and one of distracted behavior. Only one off-task behavior (taking care of needs) occurred during cooperative learning.

Post-observation debriefing.

Presentation of the observation data. After our individual written reflections had been completed, I shared with the teacher the observation data presented in Table 22 and the "Fixed Category Observation Record" (see Appendix A), which included the following analysis of the observation data:

1. *During which intervals in the lesson did the greatest number of off-task behaviors occur?* Four off-task behaviors were observed during the fourth interval (observation rounds 7 and 8).
2. *Identify the top two off-task behaviors.* Of the six off-task behaviors observed during this lesson, one occurred during cooperative learning and five occurred during other instructional activities. The highest-occurring off-task behaviors observed were talking, which was observed three times, and waiting, distracted behavior, and dozing were each observed once.
3. *For each interval identified in #1, record the top two off-task behaviors, the number of times they occurred, and the corresponding learning activity.* During the fourth interval (observation rounds 7 and 8), talking was observed three times and distracted behavior was observed once.
4. *Name the students who were off task the most during the lesson.* (Names are omitted to preserve student confidentiality.) Six students were each off task once.
5. *Record anything else that could impact instruction or student performance.* The cooperative activity was the same as the one used in Observation 2, but this time, the lesson content was new.

A comparison of the number of off-task behaviors during cooperative learning from Observation 2 to the Observation 3 revealed the following:

- The instances of talking and distracted behavior decreased from two and one, respectively, in Observation 2 to zero each in Observation 3. The instances of taking care of needs increased from zero in Observation 2 to one in Observation 3.

- The number off-task behaviors for every group of four students during cooperative decreased from Observation 2 (0.55) to Observation 3 (0.25).
- For Teacher D, the number of off-task behaviors during cooperative learning decreased from 32 in Observation 1 to three in Observation 2, and then again to one in Observation 3.

Reflection sharing. Once the observation data were shared with the teacher, the teacher and I shared our reflections with each other (see Table 36).

Physical classroom environment. Student desks were pre-arranged in groups of four. “Working in groups of four facing each other seemed to produce a much better working environment for the groups,” the teacher wrote. “It allowed the students to feel more a part of a group and more comfortable asking each other for help as well as offering help (solicited or unsolicited).”

Instructional strategies/procedures. One aspect of the lesson that was different from Observation 2 to Observation 3 was that the teacher repeated the same cooperative learning structure from the previous observation to teach new content. The teacher reflected, “Teaching the lesson right before the activity seems to work better than using the group activity to review previously learned topics.” S/he continued, “The students had experienced the activity before and were well-versed in its specifics. I taught the lesson before the group activity and the students who didn’t understand the topic were able to learn it from their group members during the activity.”

Table 36

Teacher D and Coach Reflections Observation 3

Reflection Category	Teacher's Written Reflections and Actions to Take	Coach's Written Questions and Strategies
Physical Classroom Environment	**Reflection**: "Working in groups of four facing each other seemed to produce a much better working environment for the groups. It allowed the students to feel more a part of a group and more comfortable asking each other for help as well as offering help (solicited or unsolicited)." **Action**: "Keep the groups facing each other in groups of four."	**Question**: What is the best way to manage cooperative learning in terms of physical arrangement? **Strategy**: Keep the groups turned toward each other. The constant moving of the desks takes time and causes students to lose focus on the activity.
Instructional Strategies/ Procedures	**Reflection**: "The students had experienced the activity before and were well-versed in its specifics. I taught the lesson before the group activity and the students who didn't understand the topic were able to learn it from their group members during the activity." **Action**: "Teaching the lesson right before the activity seems to work better than using the group activity to review previously learned topics."	**Question**: What are your expectations for homework? **Strategy**: Since making the assignment easier or shorter has not helped, a strategy that might help would be to keep the rigor and to make sure the assignment is relevant and meaningful.
Time/ Organizational Management	**Reflection**: "Instead of identifying a time constraint initially, I let the students feel free to work together without time constraints. Once everyone understood what was going on then I initiated a timer to bring everything to a close." **Action**: "No timer initially, then I will set one up as groups are ending."	**Question**: What are the best strategies to use to manage a 90-minute class period? **Strategy**: Break up the lesson into small chunks. (The teacher responded: "If something works, modify it and improve it through reflection." For example, the teacher modified the relay activity until it worked smoothly.)
Discipline Management	**Reflection**: "I had no discipline management challenges since this class is quite well behaved." **Action**: "None."	**Question**: What are some ways to engage students when they finish their work? **Strategy**: Change the name of "homework" to "assignment" so that students will work on it in class.

I noticed that when the teacher was ready to review the previous day's homework, nearly half of the students appeared not to have any homework to discuss. I asked the teacher what his/her expectations for homework were. The teacher was clearly frustrated with students' lack of follow-through on homework. I suggested a strategy that might help to keep the rigor and to make sure the assignment is relevant and meaningful, and that students are held accountable for completing it (Marzano, 2001).

Time/organizational management. The teacher made an effort to reduce the anxiety that time could play in a relay activity by allowing groups to work at their own pace. I then asked the teacher to reflect on the best strategy for managing a 90-minute lesson. We both agreed that breaking the lesson into manageable chunks of time, which the teacher did in this lesson, is crucial for keeping students focused on the task. The teacher added, "If something works, modify it and improve it through reflection." For example, the teacher modified the relay activity s/he used in the previous observation until it worked smoothly.

Discipline management. In both Observation 2 and Observation 3, there were very few off-task behaviors during cooperative learning (a total of four over the two observations). I asked the teacher why this happened and s/he believed it was because in both cases, the students were familiar with part of the lesson: either the content or the activity. Additionally, the teacher used cooperative, not competitive, groups. Therefore, the students motivated each other and the activity facilitated this. "Motivation is higher in these situations, especially when group members work on a group task" (Freiberg & Driscoll, 2005p. 298).

APPENDIX O:

TEACHER E OBSERVATION DATA AND DEBRIEFING/COACHING SESSIONS

APPENDIX O: Teacher E Observation Data and Debriefing/Coaching Sessions

Observation 1 context. My activity during this 90-minute class proceeded in the following manner:

Minutes 0 – 3:	The students began work on a warm-up while the teacher prepared the third-party observer and me with an overview and logistics for the lesson.
Minutes 4 – 44:	The third-party observer conducted the classroom observation (10 four-minute rounds).
Minutes 47 – 52:	I administered and collected the student survey.
Minutes 53 – 75:	I organized observation data, set up interview space, and conducted sequential interviews in the hallway outside the classroom.
Minutes 76 – 90:	I began preparations for the post-observation debriefing/coaching session with the teacher by analyzing observation data using the "Fixed Category Observation Record" (see Appendix A).

When the bell rang to start class, all but five of the students had arrived and the teacher directed them to begin the warm-up, which was written on the front board. Due to a unique scheduling system at this campus, five additional students arrived about 20 minutes into class. This lesson engaged 26 students in learning. As soon as the groups had completed their warm-up, they began the investigation. Students' learning throughout the investigation was facilitated by the use of manipulatives, with which students were familiar, and culminated by displaying their results on chart paper.

In order to inform Research Question I, the observation data were organized to show the type and number of off-task behaviors (Table 24) and the number of off-task behaviors per group of four students during cooperative learning.

Post-observation debriefing.

Presentation of the observation data. After our individual written reflections had been completed, I shared with the teacher the observation data presented in Table 24 and the "Fixed Category Observation Record" (see Appendix A), which included the following analysis of the observation data:

1. *During which intervals in the lesson did the greatest number of off-task behaviors occur?* The third interval (observation rounds 5 and 6) had a total of five off-task behaviors.
2. *Identify the top two off-task behaviors.* Eleven off-task behaviors were observed during this lesson and all observation rounds involved cooperative groups. The highest-occurring off-task behavior was talking, which was observed six times.
3. *For each interval identified in #1, record the top two off-task behaviors, the number of times they occurred, and the corresponding learning activity.* In the third interval (observation rounds 5 and 6), talking occurred four times, while distracted behavior occurred once.
4. *Name the students who were off task the most during the lesson.* (Names are omitted to preserve student confidentiality.) One student was off task three times, one student was off task twice, six students were off task once, and 18 students were not observed as off task.
5. *Record anything else that could impact instruction or student performance.* Due to a unique class schedule at this campus, five students entered this class about 20 minutes

after the lesson began, and these students were accustomed to asking their groupmates for help in getting caught up in the lesson.

Reflection sharing. Once the observation data were shared with the teacher, the teacher and I shared our reflections with each other (see Table 37).

Physical classroom environment. The classroom was of average size for a high school mathematics class, but due to the configuration of the room, a few students were a bit cramped in their groups-of-four seating. However, once they got up to work on the chart paper display, they had plenty of room. The teacher wrote in his/her reflection that s/he would like to consider moving a few desks around to give some students more room. Although physically conducive, I sensed that the emotional environment was more business-like than pleasant. The teacher's manner was abrupt and there did not appear to be an affective connection between the teacher and the students. However, for this observation, the teacher's manner did not keep the students from successfully completing the task.

Instructional strategies/procedures. This lesson engaged students in the learning of new content while using a cooperative learning structure with which students were familiar. The teacher presented the directions for the cooperative investigation on paper, but did not discuss them verbally with the students. The teacher wrote, "There were clear directions for the most part, but I could have done better by writing down the steps on the board. I was under the assumption that we have done numerous such activities in the class and the students should have been used to this." I mentioned to the teacher that even with a familiar activity, students may still have questions, especially when manipulatives are involved.

Table 37

Teacher E and Coach Reflections Observation 1

Reflection Category	Teacher's Written Reflections and Actions to Take	Coach's Written Questions and Strategies
Physical Classroom Environment	**Reflection**: "It was a tight but conducive environment for the students to complete the activity." **Action**: "Some desks need to be moved around."	**Question**: None; the environment was conducive to the activity. Student desks were in groups of four and groups had room to complete the chart paper display. **Strategy**: None.
Instructional Strategies/ Procedures	**Reflection**: "There were clear directions for the most part but I could have done better by writing down the steps on the board. I was under the assumption that we have done numerous such activities in the class and the students should have been used to this." **Action**: "Write the steps on the board."	**Question**: Did the students have clear expectations of what to accomplish? **Strategy**: Provide both written and verbal directions, making sure to check for students' understanding.
Time/ Organizational Management	**Reflection**: "I was pleased with my timing though I started with less time, but the activity was planned for 45-50 minutes." **Action**: "Have a student be the time manager for the class. Have the manager ask the groups, 'show with your fingers how much more time you need."	**Question**: Did students have adequate time to complete each part of the assignment? What could be done to facilitate smoother transitions within the investigation? **Strategy**: Appoint a student to be the timekeeper.
Discipline Management	**Reflection**: "Students were well behaved except for one who came in late from another class and became disruptive for a while before we had to straighten issues out with him/her." **Action**: "I had to converse with this student about the behavior today."	**Question**: Did students have assigned roles throughout this investigation? **Strategy**: Since students are familiar conducting this sort of investigation, the teacher could help students create and choose their roles, and practice taking on different roles from activity to activity.

"Checking for understanding" is a strategic part of the lesson cycle. It not only assesses what students understand about the directions and provides the opportunity to correct misconceptions (Fisher & Frey, 2007), it also allows them to ask a few questions now that may stem the tide of endless (and potentially disruptive) questions later. I suggested to the teacher to include "checking for understanding" as a frequent part of every lesson.

Time/organizational management. The teacher shared that an incident with a student required a private conversation with the student, which took away from the teacher's time in monitoring the class. However, the teacher held the conversation discreetly and no other students in the class showed awareness of the fact that the teacher took the student outside of class to hold a conversation. Even though the teacher was outside the room with the student for less than a minute, the incident prompted me to wonder if students had a timekeeper to help them regulate their time, whether in the teacher's presence or absence. When students facilitate classroom operations and learn how to self-manage their behavior, they make the transition from "tourist" to "citizens" in the classroom (Freiberg, 1996). I also suggested that having each group appoint a timekeeper would facilitate students to monitor their own behavior and to ensure individual accountability (Holt & Kysilka, 2006). The teacher's reflective writing concurred: "Have a student be the time manager for the class. Have the manager ask the groups, 'show with your fingers how much more time you need.'"

Discipline management. There were 11 instances of off-task behavior during the lesson—six of these due to talking—but students quickly redirected themselves back on task. The teacher circulated amongst the groups and his/her presence kept any off-task behavior brief. The teacher reported an incident with one student that required a private conversation between the teacher and student outside the classroom, but the teacher kept the incident quiet and private.

The teacher also reflected that the student became “disruptive,” but it must have happened very quietly as neither I nor any other students seemed aware of any particular disruptive behavior. The issue was handled in less than a minute, and the teacher and student returned quickly to class and returned to their pre-discussion tasks.

Because assigning roles to every student in the group helps to maximize student engagement and participation (Williams, 2002), my question for the teacher concerned the assignment of roles to the cooperative tasks. I suggested that since students are familiar with conducting this sort of investigation, the teacher could allow students to create and choose their roles, and practice taking on different roles from activity to activity. The teacher agreed that this particular class could do this.

