



Frenchtown High School
Home of the Broncos

Primary Literature in the Science Classroom

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Background

Frenchtown High School is a small rural high school outside of Missoula, MT. There are 400 students that attend the high school. The demographics at the high school are about 87% White, 3% American Indian or Alaskan Native, and 3% Asian. Frenchtown has rigorous graduation requirements for math and science, every student must take three years of math and science. Because of this requirement, there are many students who sign up to take Chemistry their junior year. There are three sections of Chemistry at Frenchtown with about 15 students in each section. In the Chemistry classes there are 8 seniors, 40 juniors, and 1 sophomore. There are also more girls in the class than boys.

Introduction

In recent years there has been a lot of attention on the state of science education in the United States. The attention to science education has been raised due to student performance on such tests as the international PISA and ACT Science. These assessments show that students in the United States are performing at decreased levels in the sciences, demonstrating a lack of preparation for STEM degrees and careers. This decreased performance reveals the need for students to be exposed to authentic scientific inquiry practices in the classroom. One of these practices should be teaching students to read scientific articles, since scientists spend a majority of their time reading.

References

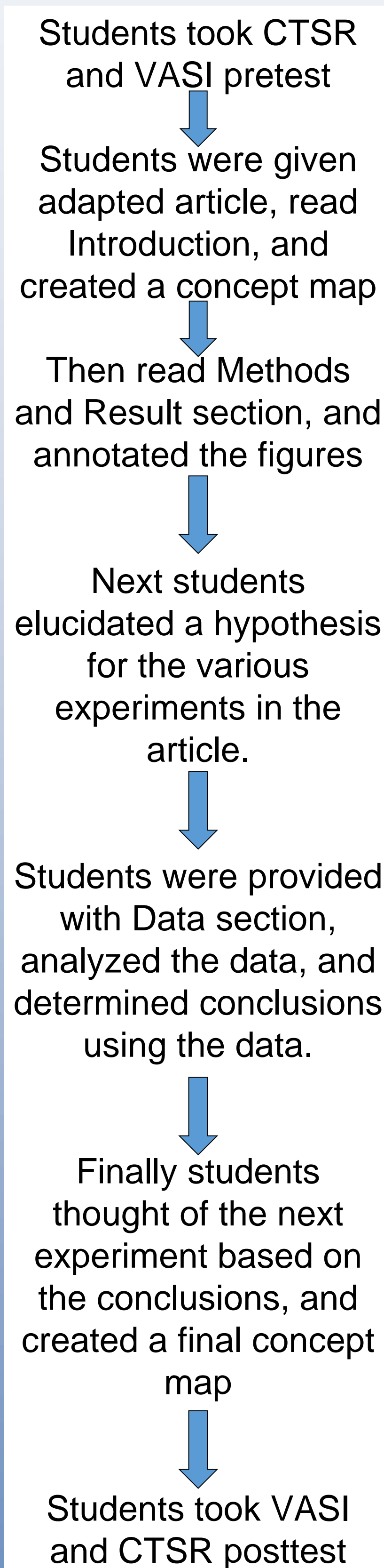
NGSS Lead States. (2013). Next Generation Science Standards: For states, by states (1st ed.). Washington, D.C.: National Academy Press. Retrieved from <http://www.nextgenscience.org/sites/default/files/Appendix%20H%20-%20The%20Nature%20of%20Science%20in%20the%20Next%20Generation%20Science%20Standards%204.15.13.pdf>

Research Questions

Focus Question: *How will the incorporation of scientific texts and implementation of reading strategies to comprehend these texts affect students' understanding of the scientific practices and how scientists employ these practices.*

Sub-Question: How will the incorporation of scientific articles affect students' cognitive development level?

Treatment



Data Analysis

Table 1
Triangulation Matrix

Questions	Data Source 1	Data Source 2
Focus Question: How will the incorporation of scientific texts and implementation of reading strategies to comprehend these texts affect students' understanding of the scientific practices and how scientists employ these practices.	Views About Scientific Inquiry (VASI)	Concept Maps
Sub-question: How will the incorporation of scientific articles affect students' cognitive development level?	Classroom Test for Scientific Reasoning (CTSR)	



