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Collaborative Learning in Middle School Math Classrooms
Action Research Proposal

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Introduction

Collaborative learning has been an interest of mine since beginning my career as a teacher 16 months ago. I strongly believe that students will often learn things better from their peers than from an authority figure, and that they can learn a lot from teaching things to their peers as well. I have had several encounters and discussions with my Curriculum Instructor at my school centering around the extent of the use of groups in my classroom. She thought I used too much of it and that it wasn't effective; I thought it was important. Our disagreements usually ended up in a compromise that I wouldn't use groups every day, but I would continue to look for ways to refute her arguments that I overused groups in my classroom. When test scores came out in September, she found out my students had greatly exceeded the scores from years previous, and she told me I could teach with groups as much as I wanted. This was encouraging, but I still sought to find more concrete evidence that group work and collaboration between students was not only effective and beneficial in the educational realm for students, but that it would enhance many areas of their lives. I would like to study the effects of collaborative groups in classrooms on academics and social skills and behaviors of middle school students.

Identification of the Problem

The purpose of my action research proposal is improving the effectiveness of my teaching methods in my classroom. I will be looking specifically at the difference between individualized instruction and group work. The topic of my action research proposal will discuss how students can benefit from using collaborative groups in the classroom and how that differs from individual, direct instruction. Significant studies have been done on the importance of developing socially verses just academically as an individual and it has been shown that the students benefit just as much, if not more, from learning how to work with others (Muscott et al, 2008). Collaborative groups have been found to
give students and teachers alike the added benefit of student motivation and confidence (Felner et al, 2007). I know the students I worked with last year worked both individually and in groups, and I was told I had them working in groups too often by my curriculum instructor. After seeing my students' test scores from last year, however, I was told I could do as much or as little group work as I want and that whatever I had been doing had been working. My target audience for this study are my students, my fellow teachers, and my administration.

**Review of Research**

Different teaching and classroom methods have been the subjects of many research studies to find which types are the most beneficial for the students as far as preparing them for a productive and successful life through their education. There is a great deal of literature that a child's cognitive development can be enhanced by collaborating with peers. A collaborative group in school consists of a “reciprocal interaction in which ideas and perspectives are explored and exchanged, solutions are elaborated and justified, and exchanges are supportive and coordinated” (cited in Harris 2008). While these are the goals for collaborative groups, the effectiveness of these groups depends on the structure of the groups and the respect in the classroom. Classroom collaboration is something I believe is extremely important for the complete education of a child, both in the classroom and to prepare them for a life in our society, and the following articles outline research that discusses the benefits and implications of collaborative groups.

Felner, Seitsinger, Brand, Burns, and Bolton (2007) conducted a study on the “Project on High-Performing Learning Communities” to determine their effectiveness within schools, especially at a middle school level. Felner et al focuses on the importance of personalizing the school environment in hopes of “[engaging] diverse, socially, and economically disadvantaged students, in middle and high schools, to improve academic performance, reduce dropout rates, enhance developmental outcomes,
and close equity gaps.” The high-performing learning communities (small groups within the larger population) were put in place to enhance interpersonal context between students and their peers and students and their teachers. These interpersonal skills proved to be effective in a more thorough education, a development of prosocial behavior, and a reduction in dropout rates and dangerous behaviors. They also proved to enhance students' motivation and abilities to “shape their own learning.” The small learning communities also allowed the students an opportunity to teach and more opportunities to learn. The study also found that improved peer relationships had a direct correlation on test scores and performance in school. This particular study focuses on the socioeconomically disadvantaged, which is exactly the subgroup I would study in my research. This study found that the use of smaller communities helps students grow in knowledge and social skills, both of which are essential to survival in today's world.

Harris, Yuill, and Luckin (2008) conducted a study on collaborative groups with primary school students. The study differentiated between two different tasks and two different focuses for the assignments. The different focuses were mastery and performance – one based on developing long-term knowledge and the other based on completing a task. The study was conducted on primary school students, only 20% of whom were on reduced lunch. The students were randomly selected at first, and then they handpicked students who they believed would work the best together based on “achievement goal” and “suitability.” The students are to work together to complete a computer game involving logical problems and tasks. Their interactions and performances were observed and coded. The main results that Busher found was that there existed behavioral differences between the students depending on the goals of their collaborative efforts. The two main goals included mastery of the topic and performance, and the students' perceptions of these goals directly influenced how well they interacted. The interactions between the students were positive when the goals were clearly outlined. This is a very important piece of information as I have seen in my classroom that when students do not know what is
expected of them, they are turned off to the assignment or group work.