APPENDIX P:

STUDENT SURVEY RESPONSES

APPENDIX P: Students' Survey Responses

An examination of the mean rating response, coupled with additional information regarding student responses, reveals the following:

- The items with the highest mean ratings were items #1 (mean rating of 3.43) and #3 (mean rating of 3.36).
    - 94% of students agreed or strongly agreed with item #1.
        - 50% of students strongly agreed (4 points), 44% agreed (3 points), 5% of students disagreed (2 points), and 1% strongly disagreed (1 point);
        - Item #1 was the only item of the six to which all students responded.
    - 92% of students agreed or strongly agreed with item #3.
        - 46% of students strongly agreed (4 points), 46% agreed (3 points), 6% disagreed (2 points), and 1% strongly disagreed (1 point);
        - 1% did not respond (zero points).
- The item with the third highest rating, with a mean rating of 3.16 on a four-point scale, was item #2, "This teacher is prepared for class."
    - 91% of students agreed or strongly agreed with item #2.
        - 28% of students strongly agreed (4 points), 63% agreed (3 points), 7% disagreed (2 points), and 2% strongly disagreed (1 point) with item #2.
- The items with the fourth and fifth highest ratings were, item #5 (with a mean rating of 3.11 on a four-point scale), "In this class, I am frequently involved in working in groups on class projects." and item #6 (with a mean rating of 3.08 on a four-point scale), "When my classmates and I have problems with each other, we try to work them out together,"

  - 84% of students agreed or strongly agreed with item #6.
    - 27% of students strongly agreed (4 points), 58% agreed (3 points), 13% disagreed (2 points), and 2% strongly disagreed (1 point);
    - 1% did not respond (zero points).
  - 83% of students agreed or strongly agreed with item #5.
    - 33% of students strongly agreed 4 (points), 50% agreed (3 points), 12% disagreed (2 points), and 4% disagreed (1 point);
    - 1% did not respond (zero points).
- The item with the lowest rating, with a mean rating of 2.96 on a four-point scale, was item #4, “I am actively involved in the lessons in this class.”
  - 81% of students agreed or strongly agreed with item #6.
    - 16% of students strongly agreed (4 points), 65% agreed (3 points), 18% disagreed (2 points), and 1% strongly disagreed (1 point).

Student responses to each survey item were further analyzed to determine whether students’ responses changed over the 11-week period:

- The average percent change in mean survey ratings from Observation 1 to Observation 2 was +1.3%.
  - All items showed an increase in mean rating, ranging from 0.0% (item #1) to +4.0% (item #3)
  - Item #3 proved to be an outlier, with a change in mean rating of +4.0% (approximately three times greater than the mean percent change for all items).
- The average change in mean survey ratings from Observation 2 to Observation 3 was +2.4%.

- o Items #1, 3, 4, 5 and 6 showed an increase in mean rating, ranging from +1.0% (item #5) to +6.2% (item #4).
- o Item #4 proved to be an outlier, what a change in mean rating of +6.2% (approximately two and one-half times greater than the mean percent change for all items).
- o Item #2 also proved to be an outlier as it was the only item to show a decrease (-0.9%).

- Items #1, 3, 4, 5, and 6 showed a net increase in mean survey ratings from Observation 1 to Observation 3, ranging from +1.2% (item #1) to +7.7% (item #3).
- Item #2 was the only to show a net decrease in mean survey ratings from Observation 2 to Observation 3 (-0.9%).

APPENDIX Q:

Students' Interview Responses

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Interview Responses—Students' Responses to Interview, Part I:

"Today in class, we observed how students worked together in groups. We observed that you were _____< on task the entire class period, or talking, texting, waiting, taking care of needs, interrupting, distracted, or dozing)>. Is this a correct observation?"

Category 1: Confirmed by Student—Observed Off-task Behavior

29 Student Responses (listed by student code):

- A2. Off-task behavior: Talking

  Student: "No (with hesitation)."

  Interviewer: "You were talking, but it was always about math, is that what you are saying?"

  Student: "Not really."

  Interviewer: "So, there were some times you might have been talking but not about math?"

  Student: "Yeah."
- A4. Off-task behavior: Talking "Yes."
- A5. Off-task behavior: Talking, Taking Care of Needs, Waiting "Yes. I basically do all my work. When I'm just sitting there waiting, I'm waiting for him/her. So I just find something else to do while I wait."
- A6. Off-task behavior: Talking "It's a correct observation."
- A9. Off-task behavior: Talking and Texting "At the beginning, I was talking about something else, but then we started to do our math. And yes, I was texting."
- A10. Off-task behavior: Talking and Texting "Yes, your observation is correct."
- A11. Off-task behavior: Talking "We were talking about math and about other things."
- A14. Off-task behavior: Talking "That is correct."

- A15. Off-task behavior: Talking, Texting "Yes."
- B4. Off-task behavior: Talking "Yes. I was talking about jokes…probably things people have seen on the Internet and Facebook."
- B5. Off-task behavior: Talking "Yes. At one point, I wasn't talking about the math."
- B8. Off-task behavior: Waiting "Yes, I was waiting on how to start the whole project. Most of the time in groups, I always like to start it, like the leader. That way, everyone knows what to do and does something so the teacher doesn't come and say, 'One person's doing the whole thing.'"
- B9. Off-task behavior: Talking, Distracted, Waiting "Yes."
- B10. Off-task behavior: Talking "Yes, that's true."
- B13. Off-task behavior: Distracted "It's because I was dozing off, laying around because I was a 'communicator' and I really knew everything and everything was under control so I didn't have anything else to do. Correct observation."
- B14. Off-task behavior: Talking, Distracted "Yes, several times."
- B15. Off-task behavior: Talking "Yes, it was <a correct observation>."
- C7. Off-task behavior: Taking Care of Needs "Yes. I just had three cups of coffee because I went to sleep pretty late because of work."
- C8. Off-task behavior: Talking "To be honest, I do not remember. But if we did, it was because we were dealing with so many numbers. We needed to clear our heads. I probably do confirm it because we got tired."
- C10. Off-task behavior: Talking "Yes, I get distracted easily, but I do come back to it."
- C11. Off-task behavior: Distracted, Waiting "Yes. When we first started, I didn't want to be the first one to say something, so I waited for them to do something but they didn't.

Usually I don't play around a lot, but the girl in my group was kind of like fun. I was like I didn't want to do this anymore."

- D2. Off-task behavior: Talking, Waiting "Sometimes I was talking about math, sometimes it was a sidebar conversation. When I finished my work, I went over my notes to process my notes. And then <the teacher> was like, 'Your recorder has to do something,' and he didn't want to help, so I just sat there and waited."
- D3. Off-task behavior: Talking "Yes. There were times that we were off task, but we also did talk about the lesson."
- D5. Off-task behavior: Waiting "Yes, waiting for them to do the work. I don't really understand fast, so I wait for them to do it and then I see how they do it and that's how I learn."
- D7. Off-task behavior: Distracted "Yes. When I work in a group, sometimes the group members are quiet and not talking so if I say something funny, then they will laugh and start talking."
- D12. Off-task behavior: Distracted "Yes, and that happened."
- D13. Off-task behavior: Talking "Yes."
- D14. Off-task behavior: Talking "Yes."
- E5. Off-task behavior: Distracted "Yeah, I didn't really have an assigned task. When I offered to do something, I just took over. Towards the end, I started tracing the graphs, doing graphs and stuff like that…and drawing and measuring and handing out what they needed…going to get the supplies for what they needed. This is probably the second time I have been daydreaming: chilled out, relaxed, not doing hands-on. Yeah, maybe just a couple of times."

Category 2: Confirmed by Student—Observed On-task Behavior for All Ten Observational Rounds

29 Student Responses (listed by student code):

- A1. “I would say so, yes.”
- A3. “Yes.”
- A7. “Yes.”
- A8. “Yes.”
- A12. “Yes.”
- B1. “Yes.”
- B3. “Yes.”
- B7. “Yes.”
- B11. “Yes.”
- B12. “Yes.”
- C2. “Yes. I don’t see the point of doing something else. I listen, of course.”
- C3. “Yes.”
- C4. “Yes. In math class, I don’t. I feel like if I do, if I do, I get off-topic and I ask questions and I don’t know anything. So, I don’t do all that.”
- C5. “Yes, it is correct.”
- C6. “Yes.”
- C9. “Yes. I try to be because I came in late <from an off-campus class> and I know the teacher expects us to be on time. One of the rules in class is you must stay on task and you can’t get off topic and talk about things that don’t involve the topic.”
- C12. “Yes.”
- C13. “Yes.”
- C14. “Yes.”
- D6. “Yes.”
- D8. “Yes.”
- D9. “Yes, it is.”
- D10. “Yes.”
- D11. “Yes.”
- D15. “Yes.”
- E1. “Yes.”
- E2. “That is correct.”
- E3. “Yes.”
- E4. “Yes.”

Category 3: Disconfirmed by Student—Observed Off-task Behavior

4 Student Responses (by student code):

- B2. Off-task behavior: Talking "No**.** I got distracted with the kid next to me."
- B6. Off-task behavior: Talking, Waiting Talking: "Incorrect observation." Waiting: "Correct observation. I was waiting on one of my classmates to help me with something."
- C1. Off-task behavior: Talking "No. We were talking about the lesson.
- D1. Off-task behavior: Talking "No, I was talking about the work we were doing…to find the side lengths of the triangles."

Category 4: Disconfirmed by Student—Observed On-task Behavior for All Ten Observational Rounds

0 Student Responses

Interview Responses, Part II: Students' elaborated responses to Survey Item #1—"I like working with other students in this class to achieve goals."

1. **E5. "It helps to give a better understanding when a peer helps instead of asking a teacher." (15)**

- A1. "I do. I like having someone to ask a question and they can help me out. If I'm lost, they can guide me through it**."**
- A8. "Yes. I like it because I understand it more better."
- A9. "Yes I do. When I can't understand, we have each other to help."
- A11. "I agree because I understand better."
- B8. "Yes. If it's just the teacher talking on and on, I get really bored and start zoning out. But if I'm in a group, then I'm hands-on the activity."

- B9. “Yes. Because other students help me understand but they break it down more than the teacher would.”
- C7. “I strongly agree. Especially because math is a difficult subject for me and working in groups gives me another perspective on things. Working with my peers instead of just listening to the teacher lecture helps me to understand what’s going on.”
- D6. “I agree. If you have a problem, you can ask one of your group members that know.”
- D7. “I do. Sometimes when I don’t know stuff, they teach me. If the teacher is not there for me, I can ask someone else and they will explain it to me and I will get it better.”
- D10. “If you don’t understand something while the teacher is explaining it, you can go back and ask them and they’ll get you on task or they will tell you that they don’t get it as well so you can help each other out. Meanwhile if they don’t get something and you do, you can help them out and if they get something you don’t they can help you out with that.”
- D11. “I strongly agree. Yes, because with other students I get help and there’s more people who understand what the problem is about.”
- D12. “Yes, it’s easier with people and if you have questions, you can always ask other people.”
- D13. “I strongly agree. A lot of times, the teacher doesn’t explain it well enough. And sometimes, somebody gets it better than me and they can explain it better most of the time than the teacher.”
- D15. “I agree because sometimes I can’t do it by myself and I need help and when I can’t do it, maybe somebody else can.”
- E5. “I do. It helps to give a better understanding when a peer helps instead of asking a teacher. The teacher uses big vocabulary words or sometimes the sound of <the teacher’s>

voice and actions can make you feel stupid. So it's actually better to ask a peer who is always paying attention or who is better in math."

2. **A14. "We get to help each other out. Some of us have stronger parts and some of us have weaker parts of math and we can fuse them together and make one strong group." (10)**

- A7. "Yes, because everyone wants the same goal in class. We all want to pass and we all want to get a good grade, so we all work together to make that happen, that's why I think it's good."
- A14. "We get to help each other out. Some of us have stronger parts and some of us have weaker parts of math and we can fuse them together and make one strong group."
- B6. "I do because it divides the work up evenly and everyone can have their own load instead of just one whole thing to take care of."
- B10. "I agree. Sometimes I don't understand and the other students are paying attention. Sometimes I am not paying attention. You can't always do it by yourself. I am in sports and I can relate this to teams. When you're in teams, you do much more better. Unless you are with your best friend and then you'll never get anything done. If you're both dedicated to achieve the same goal, then you can actually get the goal achieved."
- B11. "Yes, because we work together to get answers. If we get behind, we help each other address our shortfalls."
- B12. "Yes, it's a way to cooperate and get help."
- C8. "I do. Working together with other students helps me be prepared to work with others in real life."

- C9. “I do. I don’t always know the answers to what’s going on. I feel like I get lost sometimes. I feel like math is a weak point for me, always has been so having other people there for support and asking questions is really nice. Instead of always asking the teacher and look like you have no idea what you’re doing. I’m pretty sure that would get on the teacher’s nerves if you did that all the time.”
- D8. “Because not only do you get to notice your strengths, but maybe some of your weaknesses is their strength so you can help each other out in learning.”
- D9. “I strongly agree because we have the opportunity to work together and put our thoughts together.”

3. A10. “Yes. That’s true.” (9)

- A10. “Yes. That’s true.”
- B3. “Agree.”
- B5. “Yeah.”
- B7. “Yes.”
- D1. “I do.”
- D5. “I strongly agree.”
- E1. “I do like working in groups.”
- E3. “True.”
- E4. “Yes.”

4. B15. “When you work with others, you bring fresh new ideas to the table.” (9)

- A4. “Strongly agree. So you can understand people’s opinions on their answers and everything. To see if I have the right answer or wrong answer.”
- B14. “It’s fine. It’s different. Usually, we just sit and are told stuff and expected to learn. But when working with other people, it’s other minds and other experiences.”
- B15. “Yes, I do. When you work with others, you bring fresh new ideas to the table. Everyone has a different background, and it just helps out with whatever challenges you have to face.”

- C2. “Yes, because this class is not your usual math. So, I like to hear other opinions. Sometimes I don’t get what’s going on, so I like to study with others. They help me out.”
- C3. “I do. I think that our class is very small, but we have such variety and we all think of something different. We get to get a lot of different opinions on what we’re doing.”
- C5. “Yeah. I like to work in groups because it’s easier. You get other points of view from other classmates, too. The fact that someone else is there in case you have problems. Like other than the teacher. Say, you have a problem with a math problem; they can help you out right away. They might have the same problem and they can work together.”
- C10. “I do <like working in groups>. Sometimes, I will think too much about something, and someone will give me another opinion that will trigger something in my head that makes me understand better.”
- C12. “Yes. Not everything is easy to understand, so I like to get other people’s opinion so I can understand it better.”
- E2. “I feel that I do my best working with other students because I get to cooperate with them and share knowledge.”

