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# Cooperative Learning in the Mathematics Classroom: Work Together, Learn Together

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### Abstract

In this action research project of Academy students in Algebra 1 Track 3, I incorporated group work after some lessons and not after others which compared whether the use of group work post the lectures has an effect on their understanding. Through the research, I analyzed the effects of this increased student discourse in regards to the cooperative learning in the classroom. After the research, from clear analysis, it was evident that cooperative learning is effective in the classroom and raises the grades of students. The grades on tests and quizzes are much higher when the students work together in comparison to individual work. Therefore, through this project, I demonstrated the positive effect of group work on the students' grades, which I previously questioned. Throughout my student teaching, I noticed that students work together at the end of class very often. Hence, I wanted to see if the time that they were using to work was beneficial. Thus, I decided to incorporate structured group work into my lessons, and take some action in researching it's effectiveness in the classroom. In this action research project, the benefits of cooperative learning are discussed, analyzed, and illustrated along with the potential disadvantages.



### Research Problem

Students tend to work well in groups in other classroom settings, will incorporating groups in a mathematic classroom improve learning?

### Research Question

Will incorporating cooperative learning after lectures improve the grades of freshmen Algebra 1 Track 3 students on tests and quizzes?



### Hypothesis

If the cooperative learning (group work) is structured appropriately after lecture, then the grades of the students will improve drastically due to understanding the material in more detail.

### Methodology

#### Setting and Subjects:

- High school Algebra 1 Track 3 classroom of students in the freshman Academy.
- The class was composed of 21 students,10 females and 11 males.
- Caucasian, Hispanic, Arabic, African American, and others.
- Low to average incomes.
- Their ability levels are low. They have little focus.
- Home life is a priority for several.
- Large school about 2,500 students in a suburban/city area.
- Different maturity levels.

#### What students think!

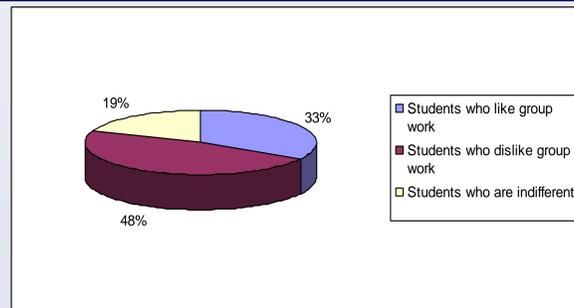


Figure 1: The students opinions on group work prior to the project.



### Research Instruments Data Collection Methods

In this study, the variable that changed was the use of cooperative learning in the classroom. The increase of cooperative learning used after lecture affects their grades. In order to develop research on this topic, I incorporated group work after some lectures and not after others. Then I analyzed and compared the grades they received on the quizzes and tests over the material. In addition, I taught one chapter with very minimal group work and the next with extensive group work and analyzed these test scores. In addition, the group work varied from actually working on the quizzes in groups compared to scores on individual quizzes. I also tested the difference between the ways in which the groups are chosen. I compared their performance on homework when they worked in groups to their performance on individual homework. I initially performed a class poll of the students on their opinions. Lastly, the data also came from the observations that I developed from placing the students in their groups and observing them as they work which I analyzed through the analysis of my reflective journals.

### Results

#### Grades of Students on One Test without group work and one with group work

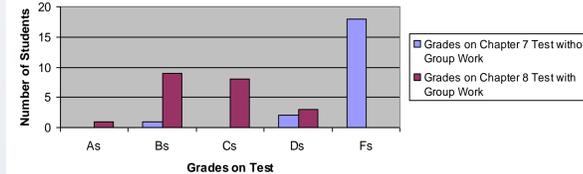
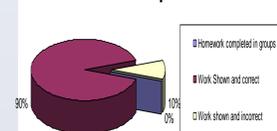
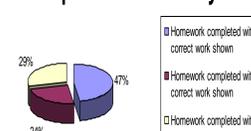


Figure 2: The students scores the Chapter 7 test in comparison to their scores on the Chapter 8 test which incorporated group work.

#### Homework Completed in Groups



#### Homework Students Completed Individually



Figures 3 and 4: These images display the amount of homework that is completed by students and the accuracy of that homework when group work is used in comparison to individual work.

#### Grades of Students on Partner Quiz and Individual Quiz

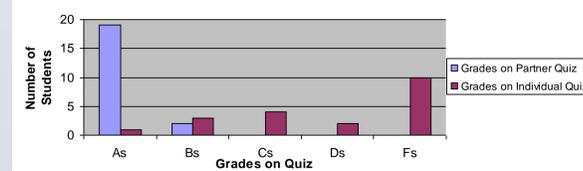


Figure 5: This image compares the students grades on a partner quiz to their grades on a quiz they take individually.

### Discussion of Results

- Students tend to complete homework more effectively and efficiently in groups.
- Help one another increasing their understandings.
- According to the pie graphs, the students did 50 percent of their work with out group work and only 25 percent was correct.
- When they worked in groups, they did 90 percent of their work correctly and only 10 percent was incorrect.
- Cooperative learning after lecture improved the grades and understandings of students, even if students originally disliked group work.
- The scores on the test for the unit on Chapter 8 that involved daily group work were higher than the scores on the Chapter 7 test.

### Conclusion

#### Impact of Research on Students, Teachers and the Field of Education

- The study required adaptations to class lessons.
- Students understood the discourse of mathematics through the use of group work,
- They looked to their peers as guidance to improve understanding.
- Students impacted their own learning, increasing motivation.
- Different methods of cooperative learning are beneficial such as partners compared to large groups, structure accordingly.
- Direct Instruction is not the only effective method of teaching.
- Education is transforming from teacher-centered to student-centered.
- Group work benefits students of all abilities in classrooms of different resources improving students grades and understanding.
- Material must be understood to avoid wasting time.
- Limited time to teach the lessons, daily group work was not possible.
- The positive impact of group work might be alarming to experienced teachers because of its authenticity, understanding how it works can make one a more effective teacher.

#### Self-Impact

- Cooperative learning allows students to influence learning, which gave me more of the opportunity to guide students.
- Gave me the opportunity to assess my self efficacy.
- Immediate evaluation of student knowledge.
- Understand how they learn to work with mixed abilities.
- Action Research put the theories learned into practice.
- I plan on using group work as often as possible.

#### Further Questions and Thoughts, and Changes

- Are there methods that will help all of my students learn?
- How can different types of note taking techniques benefit students?
- Is it possible to use group work excessively?
- Incorporate group work often, create consistent groups.
- Pace lessons, assure student understanding.
- Increase the familiarity and understanding of the individuals in groups by not changing the groups as frequently.
- Teach each lesson in the unit for 2 days with and without group work.

#### Implications

- Teachers should be encouraged to incorporate groups.
- Attempt different participation techniques when integrating group work in order to create an engaging lesson.
- Student excel because they can check one another's work, and working together prevents students from blatantly guessing.
- Separated among their abilities, which can be difficult in classes that are tracked less students are of high, medium, and low learning abilities.

### Acknowledgments



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