

**Title of Study:** *Math Computation Proficiency in Elementary Classrooms*

**Dates of Study:** *Spring 2018*

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**Purpose of the Action Research:** *Determining the effectiveness of base-ten blocks on the computational skills of fourth grade students.*

**Research Question/Hypothesis:** *How does the use of base ten blocks as an intervention strategy affect students' math computation skills with regrouping? How does a student's language level affect their math computation skills when using base ten blocks as an intervention strategy?*

**Research Connection:** *Learning computation skills with regrouping is very important. The ability to master computational skills and apply those skills has been found to impact the lives of students outside the elementary school setting. Additionally, the importance of math computation with regrouping continues to be studied and analyzed in order to increase student proficiency with the math domain as it plays an important part in determining the level of education a student will attain. This line of inquiry and research is important and at the core of helping students move toward mastering the Common Core State Standards for Mathematics.*

**The Existing Need:** *Addressing the deficits in early math literacy is important to the future academic success of students. The need to target and address underlying misconceptions amongst students in elementary school can make a significant difference in the educational proficiency of students. Proficiency in math, more than any other skill, is a predictor of academic success for students in high school. Not addressing the early math misconceptions highly impacts a student's future and their academic access to high-level mathematical concepts.*

**Participants:** *The participants were selected from fourth grade general education classrooms in a public elementary school in Southern California.*

**Sex:** *Female and male students*

**Grade:** *Fourth grade*

**Ethnicity:** *Predominantly Latinx/Hispanic*

**Intervention:** *The planned intervention took place two times a week for twenty-five minutes for the duration of six weeks. The intervention followed a pull out intervention program where students left their classrooms for the duration of the six-week intervention. The pretest included ten addition problems and fourteen subtraction problems. Students who scored less than seventy percent of the digits from the individual sums and differences correct would qualify for the six-week intervention.*

**Results:** *After the intervention one hundred percent of students scored proficient in addition with regrouping. The students who were proficient in subtraction with regrouping went up from seven percent to fifty-nine percent, an increase of fifty-two percent. The number of students with 70%*

to 90% proficiency increased from 8% to 22%. The number of students with less than 70% by 57%. At the start of the intervention 89% of the English language learners were not proficient in subtraction with regrouping. Seventy-one percent of students were less than 70% proficient and 18% of English Language learners fell between 70% and 79% proficient. In regards to addition with regrouping, 95% of students were able to add with regrouping while 5% were less than 70% proficient.

**Conclusions:** Based on the literature review along with results from the action research implemented with 28 students, the use of base ten blocks had a positive effect on students' math computational skills with regrouping. All students demonstrated proficiency in addition with regrouping after the six-week intervention. There was a 52% increase of students who scored in the proficient band of subtraction with regrouping. There was a significant difference with students' results that were English proficient than with students who were English language learners. There was a 20% difference in students who were proficient, when comparing language learners versus English proficient students. When comparing the pretest and posttest, the data showed that many students made positive gains.

**Recommendations:** Future research is recommended in order to identify connections between base ten blocks and students' conceptual understanding of numbers. If correlations or relationships between computation and conceptual understanding can be identified and taught explicitly, student success in the areas of advanced mathematics might increase. Additionally, another area for research involves the use of base ten blocks with students in grades one and two. If students at this level are offered ample practice with use of base ten blocks during instruction, there could be a high probability of a decrease in fourth grade students needing intervention in math.