5. **D2. “It makes the work easier and you don’t get stuck by yourself trying to figure it out.” (6)**

- A3. “Yeah I do. I think it is more easier, more faster.”
- B13. “It makes it easier. I learn more from the students than from the teacher.”
- C1. “Yeah. If you’re working, it makes things faster—you don’t have as much pressure on yourself. But you have pressure because you’re worried that the other person might not do it. But it makes things go faster and easier. If you don’t get it, they can help you understand it. It’s team work.”

- C6. “Working in groups is easier. They tend to point out when you’re wrong, but not in an aggressive way. If you make a simple mistake, they’ll correct you, but nicely.”
- D2. “I do. It makes the work easier and you don’t get stuck by yourself trying to figure it out. If I get stuck and I’m by myself, I just sit there. If I‘m in a group, I can ask someone for help and it’s easier.”
- D14. “Strongly agree. It’s easier to work with other people. If I don’t know something, they can help me out.”

6. **C13. “I like working with other students in this class because it’s fun. Each person has their own insights.” (6)**

- A2. “I strongly agree. I like to work with other people to see—I don’t know—”
- A6. “I strongly agree because I like working with people.”
- D3. “I like working with other students because I work better working with other people instead of working by myself. If I don’t understand something, I can ask them and they will understand and we can do it together.”
- C11. “I agree. I like working in groups over just working by myself. You get to work with other people and that’s better.”
- C13. “I like working with other students in this class because it’s fun. Each person has their own insights.”
- C14. “Yes, most of the time, it is fun. There are a few students I’d rather not work with, but I enjoy working in groups.”

7. **A5. “Disagree. I’m more of a solo person. I like to do things by myself.” (4)**

- A5. “Disagree. I’m more of a solo person. I like to do things by myself. That’s why I sit by myself because I prefer to work alone than to have people copy off of me.”

- A12. “I don’t really like working in groups. Sometimes, someone is wrong and I have to correct them or I don’t like being corrected.”
- A15. “I disagree. I like working alone. I prefer it because I get my work done faster.”
- B4. “I don’t like working in groups because it is a distraction and I don’t get as much work done as I could by myself.”

8. B2. “I agree sometimes, but it depends on who is in my group.” (3)

- B1. “Sometimes. Some people I don’t work well with, and some people like to get work done and I can work well with them.”
- B2. “I agree sometimes, but it depends on who is in my group.”
- C4. “I agree, kinda sorta. In our class, if others get off topic, they frustrate me. If you go off topic when something really, really needs to be done, I don’t like that. So, some people in my class don’t do that, so I do agree with it, but then sometimes I disagree. But I put agree because most of the time we get our stuff done.”

Interview Responses, Part II: Students’ elaborated responses to Survey Item #2—“This teacher is prepared for class.”

1. E5. “S/he has a lot of stuff prepared. Instead of interrupting the class to go make copies, s/he already has it all out.” (32)

- A5. “I agree. The first time I came here, s/he already had an assignment for us. Every time we come, s/he already has an assignment for us to do or what we have to finish. So yeah, I agree.”
- A6. “I agree. This teacher is really nice. As soon as we get in the door, s/he really wants everyone to be on time.”

- A7. “Yes, s/he’s always prepared. S/he’s never like “oh, hang on kids, I’m going to do something real quick, today we’re going to do this.” So it’s good.”
- A14. “Yes, but sometimes the class is loose and that is when everyone starts talking about different stuff. But yes, this teacher is prepared.”
- B6. “Yes, s/he is. S/he always has everything ready for us.”
- B8. “Yes, s/he’s always prepared for class and I never have to wait for anything.”
- B12. “This teacher is always prepared. I don’t have to wait.”
- B13. “Oh, yeah. S/he is always prepared.”
- B14. “Yes, we always have something to do, even when we wish we didn’t.”
- B15. “This teacher is always prepared for class. S/he has our warm-up and takes us straight into the lesson afterwards.”
- C1. “Yes s/he is. I have had a lot of teachers that when they walk in there, they go through their backpacks for 15 minutes trying to find their lesson plan for the day, and then they’re like ‘OK, here we go.’ Fifteen minutes into class time and we only have an hour and a half for learning, so it’s kind of useless for the teacher to be unprepared. But <this teacher> always walks in and has his/her stuff ready for us to do. S/he’s a real pretty prepared <teacher> and always has stuff for us to do.”
- C2. “Yes, always. S/he knows what s/he is doing.”
- C4. “I agree, but I should have put strongly agree because we always have something prepared for class.”
- C5. “Yes, every time I come in, s/he always has something on the board and it’s always what we do over the class time.”
- C6. “Yes. This teacher is always on his/her game. S/he makes us think.”

- C7. “Yes, definitely. Always prepared.”
- C8. “The teacher is more prepared than any of the students.”
- C9. “Yes. This teacher is the only teacher here who knows the lesson plan front to back every day. S/he walks in and s/he’s prepared. It’s really nice. It’s not a waste of time, it’s not busy work. It’s very serious stuff that s/he knows and cares about. S/he doesn’t seem confused about the material ever, so it’s nice to have a teacher like that. I’ve had bad experiences in the past where the teachers don’t even understand their own lesson plan.”
- C10. “Yes. Sometimes, this teacher must go and make copies, but is always prepared.”
- C11. “This teacher is one of the best teachers here. I always go into this class feeling like I would learn more than going into anyone else’s class.”
- C12. “Yes. Always. I don’t think there is ever a time when I don’t have anything to do.”
- C13. “This teacher is always prepared for class.”
- C14. “This teacher always knows what we are doing next, and if we catch up or get ahead, he always has something planned for us.”
- D3. “Yes, the teacher is always prepared for class.”
- D7. “Yes. As soon as we come in, there is a do now on the table. Then there are notes on the board.”
- D8. “For this lesson, s/he was pretty prepared.”
- D9. “I agree because sometimes s/he is ready and other times we have open space.”
- D11. “I do agree, because I do understand most of the time what s/he is talking about.”
- D12. “Yes, s/he always has things for us to do.”
- D15. “Yes. Every time we come in, s/he always has something for us to do, and it doesn’t seem like s/he is fumbling with something.”

- E2. “I always come in late but every time I go in there, s/he always has a worksheet out and everyone is on task doing their work.”
- E5. “S/he is. S/he has a lot of stuff prepared. Instead of interrupting the class to go make copies, s/he already has it all out. S/he has the agenda on the board and s/he follows it, and s/he even has time limits on the agenda.”

2. B10. “Yes, s/he is prepared.” (17)

- A8. “Yes, I think s/he is.”
- A9. “Yes, s/he is.”
- A11. “S/he is.”
- A12. “Yes, I agree.”
- A15. “Yes.”
- B1. “Yep.”
- B2. “Yes.”
- B3. “Strongly agree.”
- B5. “Yeah, s/he’s prepared.”
- B7. “Yes.”
- B9. “Yes.”
- B10. “Yes, s/he is prepared.”
- B11. “Yep.”
- C3. “Always.”
- D5. “I agree.”
- D6. “Yes, s/he is.”
- E1. “S/he is very prepared.”

3. E4. “Sometimes, not all the times. Sometimes s/he is not well organized.” (11)

- A1. “I do and I don’t. Because I had him/her last year. S/he was pretty prepared but half the class would talk and s/he would teach only the half that would pay attention. I feel like if s/he could just make the whole class pay attention it would help out a lot with less distractions in the background.”
- A2. “Yeah.” (with a shrug)
- A3. “Yes, s/he is a good teacher.” (with a shrug)
- A4. “Mostly, yes.”

- A10. “I have not spent any time with this teacher. This is my second day, but s/he is somewhat prepared. S/he needs to be more specific on what s/he is trying to teach us.”
- B4. “My teacher usually seems like s/he is prepared but I’m not sure the curriculum is appropriate for the class. I feel like half the time we are doing <state test> review, but it is the school’s requirement.”
- D1. “Kind of, yes and no. Well, <this teacher> is prepared because we do assignments, so s/he is prepared.”
- D2. “I agree, but I don’t strongly agree. Sometimes, s/he doesn’t have time to take the lesson forward and explain it more. S/he doesn’t have a lot of time.”
- D10. “It seems like the teacher was forgetting to give us our papers out at the beginning of class.”
- E3. “Most of the time, yes.”
- E4. “Sometimes, not all the times. Sometimes s/he is not well organized.”

4. **D13. “I strongly disagree. A lot of times, s/he does not know what s/he is doing. I don’t feel like s/he is prepared a lot of the time.” (2)**

- D13. “I strongly disagree. A lot of times, s/he does not know what s/he is doing. I don’t feel like s/he is prepared a lot of the time.”
- D14. “I disagree. Sometimes this teacher doesn’t know what s/he is saying and that really confuses us.”

Interview Responses, Part II: Students’ elaborated responses to Survey Item #3—“I like working in groups.”

1. **A3. “I like working in groups more. I learn more. If there are some things I don’t know, I could ask a teammate, ‘Can you explain this to me?’” (16)**

- A1. “I do like working in groups. I like having someone else I can ask if I have questions or if I am lost, they can guide me through it.”
- A2. “I like working in groups. It’s more better instead of working alone. Some stuff I don’t really know so I get to ask my group member to see how they do it and I can learn from them.”
- A3. “Yeah. I prefer <working in groups>. I think it’s more, I guess—just—I like working in groups more. I learn more. If there are some things I don’t know, I could ask a teammate, ‘Can you explain this to me?’”
- A7. “I do <working in groups> because we help each other. Of course we talk, but it’s more like we are trying to help each other so that we can all pass.”
- A11. “I agree because if I don’t understand something, I can ask my partner if s/he understands it or not.”
- A14. “I do like working in groups because we get to share our abilities while working on different parts of math.”
- B5. “I prefer working in groups, actually. If I don’t get a problem, the other person that gets it will help me and if they don’t get it, I help them and we get stuck we help each other out.”
- B9. “Yes because I learn from each person. Everyone has their own opinion and so you have different options for working out the problem.”
- C1. “Yes, I do like working in groups. It’s teamwork so it makes things easier.”
- C4. “Yeah, I like working in groups. Because it feels like I don’t have all the load on me. I can just divide it up with everyone else and hope they do their part.”
- C9. “Yes, I do like working in groups as long as other people will listen to you. We have a rule that we set up in class that we have to listen to each other.”

- C14. “Yes, I enjoy working in groups. It’s easier. We can split up the work.”
- D8. “Yes. Let’s say you don’t understand something but they understand something, you could learn from them or you could teach them something.”
- D9. “I like working in groups because we have the opportunity to test our learning skills and we can be on task together and if we have problems we can all work together.”
- D11. “Yes, because everybody can help out each other.”
- D15. “I agree, because if I don’t know something, maybe somebody else does and I can learn from them.”

2. D5. “Yes, I like working in groups.” (15)

- A10. “Yes, I do like working in groups.”
- B2. “Yes.”
- B3. “Yeah, I like it.”
- B7. “Yes.”
- C2. “Yes.”
- C5. “Yeah, I do.”
- C7. “Yes, I prefer to do so.”
- D1. “Yes.”
- D2. “I do, strongly agree.”
- D3. “I love working in groups.”
- D5. “Yes, I like working in groups.”
- E1. “I love working in groups.”
- E2. “Yes.”
- E4. “Yes.”
- E5. “Yes.”

3. B12. “It’s fun. I get bored easy and zoned out. If I’m working with someone, then I’m into the project and I want to finish it together.” (10)

- A4. “Yes. You have people to talk to. If you’re by yourself, it’s good, too, but you’d be bored.”
- B8. “Yes, it <working in groups> is more like the real world. We are not always going to work by ourselves. Sometimes we won’t like the people we work with so it’s a great opportunity to practice.”

- B12. “It’s fun. I get bored easy and zoned out. If I’m working with someone, then I’m into the project and I want to finish it together.”
- B13. “You get to interact more, and for me, it’s better—interacting.”
- B14. “Absolutely true. It’s fun.”
- B15. “Yes, I do like working in groups. I enjoy it actually. It lessens the load that I have to take on myself and I can look to my teammate for help.”
- C8. “It helps me to get to know people better and to work with other people.”
- C10. “I like people, I’m a people person.”
- C11. “Yes. I prefer it over working by myself. Some days, you don’t want to do that much, and people pick up the slack. And some days, you’ll do it. Most of the time, I like it.”
- D7. “I do because I get to meet new people and learn a bunch of stuff from them.”

4. **A9. “Yes because four brains (are) better than one.” (8)**

- A6. “I agree. It’s good. I like it because when I don’t work in groups, I don’t really get much of the idea.”
- A9. “Yes because four brains <are> better than one.”
- B10. “Yes. I like both working and talking so that we can understand the problem at the same time.”
- C12. “Yes, I do <like working in groups>. Basically, because I can learn more.”
- D6. “Yes, because they can help you understand and you don’t have to ask the teacher because s/he is busy at times.”
- D10. “Yes, I like working in groups because it helps you out a lot.”
- D13. “I strongly agree. Yes, I get a better understanding.”
- E3. “Yes, I do because we get to learn better.”

5. **B6. "Yes, I do. Like I said before, it makes everything easier. We all work faster, especially when everyone does their part." (5)**

- A8. "I like working in groups because I learn faster in different ways."
- B6. "Yes, I do. Like I said before, it makes everything easier. We all work faster, especially when everyone does their part."
- C6. "Yes. Some work I prefer to do by myself, but working in groups is always easier."
- D12. "Yes, it's easier with other people if you have questions."
- D14. "Yeah. Because it's easier for me than working by myself."

