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Cooperative Learning and Student Motivation

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Abstract

The effects of cooperative learning on student motivation, attendance, and achievement were investigated in a school age GED program's science lessons. Students took a pre-survey and post-survey to assess the effect of cooperative learning on motivation. Students took a pretest and post-test to assess the effect of cooperative learning on achievement. Student attendance was analyzed before and during the implementation of cooperative learning. Students exhibited more positive motivation and higher achievement after implementation of cooperative learning. It was not possible to determine the effect of cooperative learning on student attendance.

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Chapter One: Introduction

Problem statement

As a GED instructor for the last four years, student motivation has always been a major concern. Lack of motivation is usually what leads students to quit school in the first place. I am constantly trying to motivate students to persist and achieve their goals.

Significance of the problem

Researchers often find a correlation between motivation to learn and student achievement (Wang, Haertel, & Walberg, 1993). Many students today lack the motivation to be successful in school. Lack of motivation can lead to many problems in the classroom including lack of student effort, inattention, poor task persistence, class cutting, and high rates of other discipline problems (Goldberg, Foster, Maki, Emde, and O'Kelly, 2001).

Purpose

The purpose of my study was to incorporate a new learning technique with my class to see if it would help motivate my students to be more interested in school and improve their attendance. These two outcomes, if positive, would lead to increased achievement.

Rationale

In my review of the literature, many causes for lack of student motivation were discovered and many solutions and learning strategies were offered to improve student motivation. I chose cooperative learning as the best strategy for intervention

in my school-age GED classroom science lessons. Cooperative learning has been shown to improve motivation, attendance, and student achievement.

Cooperative learning is especially relevant in the instruction of science because students learn to work as part of a team to solve problems. Scientists in today's world often work in teams to solve complex problems, so it is imperative that students are taught how to be an effective member of a team.

Definition of terms

Cooperative learning is a learning situation in which students work together in small groups toward a group goal (Slavin, 1989). Working in small groups, peers recognize that their rewards are dependant on the success of their teammates and are more likely to provide support for each other's learning.

Summary

The purpose of this action research project is to determine if using cooperative learning in my classroom affects student motivation, achievement, and attendance. Will cooperative learning improve my students' poor motivation? If motivation is improved, will an improvement in attendance also be noted? Finally, will the ultimate outcome of increased achievement be realized? This action research project will investigate the answers to these questions by administering standardized practice GED science tests, motivation surveys, and observing attendance records before implementation of cooperative learning and immediately after implementation of cooperative learning for five weeks of science instruction in my classroom.

Chapter Two: Literature Review

Few topics in education have received as much attention as motivation. Motivation may be defined as the force that energizes, directs, and sustains behavior toward a goal (Hancock, 2004). Researchers often find a correlation between motivation to learn and student achievement (Wang, Haertel, & Walberg, 1993). Many students today lack the motivation to be successful in school. Low motivation can often be evidenced by low levels of effort, inattention, poor task persistence, class cutting, and high rates of other discipline problems (Goldberg, Foster, Maki, Emde, and O'Kelly, 2001). Consequently, teachers routinely implement strategies designed to enhance student motivation to learn.

Two types of motivational forces move individuals: extrinsic, coming from external sources, are often tangible; and intrinsic, coming from within, are usually in the form of personal satisfactions (Deci, 1971). Students motivated by extrinsic factors strive for high grades and praise from teachers and family as rewards for achievement, whereas students who are intrinsically motivated enjoy learning the subject matter they are studying for its own sake (Nichols & Miller, 1994). Extrinsic inducements always work more quickly and powerfully than intrinsic ones, but extrinsic attractions must usually be offered indefinitely for the behavior to continue. Although intrinsic attractions work slower to motivate, they are usually more lasting once they take hold (Lowman, 1990).

Intrinsic motivation is generally more desirable. Intrinsically motivated students are more interested in the subject matter, are more creative, and enjoy more difficult activities that challenge them. They take more risks in learning and explore

more freely, and they have better study strategies that are efficient and logical (Lepper, 1988). However, it is not always possible to intrinsically motivate students. According to Bandura and Schunk (1981), extrinsic motivations are often necessary to produce learning when the activity is one that students do not find of inherent interest or value.

Many students today lack motivation to succeed in science. Anyone teaching science has encountered students who ask such questions as, "Why do we have to learn this?" and, "What is the point of doing this experiment?" A web-based survey undertaken in England found that 42 percent of students age 14-19 indicated that their science lessons had not made them curious about the world and interested in finding out about more (Planet Science, 2003). Scientists and engineers that are reaching retirement age are not being replaced in the numbers that they must be to keep the United States economy on the top of the heap (Friedman, 2005). The National Science Board found that the number of American 18-24 year olds who receive science degrees has fallen to seventeenth in the world. Three decades ago we ranked third (Friedman, 2005). Many business and political leaders are worried about the ability of American schools to stimulate students' interest in math and science. This weakness has led to the growing influence of India and China in the fields of engineering and technology. If students are not motivated to pursue science careers the United States may not be able to compete in a globalized world (Honawar, 2005).

Causes for lack of student motivation

Lack of student motivation has many causes. Young children appear to be driven by curiosity and a need to explore their surroundings. Unfortunately, as

children grow, their passion for learning seems to diminish and also becomes associated with drudgery (Lumsden, 1994). Developmental changes may contribute to a child's lack of motivation. Young children tend to maintain high expectations for success, even when faced with repeated failures. This is not true of older children. Older children view effort as a "double-edged sword" (Ames, 1990). They feel failure following high effort carries more negative implications than failure that results from minimal or no effort.

Some students find little relevance in the relation of their course of study to their own goals and abilities. A one-size-fits-all curriculum may cause students to become bored, unmotivated, and may even cause them to drop out (Golden, Kist, Trehan, and Padak, 2005). Students want science classes that offer more relevance to their everyday lives (Jenkins, 2005). They would like to learn more about their bodies in biology. Women especially, value science when it gives them insight into the causes and prevention of illness, maintenance of good health, diet, and exercise. Students also would like to engage in relevant ethical and controversial science issues, things that matter to them on a daily basis. When students were asked what they found most boring in school science, topics drawn from physics were mentioned most often, followed by chemistry and then biology (Planet Science, 2003).

One of the main causes for lack of motivation is the negative self-perception of students. Ames (1984) found that students' self-perceptions of their own ability (self-efficacy) could affect effort and level of persistence at difficult tasks. Learners with low self-efficacy tend to avoid challenge, expend little effort, and believe they are not in control of their learning (Schunk, 1991). Many teenagers today are filled

with self-doubt and are dealing with many internal problems to begin with. Teachers must find a way to get students to believe in themselves in order to truly motivate them to learn.

