Introduction

My research focused on developing creative confidence and problem-finding skills in Grade II students. The goal was to provide students with a relevant experience where they could practice and apply skills they will be able to use throughout their lives. The participants in my project collaboratively worked through the Design Thinking process to design and build a subway station for the year 2035.

The Research Question

How might collaboratively designing and making a model of a New York City subway platform for the year 2035 develop Grade II boys' creative confidence and problem-finding skills in Technology?

Research Context

Founded in 1888, The Browning School still strives toward a commitment to the goals of John A. Browning: the pursuit of academic excellence and a lifelong love of learning, the belief in the dignity of the individual, and the development of personal integrity and responsibility to the broader community. Browning is an all boys', K-12 institution located on the Upper East Side of Manhattan, in New York City. The school desires its students to develop into good citizens who are sensitive to the needs of others, and respectful of divergent yet informed opinions. Browning's goal is to graduate students who are gentlemen.

Participants

Thirteen Grade II boys who were part of a required technology class that met three times over a two-week cycle were the participants in this research. This course meets for one semester and is focused on intentional and thoughtful design and fabrication.

The Research Action

The action in this project followed the stages of the Design Thinking process:

•**Building Empathy and Synthesis:** Students researched the New York subway system. They took pictures and made observations of subway stations around the city, and presented their findings to the rest of the class. As they gathered data, they had to synthesize all of it into a clear understanding of what the future holds for public transit.

•**Ideation:** Brainstorming ideas for improvements. Students were asked to think of all the big ideas they could and began focusing on a few potential, realistic ideas to integrate into their model subway station.

•**Prototype:** Students worked with their group to build a model of a subway station using Adobe Illustrator, the laser cutter and a 3D printer.

•**Storytelling:** Students delivered a persuasive talk to the rest of the class and other teachers to share their ideas and improvements.

Data Collection

Throughout the project, the boys were required to **reflect** on their experience in class and talk honestly about how they thought the project was progressing. I made **notes** during class as I worked with each group individually. This allowed me to see firsthand how each group was functioning. Finally, **interviews** were conducted with students at the end of the project to see how they felt the entire project went.

Data Analysis

After I compiled all of the data, I sorted through them looking for common themes that emerged from the four different groups. I created a system of tagging the boys' responses and grouped them into similar categories. From these categories I was able to assess where the project was successful and how it could be improved.
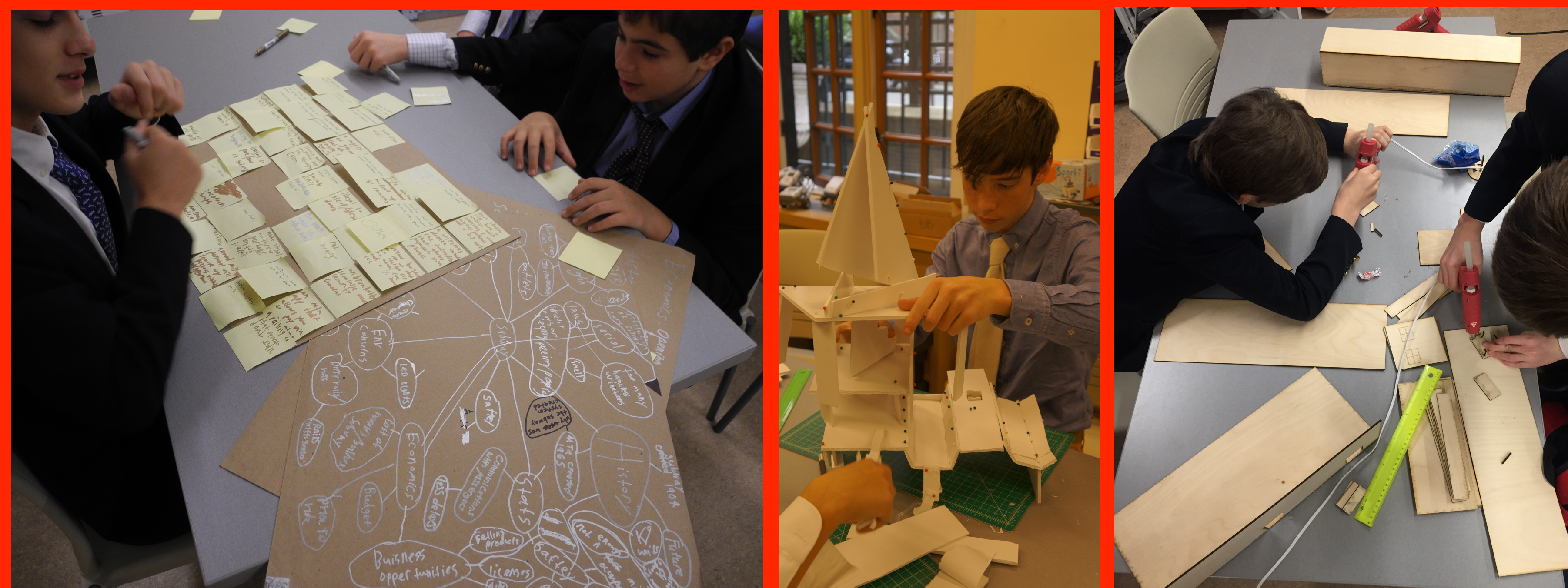
Key Findings and Discussion

• The development of creative confidence

At the beginning of the project

"No, I am not a creative person. I prefer having a clear plan when engaging in a task and then strictly following that plan. I don't like to be creative since that has to do with my imagination. And when I freely use my imagination, I don't operate via any type of plan. I think that is always good to stay structured and work efficiently with a plan"