6. **A5. "Disagree because I like working solo. Sometimes in a group effort, not everyone puts their effort in." (4)**

- A5. "Not really. Disagree because I like working solo. I feel more concentrated. Sometimes in a group effort, not everyone puts their effort in."
- A12. "No, I don't. I have to correct them."
- A15. "Disagree."
- B4. "I do not like working in groups because I feel that I can get more done alone."

7. **B11. "Yes, it depends who are the people are you're working with." (4)**

- B1. "Sometimes. Some people don't know what they are doing and they just want to play. Other people do know what they are doing and I want to work with them because we get it done."
- B11. "Yes, it depends who are the people are you're working with."
- C3. "I do, depending on what I'm doing. There are some things that I would rather do by myself and I can figure that I can get it done faster that way. But I like seeing a different view other than mine."

- C13. “I do like working in groups, but it depends on what I am doing. For example, if we are doing an assignment like today, then yes, I like working in groups. I like having different opinions. But I also like doing it on my own because I feel like I know what I would want to do and then my will would benefit everyone else’s opinion too.”

Interview Responses, Part II: Students’ elaborated responses to Survey Item #4—“I am actively involved in the lessons in this class.”

1. B15. “Yes, I am.” (14)

- A6. “I just normal-agree.”
- A8. “Yes.”
- A9. “Yes.”
- A11. “Yes, I agree.”
- A12. “Yes, agree.”
- B1. “Yep.”
- B7. “Yes.”
- B10. “Yes.”
- B12. “Yes, all the time.”
- B15. “Yes, I am.”
- D6. “Yes, I am.”
- E1. “Yes, I am.”
- E3. “Yep.”
- E4. “Yes.”

2. C5. “Yeah. I always pay attention in class and I always work together.” (14)

- A1. “I try to be. I do. I used to be not involved. This year I try to be more involved as much as I can because I really need math.”
- A7. “Yes, I don’t just get my stuff and put my head down; I actually try to just be with everyone.”
- A10. “Yes, I am actively involved. But today was not a good day so that’s why I have been acting this way.”
- B8. “Yes, I am. I always try to answer questions. If I’m in a group I try to be the leader and help everyone with everything.”

- C1. “Yes. With <this teacher>, s/he takes the time to make sure everyone knows what’s happening in class. If <the teacher> doesn’t, then <the teacher> won’t call you out, but he will try to explain it in a different way. Some teachers will explain the exact same thing in the exact same way and you don’t learn it. But with this teacher you do, so I am always there trying to pay attention. There might be two or three seconds where I am spaced out a little bit, but that’s about it.”
- C2. “There are times where I observe because if I don’t know what to do, I’m just observing. But yes, I always try to do my best to put my input into it too, my understanding.”
- C4. “I agree. There are a bunch of strong personalities and people who like to talk all the time, so I’m like, let them get their shine, and then afterwards, I’ll say something.”
- C5. “Yeah. I always pay attention in class and I always work together.”
- C13. “I am actively involved because we are all required to participate. We all have to give our input.”
- C14. “Yes. Although I could sleep in this room after lunch, I’m pretty much always on task.”
- D3. “Yes, I am. Some of the lessons are pretty fun. Even if I don’t understand, I’ll eventually get it.”
- D7. “I am because sometimes I really don’t get this stuff, but if I actually understand and pay attention to it and I learn a new way to memorize and understand it.”
- D10. “Yes. Sometimes if I talk, I might get more confused and confuse others.”
- E5. “I am. This is the first time that I slacked off today. But always I’m always active in the assignments. It’s not a one-person assignment—it’s a group assignment—and we are all

going to agree. So you don't have a choice not to work, unless you don't care about your grade."

3. A4. "Most of the time, it depends on what kind of lesson it is." (14)

- A2. "Not that much. I don't know. If I know it. If I don't, then I don't participate that much."
- A3. "Yeah. I do my work. I guess I participate, raise my hand if s/he asks, 'Do you want to do this problem?' Sometimes I do, sometimes I don't."
- A4. "Most of the time, it depends on what kind of lesson it is. Mainly, fractions, doing graphs."
- A5. "Yeah, pretty much. I give them some of the answers, most of them."
- A15. "Agree most of the time."
- B4. "Most of the time, I listen so that I can prepare for assignments and tests to make sure I understand the work we are trying to do."
- B5. "Yes, most of the time."
- C3. "It depends on what it is. I like math, but I don't like all types of it. I'm not very outspoken so when I can participate, I do."
- C10. "Most of the time. Sometimes, I could not be having a good day, or the lesson doesn't appeal to me."
- C12. "Yes, but if there is something I am lost or confused about, I'm just there waiting to see if there is someone else who can say it so I don't have to say anything."
- D8. "Somewhat. I'm involved when it comes to doing class work, but not in participating. I don't like to raise my hand. I don't feel like it's important."
- D13. "Agree, but a lot of times I'm not active because I don't understand."

- D14. “Sometimes, when I understand things.”
- D15. “If I know the answer, I’ll raise my hand. If I don’t, I’ll probably say the wrong answer, but s/he will correct it.”

4. B9. “Occasionally. I do my part, but I get distracted and bored and I just sit there.” (13)

- A14. “Not really. I am involved in some parts, but most of the time I get distracted and start talking.”
- B2. “Sometimes. Sometimes it could be boring.”
- B3. “Not that much, but yes. Sometimes the class might get boring I daze off somewhere else. But usually, yeah, I end up paying attention.”
- B9. “Occasionally. I do my part, but I get distracted and bored and I just sit there.”
- B13. “Sometimes it’s boring. I have to get involved to get a grade, but not really.”
- B14. “Involved can vary. Yeah, I’m active. Sometimes on assignments, sometimes on side-track stuff.”
- C6. “Most of the times. Sometimes I am sleepy because of the time of day.”
- C7. “Yes, most of the time when I’m not really tired. Working in groups helps me to keep up with everyone’s pace.”
- C9. “I feel like I could be more involved. I don’t speak up as much as I could because I’m afraid that what I have to say is wrong. This teacher is very understanding and is willing to answer anything.”
- C11. “Sometimes, I’m not. Sometimes, I doze off. I get pretty tired in there.”
- D2. “Sometimes, if they catch my interest. If the teacher makes the lesson into an activity, in a fun way. If they don’t, then sometimes I daydream. Sometimes I would be listening but I

won’t put my hand up. If the teacher lectures, that doesn’t catch my interest. It puts me into a sleeping mode.”

- D12. “Sometimes I space out, but I’m pretty much in there.”
- E2. “Most of the time. Other times, I am distracted with my peers.”

5. B6. “Yes, I like to partake in something because otherwise, I don’t feel like I learn.” (5)

- B6. “Yes, I like to partake in something because otherwise, I don’t feel like I learn.”
- B11. “Every time the teacher asks a question, I try to answer it. If I don’t know it, I try to look it up in the book.”
- C8. “I believe I am. I try to do the work and do it to the highest quality and make sure everything gets done correctly so I don’t have to go back and redo it later.”
- D9. “I am able to input my thoughts about the lesson.”
- D11. “Yes. Because I want to learn and pass to the next level, so I have to learn and that way it will help me to get to the next semester.”

6. D5. “No. I don’t really get <this math class> and I don’t like the way s/he teaches. S/he goes really fast and doesn’t really slow down.” (2)

- D1. “No. I don’t raise my hand or I don’t like—not with the teacher, but with the group.”
- D5. “No. I don’t really get <this math class> and I don’t like the way s/he teaches. S/he goes really fast and doesn’t really slow down.”

Interview Responses, Part II: Students’ elaborated responses to Survey Item #5—“When my classmates and I have problems with each other, we try to work them out together.”

1. B8. “Yes we talk about it. If we don’t agree, we find a solution that the whole group agrees on.” (28)

- A1. “We do. I m not that much of a fighter. If I have a problem, I’m not a fighter, I try to work things out. I try to talk things out. I don’t believe in fighting.”
- A3. “Yeah, that’s what we are doing right now. I didn’t know what the negative infinity thing was and my friend told me what it was.”
- A4. “Yes ma’am. Usually we fight about whose answer is right or whose answer is wrong. That’s it.”
- A6. “I agree. I talk to them. There aren’t a lot of really close friends, and in groups, we do talk about the work.”
- A7. “Yes, the other day we had a project all together and we actually tried working things out with each other. So, that was pretty good trying to see what everyone’s opinion on the answer would be.”
- A10. “Yes, we do try working them out together.”
- A11. “It’s a group activity and we should leave all the stuff on the side.”
- A14. “Some of us have different abilities than others in math and we help each other according to our abilities.”
- B6. “I don’t like argument, so we try to resolve any conflicts that we have with each other.”
- B8. “Yes we talk about it. If we don’t agree, we find a solution that the whole group agrees on.”
- B10. “Strongly agree. Another student looked at my work and told me if I was doing good.”
- B12. “We try to talk it out and find a solution.”
- B15. “We actually had one today: who was going to be the speaker, and who was going to be the calculator. We resolved it.”
- C2. “Yes, always. If nobody gets it, we just do it as a class.”

- C3. “We do. The school is not very centered around the teacher coping with our different problems and so you just gotta work it out yourself.”
- C5. “Yes, I agree because we always work in groups so if we don’t work it out, we would just be working by ourselves.”
- C8. “This is true. I have been in situations with classmates where one or more of us does not know how to explain something or we are confused or lost on a subject. And so the other members of the group try and compensate and explain so we don’t have to be confused.”
- C10. “Yes we do. Like today we all had different opinions—we both said our own opinion and our arguments and we came to an—I was right.”
- C12. “Yes, because that is the point of group work.”
- C13. “We do work our problems out together because we have no choice. We have to be able to work together to get our work done.”
- D3. “Yes, we do work our problems out together.”
- D6. “Yes. When we get confused, we work it out.”
- D7. “I do because when I take the test, the teacher won’t be there to tell me what to do. So I ask students to see what the outcome is.”
- D9. “I agree because we work together and if we all have problems, we ask the teacher.”
- D10. “Yes, we always help each other.”
- D11. “Yes. Two heads are better than one—more intelligence.”
- E1. “We do, actually.”
- E2. “I asked the person sitting next to me and she said we do, so yes.”

2. **A9. "Yes, that's true." (19)**

- A2. "Yeah."
- A8. "Yes, we do."
- A9. "Yes, that's true."
- A12. "Yeah."
- A15. "Yes."
- B1. "Yep."
- B2. "Yes."
- B3. "Yeah, we do that a lot."
- B5. "That's true."
- B7. "Yes."
- B11. "Yes."
- D1. "Yes."
- D5. "Yes."
- D12. "Yes, it's easier."
- D13. "Strongly agree."
- D14. "Yes, we always do."
- D15. "Yes."
- D8. "Yeah."
- E3. "Yes, this time."

3. **B4. "Usually we don't have problems but if we do, we're sure to talk about it before we enter class." (11)**

- A5. "I haven't had any problem, but I'm sure we would try to work them out."
- B4. "Usually we don't have problems but if we do, we're sure to talk about it before we enter class."
- B9. "I don't really have any problems but yeah I say we would work them out."
- B13. "If there is a problem, we talk about it amongst ourselves."
- C1. "Yeah. We don't have any real problems. We just get flustered with the work and we just take a quick five-second break to get back into the work. There's no real reason for us to have problems. All of us in this class get along."
- C4. "That's true. I don't think our class has any problems with each other. Or if we do, we probably get over it. So then if we did have a problem I think we'd just address it there."
- C6. "I agree. I don't think we've ever got into a real argument about the content. We can all come to an agreement when it comes to it."

- C7. “I’ve never had a problem with my classmates in this class. There’s no reason to have any issues.”
- C9. “I don’t think we’ve had any problems. Just being open and seeing each other’s perspective, that’s what we work on in class.”
- C14. “It’s not much disagreement, but when there is, we use logic and not emotion to figure it out.”
- E5. “Yes. We don’t have that many problems. But if we ever do, we will work it out. It’s not that big of a deal because in this class you don’t have time to argue because you have only 30 minutes to finish.”

4. B14. “Most of the time.” (3)

- B14. “Most of the time.”
- D2. “Yes. Sometimes it goes where you have to have the teacher involved.”
- E4. “Sometimes. One of us gets our way, either way.”

5. C11. “If I have a problem with a classmate, I pretty much just give up. I won’t attempt to fix it.” (1)

Interview Responses, Part II: Students’ elaborated responses to Survey Item #6—“In this class, I am frequently involved in working in groups on class projects.”

1. C12. “Yes. Most of our projects are group work.” (26)

- A2. “Yeah. Just not by myself. I like working with people because I know it—they teach me—it’s more better, I guess.”
- A7. “Yes, I am, I am always with people.”
- B4. “Even though I don’t like to work in groups, I still do my fair share when I do work in a group. I always make sure to turn in my projects on time and as correctly as I can.”

- B9. “Yes, because we always have a project to work on.”
- B11. “Yes. Ever since we had this survey (this researcher’s study), we started working in groups more, and I’m starting to like it more.”
- B12. “Most of the projects we have are class projects. Even if we’ve never worked with them before, we learn how to work with them.”
- B15. “Yes, but I definitely like to count on my teammate to do the work too, so that way can all do it together and understand the lesson together.”
- C1. “Yeah, from day one we started working on projects. We started working on how we define groups, what our groups should do as a whole, not ‘You’re the group leader so you should do it all,’ or ‘You’re the group leader so appoint someone to do all the work.’ We actually divide all the work and we do this almost every day.”
- C3. “Almost all of our assignments are done in class. We’ve done presentations that are group-based, and most of our work is group-based. Or we sit down and work it out together like we did today and answer questions.”
- C4. “Always. Everyday we’re split into groups.”
- C5. “Yes, right now, we’re about to have a project where we work together.”
- C7. “Every single packet we do, we have some kind of group work.”
- C8. “Yes, I am <actively involved >. This is the class that has given me the most projects since middle school. That’s really nice because working with other people I can learn more about myself and my own abilities plus I learn from my classmates.”
- C9. “We do get class projects pretty often. They are really fun projects. The teacher expects us to work together and not just give the load to someone entirely. I feel like in our groups people do what they are expected to do.”