Poor relationships between teacher and student are another cause for lack of motivation. Many students who choose to leave high school cite poor relations with teachers as among the most critical factors that influenced them to quit (Goldberg, et al., 2001). In a survey of twenty-five current university students who were GED graduates, many said they were victims of negative teacher influences. These negative influences ranged from no one taking an interest in them, denigrating comments from teachers, to a total lack of teacher support in high school (Golden, et al., 2005). Perception of supportive teachers is related to student outcomes in important ways. Perceived support from teachers is a significant predictor of young adolescents' motivation and academic achievement (Felner, Aber, Primavera, & Cauce, 1985). When perceived support from parents, peers, and teachers is considered, perceived support from teachers has the most direct link to students' interest in school (Wentzel, 1997). Teachers vary in the style they use to teach and motivate students. The quality of a student's motivation may depend on the quality of a teacher's instructional style (Weiner, 1990).

Many students who are labeled "at-risk" simply demonstrate a lack of motivation to learn in school (Dicintio & Gee, 1999). According to Anderman (1998), when students have a history of failure in school, it is particularly difficult for them to sustain the motivation to keep trying. If students are unmotivated to learn, then teachers must create the conditions to support self-motivation (Dicintio & Gee, 1999).

Although students' motivational histories follow them into each new classroom, it is important for the teacher to view himself or herself as being able to stimulate student motivation to learn (Brophy, 1987). The literature reveals many methods to increase motivation in students.

Ways to motivate students

Lepper (1988) presents four C's to summarize complementary approaches that can be used to increase intrinsic motivation: control, challenge, curiosity, and contextualization. People are motivated to control their environments. Control or autonomy has long been known to be the great motivator. After reviewing numerous studies, Deci and Ryan (1987) found that autonomy support is a critical component in increasing an individual's intrinsic motivation. Giving students the opportunity to choose learning activities increases motivation. Even in the college classroom, de-emphasizing the instructor's power over students strengthens their incentives for learning (Lowman, 1990). Teachers must find a way to impart a sense of control in the student without actually abdicating their own control.

A feeling of control in their learning activities is especially important for at-risk students. Dicintio and Gee (1999) surveyed six at-risk students in an alternative education program in an effort to gauge student motivation and desire to engage in learning activities. Their data indicated that the students' motivation was significantly associated with the amount of control perceived by them over their learning situations. Participants reported being more involved and more competent when they perceived greater control over decisions and choices. They felt less bored, less confused, and less interested in doing something else.

People generally seek and enjoy activities that they find challenging. This is a basic tenet of many intrinsic motivation theories (Bandura & Schunk, 1981). An intermediate level of difficulty seems to be the most motivating (Lepper, 1988). The activity should not be too easy or impossibly hard. Dicintio and Gee (1999) found that, especially in at-risk students, if the challenge is perceived to be too high students will report more confusion and less competence. People are motivated by curiosity. Teachers can provoke a student's curiosity by using incongruity or discrepancy of new information from prior knowledge (Kagan, 1972). Demonstrations with discrepant events help spark students' natural curiosity.

Educational activities promoting contextualization of subject matter increase motivation. Helping students see how skills can be applied in the "real world" imparts relevance and hence motivation to learn (Lepper, 1988). According to the previously mentioned web-based survey, many students would like to see more attention given in their school science education to contemporary and controversial issues in science that relate to their everyday experiences (Planet Science, 2003).

People also are motivated by social needs. Schools try to eliminate as much non-academic time as possible. Lunch breaks and passing times have been shortened. This does not always allow students enough time to meet their social needs (Goldberg, et al., 2000). Many students feel an overwhelming need to belong and socialize; this may be in direct conflict with their academic responsibilities.

One method of instruction that has been shown to increase student motivation is cooperative learning. Cooperative learning is an instructional strategy that offers many potential benefits to learners. In cooperative learning, students work in groups

to accomplish particular learning objectives. For cooperative learning to work it must have two essential features. First, there must be group goals, or positive interdependence. Students must work as a group to earn some recognition, grade, or reward. Second, there must be individual accountability. The groups must depend on the individual learning of all group members (Slavin, 1989). Positive interdependence develops a sense of "we" not "me", whereas individual accountability develops the feeling that each member is important to the group.

How cooperative learning increases motivation

Traditional teaching methods choose to use competition to motivate students and tend to overlook strategies where cooperation can be used to motivate. Slavin (1984) has stated that one factor that influences the success of cooperative learning is the positive motivational impact of peer support for learning. Working in small groups, peers recognize that their rewards are dependant on the success of their teammates and are more likely to provide support for each other's learning.

Another benefit of cooperative learning is that it enhances student's self-esteem, which in turn, motivates students to participate (Panitz, 1999). Cooperative efforts among groups of students result in a higher degree of accomplishment for all (Slavin, 1984). By helping one another the students build a supportive community that raises the performance level of each member.

Cooperative learning enhances student motivation by giving them more control over their learning experiences. Control, as stated earlier, is a great motivator. The focus of cooperative learning is to involve students actively in the learning process (Slavin, 1980). In cooperative learning students may be actively involved in

developing curricula and class procedures (Meier & Panitz, 1996). Cooperative learning gives groups ownership of their learning instead of passively accepting information from an outside expert. The empowerment created by the cooperative learning method leads to increased motivation and a positive attitude.

Cooperative learning has been shown to develop positive student-teacher attitudes (Johnson & Johnson, 1985). In cooperative learning, lines of communication are opened. Students are actively encouraged to explain their actions and thoughts to other students and their teacher. The level of involvement becomes more intense and personal. A natural tendency to socialize with students on a professional level is created for the teacher. Opportunities are created for students to converse more with the teacher on a personal level as the teacher facilitates the cooperative learning process by interacting with each student while moving around the class and observing students interacting.

Students are motivated to engage in classroom activities if they believe teachers care about them. Wentzel (1997) found that students described teachers who care as those that demonstrate democratic interaction styles and those that model caring behavior to their students. Cooperative learning fosters these characteristics in teachers. A warm, autonomy supportive style teacher gets better results (Goldberg et al., 2001).

