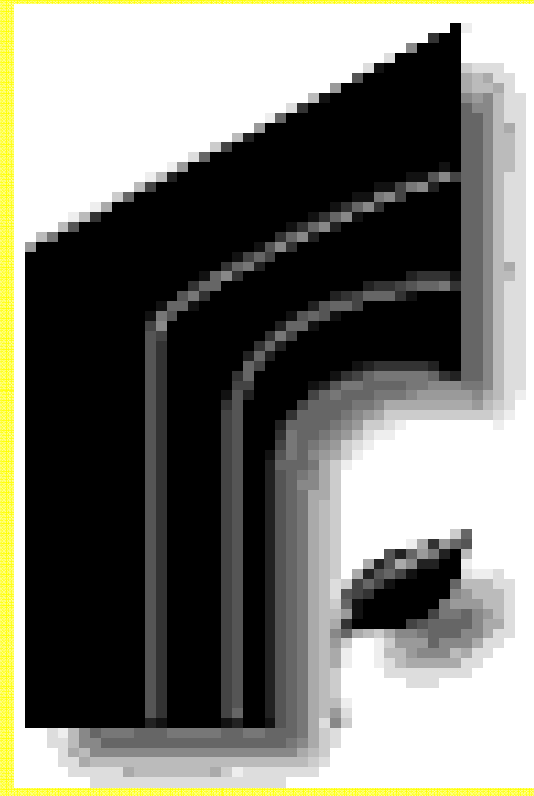


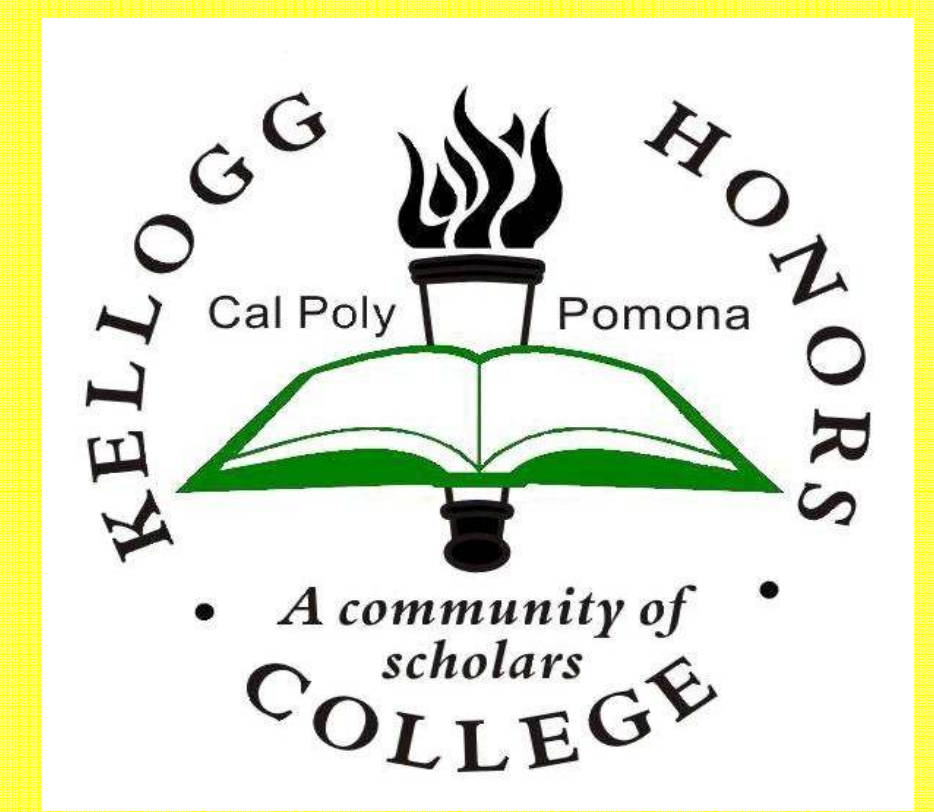
The Benefits of Targeted Group Work in ELL High School Mathematics Classes