Results

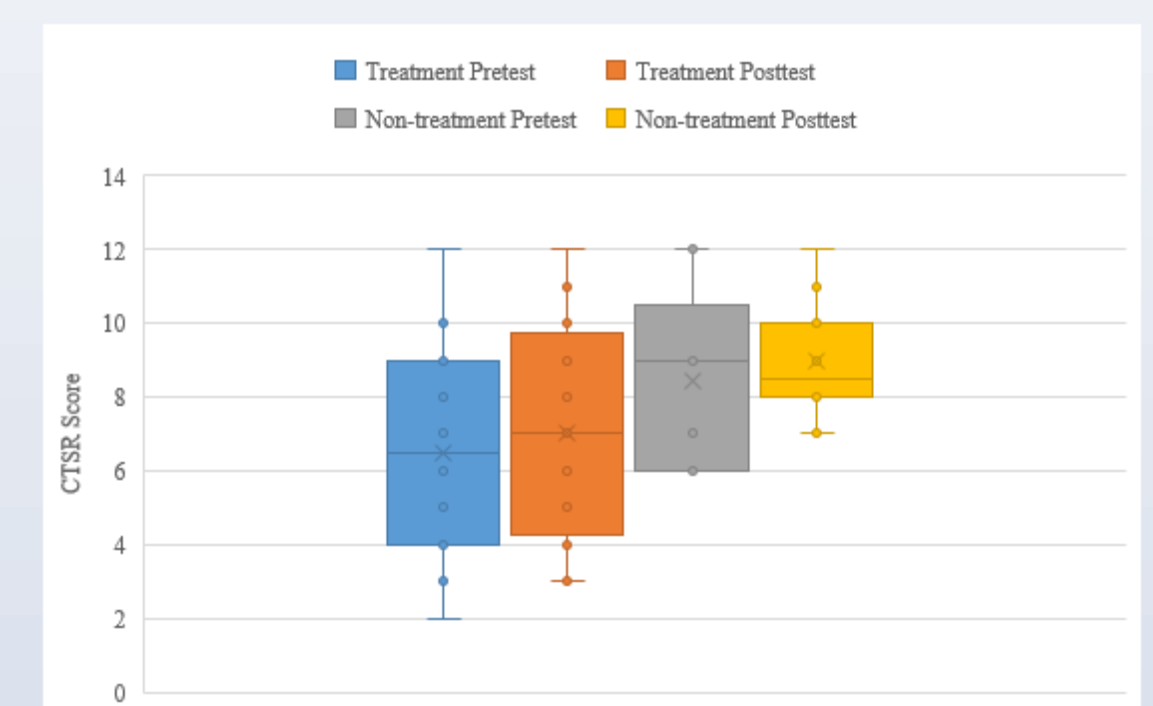


Figure 1: Box and whisker plot for both treatment and non-treatment group's pre and posttest scores for the CTSR.