Cooperative learning develops students' social interaction skills. Cooperative learning can improve academic engagement by working with students' social motivation rather than against it. Traditional classrooms discourage student interaction and set up a competitive environment. Students who cooperate learn to

like one another and provide each other greater social support (Johnson & Johnson, 1985). For cooperative learning activities, students are trained in the social skills needed to work cooperatively and they are also divided into deliberately planned heterogeneous ability groups. In this way, interaction is fostered at all levels.

Social skills used in cooperative learning are essential in today's world. The most important lesson for students in any discipline today is the knowledge and skill of how to get along and work with others (Bredehoft, 1991). Cooperation has become more and more crucial for our economy, global peace, and even basic family relations. To be successful, people must learn to communicate and work toward common goals within diverse social structures (Johnson & Johnson, 1989). According to Robert Slavin (1980), cooperative learning in school prepares students for an increasingly collaborative work force.

Learning to work as part of a team to solve problems is especially important in the field of science. Most scientific discoveries were not made in isolation; they were made by groups of scientists over time. Most scientists work in teams solving complex problems. It is imperative that schools not only instruct students on how to use the scientific method, but also how to work as an effective member of a team. Cooperative learning is an excellent tool for learning how to work together to solve problems (Nesbit & Rogers, 1997).

Cooperative learning also results in higher student achievement. According to Bredehoft (1991), at least 63 studies indicate that cooperative learning promotes greater achievement in the classroom than traditional competitive methods. For example, Lucker, Rosenfield, Sikes, and Aronson (1976) compared academic

achievement of 303 fifth and sixth grade students. Cooperative learning was used in six classes while traditional methods were used in five classes. Information on academic achievement was gathered comparing pre-tests and post-tests. Overall performance of academic achievement improved in the cooperative learning classrooms. Cooperative learning has also been shown to increase academic achievement in older students. Nichols and Miller (1994) examined the effect of cooperative learning instruction on a high school Algebra II class. They found that the cooperative learning treatment resulted in higher Algebra II achievement than the traditional lecture method. There is wide agreement in the research that cooperative methods can and usually do have a positive effect on student achievement as long as both group goals and individual accountability are incorporated into the cooperative methods (Slavin, 1983).

Cooperative learning has been shown to improve attendance. An interactive classroom environment, such as one in which cooperative learning is used, is conducive to high student motivation, participation, and attendance (Treisman, 1983). Students who feel involved in the learning process are more likely to want to come to school.

Most of all, cooperative learning can increase motivation because students find it fun. Despite the repetitive nature of the learning process, when students work together the learning process becomes interesting and fun (Panitz, 1999). Nichols and Miller (1994) reported a surprising finding when they used cooperative learning for one semester with a high school Algebra II class. When the study ended and students were switched back to the traditional lecture format the students became quite

unhappy and most wished to stay with the cooperative learning format. Motivation and achievement were both affected by their displeasure.

Implementing cooperative learning

Cooperative learning is perfect for teaching science students problem solving, critical thinking, and how to work in groups. It is very important that teachers prepare their students to work cooperatively before engaging in the process. Students cannot be expected to be placed in a group and know how to function together effectively without instruction. For most of their school lives students have been taught to depend on the teacher for their learning and when given the responsibility for their own and the group's learning, students do not automatically know what to do. Students need to unlearn their traditional concepts of learning; they have few social skills for working together. When Schultz (1989) first tried cooperative learning in his ninth grade English class it was not very successful. His students reported in their journals how much they disliked it. He realized students are traditionally taught to keep their eyes on their own papers, not to share work, and to be responsible for their own work. He realized it would take time to help them overcome those values and work together as a team.

Some instructors suggest teaching one collaborative skill each time you use cooperative learning in your class to start. Others feel that it is best to get student input by conducting a brainstorming session before beginning a cooperative learning activity. By recording ideas and then arranging them in order of importance the students will feel ownership of their responsibilities for collaboration (Anderson &

Palmer, 2001). A review of the literature (Schultz, 1989; Anderson & Palmer, 2001; Nesbit & Rogers, 1997) stresses these skills when setting the rules for group work:

- Listen while another member is speaking
- Face the speaker
- Criticize ideas, not people
- No side conversations
- Everyone participates and stays on task
- No arguing, all opinions are honored
- Praise others
- Leader respects self and others
- Talk quietly
- Be sure everyone understands answer

It is also important to use small heterogeneous groups with cooperative learning. Each group needs to have one high-achieving student, two average achieving students, and one low achieving student (Steinbrink & Jones, 1993). In this way students can help each other so that the group will experience success.

Johnson, Johnson, and Johnson Holubec, 1986 (as cited in Nesbit & Rogers, 1997, p. 54) have developed The Learning Together Method, which involves five essential elements the teacher must structure into cooperative lessons to ensure their effectiveness. The five essential elements are: positive interdependence, individual accountability, collaborative skills, monitoring, and processing. Positive interdependence helps students gain the "we" instead of the "me" perspective. Individual accountability assures that each student is responsible for doing his or her

part. Collaborative skills are the social skills students must use to work effectively as a group. Monitoring is having one person (may be the teacher) assigned to observe the group to see if they are using good collaboration skills. Processing is the final step when the group discusses how well they did on collaborating and what they will do next time to improve the use of the skill. Appendix 1 summarizes this method.

It is important for teachers not to skip the evaluative process when using cooperative learning. According to Yager, Johnson, Johnson, and Snider, (as cited in Nesbit & Rogers, 1997) the processing step, when students take time to reflect on how they did and how they can improve next time, has been shown to lead to higher achievement and retention of information than in groups that do not use an evaluative process.

There are many different ways to incorporate cooperative learning into science classrooms. Nesbit and Rogers (1997) describe six methods of cooperative learning especially suited to the science classroom in particular. These methods are drawn from four prominent developers and researchers: Johnson (1989), Johnson (1989), Slavin (1989), and Kagan (1972).

From the Johnson brothers (1989) are the Learning Together and Structured Controversy methods. The Learning Together method was described above. The Structured Controversy method of cooperative learning is effective at improving reading and writing and at engaging students in solving environmental problems facing the world today. Students work in groups of four to discuss a topic that has two positions. One pair prepares and presents one side of the controversy and the other pair prepares and presents the other side of the controversy. Then the pairs reverse

their perspectives to present the other point of view. The group then reaches a consensus and writes a report in which members must contribute one to three sentences on their own. The report receives a group grade.