- C11. “Yeah. I don’t like to be the dude who doesn’t do their part. I do what I’m supposed to do so I won’t seem like I’m lazy.”
- C12. “Yes. Most of our projects are group work. There are times when we have to do individual stuff and I can ask for help, but it’s usually group work and we get our stuff done together.”
- C13. “Every other class period is a group assignment, so we are always working in groups.”
- C14. “Most of our presentations are group presentations in class.”
- D2. “Every day, we basically work in groups, so I strongly agree.”
- D3. “Yes. Every six weeks we go down to the computer lab and do projects together. We work in groups every day.”
- D7. “I am because class projects are a way to see what other people think about a problem or equation.”
- D9. “I agree because it’s like an everyday thing.”
- D11. “At times. I really like working in groups.”
- D14. “Yes, when we work in groups.”
- D15. “When we had another project, when I was trying to find other things, I asked my classmates and they helped me find it in their interactive notebook and that way I could copy it into mine.”
- E5. “Yes, I am frequently involved. The teacher is walking around seeing who’s doing what job and you can’t slack off.”

2. **A11. "I agree." (16)**
- A4. "Yes."
- A6. "Just agree."
- A8. "Yes."
- A9. "Yes."
- A11. "I agree."
- B3. "Yes."
- B7. "Yes."
- B13. "Yes."
- B14. "Definitely."
- D5. "Yes."
- D6. "Yes."
- D8. "Yes."
- D12. "Yes, it's not hard."
- E1. "Yes."
- E3. "We always do."
- E4. "Yes."

3. **D13. "Agree. We don't work all the time on class projects, but we do work together." (10)**
- A1. "We usually don't work on class project, but if we were to, I would be."
- A14. "I agree with it, but disagree at the same time. How can I explain this? I agree because we work in groups, and disagree because we don't really do class projects in this class."
- B1. "Well, not that much on projects, but on activities we work on them together in class but not on any projects outside of school. We do it every once in a while but not frequently."
- B8. "Yes. The teacher doesn't give a lot of group projects but when s/he does, I'm actively involved."
- C2. "We never actually had…I don't remember a class project, but we do work in groups."
- C6. "Most of the time we are in groups. It is more groups than individual work."
- D1. "No, because we really don't do projects in there. We do group work frequently."
- D10. "We don't have class projects but we sometimes have group work."
- D13. "Agree. We don't work all the time on class projects, but we do work together."
- E2. "I don't think we really do any projects in class, but with the class work, we are."

4. **A12. “No I don’t like working in groups or on projects. I prefer not to. I like working alone.” (5)**

- A5. “I disagree. I don’t mind working in project. I mean it really doesn’t matter to me because I do like working solo. They don’t bother me—the groups and everything.”
- B2. “Not really. If it’s a project, I like working by myself because I get more done by myself.”
- B5. “Not all the time. On projects I am, and during class when we are in groups, yes. But if it’s just <the teacher> talking at the front, then I don’t like to volunteer because I don’t know if my answer will be wrong or right. I don’t like being called on, either.”
- A12. “No I don’t like working in groups or on projects. I prefer not to. I like working alone.”
- A15. “Disagree. I prefer working alone.”

5. **A3. “Yeah, we do it sometimes. I think it’s good. I learn more.” (2)**

- A3. “Yeah, we do it sometimes. I think it’s good. I learn more.”
- B6. “Partially true. Sometimes we have projects alone. I enjoy doing the ones with groups because everyone can bring what they have to the table and we can work things out.”

6. **C10. “Yes, but sometimes, I don’t feel like it that day so I give minimum effort.” (2)**

- C10. “Yes, but sometimes, I don’t feel like it that day so I give minimum effort.”
- B10. “Agree but not strongly agree. Sometimes I’m not really involved. I lack social skills and I don’t really talk a lot. But when I have something to talk about, I talk a lot. If I know you, I’ll talk to you but if I don’t know you, I won’t really talk to you.”

7. **A10. “Like I said, this is my first time so I cannot give any opinion on that.” (1)**

Interview Response, Part III: "What other thoughts or opinions would you like to add about working in groups?"

1. **D8. "Nothing, I already stated everything else." (13)**

- A4. "Nothing more, really."
- A5. "Nothing comes off the top of my head."
- A8. "No, not really."
- A9. "None"
- B1. "Not really."
- B2. "Not really."
- B3. "None."
- B5. "No, that's it."
- B7. "Nothing."
- B8. "None."
- C3. "No, I don't think so."
- D8. "Nothing, I already stated everything else."
- E4. "No, not really.

2. **A14. "It's pretty good because we get to share our abilities." (10)**

- A3. "Working in groups is a good thing to do. It's better than being by yourself."
- A14. "It's pretty good because we get to share our abilities."
- B6. "I like everyone to work together as a group and not have any stragglers."
- B12. "I think it's a great idea. Sometimes there is someone who doesn't want to work with the groups. But that is when someone steps up and lets them know that we are in a group and in this together."
- C6. "I found working in groups easier because we can divide the work. If you slip up or make a mistake, you have other partners to go back over your work or correct it."
- C9. "I prefer groups to working alone. It just depends on who I'm working with and if they are willing to listen and devote as much time to it as I am working on it."
- C14. "Working in groups takes the individual stress and strain off individuals who sometimes don't feel comfortable with their own answers."

- D7. “To me, sometimes when I work in groups, most kids are on a higher level than me. So they will know one thing and I don’t know another so when I’m confused they will explain it to me and so that’s why I like working in groups.”
- D10. “I think working in groups is a good thing. If you get something and someone else doesn’t, you can help each other out. It also helps to understand what kind of person you can help out and you feel good after you help someone out.”
- D11. “It really helps out. More people can learn and teach each other.”

3. C1. “I like it. It makes class less boring. It brings me into class all the time. I actually pay attention. I’ve actually learned a lot of things or relearned things that I hadn’t learned previously, but I learned them the right way now because of groups.” (9)

- A1. “I wish we would work in groups more. We don’t do it as often and I’d like to work in groups more.”
- C1. “I like it. It makes class less boring. It brings me into class all the time. I actually pay attention. I’ve actually learned a lot of things or relearned things that I hadn’t learned previously, but I learned them the right way now because of groups. I thought it was one way, they thought it was another way, we started to rebuttal each other—so I’ve been learning more in a group than by myself. When you’re by yourself, you’re too lost to know where you messed up. Working in groups is pretty beneficial. I’ve also learned a lot of things because it’s a hands-on thing. You’re seeing it and then you’re doing it and it gets stuck in your head.”
- C2. “Well, this hasn’t happened in this class, but there have been other classes where students go off-task. They just talk about their weekend or something. The smaller the class, the less off-task you get and the more the teacher will pay attention to you. So I think that is

a good key to group working. Overall, I love it. I don't like to be by myself sometimes and I learn more from other people."

- C5. "Nothing really. I like working in groups, that's all."
- C4. "I like to work in groups. But if nobody in my group likes to talk, it's like pointless. I might as well be in a group by myself. I like it where everyone has an idea and talks about something."
- E1. "I like it."
- E2. "We're doing a pretty good job."
- B9. "Groups are cool and simpler."
- D12. "I like it. It's easier."

4. D6 "It's actually fun. You can learn a lot more from your classmates, too." (7)

- C10. "I really enjoy <working in groups>. Sometimes, there are people that I didn't know who they were and I never talked to them. But because of groups, I'm always in different groups and I learn more about them. Everyone is a really good worker."
- D1. "It's OK to work in groups because you interact and do assignments together."
- D6. "It's actually fun. You can learn a lot more from your classmates, too."
- A6. "I like groups a lot because I get involved with my friends. Sometimes working alone is a little boring."
- B13. "It's easier, more interactive, and better."
- C13. "I like working in groups and I have fun doing it, but I can also work without it."
- D3. "I feel like we should always work in groups unless we are taking a test. I feel if we work in groups, I think we should get the lesson better because you're not doing it by

yourself, you're doing it with your friends, your peers. So you get to do your work and joke around a little bit with your friends; the class doesn't have to be so quiet."

5. **A11. "Working in groups is a good idea. If you don't understand the teacher, maybe your classmate does and can explain it more." (8)**

- A7. "I think it's better because people don't want to raise their hand and seem dumb so they prefer asking their friends for help. Their friends will better explain and not get mad like the teacher will get mad."
- A11. "Working in groups is a good idea. If you don't understand the teacher, maybe your classmate does and can explain it more."
- B10. "Working in groups is really good. You can understand what the teacher is asking and if you don't, you can always ask your classmates. But it depends on who you are working with. If you know you're going to talk to a person about something else besides math, it's better off to stay away from them and be with somebody who wants to work."
- C12. "I like to work in groups because it's easier to understand. You don't have to—you get more of an opinion. When you work by yourself, you think that you might be doing something wrong and you have doubts. But when you are in group work, you have more certainty of what you are doing."
- D5. "I think I understand better working in groups because they help me more."
- D13. "I think it's better in math because math is not my forte exactly. They can teach it to me and put it in lingo I can understand, rather than the teacher talking in terms I can't understand."
- D14. "I think it's easier for me. Whenever I don't understand something, one of them does. And when someone doesn't understand something, we all help each other out until we get it."

- E5. “It’s better to work in groups because your peers actually will help you with a certain problem. Whereas individually, you’ll just get stuck and you can’t ask a peer for help because the rule <when working alone> is no talking. Or you can ask the teacher, but <this teacher> may not want to because his/her actions say ‘leave me alone.’”

6. A10. “I think it is a very good way to learn. I think that the more group work you do the more you can explain to other people or people can explain to you, not just the teacher.” (6)

- A10. “I think it is a very good way to learn. I think that the more group work you do the more you can explain to other people or people can explain to you, not just the teacher.”
- C7. “I prefer group work. It’s helpful. It helps retain the knowledge you’ve got. You’re either putting something on a poster—graphing, not drawing—and it’s pretty effective, I think.”
- C8. “I believe that working in cooperative groups is an imperative skill to have in that in learning how to do so in this class I believe that I will be better to work in groups later on in life.”
- B14. “Working in groups—it’s interesting. For example, today the reason I was side-tracked so much was the role I took. We had three choices: you could be the communicator, the calculator, or the writer. I chose to be the communicator because talking is what I am good at. I ended up discovering that I didn’t need to talk that much and not too many questions were needed of me and I answered the few questions that they had. It was my job to go around class and ask questions, and I believe we only had to ask once.”

- B15. "Yes, other people might have a better idea than I do, or a faster way to solve an equation than I do and just having them explain it to me brings fresh ideas and perspectives to look through, and just having it brings a greater knowledge for everyone to learn."
- E3. "I like working in groups because we learn better."

7. A12. "Some people like working better in groups, some don't. I like to work alone. I like being independent." (3)

- A12. "Some people like working better in groups, some don't. I like to work alone. I like being independent."
- A15. "I don't like working in groups. I like working by myself."
- D15. "I'm not a group person; I prefer to work by myself. But, it could work for some people, but it doesn't really matter to me. If I don't know something, I'll ask the teacher most of the time. I guess groups work a little better than working by yourself."

8. C11. "I don't think everything you do should be done in groups. Some things would be better suited to do by yourself. (2)

- C11. "I don't think everything you do should be done in groups. Some things would be better suited to do by yourself. As far as math goes, some things, like graphs, are better to do in groups because you can get a second opinion. But if you are doing equations, it's hard to work on a group on that, but overall I like it."
- D9. "Working in groups challenges me at times but then again I feel more capable of doing things if I have to work by myself."

9. D2. "Sometimes, we get off task and it takes too long to get back on task, but we still get our work done." (2)

- B4. “I’m always going to be lacking focus at some point in time and it’s just inevitable, just part of the classroom.”
- D2. “Sometimes, we get off task and it takes too long to get back on task, but we still get our work done.”

10. B11. “I usually like to work in groups and do my share of the work. But if I have to do more of the work, then I don’t like it because I have more of the load to take care of. But if they do their fair share, then it’s all right.” (1)

11. A2. “I don’t know.” (1)

APPENDIX R:

EXPLORATORY FACTORY ANALYSIS OF THE SURVEY ITEMS

APPENDIX R: Exploratory Factor Analysis of the Survey Items

Table 38

Factor Analysis Component Matrix

Item	Component	
	1	2
#1 I like working with other students in this class to achieve goals.	.723	-.559
#2 This teacher is prepared for class.	.494	.558
#3 I like working in groups.	.692	-.584
#4 I am actively involved in the lessons in this class.	.649	.263
#5 When my classmates and I have problems with each other, we try to work them out together.	.584	.241
#6 In this class, I am frequently involved in working in groups on class projects.	.710	.312

The factor analysis indicated the presence of two factors. Items #1 – 6 loaded onto Component 1. Items #2, 4, 5, and 6 loaded onto Component 2, with item #2 more strongly so than the others, although only item #2 (.558) loaded onto it at a moderate level. This provides some evidence—although not as strong as for Component 1—for these items measuring a second factor. To further investigate, the reliability of the scale with all six items included was determined to be (Cronbach's) alpha = .712. Another analysis was conducted to examine how the alpha reliability would be affected if each item were removed. It appears that removing any of the six items would decrease the alpha reliability of the scale. An alpha of .712 is an acceptable reliability (University of California at Los Angeles, 2011), and thus there is evidence for all six items loading onto one factor.

