

Improving Length Measurement During Science Experiments

Introduction

Measuring accurately is difficult for fourth graders, but when they are in the midst of conducting a science experiment their accuracy tends to be even worse. Twenty-seven fourth graders participated in lessons and practice to improve their measurement accuracy. Their measurements during science experiments were compared to times when they were only thinking about measuring, performance tasks. The experiments were conducted in the Metric and English system to determine differences in accuracy.

Research Questions

How does explicitly teaching and practicing length measurement affect students' measurement accuracy during science experiments?

- What impact do science experiments have on student length measurement accuracy?
- What is the accuracy level when students are measuring in the Metric as compared to using the English system?
- What is the impact on the teacher?

Treatment

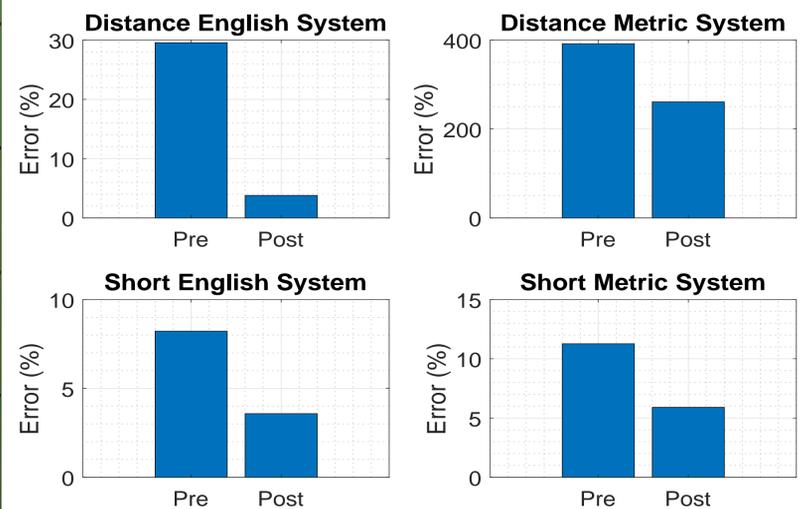
Half-hour lessons to teach students to measure and give them time to practice were done over an 8 week period and included activities such as:

- Price is Right Estimating Game
- Accuracy Board Games
- Science Experiments with an emphasis on reflecting on their measurements



Data Analysis

The average percentage error students made in each science experiment went down after treatment. Figure one shows the largest gain in the distance experiments but they had the largest error to begin with and retained high error after treatment. The short English experiment had the least error after treatment.



Sub-Question Data Analysis

- Comparing the science experiments with performance tasks they did have a negative impact on students' accuracy. Like other comparisons there was less impact on the shorter distances but the longer distances had significant error, particularly with the science experiment.
- Surprisingly students were more accurate in the English system than the Metric system. Even though treatment was split evenly between both systems they only performed better in the Metric system on two out of eight experiments.
- As a teacher I learned common errors students make when measuring both short and long distances with two tools. My expectations of accuracy were also altered and I learned to look for reasonable measurements not perfect ones, especially for fourth grade.

Implications to My Teaching

The results indicate a positive impact to student measurement with practice. Although they still made errors this emphasizes the need for as much meaningful practice as possible. I will be incorporating measurement practice into as many areas as possible, especially science.

- Since science experiments have a negative impact on accuracy I will be sure to emphasize measurement expectations in the directions like I did during treatment.
- Students were more accurate using the English system so in science I will be sure to always use the Metric system to give students more practice.
- I learned that persistence is the key to improving their skills and use that information to not give up when they are not accurate.