Slavin has developed several cooperative learning methods. Two methods discussed by Nesbit and Rogers (1997) are the Jigsaw II and the Student Teams Achievement Division (STAD). Both of these methods have a tutorial framework. In Jigsaw II, students learn material individually and then combine their knowledge with others in their group to get the total picture, like a jigsaw puzzle. Here reading materials are divided into four sections by the teacher (one for each group member). Each section has a meaningful key question. Each member is responsible for learning the answer to his or her question and writing a summary as the individual component of the lesson. Then all the students who are investigating the same question in the whole class meet in an Expert Group where they present their findings and come up with a way to teach the most important information to their Home Groups. When they return to their Home Groups, each expert presents their information so that all group members have been exposed to all the questions and their respective answers. The group spends time reviewing before taking a test on the material individually for a grade. To reward positive interdependence, the students receive bonus points if everyone in their group gets eighty percent of the answers on the test correct.

Slavin's (1989) STAD method is another tutorial framework in which teams of students teach each other material that has been identified by the teacher and then take tests as individuals. This method involves competition among the groups, but at the same time provides an equal opportunity for teams to succeed because team

scores are based on students' improvement over their past record. In heterogeneous groups of four, the students take turns reading the chapter from the text and responding to a list of review questions. When the team is sure that all members know the information well enough to take the test, the students take the test individually. When tests are scored, the students receive two scores, one for the individual and one for the team. The team score is determined by the improvement in scores by each of the members from the last test. This method provides all students an opportunity to succeed.

Kagan has developed several dozen cooperative learning structures that are informal and adaptable (as cited in Nesbit & Rogers, 1997). Two are discussed by Nesbit and Rogers (1997): Think-Pair-Share and the Three-Step Interview. Think-Pair-Share allows students to engage in individual and small group thinking before being put on the spot in front of the whole class. There are four steps to Think-Pair-Share. The class listens to a question posed by the teacher. Individual students are given time to think and then write a response. Pairs of students read and discuss their responses. Finally, the teacher randomly calls on students to share their answers with the whole class. Nesbit and Rogers (1997) find this method suited for science because an important part of science experiments is formulating hypotheses about the outcome of experiments before actually doing the experiment. Working in pairs, students will see many more possibilities than if they were working alone. This method also gives students time to think about their answers before blurting out the first thing that comes into their minds.

Kagan's (1972) Three-Step Interview method is similar to Think-Pair-Share, but is more structured. This is useful when students are solving problems that have no specific right answers. Here, the teacher presents an issue about which varying opinions exist and poses several questions for the class to address. In pairs, the students take the roles of interviewer and interviewee. The interviewer asks the questions and writes the answers given. When the interview is complete, the students switch roles and repeat the process. The pairs then read their interviews to the class, which then, as a whole, writes a summary of the interview results. This method helps students' language and listening skills.

These examples are only a small sample of the various methods of cooperative learning that have been developed. Nesbit and Rogers (1997) recommend that teachers just beginning to use cooperative learning start by using less complicated methods before proceeding to the more complicated ones. Above all, teachers need to have patience when using cooperative learning. When Edwards and Stout (1989) first used cooperative learning in their elementary classrooms they had some problems. They found it took from two to three years to really feel comfortable using cooperative learning in their classrooms. If a teacher plans to use cooperative learning in their classroom the class period should be very structured and well planned in order for it to run smoothly. It is not easy, but teachers need to let go of total control over the content and trust the process of cooperative learning to produce the desired learning outcomes (Bredehoft, 1991).

Problems associated with cooperative learning

In some situations and classrooms, cooperative learning may not be the best method to use. Randall (1999) found fault in the basic premise on which the method is based, that the members of the group are responsible for each other's learning. When one person is stuck doing all of the work it is unfair for the group to get the credit. Teachers need to be very diligent in the monitoring of the process to make sure that all members are contributing. Randall also found fault in the design of the heterogeneous group, where one high achiever, two average achievers, and one low achiever should be placed in each group. In this arrangement the high achiever becomes the teacher who is expected to explain the content to the lower achievers over and over again. The low achiever, in turn, may also understand their position in the group and become disruptive. Although Randall does recommend that cooperative learning be used in the classroom, he feels it should only be used to share or reflect on things students have already learned. It should not be the dominant learning strategy.

Hancock (2004) studied the effects of a student's peer orientation on achievement and motivation to learn and found several problems with cooperative learning. First, he found that students with predispositions to work alone were not motivated to learn in the cooperative learning setting. Second, he found that many times socializing with group members took priority over group effort. Videotapes of his graduate-level class using cooperative learning showed students talking about issues unrelated to the assignment for the majority of the period, and then working feverishly during the last five minutes to complete the task. Third, he found that students in groups sometimes supported and reinforced misunderstanding of the material rather than challenging

and correcting misconceptions. Group members did not refute an incorrect assertion. Finally, he found that a few students sometimes dominated group interactions. Those members who were less boisterous or extroverted did not fully engage in discussion.

Overall, the benefits of cooperative learning seem to outweigh the problems. If teachers diligently monitor the activity, many of these problems can be overcome. The cooperative learning method is appropriate for the science classroom because it mirrors the real world of science where scientists work together to solve complex problems.

Chapter Three: Applications and Evaluation

Introduction

The first step for my action research was to consider my student population's demographics to better implement a solution. The next step was to get a benchmark of my students' motivation, achievement, and attendance before starting my plan. I then implemented cooperative learning in my classroom. After completion of the cooperative learning unit, the students were assessed to see if any changes took place in their motivation, achievement, and attendance.

Participants

This study involves students enrolled in an Alternative High School Equivalency Preparation Program (AHSEPP), aged 16 –20, in a moderately large suburban school district in western New York. Enrollment in the district's high school was 1476 (2003-2004). For such a large district, only 3 % or 45 of these students quit school and entered my program in 2003-2004. So far this year, I have had a total of 29 students come through my program. The average class size at the high school is 21 students and the average class size for my GED classroom this year has been 12 students. The high school population is 95.9% white, 1.1% Hispanic, 1.8% Black, and 1.2% American Indian, Alaskan, Asian or Pacific Islander. Enrollment in the GED program mirrors these demographics. Eight point six percent of the districts students are eligible for free lunch. Students with disabilities are higher in proportion in the GED program than in the high school population, averaging 22% of my enrollment over the last 3 years. This school year the enrollment of males to females in my

program has been nearly equal, but in the past I have normally had more males than females.

There are many reasons students in my program give for dropping out of high school. However, the overwhelming majority of enrolled students have multiple high risk factors such as a history of personal substance abuse, parental substance abuse, truancy, parental neglect, criminal behavior, pregnancy, abuse by parent or guardian, sexual abuse, etc. Other students are just "different" and may not fit in socially at the high school. A moderate percentage of my students are extremely bright and are bored by the constraints placed on them by the curriculum and administration at the high school. These students usually plan to get a GED and attend community college or pursue careers outside the mainstream, such as acting, art, writing, etc. A small percentage, usually about one student per school year, were home schooled and need a high school equivalency diploma to have official New York State recognition.