By the end of the project

"Thinking of solutions for the problem required me to think beyond simple ideas. I had to really think in depth about my problems and then come up with effective and creative solutions"

•The development of problem-finding and problem-solving techniques

"I would spend more time understanding the needs of the user of the subway, rather than coming up with unrealistic ideas. We spent a lot time coming up with crazy ideas that would never work"

"The mistakes my group made were because we didn't really understand the problems. We made the subway cooler, but didn't fix it"

"My group did not have a plan to solve the subway's problems, instead we had a lot of ideas that didn't really work together"

•The development of collaboration skills

"It was great to encounter these problems with my group because we had more ideas as a whole then I would have had by myself"

"I learned that you need some other people to really solve a big idea like redesigning the subway. I realized that if you have other partners that you are motivated to work, you can make something great"

Conclusions

• Boys developed their creative confidence in an environment where they were free to have big ideas and fail

• Boys learned how to properly define broad problems and how to approach possible solutions

• Boys understood the importance of effective collaboration within their group

• Boys gained essential skills, like communication, critical thinking and problem solving, that they can apply to future situations

• Boys realized that creativity can take many different forms in people and that it is present in many areas of their lives

• The boys tended to focus on the end product rather than the process of properly defining problems, which made them less effective
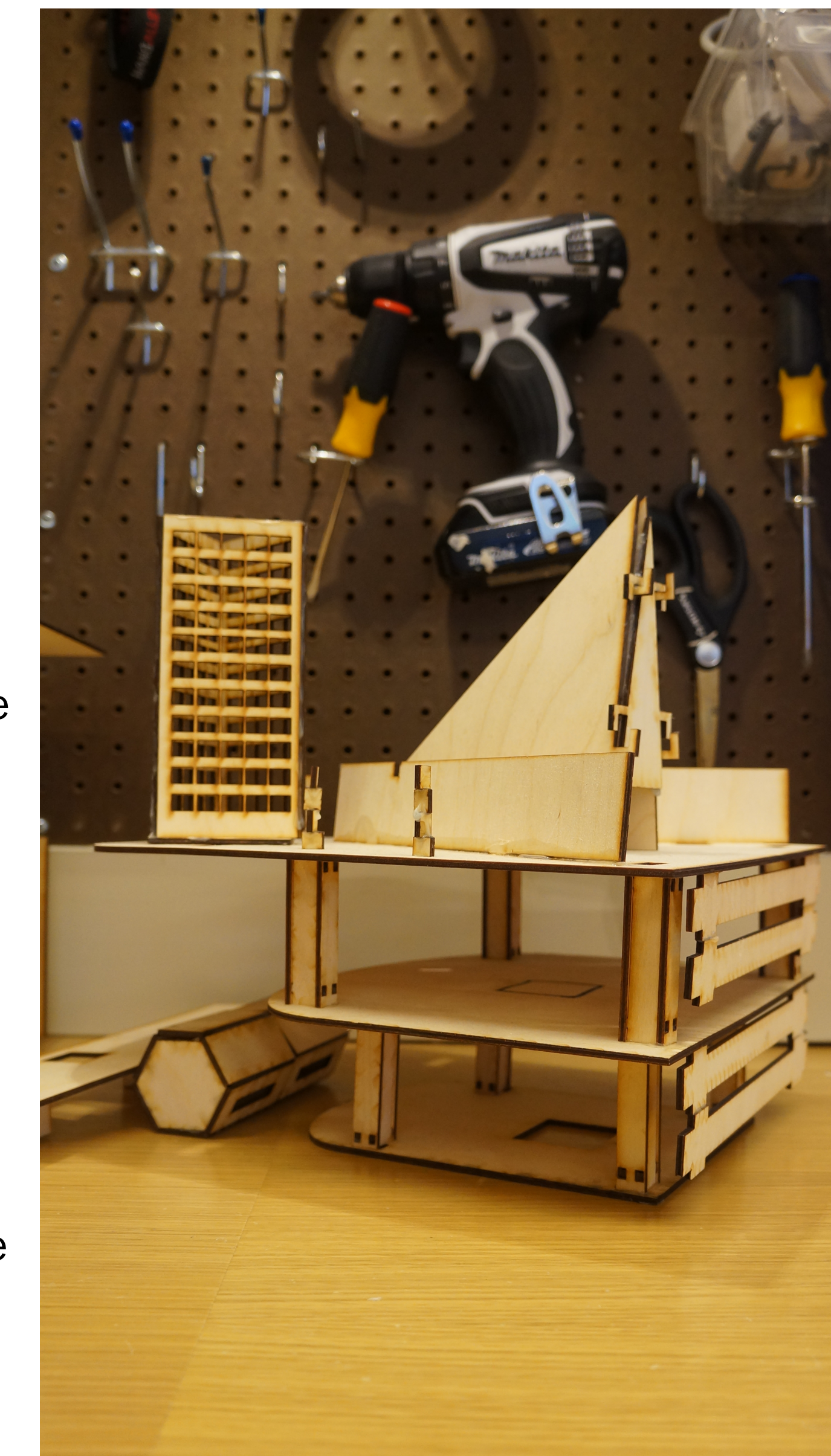
Key Readings

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Martinez, S.L., & Stager, G. (2013). *Invent to learn: Making, tinkering, and engineering in the classroom*. Torrance, CA: Constructing Modern Knowledge Press

Stringer, E. (2007). *Action research* (4th ed.). Thousand Oaks, CA: Sage Publications

Thomas, D. & Brown, J.S. (2011). *A new culture of learning: Cultivating the imagination for a world of constant change*: CreateSpace.

Further Information

This poster and further information is available at http://www.theibsc.org/
Project Blog: http://bdroke.edublogs.org/
Researcher's Email: bcdroke@gmail.com