APPENDIX S:

PROCEDURES FOR DETERMINING WHETHER STUDENTS' RESPONSES TO SURVEY ITEM #4 CONFIRMED THE OBSERVATION RECORD REGARDING STUDENT OFF-TASK BEHAVIOR

APPENDIX S: Procedures for Determining Whether Students' Responses to Survey Item #4 Confirmed the Observation Data

1. First, each student's rating on item #4 was listed in a spreadsheet next to the number of off-task behaviors observed for the student during the same lesson as the survey was administered.
2. Second, the mean number of off-task behaviors per student per lesson was determined, which was 0.64 off-task behaviors per student per lesson. For purposes of this analysis, this number was rounded up to one off-task behavior per student per lesson so that the number of times a student was off task (a whole number) could be compared to the mean as a whole number.
3. Third, if a student was off task either once or no times (at or below the mean) during a lesson, this student was designated as "actively involved" in the lesson according to the observation record. If a student was off task two or more times (above the mean) during a lesson, this student was designated as "not actively involved" in the lesson according to the observation record. In sum,
4. Fourth, the number of students whose survey responses indicated a confirmatory "match" of the observation data as defined in step #3 above was determined.
   - If a student rated item #4, "I am actively involved in the lessons in this class" with an "agree" or "strongly agree," and was "actively involved" according to the observation record (zero or one off-task behaviors), then this was determined to be a confirmatory "match."
   - If a student rated item #4 with a "disagree" or "strongly disagree," and was "not actively involved" according to the observation record (two or more off-task behaviors), then this was determined to be a confirmatory "match."

- If a student responded with high ratings for #4 ("agree" or "strongly agree") and also had high occurrences of off-task behavior (two or more), then this was determined not to be a confirmatory "match."
- If a student responded with low ratings for #4 ("disagree" or "strongly disagree") and also had low occurrences of off-task behavior (zero or one), then this was determined not to be a confirmatory "match."

Given these conditions, 63.1% percent of students' responses to survey item #4 provided a confirmatory "match" to their observation data (see Table 39).

Table 39

Analysis of Survey Item #4, "I am actively involved in the lessons in this class" as a Confirmatory Data Set for Classroom Observation Data

Student Survey Rating: Item #4	Observation Data: # Off-task Behaviors per Student per Observation (mean = 1)	# Combinations of Student Survey Rating and Observation Data (N = 222)	Confirmatory Match?	
			Yes (%)	No (%)
Strongly Agree	2+	11		4.9%
	0 or 1	24	10.8%	
Agree	2+	38		17.1%
	0 or 1	109	49.1%	
Disagree	2+	7	3.2%	
	0 or 1	31		14.0%
Strongly Disagree	2+	0		
	0 or 1	2		0.9%
Total			63.1%	36.9%

APPENDIX T:

PROCEDURES FOR CONDUCTING STUDENT INTERVIEWS

APPENDIX T: Procedures for Conducting Student Interviews

1. Students' names were put into the drawing each time and therefore could be randomly selected for multiple interviews. In the end, nine students were randomly chosen twice to be interviewed. No students were randomly chosen three times to be interviewed.
2. Even though across all 13 observations 65 interviewees were chosen, only 62 interviews took place (one class ended before I had time to interview the fifth student and since I had agreed to interview students only during the class period, the interview was not conducted; in addition, two students were interviewed, but their interview responses were later determined to be invalid).
3. Students were interviewed one at a time in a quiet, public location outside of the classroom (such as in a library or hallway) in order to allow students to respond to the interview questions in a confidential manner. I digitally recorded, and later transcribed, the students' responses to three prompts (see Table 40). The average interview time was 2 minutes and 48 seconds, not including approximately three to four minutes of wait and transition time from one student to the next.

Table 40

Interview Questions/Prompts

Interview Segment	Interview Question/Prompt	Purpose
Part I	"Today in class, we observed how students worked together in groups. We observed that you were ______< on task the entire class period, or talking, texting, waiting, taking care of needs, interrupting, distracted, or dozing)>. Is this a correct observation?"	To provide information that enables triangulation of data sources (interview and observation data)
Part II	"Now, I will read back the survey items and you may elaborate on your responses and explain why you chose your answer."	To provide information that enables triangulation of data sources (interview and survey responses)
Part III	"What other thoughts or opinions would you like to add about working in groups?"	To provide information that enables triangulation of data sources (interview and survey or debriefing/coaching reflections)

APPENDIX U:

ANALYSIS OF STUDENTS’ INTERVIEW RESPONSES REGARDING THEIR SURVEY RESPONSES

APPENDIX U: Analysis of Students' Interview Responses Regarding Their Survey Responses

Item #1. 97% of students confirmed their response to survey item #1 during the interview. Among the responses were that they like working with other students to achieve goals because doing so gives them a "better understanding" and access to other ideas, allows them to seek help from others "besides the teacher," and makes the work "easier and fun." In contrast, four students disagreed, saying they like to "work alone," or at the very least, said another three, it "depends" with whom they would work.

Item #2. Second, 95% of students confirmed their response to survey item #2 during the interview. Students interpreted this item in two ways: either regarding whether the teacher is prepared with materials (32) or whether the teacher is "organized" (11 similar responses).

Item #3. 98% of students confirmed their response to survey item #3 during the interview. They appreciated both the social aspects ("it is fun") (10 similar responses) as well as the cognitive ("four brains are better than one") (eight similar responses). However, some students answered either that they preferred to "work solo" (four similar responses) or that it "depended" on the other students with whom they would work (four similar responses). Students appeared to have interpreted "working together to achieve goals" and "working in groups" in nearly the same manner, as similar themes emerged from each category: learning is easier; students help each other to learn; they "understand better;" they get other's "insights;" it is "fun;" some like to work "solo," or it "depends" on the persons with whom they are working. This similarity indicates to me that they may not see a difference in "working together to achieve goals" and "working in groups," or that the difference does not matter to them.

Item #4. 82% of students confirmed their response to survey item #4 during the interview. Many students (28) reported that they are actively involved in class, with some emphasizing that they pay attention and desire to learn (19 similar responses). On the other hand, some (14 similar responses) become involved depending on "what kinds of lesson it is," some (13 similar responses) become "bored or distracted," and two won't participate if they "don't like the way" the teacher teaches.

Item #5. 98% of students confirmed their response to survey item #5 during the interview. Students overwhelmingly responded that when they have problems with their classmates, they try to work them out together (47). Some (15 similar responses) qualified, "usually, we don't have problems," or that this was true "sometimes." However, one student stated that s/he would avoid the situation and "won't attempt to fix it."

Item #6. 94% of students confirmed their response to survey item #6 during the interview. The item proved to be confusing as many wanted to separate "group work" from "class projects." In addition, some students wanted to qualify the word "frequently"—they interpreted this as how often they worked in groups or class projects ("we do it sometimes" (two) or "we don't work all the time on class projects, but we do work together" (10 similar responses)), and two interpreted this as the degree to which they participated in groups or class projects ("sometimes, I don't feel like it that day so I give minimum effort"). A handful of students (five similar responses) replied that they are not frequently involved because they "prefer not to" work in groups at all.

The following themes from students' interview responses regarding each survey item have emerged (organized by student code, representative student quote, and the number of students who made similar comments):

1. Survey Item #1 (97% confirmed): I like working with other students in this class to achieve goals.
    - E5. "It helps to give a better understanding when a peer helps instead of asking a teacher." (15)
    - A14. "We get to help each other out. Some of us have stronger parts and some of us have weaker parts of math and we can fuse them together and make one strong group." (10)
    - A10. "Yes. That's true." (9)
    - B15. "When you work with others, you bring fresh new ideas to the table." (9)
    - D2. "It makes the work easier and you don't get stuck by yourself trying to figure it out." (6)
    - C13. "I like working with other students in this class because it's fun. Each person has their own insights." (6)
    - A5. "Disagree. I'm more of a solo person. I like to do things by myself." (4)
    - B2. "I agree sometimes, but it depends on who is in my group." (3)
2. Survey Item #2 (95% confirmed): This teacher is prepared for class.
    - E5. "S/he has a lot of stuff prepared. Instead of interrupting the class to go make copies, s/he already has it all out." (32)
    - B10. "Yes, s/he is prepared." (17)
    - E4. "Sometimes, not all the times. Sometimes s/he is not well organized." (11)

- D13. “I strongly disagree. A lot of times, s/he does not know what s/he is doing. I don’t feel like s/he is prepared a lot of the time.” (2)

3. Survey Item #3 (98% confirmed): I like working in groups.

- A3. “I like working in groups more. I learn more. If there are some things I don’t know, I could ask a teammate, ‘Can you explain this to me?’” (16)
- D5. “Yes, I like working in groups.” (15)
- B12. “It’s fun. I get bored easy and zoned out. If I’m working with someone, then I’m into the project and I want to finish it together.” (10)
- A9. “Yes because four brains (are) better than one.” (8)
- B6. “Yes, I do. Like I said before, it makes everything easier. We all work faster, especially when everyone does their part.” (5)
- A5. “Disagree because I like working solo. Sometimes in a group effort, not everyone puts their effort in.” (4)
- B11. “Yes, it depends who are the people are you’re working with.” (4)

4. Survey Item #4 (82% confirmed): I am actively involved in the lessons in this class.

- B15. “Yes, I am.” (14)
- C5. “Yeah. I always pay attention in class and I always work together.” (14)
- A4. “Most of the time, it depends on what kind of lesson it is.” (14)
- B9. “Occasionally. I do my part, but I get distracted and bored and I just sit there.” (13)
- B6. “Yes, I like to partake in something because otherwise, I don’t feel like I learn.” (5)
- D5. “No. I don’t really get <this math class> and I don’t like the way s/he teaches. S/he goes really fast and doesn’t really slow down.” (2)

5. Survey Item #5 (98% confirmed): When my classmates and I have problems with each other, we try to work them out together.
   - B8. “Yes we talk about it. If we don’t agree, we find a solution that the whole group agrees on.” (28)
   - A9. “Yes, that’s true.” (19)
   - B4. “Usually we don’t have problems but if we do, we’re sure to talk about it before we enter class.” (11)
   - B14. “Most of the time.” (3)
   - C11. “If I have a problem with a classmate, I pretty much just give up. I won’t attempt to fix it.” (1)
6. Survey Item #6 (94% confirmed): In this class, I am frequently involved in working in groups on class projects.
   - C12. “Yes. Most of our projects are group work.” (26)
   - A11. “I agree.” (16)
   - D13. “Agree. We don’t work all the time on class projects, but we do work together.” (10)
   - A12. “No I don’t like working in groups or on projects. I prefer not to. I like working alone.” (5)
   - A3. “Yeah, we do it sometimes. I think it’s good. I learn more.” (2)
   - C10. “Yes, but sometimes, I don’t feel like it that day so I give minimum effort.” (2)
   - A10. “Like I said, this is my first time so I cannot give any opinion on that.” (1)

APPENDIX V:

SURVEY ITEMS #3, 4, AND 6 REVISITED THROUGH INTERVIEW RESPONSES

APPENDIX V: Survey Items #3, 4, and 6 Revisited Through Interview Responses

During the investigation of whether students' survey responses confirmed the observation data, three outliers in the survey data were marked for further review through the lens of students' interview responses.

Item #3. The first of these anomalies was survey item #3, "I like working in groups," which showed a change of +7.7% in ratings from Observation 1 to Observation 3, compared to the mean of +3.6% for all survey items. I examined the responses to survey item #3 of students interviewed after Observations 2 and 3 and compared them to their responses for Observation 1 and 2, respectively. Of the students interviewed, I found three students whose survey responses to item #3 increased from Observation 1 to Observation 2 and three students whose responses to this item increased from Observation 2 to Observation 3. Then I examined the interview transcripts to determine what these students said about item #3 during the interview after Observations 1 or 2. Below are their interview responses regarding item #3 and their rating change from Observation 1 to 2 or from Observation 2 to 3.

- B6. "Yes, I do. Like I said before, it makes everything easier. We all work faster, especially when everyone does their part." [Rating change: "agree" (Obs. 1) to "strongly agree" (Obs. 2).]
- B8. "Yes, it is more like the real world. We are not always going to work by ourselves. Sometimes we won't like the people we work with so it's a great opportunity to practice." [Rating change: "agree" (Obs. 1) to "strongly agree" (Obs. 2).]
- B9. "Yes because I learn from each person. Everyone has their own opinion and so you have different options for working out the problem." [Rating change: "disagree" (Obs. 1) to "agree" (Obs. 2).]

- C11. “Yes. I prefer it over working by myself. Some days, you don’t want to do that much, and people pick up the slack. And some days, you’ll do it. Most of the time, I like it.”
- C13. “I do like working in groups, but it depends on what I am doing. For example, if we are doing an assignment like today, then yes, I like working in groups. I like having different opinions. But I also like doing it on my own because I feel like I know what I would want to do and then my will would benefit everyone else’s opinion too.”
- D12. “Yes, it’s easier with other people if you have questions.”

Item #4. The second of these outliers was survey item #4, “I am actively involved in the lessons in this class” which showed a change of +6.9% from Observation 1 to Observation 3 compared to the mean increase of +3.6%. I examined interview transcripts and survey responses to find interviewees whose ratings on this item increased from either Observation 1 to 2 or from Observation 2 to 3, and listed students’ interview responses below:

- A9. “Yes.” [Rating change: “agree” (Obs. 1) to “strongly agree” (Obs. 2).]
- B9. “Occasionally. I do my part, but I get distracted and bored and I just sit there.” [Rating change: “disagree” (Obs. 1) to “agree” (Obs. 2).]
- D6. “Yes, I am.” [Rating change: “strongly disagree” (Obs. 1) to “agree” (Obs. 2).]
- D9. “I am able to input my thoughts about the lesson.” [Rating change: “agree” (Obs. 1) to “strongly agree” (Obs. 2).]
- B8. “Yes, I am. I always try to answer questions. If I’m in a group I try to be the leader and help everyone with everything.” [Rating change: “agree” (Obs. 2) to “strongly agree” (Obs. 3).]
- C14. “Yes. Although I could sleep in this room after lunch, I’m pretty much always on task.” [Rating change: “agree” (Obs. 2) to “strongly agree” (Obs. 3).]

