

STIP Nugget
**Differences in Elementary Student Engagement when Science Fair projects
are Chosen by the Teacher Versus When Projects are Chosen by Students**

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Abstract. Student engagement levels seem to decline through the duration of an optional science fair club. To determine if students would be more engaged after choosing a project on their own, data was collected on time spent on the project and using a student questionnaire. Students were encouraged to choose projects based on their interest rather than selecting a project from a bank of projects. This was done through providing them with a carefully selected website quiz linking them to project ideas or asking them to link their project to a sustainability issue being discussed in their classroom. Through analyzing the data, it is apparent students are much more engaged after selecting a project themselves, as compared to choosing a project from a bank of projects. Students spent more hours outside of the science fair club working on their projects. Furthermore, students reported higher levels of satisfaction after selecting their own projects. The entire inquiry shows students are more engaged when the topic is of interest to them. To have students complete a science fair project and not lose motivation, it appears that students should select a project based on their interest.

Background

As a new teacher, I was asked by my school administrator to begin a science club that motivates elementary students, especially females, to become engaged in science. Having a degree in biochemistry and biology, I did not think this would be a difficult task. Although the club's first year was successful, I felt there could be improvement when I led the club this past year for a second year. Students need to be intrinsically motivated as their engagement levels changed throughout the course of the club.

My Inquiry

The purpose of my inquiry was determining if elementary engagement levels would differ if science fair projects were chosen by students versus if projects were chosen from a bank of projects. This project idea stems from my observations from the previous year. I noticed students' engagement levels decreased throughout the course of the club. Based on this experience, the goal was to intrinsically motivate students to complete their projects in a timely manner.

According to Saeed and Zyngier (2012), when students are intrinsically motivated to complete a task, there are higher engagement levels. However, there are many factors that affect a student's engagement level, including "the work, the context, the time of day, and the teacher and peers (Saeed and Zyngier, 2012, p. 256). In addition, students who are given choice are more authentically engaged and intrinsically motivated (Maralani, 2016).

Hence, during the second year of the club, students were encouraged to choose projects based on their interests, or look for inspiration for project ideas from the sustainability initiative in our school. In addition, students were introduced to an online tool to help them select a topic or project of interest. All student projects were chosen by the students themselves this year, as compared to last year where most projects were chosen from a project bank.

To determine if students displayed more, less or the same engagement levels as compared to last year, I compared the hours spent on the project outside of club meeting times. This year, students spent a total of 10.25 hours (for a total of 18 projects) outside of science fair club working on their projects, as compared to an total of 3.5 hours last year (for 23 projects in total). This increase suggests that students are more engaged, as they are spending more of their lunch hours, recess breaks, and before and after school times to work on their projects.

I also collected data on student engagement using a questionnaire, given to students who participated in the club both last year and this year. Students who chose their projects themselves expressed enjoying the experience. Some of the positive experiences described by the students include:

“I loved presenting what I knew and having the experience to go to divisional.”

“My experience went very well and I was really proud of myself and it made me really happy.”

“My experience was really good because it was something different.”

Based on these student responses, I believe students enjoyed their experience in science fair and felt more fulfilled when they chose their own projects.

Reflection

The entire STIP experience taught me a lot about my students and how to pique their engagement levels. The purpose of my inquiry was to determine if allowing students to choose their own projects would increase their engagement levels. To achieve my goals, I chose to restructure my Science Fair Club.

To begin this process, I met with a group of very capable individuals as a part of the Science Teacher Inquiry Group (STIP). Through conversations with this group, I decided I would not provide students with a bank of projects; rather I would help students choose projects based on their interests. To do so, I had them either complete the questionnaire on a website of my choosing (<https://www.sciencebuddies.org/science-fair-projects/topic-selection-wizard/background-info>) or link the projects to their class' sustainability project. The school I work in is a Roots and Shoots school. This Jane Goodall initiative encourages students to select sustainability projects. Students were encouraged to look at their class project and decide if there was any science fair project they could link to their class' sustainability project. This topic selection process took a lot longer than expected; however, I think it was worth the extra time invested. Students were a lot more engaged! I think this has a lot to do with them choosing their own projects, as they were internally motivated to complete their projects.

Completing an inquiry project required me to reflect on my own teaching practices, be open to feedback from others and open to the idea of failure. Being new in my career, it was difficult for me to allow myself to be vulnerable. The entire process is long and requires a lot of work. This learning process, however, was worth it! I was supported by a group of teachers that offered many ideas and feedback. The benefits to my students are increased motivation and effort, and therefore improved learning. Our goal as educators is to provide authentic learning experiences and the best education possible for our students. Sometimes that requires us to reflect on our teaching practices and be open to the idea of changing our practice.

References

- Maralani, F. M. (2016). The mediation role of intrinsic and extrinsic motivation in the relationship between creative educational environment and metacognitive self-regulation. *Journal of Education and Learning, 5*(3), 272-277.
- Saeed, S., & Zyngier, D. (2012). How motivation influences student engagement: A qualitative case study. *Journal of Education and Learning, 1*(2), 252-267.