Matsumura and Slater (2008) examined the relationship between “rigorous classroom instruction” and an effort to create collaborative learning environments for the students and how these groups effected the students' relationships with each other. Only middle school students (sixth and seventh grade) were tested, and they used public, urban, low-income schools. This was a lot of the reason I found this particular study interesting; the students involved were from similar backgrounds and of the same age group I work with. Classroom sessions were observed and coded according to the same scale with respect to characteristics of the classroom such as interactions, classroom climate, instructional quality and student behavior. The study found that the presence of expectations for respect in the classroom as well as respect shown to students in the classroom by the teachers predicted positive social interactions between the students. They also were more likely to participate in group discussions in more meaningful ways if they felt respected.

Harmer and Cates (2007) completed a study designed to engage students in an inquiry-based science program. Being focused specifically on science, this study would have to be tweaked a little to be used in my math classroom, but the overall principles found in the study can be useful in any discipline. The study consisted of four weeks of sessions involving collaborative online-based work. Groups were presented with an online classroom complete with teachings, readings, and extra materials including images and video clips aimed to engage middle school science students. The results for this study were not as specific, but they qualitatively decided this format of a classroom engaged students more than the traditional classroom set up.

The study Graham (2007) conducted involved a first-year middle school and focused mostly on teacher improvements based on collaboration with their fellow teachers. This study discusses the benefits of working in smaller groups within a common group. Even though it is studying the teachers, the findings lend themselves to student work as well. The study was conducted as a case study of
several teachers at a brand new school and grouped them together to compete certain tasks. It was found that teachers who were part of the collaborative groups had more confidence in their abilities and had improvements in their teaching. They were also able to better manage their time and had enhanced interpersonal skills. The students we teach desperately need to enhance their confidence and positive social interactions, and the points that can carry across this study into one grouping middle school students are that the use of groups would do just that.

Rathunde and Csikszentmihalyi (2005) conducted a study on the difference between Montessori schools and traditional middle schools and how the difference effect the students. Students that attended Montessori schools participated in many more life-like responsibilities and in many more collaborative group settings than traditional school students who spent more time sitting in desks and taking notes. The methods used in this study were an observational and rating system. Students in the Montessori schools were more autonomous and found to be more likely to take on responsibility. They also worked better with others than students in traditional schools as well. The results of this study show the importance of children working with others at an early age.

Egan (2008) conducted a qualitative study on the effects of learning in depth on a student's education. The longitudinal study was conducted on 30 students who were required to have a mastery of a particular subject by grade 12. They were given the topic as first graders, and they were to keep a portfolio with all their findings on the topic throughout all their years of schooling. Topics ranged from apples to birds to countries, etc. Students used a plethora of resources, including teachers, books, and peers, to find out as much as they could about their subject. Several times throughout their schooling them were required to collaborate with peers and share their findings. The study found that the mastery of the subject filled the students with confidence, and the opportunity to teach their information to their peers enhanced their self-esteem and motivation in school. This study lends itself to mine in that the students need to have motivation to learn to be able to retain information. The existence and use of
collaborative groups allows the students to share their information and knowledge with their peers which will lead to the long-term knowledge and confidence they need to help them be successful.

The final article in this review lends itself to collaborative groups from a slightly different light. Busher (2005) conducted a study on collaboration to a larger degree than small groups in a classroom. This study defines their area of study as a learning community, and they can be “as large as a whole school or as small as a classroom.” The subjects of this research were part of a very small sampling of leaders in learning communities in secondary schools and evaluates their levels of improvements made in the schools as a result of the collaboration. The results of this study were done qualitatively as well, and they conducted many interviews with the members of the learning communities. Overall, they agreed on the importance of a strong, yet compassionate leader. The leaders showed concern for the members, but they weren't afraid to take the steps necessary to get the job done. Other common successes in the communities came from positive social cohesion and from constant practice. This can be done in the classroom, and it is important for the students to get practice working together so they will be able to function in society.

The overall results and implications of these eight articles are significant for education at a middle school level. Students need to be learning responsibilities, and they need to be learning how to and practicing working with others. When students work in successful collaborative groups, they are required to depend on the knowledge and work ethic of others in order to ensure their own success. There are very few roads in life that do not include working with people in some way, so for students to be able to learn how to in school, they will benefit throughout all of life. Other benefits of collaborative groups, when used effectively, are for the students to internalize their findings and learn from others. Many of the students in the communities that teachers in MTC teach have very few positive interactions with their peers, and they need to practice their interpersonal skills and responsibilities as often as possible.
Research Questions

Central Question: How do collaborative groups alter the learning environment of a middle school classroom?

b. Sub-questions:
- How is the amount of time-on-task in a classroom affected by the use of collaborative groups?
- Which instructional methods help students retain more information?
- How do students obtain and then demonstrate more confidence in their knowledge of math?
- What provokes students to share responsibilities in a groups setting?
- How are middle school classrooms different that high school classroom in their need for collaborative groups?