The GED program is located in the Community Center, off school grounds. Students who have reached compulsory age (finished the school year in which they turned 16) and who are at risk of not completing the high school requirements for graduation (usually too few credits) are referred to my program after alternatives for graduation are exhausted. I prepare students to pass the General Educational Development (GED) Test Battery. The GED test consists of 5 examinations: Language Arts, Writing; Social Studies; Science; Language Arts, Reading; and Mathematics. For this study I focused my cooperative learning strategies on the science portion of my instruction in an effort to improve students' achievement on the science test.

I have an open enrollment into my program, which means students can start the program at any time during the school year and leave the program at any time by taking and passing the GED test. Some students test out within 1 month and some require a full year or more of preparation. Attendance is mandatory for 3 hours per day, 5 days per week until the day they sit for the GED exam. There tends to be a fairly transient population that comes and goes around a base population of long-term students.

The 10 students who chose to participate in this action research range in age from 16-19 years old. Many of the students remaining in this group are my long-term students, so 7 out of the 10 are special education students with either an IEP or 504 plan. There are 4 girls and 6 boys in the group.

I have been the district's GED Coordinator for the last 4 years. In addition to instruction, I am responsible for over-seeing the program's daily operation, including New York State compliance and approval. Up until last year, the program had 2 instructors, but due to budget cuts, this year I am the only instructor with a part-time tutor brought in for times of increased enrollment. Students in the program have a wide range of academic abilities with reading and math levels ranging from elementary to post high school. For this reason, my instruction tends to be fairly individualized so that students get the help they need at the proper level. I do much of my instruction with smaller groups and individual instruction. On a daily basis, I use one whole group activity. This activity varies and can be in any of the 5 subject areas covered on the GED exam, but because I am a science teacher, I tend to do more

group science lessons than the other subjects. For the period of this study, I will incorporate 2 cooperative learning science activities per week into my classroom.

Procedures of Study

In order to determine if cooperative learning would have an impact on motivation, attendance, and achievement in my classroom I had to start out with a pre-analysis of all three variables. I started my research with a motivational survey (Appendix 2) to assess how motivated my students were before I began using cooperative learning. The next day, I administered a practice GED standardized science test (Appendix 3) to the class to get a benchmark of their science scores. Next, I reviewed each student's attendance record and came up with a percentage for pre-cooperative learning implementation. I also began keeping a daily journal of my own personal observations, frustrations and successes with this project.

The next step was to implement cooperative learning into my classroom. As excited as I was about starting, I knew my students would fight it. Many of my students lack self-confidence, especially when it comes to school. They don't like to participate in groups, preferring instead to work alone and get one-on-one help from me. The one thing that helped was that most of my class had become close and supportive of one another. Because they are isolated from the main high school population and because I stress tolerance in class, these kids are free to be themselves and accept each other. Even students who never fit in at the high school are welcomed into our group. Hopefully they were all comfortable enough to participate in this new learning venture.

Before starting cooperative learning, I needed to teach my students cooperative skills. The first session was spent brainstorming to come up with a list of ideas for behavior during group work. I then had them place them in order of importance. The list included: listen while another member is speaking; face the speaker; no side conversations; criticize ideas, not people; everyone participates and stays on task; talk quietly; and be sure everyone in the group understands the answers. They came up with most of these ideas themselves and I only had to add a few. I think they felt more involved and mature by setting the rules themselves.

Due to the small class size, I decided I would use five groups of two people for our cooperative learning sessions. I decided the composition of each group based on my literature review, which recommended using heterogeneous ability grouping. I tried to pair a higher ability student with a student of lower ability while also taking personality factors into consideration. All materials were first taught to students in traditional lecture format, and then cooperative learning was used as a supplemental form of review. I used cooperative learning two times per week for science instruction in the biology unit. This continued for five weeks for the length of the biology unit.

In the first week I used the simpler methods of cooperative learning, such as, think-pair-share and the three-step interview process. Eventually I built up to more complicated forms of cooperative learning. When we covered the human body systems, I used a variation of the Jigsaw II method of cooperative learning. After teaching them the systems of the human body and their functions and processes, I gave each group a body system to become an expert on. They were responsible for

labeling a diagram of the system, a list of vocabulary words, and a description of the parts, functions, processes and related health problems of their system. Working as a team, each group had class time to use the Internet and science textbooks to get information. Each group then taught the rest of the class about their system. Students were tested individually on the body systems. Upon completion of the biology unit, I used a cooperative test review process. Using the biology unit test as my guide, I prepared a review packet for students to study with their teammate. When the groups completed the review, each student should have been able to demonstrate a basic understanding of the concepts in the unit. To increase motivation we played a class review game. The team with the most points won McDonald's coupons for free food. Most of all, I hoped to add some fun and team competition to the learning process in this unit.

Upon completion of my implementation of cooperative learning in my classroom, I was ready to do my post analysis. First, I had students take the same motivation survey again. Next, I administered a second practice GED standardized science test. Finally, I calculated my student's attendance for the 20 school days that I used cooperative learning.

Instruments for Study

As stated above, my four methods for collecting data were:

- Student motivational survey (pre and post cooperative learning)
- Standardized GED science test (pre and post cooperative learning)
- Attendance records (pre and during cooperative learning)
- Journal of my personal observations

This mixture of quantitative and qualitative research gave me a better picture of the effects of cooperative learning in my GED science classroom.

I developed the motivational survey using ideas from the Motivated Strategies for Learning Questionnaire (MSLQ) developed by Pintrich and DeGroot (1990). The MSLQ was designed to assess motivation and use of learning strategies by college students. I used questions from the motivation segment and modified them to apply to students in my GED class. Students were asked to respond to a series of statements on a 5-point Likert scale. Each response corresponds to a point value, with the higher point values assigned to a positive attitude in regards to motivation (Appendix 2).

In order to track student achievement, I used a standardized GED science practice test. The content of this test, developed by the GED Testing Service, is based on the Science Content Standards from the National Science Education Standards. There are five versions of the practice test available to educators. Although each test is different, the level of the material on each test is equal. Before beginning the cooperative learning unit, students were given practice test A. After completion of the unit, students were given practice test B to determine if there was any effect on individual achievement.

