ST. MARK' S SCHOOL OF TEXAS

Math and Risk-Taking

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Introduction

- Research Question

How can making instructional videos and 3-D graphic models impact risk-taking in solving Honors Geometry problems?

- Perception

Students participate in class if and only if they know the answer to a problem.

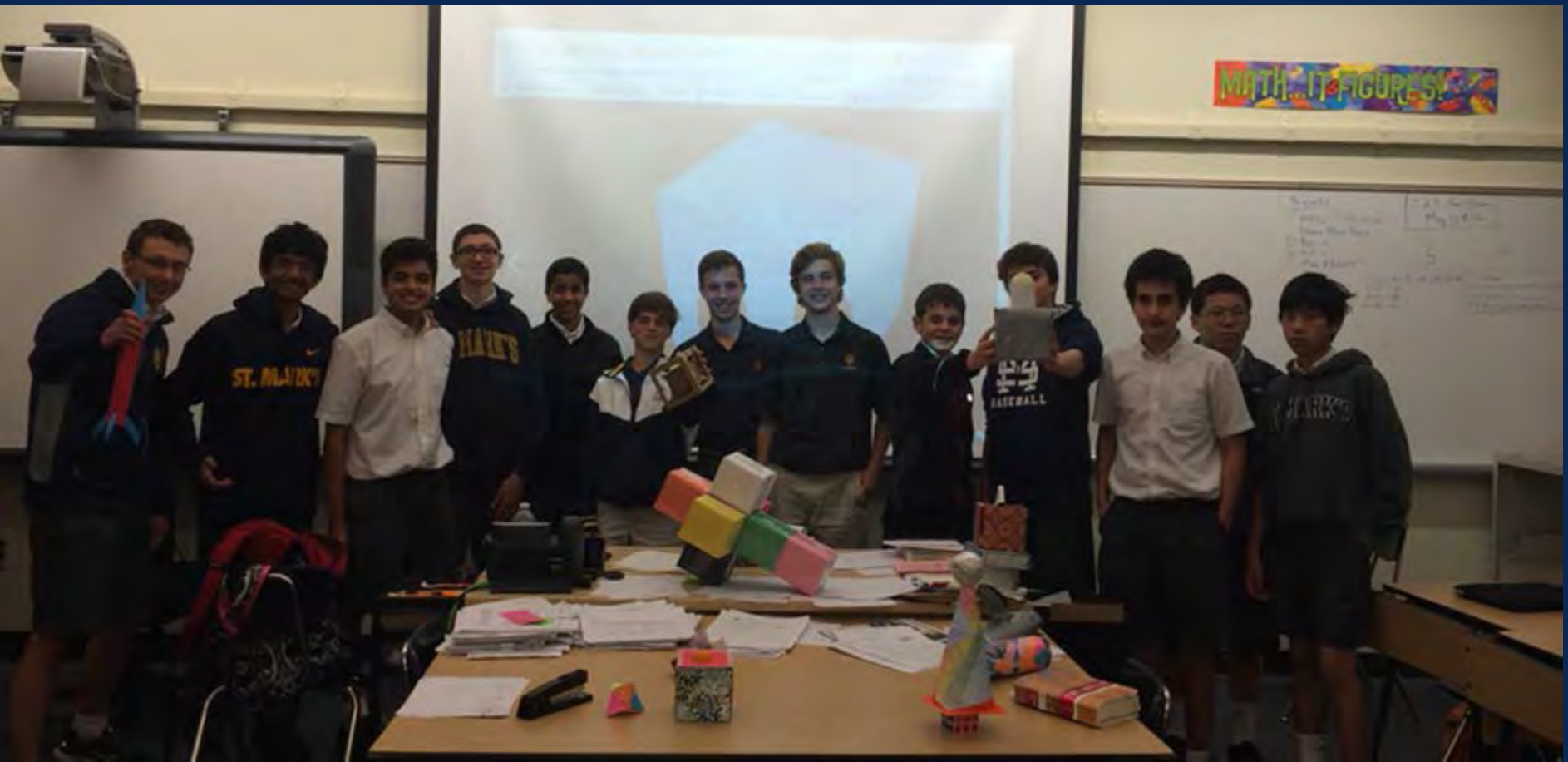
Key Ingredients of Risk-Taking

- ☐ concentration
- ☐ investment
- ☐ enthusiasm
- ☐ effort
- ☐ participation
- ☐ persistence