- D11. “Yes. Because I want to learn and pass to the next level, so I have to learn and that way it will help me to get to the next semester.” [Rating change: “disagree” (Obs. 2) to “agree” (Obs. 3).]

The third outlier involved survey item #6, “In this class, I am frequently involved in working in groups on class projects,” which showed a change of +5.0% from Observation 1 to Observation 3 compared to the mean increase of +3.6%. I examined interview transcripts and survey responses to find interviewees whose ratings on this item increased from either Observation 1 to 2 or from Observation 2 to 3, and listed their responses below:

- B8. “Yes. The teacher doesn’t give a lot of group projects but when s/he does, I’m actively involved.” [Rating change: “agree” (Obs. 1) to “strongly agree” (Obs. 2).]
- B11. “Yes. Ever since we had this survey (this researcher’s study), we started working in groups more and I’m starting to like it more.” [Rating change: “disagree” (Obs. 1) to “agree” (Obs. 3).]
- C6. “Most of the time we are in groups. It is more groups than individual work.” [Rating change: “disagree” (Obs. 1) to “agree” (Obs. 2).]
- C12. “Yes. Most of our projects are group work. There are times when we have to do individual stuff and I can ask for help, but it’s usually group work and we get our stuff done together.” [Rating change: “agree” (Obs. 2) to “strongly agree” (Obs. 3).]
- D11. “At times. I really like working in groups.” [Rating change: “disagree” (Obs. 2) to “agree” (Obs. 3).]

APPENDIX W:

THEMES FROM STUDENTS’ INTERVIEW RESPONSES

REGARDING CONFIRMATION OF OBSERVATION DATA

Appendix W: Themes from Students' Interview Responses Regarding Confirmation of Observation Data

Of the 62 interview responses, 29 confirmed observed off-task behavior, 29 confirmed observed on-task behavior, four disconfirmed observed off-task behavior and zero disconfirmed on-task behavior.

During the interview after Observation 1, 21 out of 24 students confirmed the observer's data regarding their on-/off-task engagement during the lesson. The three students who disconfirmed the observation data provided the following explanations for their response (see Appendix Q, "Students' Interview Responses"):

- B2. Off-task behavior: Talking. "No**.** I got distracted with the kid next to me."
- C1. Off-task behavior: Talking. "No. We were talking about the lesson."
- D1. Off-task behavior: Talking. "No, I was talking about the work we were doing."

During the interview after Observation 2, 18 out of 19 students confirmed the observer's data regarding their on-/off-task engagement. The student who disconfirmed the observation data provided the following explanation for his/her response:

- B6. Off-task behavior: Talking, Waiting. Talking: "Incorrect observation." Waiting: "Correct observation. I was waiting on one of my classmates to help me with something."

During the interview after Observation 3, 19 out of 19 students confirmed the observer's data regarding their on-/off-task engagement.

Of the 29 students who confirmed the observer's data involving their off-task engagement, the following categories of statements were made (organized by student code, representative student quote, off-task behavior discussed, and the number of students who made similar comments):

- B10. “Yes, that’s true.” (all behaviors, 12 students)
- A9. “At the beginning, I was talking about something else, but then we started to do our math.” (talking, nine students)
- D5. “Yes, waiting for them to do the work. I don’t really understand fast, so I wait for them to do it and then I see how they do it and that’s how I learn.” (waiting, four)
- D7. “Yes. When I work in a group, sometimes the group members are quiet and not talking so if I say something funny, then they will laugh and start talking.” (distracted behavior, three)
- C7. “Yes. I just had three cups of coffee because I went to sleep pretty late because of work.” (taking care of needs, one)

Of the 29 students who confirmed the observer’s data of on-task engagement, the following categories of statements were made (organized by student code, representative student quote, and the number of students who made similar comments):

- C5. “Yes, it is correct.” (26)
- C4. “Yes. In math class, I don’t. I feel like if I do, I get off-topic and I ask questions and I don’t know anything. So, I don’t do all that.” (three)

APPENDIX X:

DID STUDENTS' INTERVIEW RESPONSES CONFIRM THE WRITTEN

DEBRIEFING/COACHING REFLECTIONS?

APPENDIX X: Did Students' Interview Responses Confirm the Written Debriefing/Coaching Reflections?

The teachers' and coach's written reflections were examined to determine whether students' interview responses confirmed the written reflections. A "confirmation" was defined as a student interview response that addressed an issue raised either by the teacher or the coach in a particular category of the written reflection. It was found that students' interview responses addressed 51 out of 54 teacher or coach reflections, which is a confirmation rate of 94% (see Table 41).

Sample confirmatory student responses.

Teacher A.

- For the written reflections for Observation 1, I wrote, "What could be done during transition time to minimize "waiting?" Student A5 confirmed his/her waiting behavior, by stating, "When I'm just sitting there waiting, I'm waiting for him/her (the teacher). So I just find something else to do while I wait."
- In my written reflection for Observation 2, I asked the teacher, "What is your policy on texting?" Student A10 confirmed texting and student A9 admitted, "… yes, I was texting."
- In Observation 3, the teacher, a bit frustrated, wrote, "Some of the students were off task by talking, looking at their cell phone, and listening to headphones." Students A11 and A14 (talking), and A15 (talking and texting) all confirmed these various off-task behaviors in their interview responses. When student A14 was asked to elaborate on his/her response to survey item #4, "I am actively involved in the lessons in this class," he/she verified this off-task behavior by admitting, "I am involved in some parts, but most of the time I get distracted and start talking."

Table 41

Students' Interview Responses that Confirm Either the Teachers' or Coach's Written Responses (with Student Code and Part of the Interview that Contains the Confirmatory Response)

Teacher/ Observation #	Physical Environment	Instructional Strategies	Time/ Organizational Management	Discipline Management
Teacher A, Obs. 1	Coach, A3, Part III	Coach, A5, Part I	Coach, A1, Survey #1	Coach, A2, Part I
Teacher A, Obs. 2	Coach, A6, Survey #5	Teacher, A6, Survey #3	Coach, A6, Survey #2	Coach, A9, Part I
Teacher A, Obs. 3	Teacher, A11, Survey #3	Coach, A11, Part III	Teacher, A11, Survey #2	Coach, A15, Part I
Teacher B, Obs. 1	Teacher, B5, Survey #3	Coach, B4, Survey #1	Coach, B4, Survey #2	Coach, B1, Survey #3
Teacher B, Obs. 2	Coach, B6, Part III	Coach, B9, Survey #1	Coach, B8, Survey #1	Coach, B13, Part I
Teacher B, Obs. 3	Not confirmed by student interview	Teacher, B12, Part III	Coach, B13, Part I	Coach, B11, Survey #3
Teacher C, Obs. 1	Coach, C4, Survey #3	Coach, C1, Survey #6	Coach, C5, Survey #2	Teacher, C4, Part I
Teacher C, Obs. 2	Coach, C6, Survey #4	Teacher, C9, Survey #6	Coach, C8, Part I	Teacher, C7, Part I
Teacher C, Obs. 3	Teacher, C11, Part I	Teacher, C13, Survey #3	Coach, C10, Part I	Coach, C13, Part III
Teacher D, Obs. 1	Not confirmed by student interview	Coach, D2, Part I	Teacher, D2, Survey #2	Coach, D2, Part III
Teacher D, Obs. 2	Teacher, D6, Survey #3	Teacher, D7, Survey #1	Teacher, D10, Survey #1	Teacher, D9, Survey #1
Teacher D, Obs. 3	Teacher, D11, Survey #3	Teacher, D11, Survey #2	Not confirmed by student interview	Teacher, D15, Part I
Teacher E, Obs. 1	Coach, E1, Survey #3	Coach, E5, Part I	Coach, E5, Survey #2	Teacher, E2, Survey #2

- The teacher stated in the reflection, "The desks were in groups of four and the students were allowed to work together." Students A3 and A10 positively reinforced the idea of working in groups and student A10 responded, “I think that the more group work you do the more you can explain to other people or people can explain to you, not just the teacher.” In fact, in Observation 3 when the students were confused by the real-world problem solving, they resorted to helping each other to gain an understanding of the mathematics.

Teacher B.

- This teacher began his/her reflection to Observation 1 by stating, “The students were great: I see no discipline issues with this class.” In fact, both students B1 and B3 confirmed their on-task behavior, and student B4 added, “Most of the time, I listen so that I can prepare for assignments and tests to make sure I understand the work we are trying to do.”
- I wrote, “How could the activity be structured differently so that students’ off-task talking is not distracting?” Student B4 admitted, “Yes. I was talking about jokes…probably things people have seen on the Internet and Facebook,” and student B5 confirmed, “At one point, I wasn’t talking about the math.
- After Observation 2, this teacher stated, “We were not prepared for group work because I have not seen this class in over a week.” The groups were frustrated, and this was noted by student B6, “I like everyone to work together as a group and not have any stragglers.”
- I asked, “What changes can be made for the next cooperative lesson that would keep students on task for more of the lesson?” The teacher wrote that he/she needed to reorganize and “Take time for groups to present and interpret” each other’s work. Students B13 and B15 agreed. Working in groups is “more interactive” responded student B13, and student B15 added, “having them explain (things) to me brings fresh ideas and perspectives to look through.”

- In Observation 3, the teacher tried having the students in new roles. I noticed that the roles were not equally balanced in terms of responsibility, which caused some students to become bored and others to be overloaded. One of bored students was B14, who responded, "…today the reason I was side-tracked so much was the role I took. I chose to be the communicator because talking is what I am good at. I ended up discovering that I didn't need to talk that much and not too many questions were needed of me and I answered the few questions that they had."
- Student B13 admitted to "dozing off" due to the boredom that came with the communicator role. Finally, student B11, one of the students who became overloaded, expressed that "I usually like to work in groups and do my share of the work. But if I have to do more of the work, then I don't like it because I have more of the load to take care of." This student finished by saying, "But if they do their fair share, then it's all right."

Teacher C.

- This teacher had very few off-task students over the course of the three observations. S/he was organized and prepared, noting in his/her reflection that "The desks are easy to set up for pairs." Student C1 responded with his/her opinion about working in groups in this class: "When you're by yourself, you're too lost to know where you messed up. Working in groups is pretty beneficial."
- In my written reflection, I noted, "Not one moment of class time was unstructured." This teacher's students also noted how prepared this teacher is for class. When asked to elaborate on the survey item, "This teacher is prepared for class," student C4 shared, "I agree, but I should have put 'strongly agree' because we always have something prepared for class." The

teacher saw the benefit of being prepared and wrote, “In my judgment, there was really not a discipline problem that needed to be managed.”

- Although student C1 was observed as off task, s/he informed me that the observation was incorrect and that the group was “talking about the lesson.” Students C2, C3, C4, and C5 all confirmed their on-task behavior during this observation. Student C2 responded, “I don’t see the point of doing something else. I listen, of course.”
- In Observation 2, students worked in pairs at the computer for the entire period. The teacher wrote, “I didn’t really see much discipline problems,” and students C6 and C9 confirmed their on-task behavior. “One of the rules in class,” stated student C9, “is you must stay on task and you can’t get off topic….”
- The prolonged work at the computer made students tired. I suggested that the teacher may wish to consider giving students “a mental break or change of pace every 15 minutes.” Student C6 agreed, “Sometimes I am sleepy because of the time of day.” Student C8, when asked to confirm observed off-task talking, replied, “I probably do confirm it because we got tired.”
- Another instance of off-task behavior came from student C7, who was observed taking care of needs by bringing pizza and coffee to class, which was not allowed in this teacher’s classroom. Both the teacher and I mentioned this in our written reflections, and the student confirmed, “Yes. I just had three cups of coffee because I went to sleep pretty late because of work.”
- For Observation 3, this teacher used a Gallery Walk as a cooperative learning strategy for the first time in his/her class. The teacher wrote, “The empty desks in the center of the room were a little distracting at first.” Student C11, agreed to being distracted at the beginning of

the furniture arranging time: “When we first started, …I waited for them to do something but they didn’t. Usually I don’t play around a lot, but the girl in my group was kind of like fun.”

- The Gallery Walk was successful, and the teacher reflected that it “went well.” Several students made positive remarks about this and other similar activities experienced in this class. Student C8 shared, “I believe that working in cooperative groups is an imperative skill to have in that in learning how to do so in this class I believe that I will be better to work in groups later on in life.”

Teacher D.

- In Observation 1, the teacher noted in his/her reflection, “While the group recorder was collecting data, the other group members were doing nothing, which led to idle chit chat and off-task behavior.” Likewise, student D3 admitted, “Yes. There were times that we were off task, but we also did talk about the lesson.”
- In contrast to Observation 2 where students moved their desks to work together, in Observation 1, students were asked to rotate their bodies to work together in groups of four. The teacher reflected, “I will probably keep the groups facing each other instead of just in close proximity. It helped to keep them involved and talking to one another about the activity.” Not only did this result in a decreased number of off-task behaviors during Observation 2, but student D3 also commented during the interview, “I feel like we should always work in groups unless we are taking a test.”
- The teacher wrote in the reflection, “The students were very quick to catch on to the activity.” Student D5 found that “… I understand better working in groups because they help me more.”