Individual students' attendance records for the twenty days prior to implementation of cooperative learning were compared to the attendance records for the twenty days of the cooperative learning unit.

I also began keeping a journal of my personal observations during the cooperative learning period. At the end of each day's class, I would write down how I felt the lesson went. I noted successes, problems, specific student comments, things I

wanted to remember for future use, and things I would change for future use. Although it was often difficult to find the time for journal entries, it was this qualitative data that provided me with my greatest insight for reflection and thought.

Chapter Four: Results

Table 1 shows the results of my motivation survey. I assigned a point value of 5 to the most positive response a student could give to the question and gave the rest a descending point value. If each of my 10 students gave the most positive response to the question, that would make 50 the highest positive score possible for a question. For each question I tallied the point value of the students' responses and represented it as a percent of the highest score possible (50). If the score is above 50%, that shows a more positive student response. If the score is below 50%, that shows less motivation. Figure 1 demonstrates the data graphically.

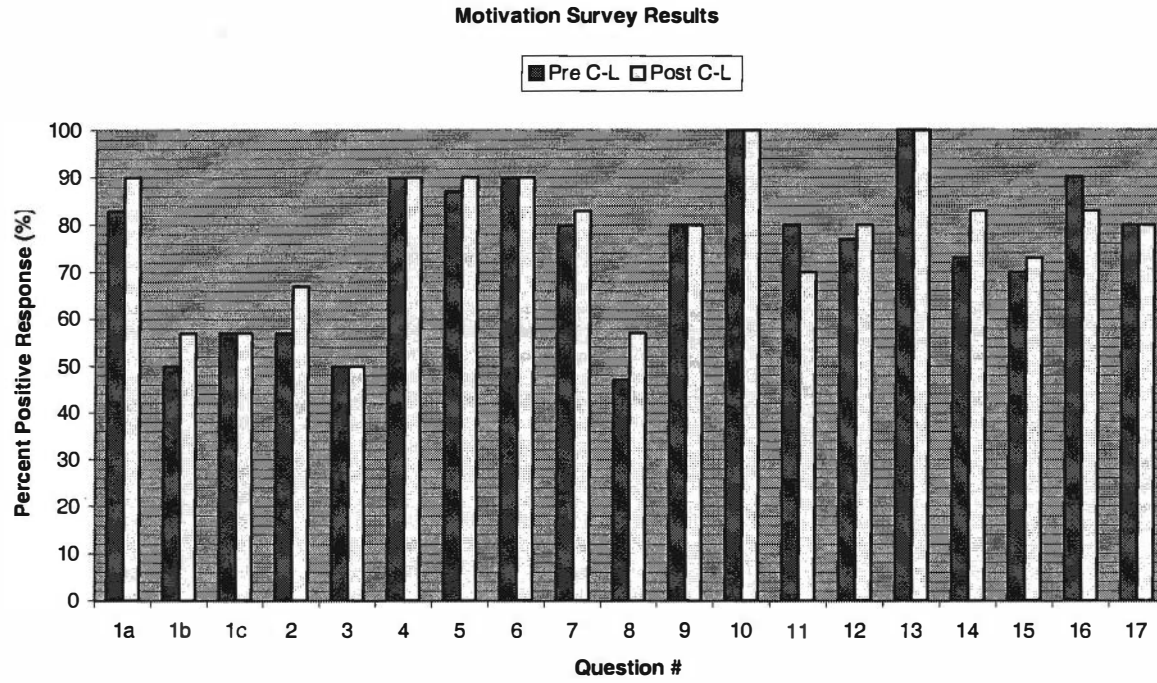
Table 1

Pre- and Post-test Motivation Survey Data

Question #	Pre-test	Post-test
1a	83	90
1b	50	57
1c	57	57
2	57	67
3	50	50
4	90	90
5	87	90
6	90	90
7	80	83
8	47	57
9	80	80
10	100	100
11	80	70
12	77	80
13	100	100
14	73	83
15	70	73
16	90	83
17	80	80

Note. All scores represent a percent positive response. The higher the score, the more positive was the student response.

Figure 1



Note. Pre scores are student scores before implementation of cooperative learning, post scores are student scores after implementing cooperative learning in the classroom.

For the pre-cooperative learning motivation survey, the responses to most questions were positive. Only 3 questions were responded to negatively and 2 questions had 100 % positive responses! I did not expect such positive motivation responses from my students. I am not sure if these students were being honest with themselves, although they may be more motivated now than they ever were in high school. The reason for that may be due to the fact that they can test out of my class when they can demonstrate readiness. They know that the faster they learn the material the sooner they can be done with school. Dealing with them on a daily basis, I don't always think they have strong motivation, but compared to their past they may feel they are much more motivated.

After implementing cooperative learning the response to fifteen questions either became more positive or stayed the same. Only two of the questions, number eleven and number sixteen, showed a slightly more negative response. Question eleven asked students if it was their own fault if they didn't earn their GED diploma. On the pre-cooperative learning survey the response was 80% positive, whereas, on the post-cooperative learning survey the response was only 70% positive; perhaps working in groups caused students to feel less in control of their own learning. It may have felt that others were responsible for their success or failure. Question sixteen asked students whether they asked the teacher for help when they needed it. Before implementing cooperative learning, the response was 90% positive, with half the class strongly agreeing with this statement, and half the class strongly agreeing. After implementing cooperative learning the response decreased to 84% positive. Perhaps this was due to the fact that cooperative learning stresses reliance on team members for learning rather than reliance on the teacher. On the whole, the survey showed an improvement in student motivation after the cooperative learning period.

Table 2 shows the results of the GED science test scores. On the test taken before implementation of cooperative learning, my student's scores ranged from a high of 88% to a low of 48%. The class average was 70%. After implementation of cooperative learning, the scores ranged from a high of 84% to a low of 60%, with the average score increasing by 5% to 75%. It seems my lower achievers were the ones that made the most gains. Of the four lowest scorers on the pre-test, three of them increased their score by 12% and one increased their score a full 20%! Steinbrink and Jones (1993), who used cooperative learning for test review, found that the majority

of the gains in achievement occurred in test scores of students who previously scored in the lower half of the class. Figure 2 shows this data graphically.