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Introduction

The purpose of this study was to gain a better understanding of the effectiveness of group work in high school mathematics classes, more specifically in high school English language learner (ELL) classes. In this study, the pedagogical innovation of group work interventions based on performance assessments was examined in two ELL high school pre-algebra classes. A previous study found that grouping students based off of their performance levels where tasks are highly structured can benefit these students greatly, (Cohen, 1994, pp.11). Another study conducted by Rochelle Gutierrez found that group work in ELL classes can greatly benefit students if the students are comfortable speaking in their most comfortable language, (2002, pp. 1075). This experiment was designed in an attempt to see if grouping students based off of their performance levels was still as effective in ELL high school mathematics classes. Another facet that I was also interested in designing this study was if this grouping method would influence the productive dispositions of students towards mathematics, their experience in their math class, and their self-efficacy. This led to the design of a nine question Likert scale survey with only four possible answers, eliminating the neutral option. The idea of productive disposition, as presented in the book *Adding it up: helping children learn mathematics*, was taken into consideration when designing each of the Likert scale questions, (Kilpatrick, Swafford, & Findell, 2001).

Hypotheses

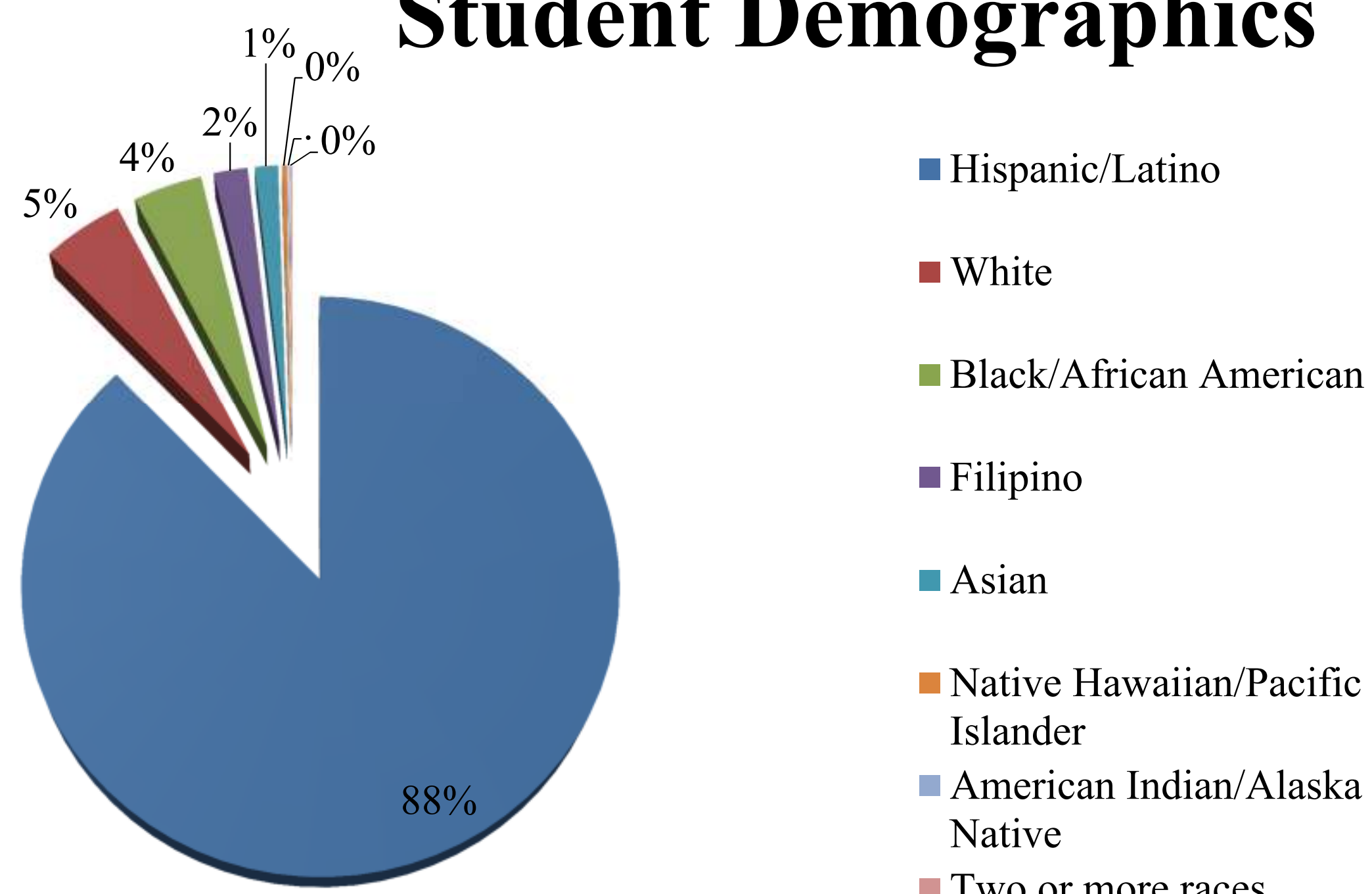
If Cohen's grouping method is an effective teaching method for ELL students, then students placed in groups based on their performance levels will do better relative to those working individually on an exam.