- For Observation 2, the teacher wrote, “I had no discipline management challenges since this class is quite well behaved.” In fact, there were only three off-task behaviors in a very quiet classroom—evidently too quiet for student D7, who confirmed his/her off-task behavior by explaining, “When I work in a group, sometimes the group members are quiet and not talking so if I say something funny, then they will laugh and start talking.”
- For Observation 3, I asked the teacher in my reflective writing, “Why do you think the students are so engaged in the activity?” Student D15 shared, “…if I don’t know something, maybe somebody else does and I can learn from them.”

Teacher E.

- Student E5 experienced some frustration at being distracted. I asked the teacher, “Did students have assigned roles throughout this investigation?” This was confirmed by student E5 who, when asked about two instances of distracted behavior, informed me, “Yeah, I didn’t really have an assigned task.”
- Five students entered this class about 20 minutes into the lesson from an off-campus class. This caused some confusion, and led student E4 to comment in the interview, “Sometimes, s/he is not well organized.” I asked the teacher in my written reflection, “Did the students have clear expectations of what to accomplish?” In fact, the teacher concurred: “There were clear directions for the most part, but I could have done better by writing down the steps on the board.” However, student E2, one of the students who came in late, remarked in the interview, “I always come in late, but every time I go in there, s/he always has a worksheet out and everyone is on task doing their work.”

- The teacher wrote, “I was pleased with my timing….” One student showed awareness of how this teacher managed class time by stating that the teacher “… has the agenda on the board and s/he follows it, and s/he even has time limits on the agenda.”
- Finally, the teacher wrote, “Students were well behaved….” It was evident that students in this class were able to work well together to achieve the goal for the day. This was summed up best by student E2 who said, “I feel that I do my best working with other students because I get to cooperate with them and share knowledge.”

APPENDIX Y:

DID THE WRITTEN DEBRIEFING/COACHING REFLECTIONS

CONFIRM THE OBSERVATION DATA?

APPENDIX Y: Did the Written Debriefing/Coaching Reflections Confirm the Observation Data?

The observation data were examined to determine the percent of observed behaviors that were confirmed by the written debriefing/coaching reflections. A "confirmation" was defined as either the teacher or coach writing about a particular student off-task behavior or teacher instructional activity (see Table 42).

Table 42

Percent of Observed Off-task Behaviors and Instructional Activities Confirmed by the Written Debriefing/Coaching Reflections

Teacher/ Observation #	# Different types of off-task behavior observed	# Different types of off-task behavior discussed in debriefing/ coaching session	# Different types of instructional activities observed	# Different types of instructional activities discussed in debriefing/ coaching session
Teacher A, Obs. 1	4	3	5	4
Teacher A, Obs. 2	6	4	2	2
Teacher A, Obs. 3	4	3	2	2
Teacher B, Obs. 1	1	1	2	2
Teacher B, Obs. 2	3	2	2	2
Teacher B, Obs. 3	4	2	2	2
Teacher C, Obs. 1	1	1	2	2
Teacher C, Obs. 2	3	2	1	1
Teacher C, Obs. 3	4	3	3	2
Teacher D, Obs. 1	4	3	2	2
Teacher D, Obs. 2	2	2	2	2
Teacher D, Obs. 3	4	3	5	3
Teacher E, Obs. 1	4	2	1	1
Total	44	31	31	27
Percent		31/44 = 70.45%		27/31 = 87.10%
Combined Total: 58/75 = 77.33%				

This examination found that 70% of student off-task behaviors and 87% of teacher instructional activities, or an overall percent of 77% of the observation data, were discussed and confirmed by the written reflections.

Teacher A.

- In Observation 1, students were observed three times as taking care of needs during the warm-up time while the teacher was cutting out the cards for the cooperative activity later in the period. The teacher wrote, “At the beginning of the year, I told them to take care of their personal needs prior to getting in class. I need to stick to my original plan.”
- In Observation 1 and again in Observation 2, the start of each observation was delayed (by six and nine minutes, respectively) while the third-party observer and I waited for students to arrive to class (none had arrived when the bell rang to begin class). I asked the teacher, “Is tardiness a school-wide problem?” The teacher wrote, “I should start class immediately when the tardy bell rings.” This issue was resolved by Observation 3 when students entered the room as the bell rang and immediately began the warm-up, as this statement from the teacher confirms, “When the students came into the room (in Observation 3), the warn-up was on the board.”
- In Observation 1, the written reflection confirmed the observation data regarding the most frequently occurring off-task behavior, which was talking (17). I wrote, “What could be done during instructional time to minimize talking?” The teacher reflected, “Some students get off-task easily, but with encouragement, they start to refocus.”
- In Observation 2, the teacher had manipulatives on the desk ready for students to begin using when they came to class. The teacher wrote, “The material and manipulatives were ready when the students came in the door. I should have pushed the students to work a little harder and not be off task.” However, the students were off-task 32 times during six rounds of cooperative learning while they helped each other through the activity; once they were comfortable with the use of the manipulatives, these rounds were followed by three rounds

during which only three off-task behaviors occurred, showing that it would have been helpful to the students if they had received instruction on the use of the manipulative prior to their use. This was confirmed in the written reflection where I asked, “How could you plan in advance for students who had not used these manipulatives before?”

- In this same class period, there were eight instances of texting observed. This was confirmed in my written suggestion to the teacher: “Use texting in a cooperative environment so that students can help each other.”
- In Observation 3, students were engaged in a real-world problem-solving investigation. The teacher had written of this in his/her reflections in Observation 2: “I would like to use more real-world problems to bring a connection to what the students are learning,” and again in Observation 3, “I integrated science and a real-world problem.” The students showed a misunderstanding of the problem, so the teacher stopped the activity to give further explanation. Yet the number of off-task behaviors during other instructional activities increased from two in Observation 2 to 19 in Observation 3, due to the teacher’s misdiagnosis of student misunderstanding, which only served to confuse them. Afterwards, the teacher confirmed this by reflecting, “I should provide more guided practice with the students to help them more.”
- A final example where Teacher A’s reflections confirmed the observation record involved the 17 instances of texting observed in Observation 3. The teacher’s writing confirmed this: “Some of the students were off task by talking, looking at their cell phone, and listening to their headphones.”

Teacher B.

- In Observation 1, my written reflections provided confirmation of the fact that 100% of off-task behaviors (16) were due to talking: I asked, "How could the activity be structured differently so that students' off-task talking is not distracting?"
- The students were given the following task: work together on the packet of review problems for the quiz and teach each other how to solve them, with the goal being that any one student chosen at random could be ready to present the problem on the board. Since student's uncertainty about expectations could have added anxiety to the task and caused off-task behavior to escalate, I asked in my reflection, "Were the students' tasks and roles clearly defined?" In addition, I suggested, "Perhaps giving groups one or two problems at a time may help students to focus better on the task."
- Furthermore, I noticed in the observation record that once the 12-minute review period was complete and the teacher started calling students to the board, the off-task talking eventually stopped: the students felt more comfortable with their groupmates' ability to present the problem, so the anxiety of the task was reduced. The teacher wrote that s/he needed to "learn new strategies" and would be attending a workshop that would hopefully provide new strategies for effectively utilizing cooperative grouping.
- In Observation 2 for Teacher B, the number of off-task behaviors increased from 16 in Observation 1 to 35 in Observation 2—34 of these occurred during cooperative learning. Since the observation record showed that students had been placed into groups of five, I wrote in my written reflection, "What is an optimal number of students per group?" and "Consider whether the number of students (five) in a group has an effect on student participation in the activity."

- In Observation 2, the teacher engaged the students in a cooperative activity for 32 minutes straight. I suggested in the written reflection, "Consider breaking the assignment into parts and giving a time limit for each part," and the teacher agreed by writing, "Break group work into short intervals."
- 23 of the 35 off-task behaviors occurred in the final four rounds of the observation. In the written reflection, I asked the teacher, "The students were learning, but could have accomplished more. What was the biggest drain on instructional time today?"
- During Observation 3 for Teacher B, there were 28 instances of off-task behavior during cooperative learning, and an increase in the occurrences of distracted behavior (18) from two in Observation 2. The observation record showed that students were placed into groups of three, a different arrangement from their usual groups of four. This arrangement took more time than usual to position the desks and the students were clearly uncomfortable with both their new group size and their new roles to which they had been assigned. This was confirmed in the written record where I asked, "How else could you arrange the desks to minimize 'desk re-arranging time?'" In agreement, the teacher wrote, "(I) need to create and practice a procedure for going to and coming from groups. Moving desks to and from a preassigned place."
- A second example from this observation is related to the fact that in rounds 8 – 10, none of the off-task behaviors was due to talking (which was usual for this class); instead, all 11 off-task behaviors during these three rounds were due to distracted behavior (nine) and dozing (two). This was confirmed by my written reflection, "What can be done to engage the silently distracted students?" and by the teacher's writing, "Two disengaged students: one

smart kid who likes to do as little as possible, but learns as much as anyone. The other was withdrawing and may have had outside issues on his/her mind."

- In Observation 3, the teacher broke the 40-minute observation into smaller segments, compared to the previous observation. The written reflection record confirmed this, as the teacher wrote, "Having periodic stopping points to pull people together is definitely an improvement."

Teacher C.

- For this teacher, the observation record for Observation 1 noted only three off-task behaviors. For example, I wrote, "Very few students were off-task and the few who were very quickly redirected themselves back on task" and the teacher agreed, "In my judgment, there was really not a discipline problem that needed to be managed." The observation record also noted that class began as soon as the bell rang, and this was confirmed by my written comment, "Not one moment of class time was unstructured."
- In Observation 2, the observation record showed students in pairs, crowded in an oval shape around a bank of computers in a conference room that had been converted to a college "GO" center. This was confirmed in the teacher' written reflection, "A bit restrictive in terms of space. Students were crowded around each computer, and some students were seated in a manner that prevented them from seeing the computer at all."
- Second, the observation record showed that students participated in the cooperative learning activity for the whole period—with no break, and this is confirmed by the teacher's writing, "As the students were working, I considered the possibility of giving the students a 2-minute stretch break during the lesson – I know I needed one!"

- Third, out of eight instances of off-task behavior, three were due to taking care of needs. The teacher wrote, “One student came to class late; another came to class with a pizza. I allowed the student to keep the pizza in a box and not throw it away.” I continued, “Three of the off-task behaviors involved taking care of needs, which is unusual. One student brought pizza and coffee to class. One student got up to get his/her sweater only to hang it on the back of his/her chair. Another student went fishing through his/her backpack.”
- For Observation 3, the teacher wrote, “The Gallery Walk went well,” and in fact, there were no recorded off-task behaviors during this activity. Second, there was a point mid-way through the lesson where the observation record showed two students who were distracted. At that point in the lesson, students needed materials and supplies to continue and the teacher was getting ready to distribute them. This was confirmed by the teacher’s writing, “There was one point where I didn’t have the material at hand before I distributed them, and I inwardly panicked a bit before I remembered where I had the worksheets.”
- Finally one student was noted in the observation record as eating candy (taking care of needs), and the teacher confirmed this by writing, “…some of the students were eating candy (suckers) during class.” Although Teacher C had few instances of off-task behavior, evidence in the written reflections was found to corroborate them.

Teacher D.

- This teacher had many students in a very small classroom, and this fact was noted in both the observation record and in the teacher’s and my written reflections. The observation record noted that in round three, students were off-task due to waiting and taking care of needs when it was time to move the desks around so that students could face each other. This was confirmed by the teacher writing, “Because of the large size of the class, it was often difficult for the students to have group discussion," and my writing, "The room is very close and cramped and yet must fit 26 students—there was no room for a teacher desk or for the observer and me to sit."

- Second, there were 12 instances of waiting throughout the 36 minutes of cooperative learning, and this is confirmed by the teacher's reflection, "While the group recorder was collecting data, the other group members were doing nothing, which led to idle chit chat and off-task behavior."
- Finally, when some students came in late during round 3, the number of instances of talking increased to five during that round. The teacher confirmed, "Time was an issue, especially when some group members were late."
- In Observation 2, there were only three instances of off-task behavior, and this was confirmed in the written reflections. The teacher wrote, "I had no discipline management challenges since this class is quite well behaved."
- The students went straight to work on the activity as soon as class started, with no off-task behavior until round 8, and the teacher confirmed this by writing, "The students were very quick to catch on to the activity."
- In addition, the desks were already in groups facing each other when students arrived, also contributing to the on-task behavior of the students. The teacher noted this and wrote, "Working in groups facing each other seemed to produce a much better working environment for the groups."
- The teacher noted this again in Observation 3, "Keep the groups facing each other in groups of four," as having the desks prepared in advance also resulted in students getting to work and helped keep off-task behavior to a minimum (six instances in this lesson). The students

were engaged in the cooperative activity, and were off-task only once during cooperative learning. My written question, "Why do you think that students are so engaged in the relay activity?" confirmed this observation.

- Finally, the teacher segmented the lesson into small intervals of activity, which was noted in the observation record and was another contributing factor to the low number of off-task behaviors. My written reflections on this observation included the comment, "Break up the lesson into small chunks" as a way to successfully manage a 90-minute class period.

Teacher E.

- Five of the six instances of talking occurred in the two rounds after which five students came in late from an off-campus class, giving students an excuse to engage in off-task talking while the latecomers settled in. This was confirmed in the teacher's reflections, "Students were well behaved except for one who came in late from another class and became disruptive for a while before we had to straighten issues out with him/her."
- Two students were noted as distracted in the observation record, and this caused me to write in my reflections, "Did students have assigned roles throughout this investigation?"
- Finally, two students were observed as taking care of needs because they were unprepared with the correct materials needed for the activity. To prevent this in the future, the teacher decided to "Write the steps on the board" so that students would know what to expect.