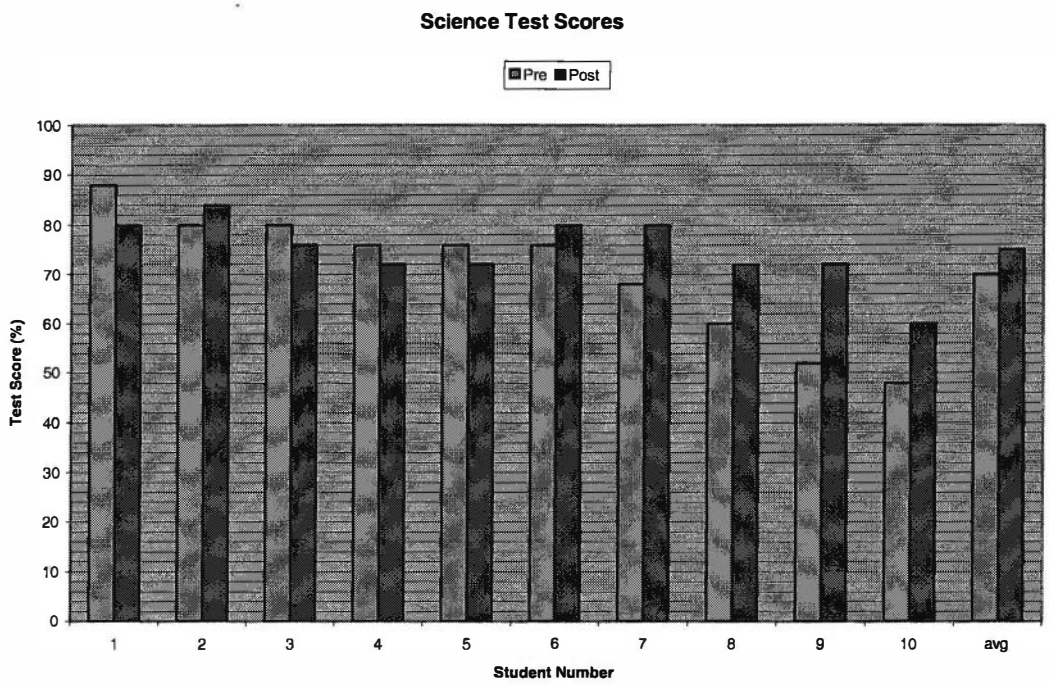
Table 2

Pre- and Post-test Science Scores

Student #	Pre-test	Post-test
1	88	80
2	80	84
3	80	76
4	76	72
5	76	72
6	76	80
7	68	80
8	60	72
9	52	72
10	48	60
Average	70	75

Note. Scores are in percent.

Figure 2



Note. Pre scores are student scores before implementation of cooperative learning, post scores are student scores after implementing cooperative learning in the classroom.

Table 3 shows my student's attendance for the twenty days before implementing cooperative learning and the twenty days during use of cooperative learning. Attendance is based on the number of days the student attended as a percent of total school days for the period. Five students had an increase in attendance, one student (who always has perfect attendance), stayed the same, and four students showed a decrease in attendance. Figure 3 shows this data graphically. It is difficult to determine if cooperative learning was responsible for these fluctuations in attendance. In my previous month's attendance, I saw just as much variation. It is difficult, with any degree of certainty, to attribute changes in attendance to my cooperative learning experiment.

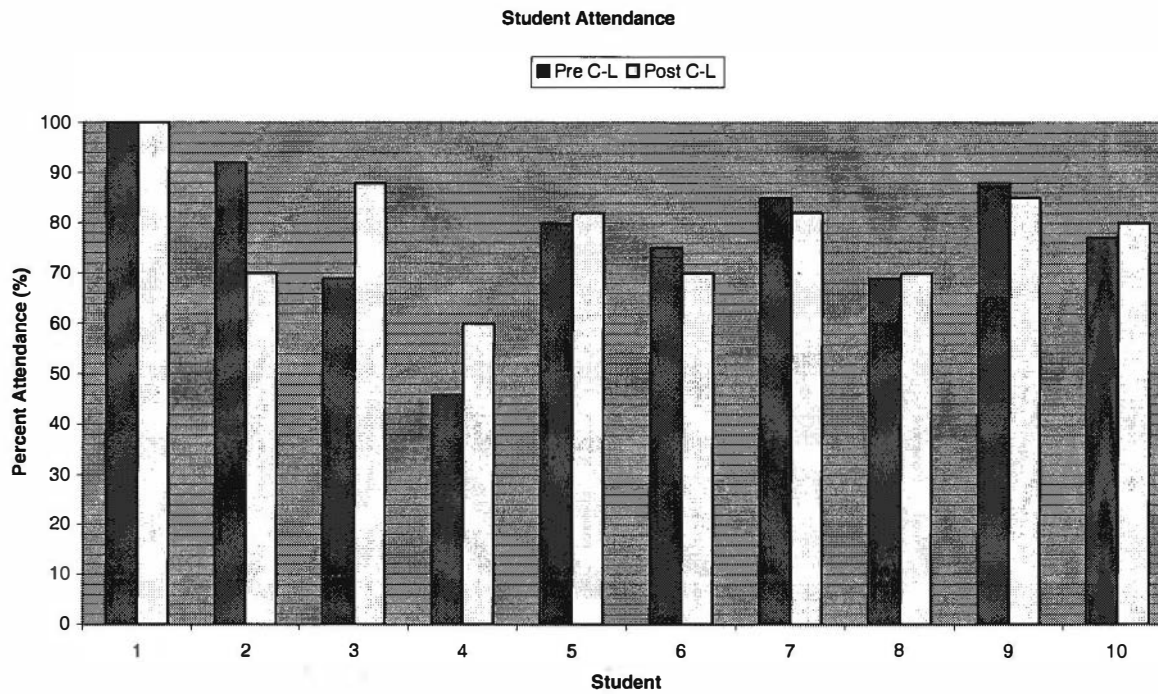
Table 3

Pre- And Post-Cooperative Learning (C-L) Attendance

Student #	Pre C-L	Post C-L
1	100	100
2	92	70
3	69	88
4	46	60
5	80	82
6	75	70
7	85	82
8	69	70
9	88	85
10	77	80

Note. Attendance is percent student attended.

Figure 3



Note. Pre scores are student scores before implementation of cooperative learning, post scores are student scores after implementing cooperative learning in the classroom.

Chapter Five: Conclusions and Recommendations

Discussion

Cooperative learning has had a positive effect on my students' motivation and achievement according to the analysis of my quantitative data. But it is my qualitative data, my observations, which really showed me the positive effect cooperative learning had on my class.