If the experimental group is encouraged and comfortable talking about mathematics in their classroom, then experimental group's dispositions towards mathematics, their experience, and self-efficacy will improve relative to the control group over the period of time that this experiment will take place.

Methods

- Experimental Design: control group and an experimental group.
- Data Collected: pre-test, post-test (regular unit tests), pre-survey, and post-survey (these were both the same survey).
- Participants: high school ELL pre-algebra students from two ELL pre-algebra classes taught by the same teacher. These students were mostly 9th graders but there were a few 10th graders. The student demographic composition of this high school for the 2012-2013 school year is listed in a table below, (Ed-Data, 2013). Only 29 students returned permission slip to me making the population of the experimental group 18 and the control group 11.
- Both classes received common tasks, were taught the same material by the same teacher, and they roughly had the same number of teaching assistants in each class. The control group experienced no change to their daily classroom activities, whereas the experimental group adopted performance level grouping schemes during the time that they would usually do class work.
- Grouping schemes: high performing students with low performing students and average performing students with other average performing students. High, average, and low is taken to mean relative to the average for each class.
- Time Period: an entire unit, which lasted a total of three weeks.
- The goal: to determine how much more effective targeted group work was than individual work and to determine the effects of targeted group work on the dispositions of students towards mathematics, their experience, and their self-efficacy in high school ELL mathematics classes.

