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 science standards could assess the new standards.

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.

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."

Notebook entry during cell lab

Students modeling genetic variation using marshmallows