Overview of research methods that will be used

In order to obtain the data for this qualitative study, I will use some of each of the three types of research methods: interviews, observations, and document analyses. I think there are important things that can be found out using each of the methods that couldn't be using other methods.

Interview Plan

I will interview several of my students outside of the classroom right after a class session in which a particular teaching method was used. I will do some of the interviews individually, some of them in focus groups, and some of them as open-ended surveys for the students who are more comfortable writing than speaking. For the spoken interviews, I will have a set of questions set up involving first questions relating to how comfortable they felt in the groups in the classrooms and then moving into the information they were to have mastered. The interviews will last 5-10 minutes each and will be recorded on the video camera built into my laptop. I will have pre-written consent forms for the students to sign that will allow me to interview them and use the information for my study. Some
specific topics I would touch on in the interviews include their perception of their group members, where they would rank themselves with their peers as far as mastery of the material went, their feelings on group work in general, their concept of a leader in the group and if they perceive themselves to be a leader, and the level of confidence they have in themselves concerning the material.

Observation Plan

The observations for this study will probably be the most important method used as I will be able to observe all aspects of the collaborative groups at once except what is actually going on in the minds of my students. I will observe my students while they are in my classroom, both during individual work and group work. While observing them, I will look at how much work each individual is taking responsibility for, what types of students take initiative, the progress of the groups compared to progress of individuals, the mastery of the material, and the amount of time-on-task. Because I am the teacher in the classroom, I am a participant observer. I have to continue my role as a teacher while taking many mental notes and pictures to record after class regarding my study. Mostly, this will be the only recording I do, but if there are any direct quotes that I will want to remember, I will record those as the period is going on. The descriptive field notes will include information about the setting, the class size, and the type of work and instruction that is planned. The reflective field notes will take place after the experimental method has taken place, and I will record the vital information on how my students reacted to and performed in the given situation.

Document Analyses

I will have to look at the student work to see how effectively they mastered the material. Whether just the recorder or each individual wrote down answers, the work of the students is the most important evidence of mastery of a particular subject. Seeing how well they mastered the material and how well they worked together to produce the work is significant to the study. I would also like to have the students keep a journal, so I could tell how they perceived the activities and how they felt about the
material after the fact. Their journals would give me a little more insight into how much enjoyment, confidence, and motivation each student has, and this is the basis for my study.

**Overview of how the data will be used**

The three different methods of data collection will help me to fully answer my research topic questions from different angles. Some of the methods of data collection are completely objective and others allow me to specifically seek out the information I am looking for.

The interview data will help me see how the students perceive the effectiveness of each method of teaching. Not only will the interview touch on the enjoyment of the experience, but it will help answer the question of if the students feel comfortable working with others, if they feel confident in their abilities, and if they are able to effectively communicate ideas and concepts to their peers. The interview will also give me insight into which parts of the collaborative groups need to be more or less structured to be effective. Depending on the ages of students I was able to study with, I would possibly also be able to use this information to compare and contrast the needs of high school students verses middle school students.

The observations will help me to see the students at work in each setting, and it will allow me to evaluate the time-on-task and the ability of the students to effectively work with each other. I can observe differences in the responses of the students when I give them very specific instructions verses when I set them off on a task that is not as clear, and they have to take more initiative and exploration. I can also observe the interpersonal relationships between the students, and I can alter the situations by giving each student a specific role in the group. One aspect of the group work that needs to be observed is the amount of work that each student does individually, or at least takes responsibility for. Some students are content to sit back and let others do all the work, and others will step right up to the plate.

Finally, the document analyses will give me concrete evidence at how well my students are
completing tasks and how they are feeling about it. I will use the student work to assess their mastery and the journals to get into their minds and see how they are perceiving the activities and different teaching methods. The student work must be looked at to see how well they are completing the tasks, if they are following instructions, and how thoroughly they are able to complete an assignment. The journals will be the personal thoughts of each student individually, and they will be used to find out the feelings of the students to try to find out how to help them the best.

Each of the types of data collection has its own place, and I will be using all three to try to get at all angles of my research question.
References