Student Demographics

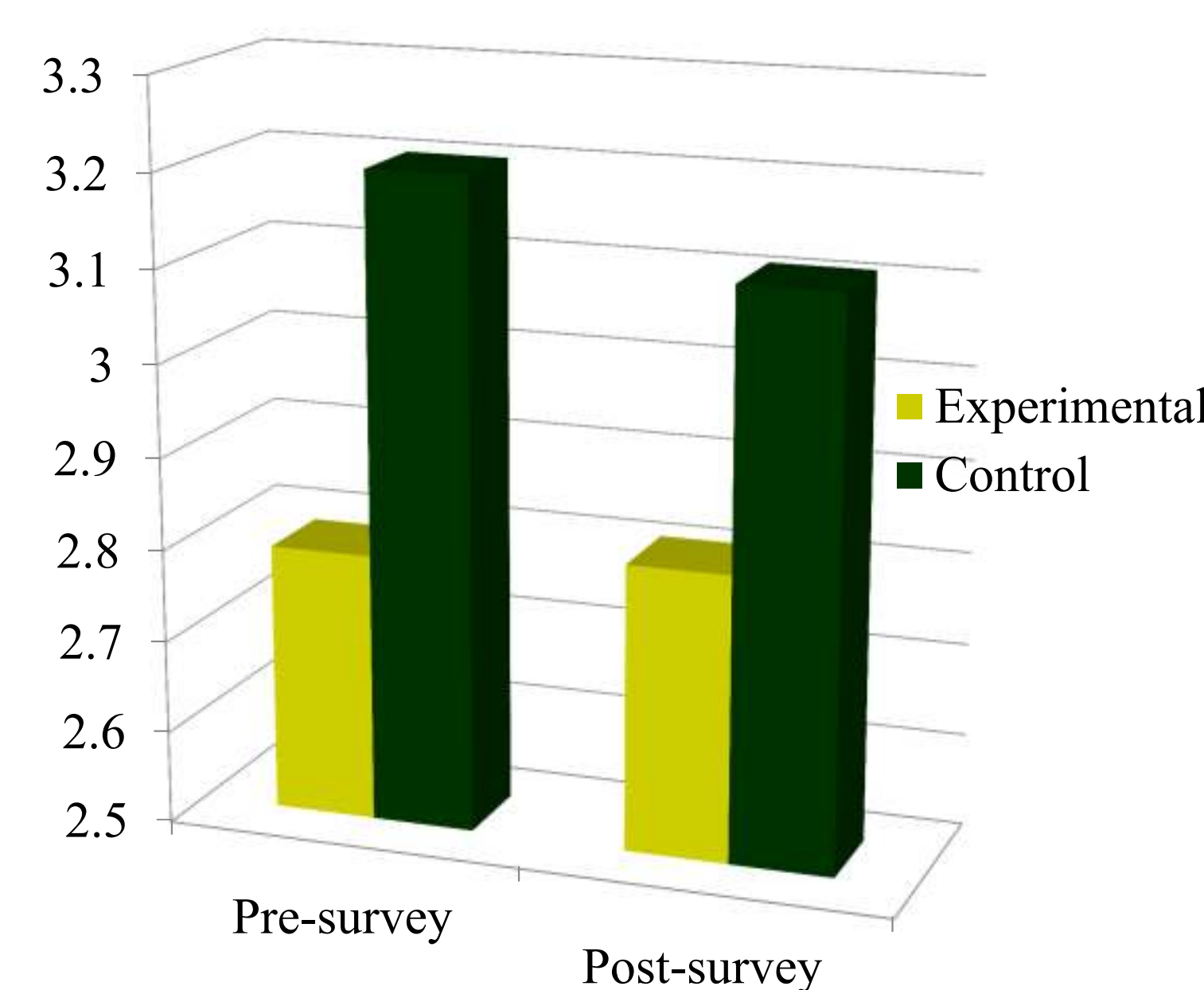


Results

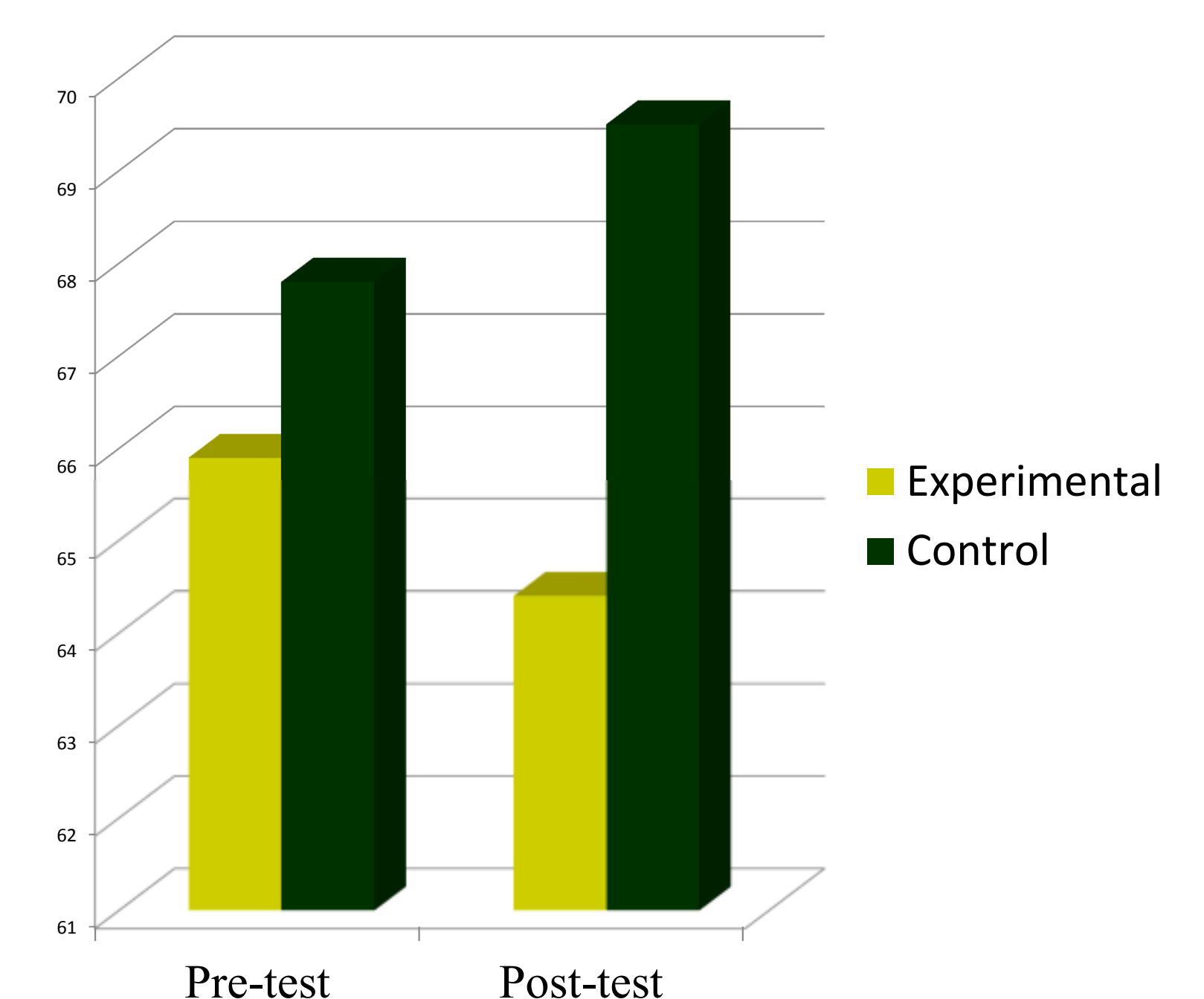
My hypothesis stated that students in the experimental group would, on average, do better on the post-test than the control group relative to their pre-test scores. I used a t-test to compare the two groups' results. The groups that the students were placed in did not have a significant effect on the test results. $T(9) = .492, p > .05, r = .257$. We reject the alternative hypothesis and accept the null hypothesis which states that there is no difference between the two groups. Hence, the students placed in the experiment group ($M = 64.4, SD = 25.97$) performed relatively the same as the control group ($M = 69.5, SD = 27.78$).

As for my other hypothesis, it stated that the experimental group's dispositions towards mathematics, their experience, and self-efficacy would improve relative to the experimental group over the period of time that this experiment took place. To analyze the pre and post surveys for both classes I first assigned a number to each of the four answers possible: strongly disagree=1, somewhat disagree=2, somewhat agree=3, strongly agree=4. Looking at the averages for each answer and taking into consideration the size of the study populations there was near to no change in the average answer for each question. The percentage difference between the average answer for the experimental group was about .6% meaning that one student changed one of his or her answer from somewhat disagree to somewhat agree from the pre-survey to the post-survey. The