ASSESSING THE NEXT GENERATION SCIENCE STANDARDS AND ITS EFFECTS ON STUDENT AND TEACHER LEARNING

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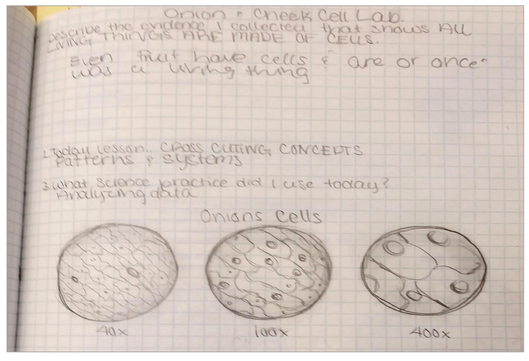
Research Question

What are the effects of three-dimensional assessments on student learning following explicit instruction of the Next Generation Science Standards practices and cross-cutting concepts?

Background

As I was taking a course over the Next Generation Science Standards (NGSS), I found myself drawn to the idea of transforming myself into a three-dimensional teacher. During the 2014-2015 school year, I began implementing the practices of NGSS into my lesson plans and have seen great success in my students. The Great Falls Public School district wrote new science standards based on the NGSS and so I came to my research in an effort to see how the district could assess the new standards. There is little research currently about assessment and NGSS. My hope is to provide a bit of insight into how this may look moving forward in districts similar to mine.



Notebook entry during cell lab

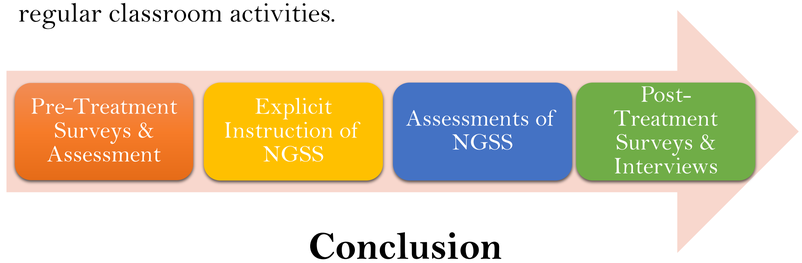
Data Collection Tools

Pre-Treatment	Pre Treatment Assessment
	Pre NGSS Student Survey on the SEP and CCC
	Pre NGSS Teacher Survey on the SEP and CCC
Treatment Period	NGSS Treatment Assessments
	Student interviews
Post-Treatment	Post NGSS Student Survey on the SEP and CCC
	Post NGSS Teacher Survey on the SEP and CCC

Treatment

Treatment began with lessons specifically designed to teach students to identify and use the NGSS Science and Engineering Practices (SEP) and the Cross-Cutting Concepts (CCC). Students were given graphic organizers to keep in their science notebooks that would be a continual reference for them throughout the process.

As instructional units continued in the classroom, students were periodically assessed to test their ability to not only use the SEP and CCC, but to identify which ones were being used during regular classroom activities.

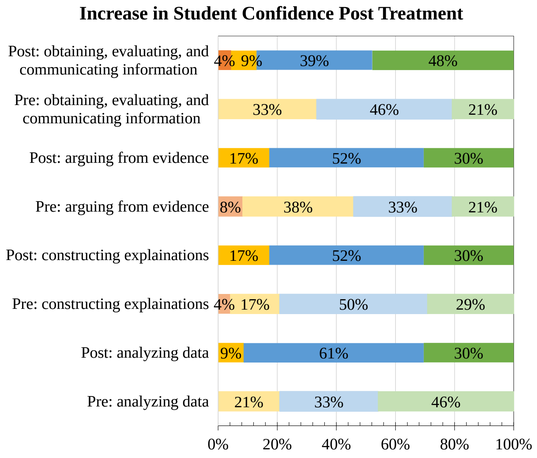


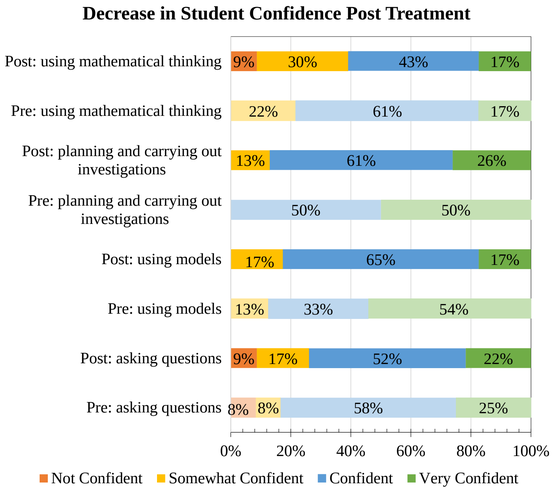
Conclusion

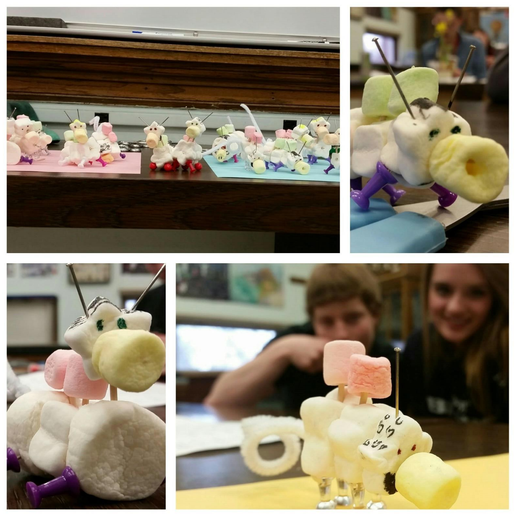
Overall, students became better at using and identifying the SEP and CCC following the treatment period. During the treatment period, student engagement was very high and 72% of students stated that they enjoyed learning about NGSS. However, there were distinct areas of increase and decrease regarding student confidence in their abilities to use the SEP. After exposure to the SEP, many students realized they had a lot more to learn, therefor affecting their confidence in certain areas.

Demographics of Sample

Two sophomore biology classes were used in the collection of this data, totaling 31 students. Seventy-two percent of the class is comprised of white students and 26 percent are Native American. The two classes are a mixture of a typical sophomore class, including high achieving students and those who need additional support.







Students modeling genetic variation using marshmallows

Data Analysis/Results

Students improved in their ability to identify and use the NGSS SEP along with the CCC. However, no significant gains were made in the content areas. Student confidence in using the SEP increased in half of the areas, however half of the areas showed a decrease in confidence.

Student Quotes:

"[Using the Practices] gives you an idea of what you're doing, like the reason why we are doing it in class."

"I enjoyed doing the labs to help me better understand these practices but [without] reviewing them."

NGSS Lead States. 2013. *Next Generation Science Standards: For States, By States.* Washington, DC: The National Academies Press.