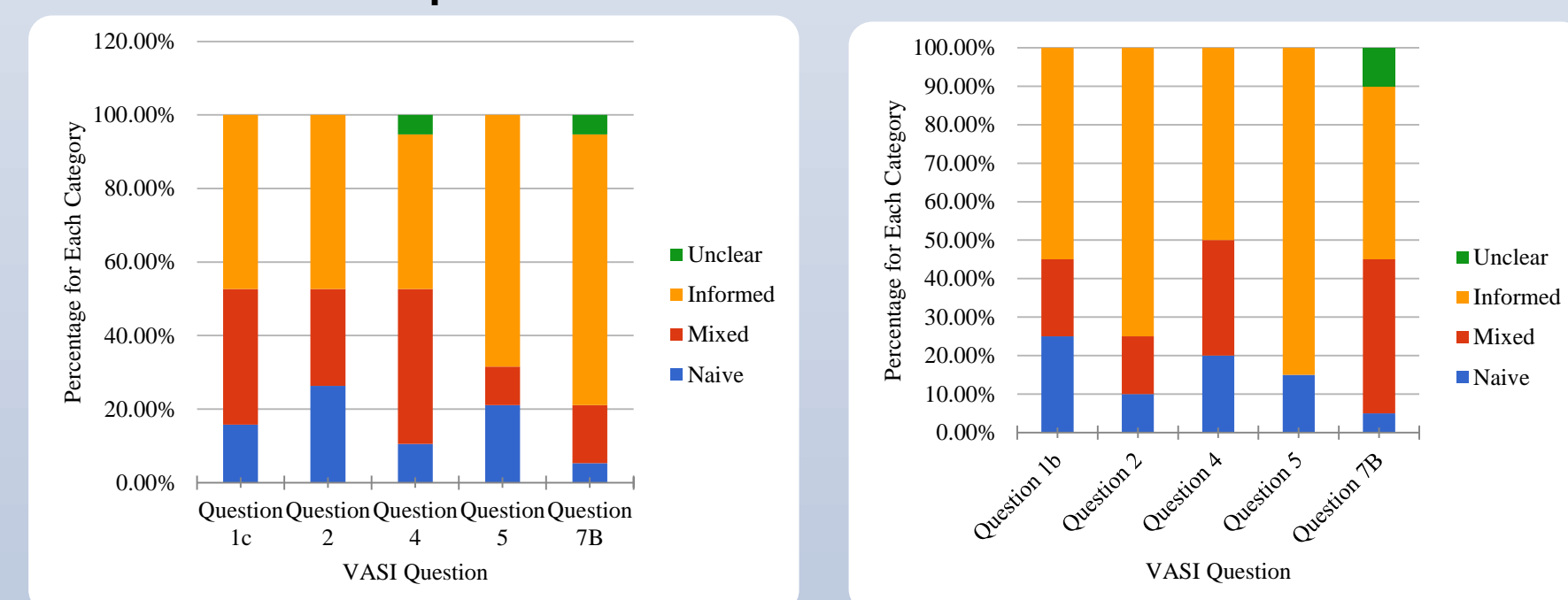


Figure 2: The chart on the left is a stacked bar graph of the number of students in the treatment group for each of the different scoring categories on the VASI pretest. Each question was graded either informed, mixed, naive, or unclear, (N=21). The chart on the right is a stacked bar graph of the number of students in the treatment group for each of the different scoring categories on the VASI posttest, (N=20).

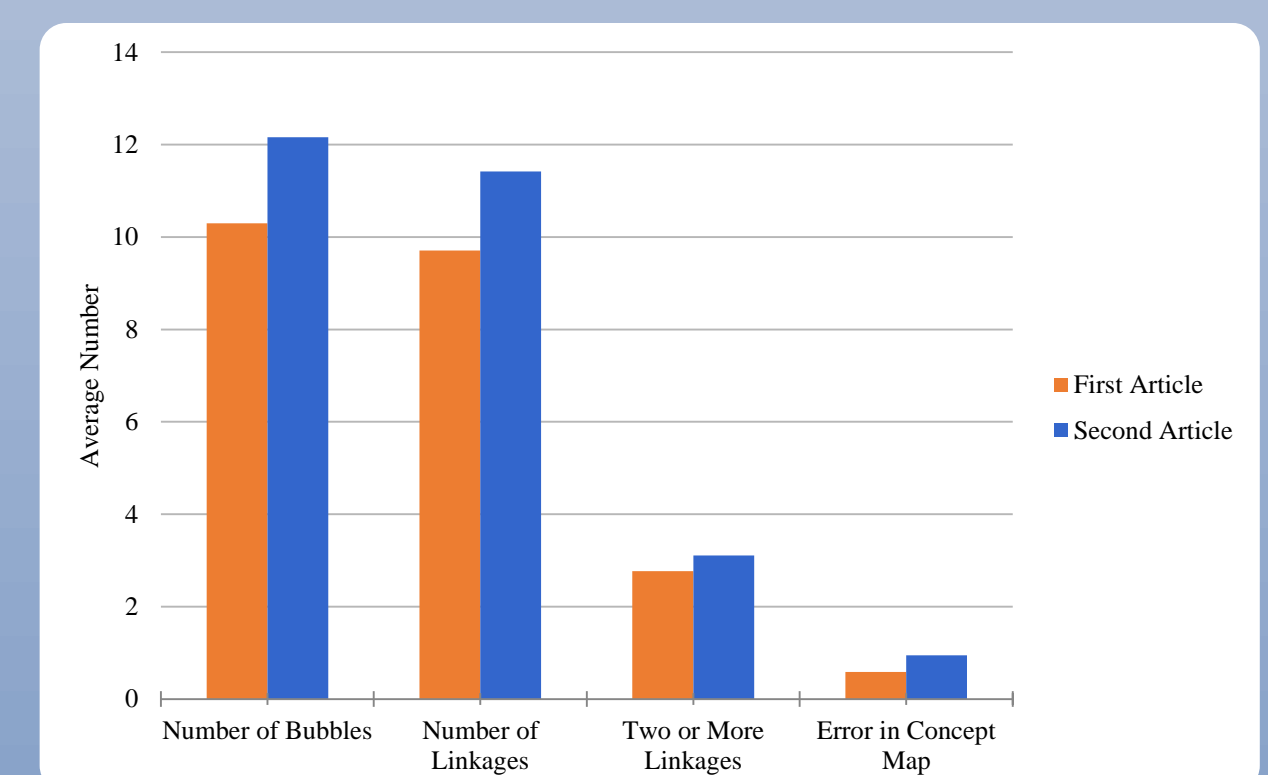


Figure 3: Bar graph showing the average number of bubbles, linkages between bubbles, bubbles that were linked to two or more bubbles, and the errors in the concept maps for the first and second article, (N=17, 20).

Discussion

- There was a 0.5 point increase in the median score from pre to posttest scores on the *Classroom Test for Scientific Reasoning* for the treatment group.
- The number of *informed* responses for Question 2, 4, and 5 on the *Views About Scientific Inquiry* assessment increased.
- Various aspects of reading comprehension measured using concept mapping, increased from the first to second article.
- These three different data sources demonstrate a positive correlation between increased ability in scientific reasoning, understanding of scientific inquiry, and comprehension of complex scientific texts by incorporating primary literature texts into the classroom.