Student responses to the motivation survey became more positive after implementation of cooperative learning. There may be several reasons for this. First, cooperative learning allowed my students to have more control in the learning process. A feeling of control is especially important for at- risk students such as mine (Dicinto & Gee, 1999). In the beginning, I had to push my students to work cooperatively, but by the third cooperative assignment, the students took control. They moved their seats to partner up, they gathered materials, asked relevant questions, and got to work with very little complaining. On the whole, their motivation to complete the assignment before them improved. The students seemed more involved and competent. They wanted to be the first team done. The funny thing is that although this required cooperation within each group, the groups became competitive with each other! This seemed to provide drive toward completing the assignment.

Second, I used cooperative learning to introduce students to 'real world' problems. Students are motivated when schoolwork can be applied to contemporary and controversial issues (Lepper, 1988). I used the Structured Controversy method (Johnson & Johnson, 1989) to have students look at both sides of the global warming

issue. This is a subject that students hear about everyday. The relevance of this topic to their everyday lives motivated my students. Each student had a definite opinion on the subject, but was required to argue both sides of the issue. This gave them a much broader understanding of this environmental problem.

Third, cooperative learning seemed to really tap into my students desire to socialize. I expected to have problems with students getting off task when given the opportunity to work together. Most students enjoyed working with a partner and this gave them motivation to do their work. It seemed to really improve the social interaction skills of my students. Instead of each student doing their own packet of work, students were giving each other advice on how to best complete projects. These social skills need to be fostered in GED students who will soon be facing the working world.

Observing my students, I could see the positive effect cooperative learning had on their motivation. In almost every case, the students took their responsibility within the team seriously. These typically low achieving, unmotivated students were busy completing their work and enjoying the feeling of belonging to a team.

Cooperative learning also had a positive effect on achievement in my classroom as the post implementation scores show. The class average increased. Use of cooperative learning seemed to have the most positive effect on my lower achiever's scores. The correlation between motivation and achievement was obvious in this area. These students seemed to care more and be more involved after working cooperatively. It is difficult to determine if they actually learned more or if they simply viewed success in a more positive manner.

Action Plan

Due to my success with cooperative learning, I plan to use it on a regular basis in my classroom. For this study, I have only used it for science lessons, but plan to implement it with the other four subjects that I teach. In my review of the literature, I came across many cooperative learning methods that would be applicable to the other subjects that I teach. I found an especially good cooperative test review process that will work great for math.

The biggest problem I had using cooperative learning with my small class was absences. Because I used only two students per group, when a student was absent, one student was left to work alone. I had to constantly revise the grouping configurations to make up for missing students. When I use cooperative learning in the future, I plan to use groups of three so that my plans will be less vulnerable to student absences.

I plan to share my findings with my administrator. She is very curious to hear the results of my experiment. The district I work in is very progressive, constantly striving for improvement. Every student is important, regardless of class ranking, so we strive for improvements in every program. My efforts to incorporate cooperative learning in my classroom will be encouraged because I have demonstrated the effectiveness of the technique. I am a member of the New York State Alternative Education Association. Once a year we meet for a conference where I can share my success with cooperative learning with other GED instructors at the workshops. Hopefully, they will give cooperative learning a try in their classrooms.

Recommendations for Future Research

In the future, I would like to investigate the use of cooperative learning over a longer period of time. If this technique is used all year, I feel it would bolster the confidence of my long-term students who are traditionally the lower achievers. They could be used as 'experts' who, as group leaders, could show my transient student population how the process works.

Conclusions

The use of cooperative learning in my classroom improved student motivation; students were more positive in their responses to the motivation survey after the science unit using cooperative learning. Cooperative learning also improved achievement in my class, the class average increased by five percent on the standardized GED science practice test. Cooperative learning seems to have had the greatest effect on my lower achievers who made the largest gains on their test scores.

Not only did motivation and achievement improve, but also my students had fun during these lessons! Students were actively engaged in the learning process, communicating with each other, and, for the most part, working as a team on their assignments. Most of these students are done with their formal education and it is highly unlikely that they will ever attend any kind of school again. For many of these students, learning has not been fun. It has been associated with boredom, frustration, confusion, and failure. If using cooperative learning in this class allows them to see that learning can be fun, than it is worth using. I plan to continue using and refining my cooperative lessons.

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Appendix 1

Ways to practice the five elements of cooperative learning

Positive Interdependence

1. One product is signed by all members of the group.
2. A single group grade is given to all members of the group
3. There is only one set of materials for each group.

Individual Accountability

1. Each Task is divided into jobs, with a different job for each member.
2. Students initial their contributions to the overall product.
3. Students are tested individually.

Collaborative Skills

The teacher decides which social skills students need and integrates them into the lesson.

Monitoring

1. The teacher walks from group to group observing and recording examples of collaborative skill practice.
2. A student within each group is assigned the job of monitor. He or she uses a checklist and notes every time the skill is practiced.

Processing

1. The group members analyze verbally how well they have practiced the collaborative skill.
2. The teacher shares with the class how well each group did practicing the skill.

3. The group members decide how they can improve in the future.

Appendix 2

Motivation Survey

Instructions: Please answer the following questions by circling the appropriate number.

Strongly agree = 1
Agree = 2
Undecided = 3
Disagree = 4
Strongly disagree = 5

1) When I am doing my class work I feel:
   a) involved 1 2 3 4 5
   b) bored 1 2 3 4 5
   c) confused 1 2 3 4 5

2) I often wish I were doing something else when in class.
   1 2 3 4 5

3) During class time, I often miss important points because I am thinking of other things.
   1 2 3 4 5

4) It is important for me to learn what is being taught in this class.
   1 2 3 4 5

5) I like what I am learning in this class.
   1 2 3 4 5

6) I expect to pass my GED after attending this class.
   1 2 3 4 5

7) Compared with others in this class, I think I am a good student.
   1 2 3 4 5

8) When work is hard, I either give up or study only the easy parts.
   1 2 3 4 5

9) I always try to understand what the teacher is saying, even if it doesn't make sense.
1 2 3 4 5

10) Doing well in this class and passing the GED test is the most important goal for me right now.
1 2 3 4 5

11) It is my own fault if I don't earn my GED diploma.
1 2 3 4 5

12) If I can, I want to get a better score on my GED than most other students in class.
1 2 3 4 5

13) I want to do well in this class because it is important to show my ability to my family, friends, employer, or others.
1 2 3 4 5

14) I often feel so lazy or bored in class that I have trouble finishing my assignments.
1 2 3 4 5

15) I make good use of my class time.
1 2 3 4 5

16) I ask the teacher for help when I need it.
1 2 3 4 5

17) I attend this class regularly.
1 2 3 4 5