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## INTRODUCTION

Chemistry tends to be a difficult subject for many students. It is the first time many students will be asked to apply the math skills they have and to then throw in lab skills, Whew! This sets them up for struggle. To combat this struggle, I set out to determine if cooperative groups, arranged around Algebra 1 grades, would help to improve their individual chemistry grades, to develop confidence with the chemistry concepts being taught and improve their attitude towards science.

## BACKGROUND

Merrill F. West High School is in Tracy, California and has a diverse population (2106 students) of Hispanics, Caucasians, African American/Blacks, and Asians with 54.65% receiving free or reduced lunch. In the previous year, there had been an 11% decline in students meeting or exceeding proficient on the Smarter Balanced Assessment Consortium test (Brown, T., 2016).

My classroom research project was conducted in my college preparatory chemistry class which contained 21 students comprised of 10<sup>th</sup> – 12<sup>th</sup> graders.

## RESEARCH QUESTIONS

- ❖ What effect do cooperative groups have on individual learning in a high school chemistry course?
- ❖ What effect do cooperative groups have on student attitude towards chemistry or science in general?
- ❖ What effect do cooperative groups have on students' confidence about chemistry?

## DATA COLLECTION/ANALYSIS METHODS

During this study, data was collected through pretests, posttests, multiple student surveys and teacher observations.

## RESULTS

- ❖ Test scores increased from treatment unit to nontreatment unit for 75% of the students. Indicating a positive effect on the individual learning outcomes for most students.

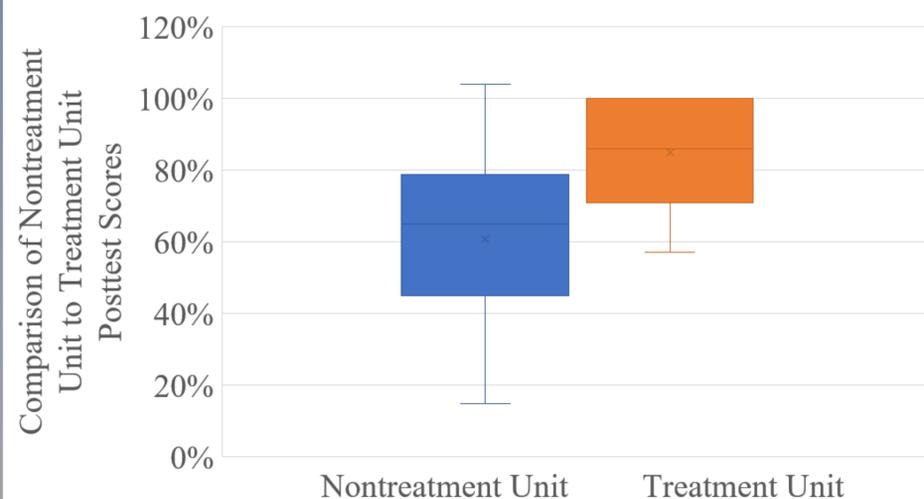


Figure 1. Comparison of nontreatment unit posttest scores and treatment unit posttest scores, (N = 20).

- ❖ Though one more student reported the group *always* helped them to understand the chemistry concepts, two more reported the group *never* helped after the treatment unit ended

- ❖ A Pearson's correlation test was completed to measure the strength of correlation between student self-reporting of understanding chemistry concepts and posttest scores. The correlation test r value of -0.04 indicates that these two variables did not correlate.

Table 1. Student responses to groups clarifying chemistry concepts.

(N = 21)	Always	Often	Occasionally	Never
Pre – Research Survey	6	10	5	0
Post – Research Survey	7	10	2	2

Table 2. Survey response vs. Increasing Scores

		Increase Between Treatment and Nontreatment Unit Test Scores
Chemistry Concept Question Response	Groups ALWAYS Help	26% to 45%
	4 out of 7 of these students	
	Groups NEVER Help	41%
	1 out of 2 of these students	

- ❖ Students remained neutral when it came to an interest in science or chemistry after the treatment unit.

## TREATMENT

Students were placed into seven groups of three based on their Algebra 1 grade, if available, and if not, the grade from the last math class they took. This was to ensure that each group had a mix of a high, medium and low ability algebra students. Math ability was important as the treatment unit took place during the Chemical Quantities unit which places high demand on math manipulation. The roles of Facilitator, Motivator and Checker were rotated through the group throughout the unit. Students were given directions to work through the day's work together and to stop and show how to do the work correctly to those who were confused.

## CONCLUSIONS

This study indicates that:

- ❖ Cooperative groups have a positive effect on individual student test scores.
- ❖ There is ambiguity on the part of cooperative groups increasing confidence because scores increased even for those stating groups *never* helped with the chemistry concepts.
- ❖ Cooperative groups had no effect on student attitude towards science and chemistry in particular.