

# Incorporating Active Learning Strategies Focused on Contextual Data Analysis to Improve Student Engagement, Data Literacy and Conceptual Understanding in Middle School

## Background

I conducted my capstone project with my eighth grade Earth Science students. I have noticed that my students often struggle with data analysis in a given context and their state testing scores for both math and science reflect this. By providing more opportunities to interact with and relate to contextualized data my students should be able to increase their conceptual understanding of the material that we are covering as well as improve their general data interpretation skills and feeling of engagement in class.

## Focus Questions

How can active learning strategies with a focus on contextualized data analysis be used to help improve middle school student data literacy and conceptual understanding.

## Sub-questions

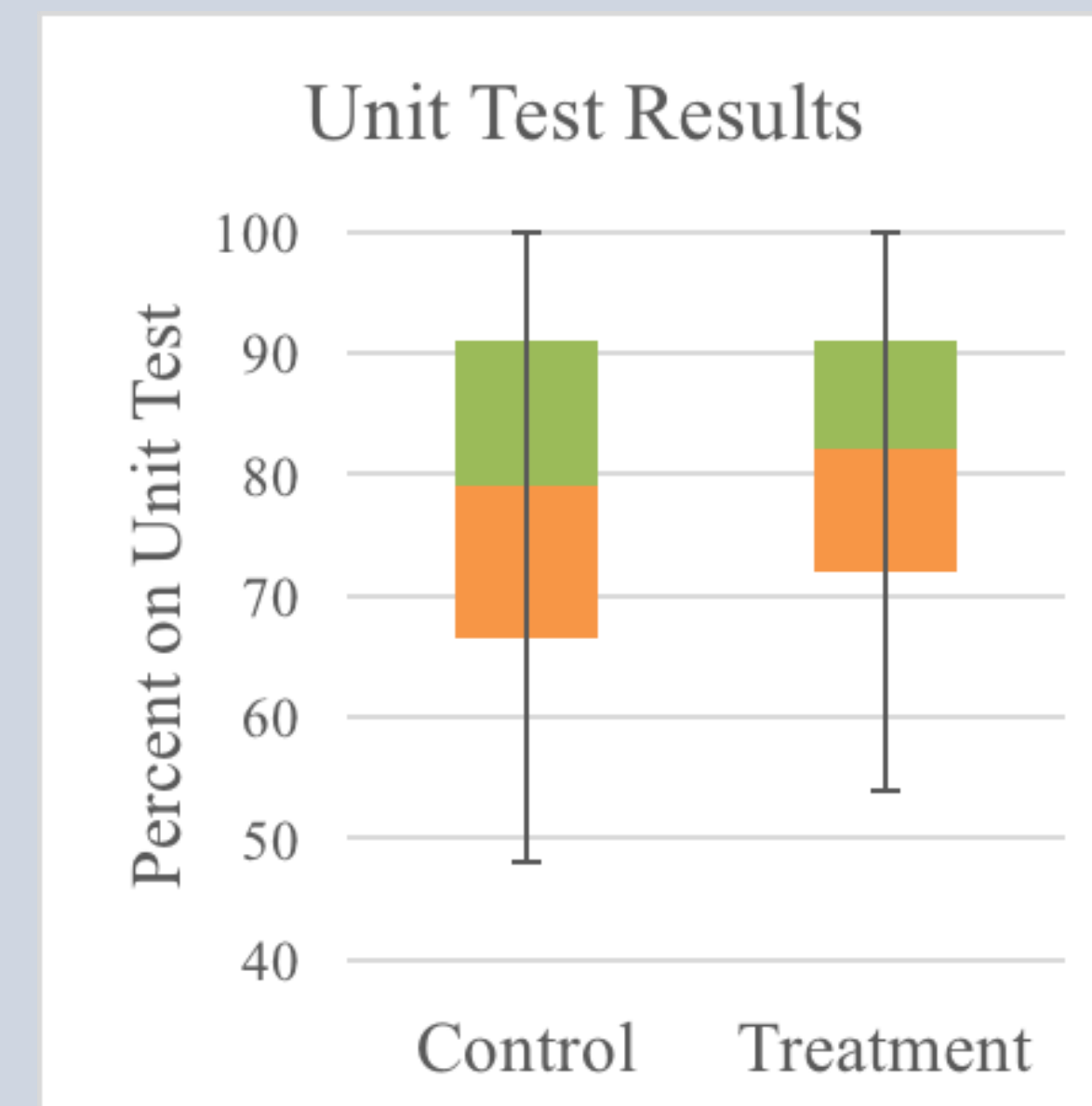
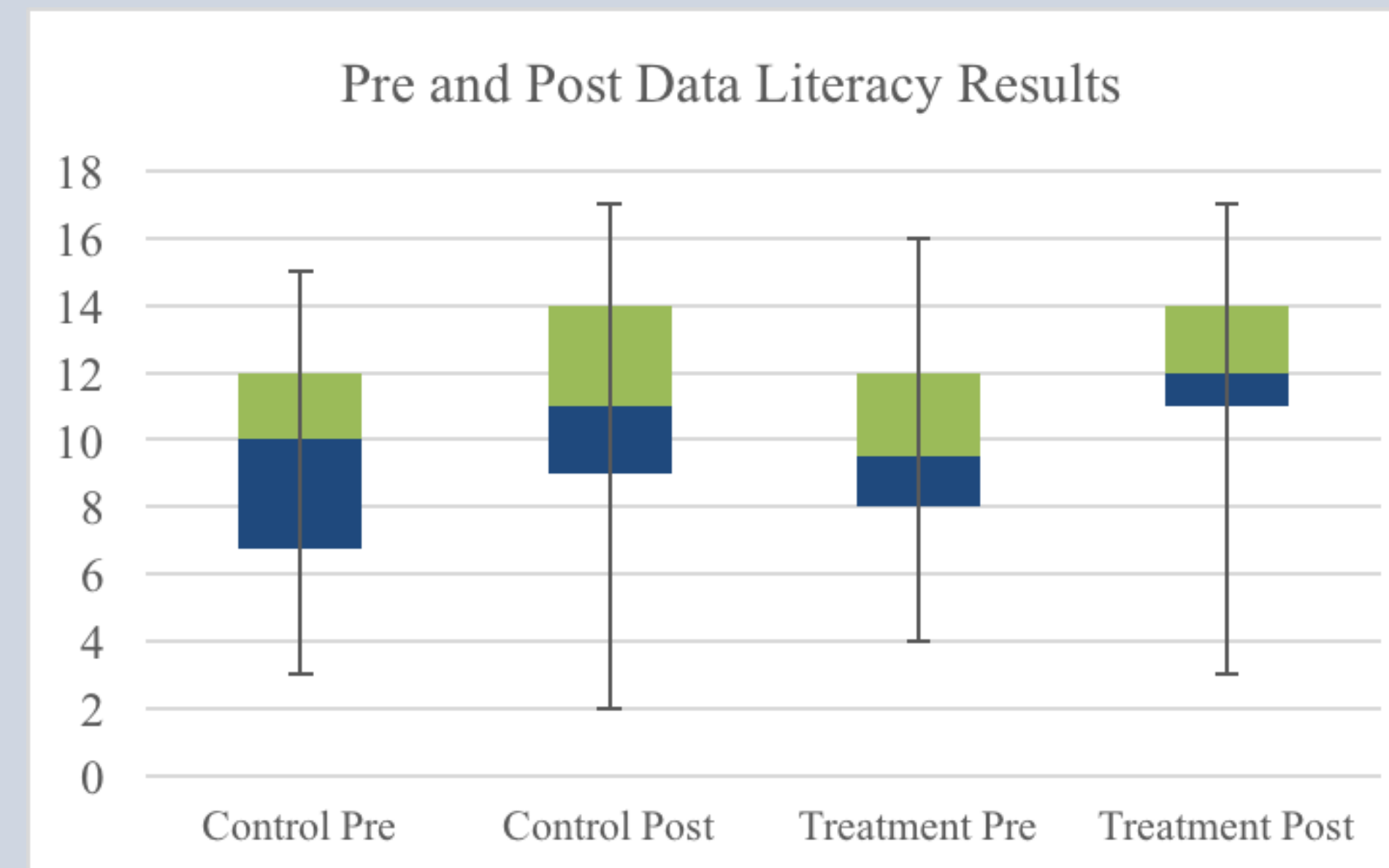
- How does contextual data analysis increase student engagement?
- How does active learning and contextualized information reinforce conceptual understanding?
- How does active learning and contextualized information affect student data interpretation skills?
- How will active learning strategies affect the length of my units?

## Data Collection and Analysis

Subquestions	Data Sources		
Sub-question 1	Pre-Survey	Student Interviews	Post-Survey
Sub-question 2	Formative Assessments	Group Discussions	Group Project and Post-test (summative assessments)
Sub-question 3	Pre- and post- data literacy assessments	Group Discussions	Formative Assessments
Sub-question 4	Teacher Journal	Student Interviews	Formative Assessments

## Treatment

Students participated in a unit where their source of information was through contextualized background information for labs or activities rather than lecture styled presentations. Students were graded based on their abilities to analyze data and apply concepts accurately and appropriately to new situations.



## Results

The results of this investigation show that there is no statistical significance between the students who learned through more traditional teaching methods and students who learn through active learning strategies with contextualized information. The Data Literacy Assessment and Unit Test both show a large upper and lower quartiles with the treatment group showing a higher and more condensed interquartile range so the majority of the treatment group performed more consistently and earned higher scores. The engagement surveys show more positive results from the treatment group. The unit took two weeks longer this year compared to past years.

Overall, results were inconclusive and further testing is required. Considering this was the first time I taught this way and this is the first time students were learning through active and contextualized data analysis even the small difference between the control and treatment groups is notable and should be explored.