



### Introduction

We added "Making Days" to our PBL<sup>2</sup> Science program curriculum. Making places the student at the center of the project and process. There is no more going through the motions of simply filling in a worksheet or answering questions on a quiz. The boys have to critically think and apply their knowledge to their unique project. Martinez and Stager's *Invent to Learn* states, "Evidence of test score gains and better long-term understanding for children who are exposed to experiential learning, especially in STEM subjects." This quote defines what a teacher should be doing in class, improving students' abilities and understanding through authentic assignments. If Making does this, then Making should be present in every classroom. Furthermore, Making develops and nurtures all the skills that have been defined essential for the CEO of today's workplace.

### The Research Question

How can enhancing our PBL<sup>2</sup> program with a Making component increase student engagement?

### Research Context

San Miguel Academy is a small all boys' school located in Newburgh, NY. In 2013, Newburgh was rated the 9<sup>th</sup> most violent city in the United States. San Miguel Academy is a tuition free school for minority males that live in poverty. The graduation rate for minority male students at the local high school hovers around 30%. San Miguel Academy opened 9 years ago as a school to help defy the odds of Newburgh. Last year our school had its first graduating class from high school which had a graduation rate of 100%.

### Participants

San Miguel is a tuition free school for minority males that live in poverty. My participants were from my 8<sup>th</sup> Grade class. The class has 14 boys who worked in groups of two. All the boys in my class are exposed to violence and unrest brought on from living in poverty in an area with a strong gang and drug influence.

### The Research Action

The Making project required students to construct a vertical garden structure for their own hydroponically grown plants. Working in groups, the boys created their own unique planting structure that supported their plants. The focusing objective for this project was "Create a garden that does not touch the ground using recycled materials."

### Data Collection

- Videos of Making Days
- Student logs
- Post interviews
- Post activity answers to questions



"Stop!! Let's think a minute & not just go with what pops in our head."

The video footage provided first-hand visual evidence of each day's activities, which allowed for in-depth analysis. The questions that were implemented tried to have the boys think and explain about their thinking and decision making as they worked through their garden project. As the students completed each Making session, I recorded notes on the day in my own personal log. These three separate data sets were used to look for trends in student thinking as they progressed through the project.

### Data Analysis

During Making Days, the boys were video recorded while they worked on their projects. I reviewed the films, looking for common trends and themes in the groups as they worked on their project. I then combined my notes from what I observed first hand during the Making Days with what was on the videos.

. As I watched the video of the boys, I transcribed their responses into *Microsoft Excel*. The four categories/trends that I found were collaboration, creativity, critical thinking (problem solving), and grit.

### Key Findings and Discussion

- Making Creates an authentic opportunity for students to collaborate together.

"My partner realized the value in my ideas from this point forward,"

- Allows students to self-correct and find answers to their group's questions and problems.  
"We had to physically help each other."

"No arguing, not going against each other."

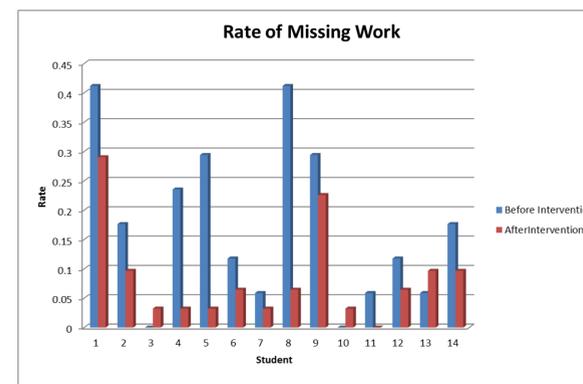
- Making enhances student engagement by providing a personal link between the student and the assignment.  
"This is better than basketball."

- Making fosters the need for resilience.  
"Had to do it about 6 times to get it good and right."

- Making builds self-confidence.

- Making cut missing assignments in half from an average of 17% to 8%

"Not simple design, just awesome."



### Conclusions

- Making in the classroom has a clear ability to help improve and strengthen students' 21<sup>st</sup> century skills.
- By being exposed to open-ended projects and the Making process, students build self-confidence.
- Failing is not an end but a new beginning for students.
- Making empowers students to think for themselves, develop and research new knowledge while still being able to use their past experiences to contribute to the project.
- When students have ownership of their work, their overall school engagement increases.
- Allows students to practice skills needed for crowd sourcing.

"3 different ways to try to get it to work, Was difficult but good work."



### Key Readings

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### Further Information

This poster and further information is available at <http://www.theibsc.org/>.

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