percentage difference between the average answer for the control group was about -2.8% meaning that one student changed his or her answer from strongly agree to strongly disagree (or any combination in between) from the pre-survey to the post-survey.

Comparison of Average Answers on Survey



Average Test Scores Between Groups



Conclusion

It was found that the students placed in the experiment group performed relatively the same as the control group not only on the pre and post tests but on the Likert scale surveys. This means that over the three weeks that this experiment took place both of my hypotheses failed. My findings suggest that Elizabeth Cohen's grouping method is not as effective when applied to ELL pre-algebra classes.

Limitations

- Due to a lack of interest from the two classes, I only had 29 permission slips returned to me. That said, I had a very small sample size.
- I was not present during the duration of the study, so I cannot specifically attribute anything that occurred during the study to the targeted group work method that I employed.

References

- Cohen, Elizabeth G. "Restructuring the Classroom: Conditions for Productive Small Groups." *Review of Educational Research* 64.1 (1994): 1-35. Print.
 Gutierrez, R. "Beyond Essentialism: The Complexity of Language in Teaching Mathematics to Latina/o Students." *American Educational Research Journal* 39.4 (2002): 1047-088. Print.
 Kilpatrick, Jeremy, Jane Swafford, and Bradford Findell. *Adding it up: helping children learn mathematics*. Washington, DC: National Academy Press, 2001. Print.