(Jabalon and Wilkinson 2006)

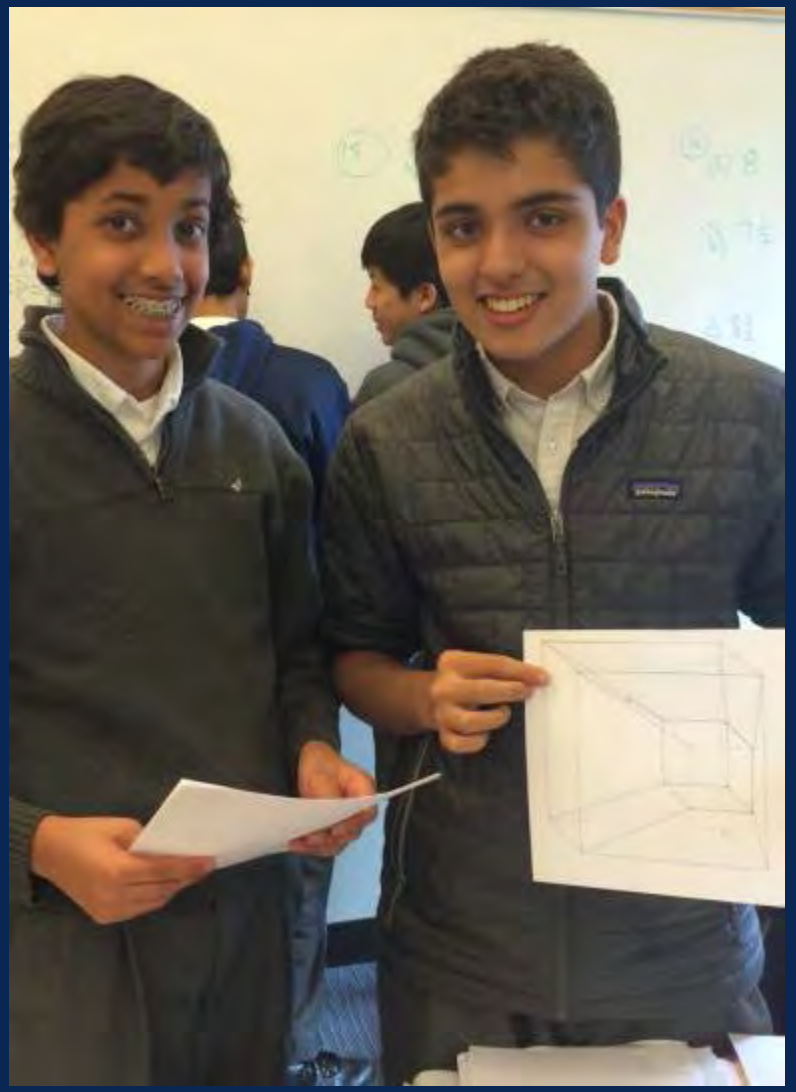
Participants

- Fifteen students in my 5th period Geometry Honors class
- Ages 14 - 15



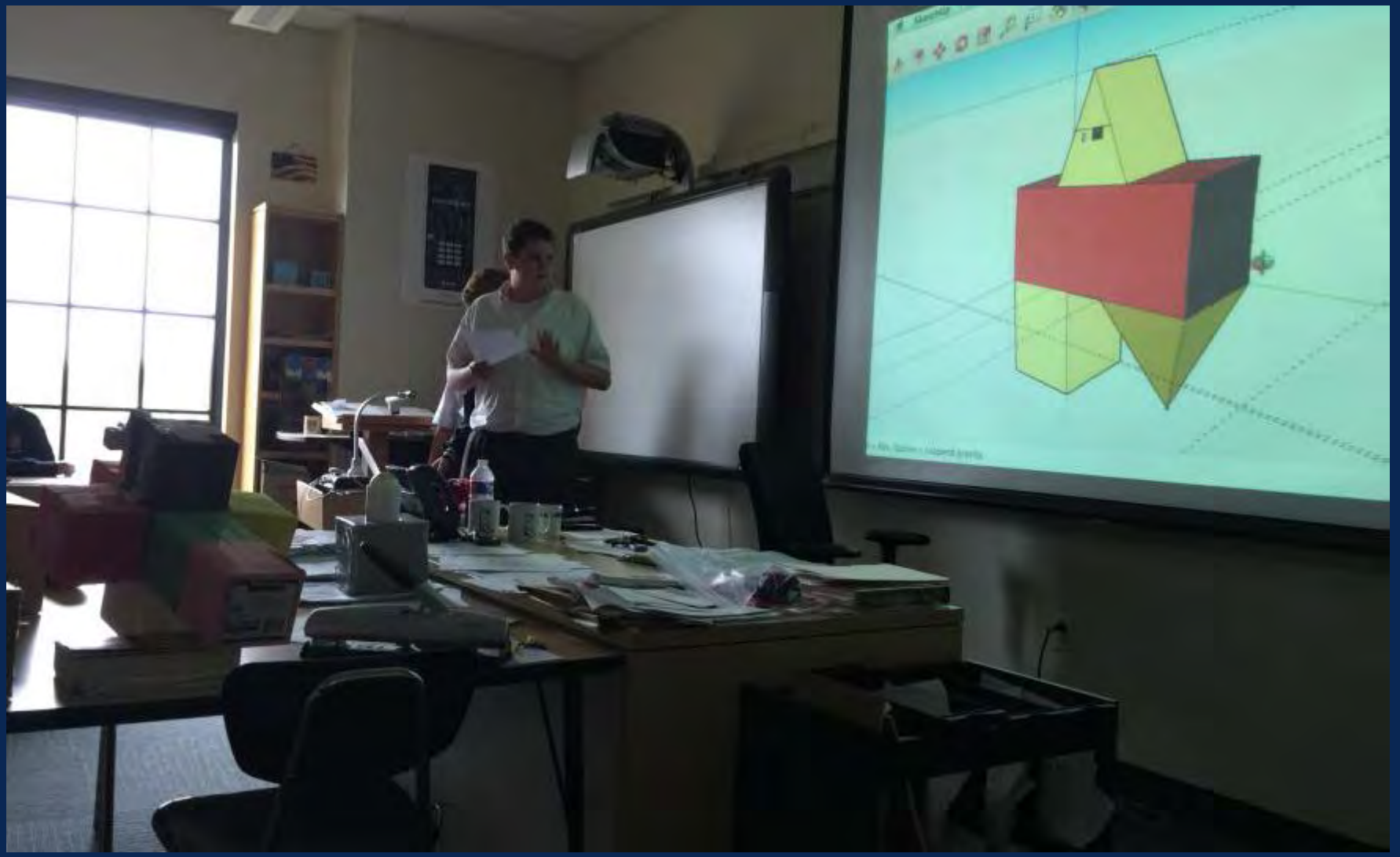
The Research Action

- First, we read *Flatland*.
- Then, the boys self-selected into groups of 1 – 4 members to make the following:
  - videos explaining various dimensions
  - physical or electronic three-dimensional compound solids
  - physical or electronic representations of a four-dimensional hypersolid



Planning

Samples of Students’ Work



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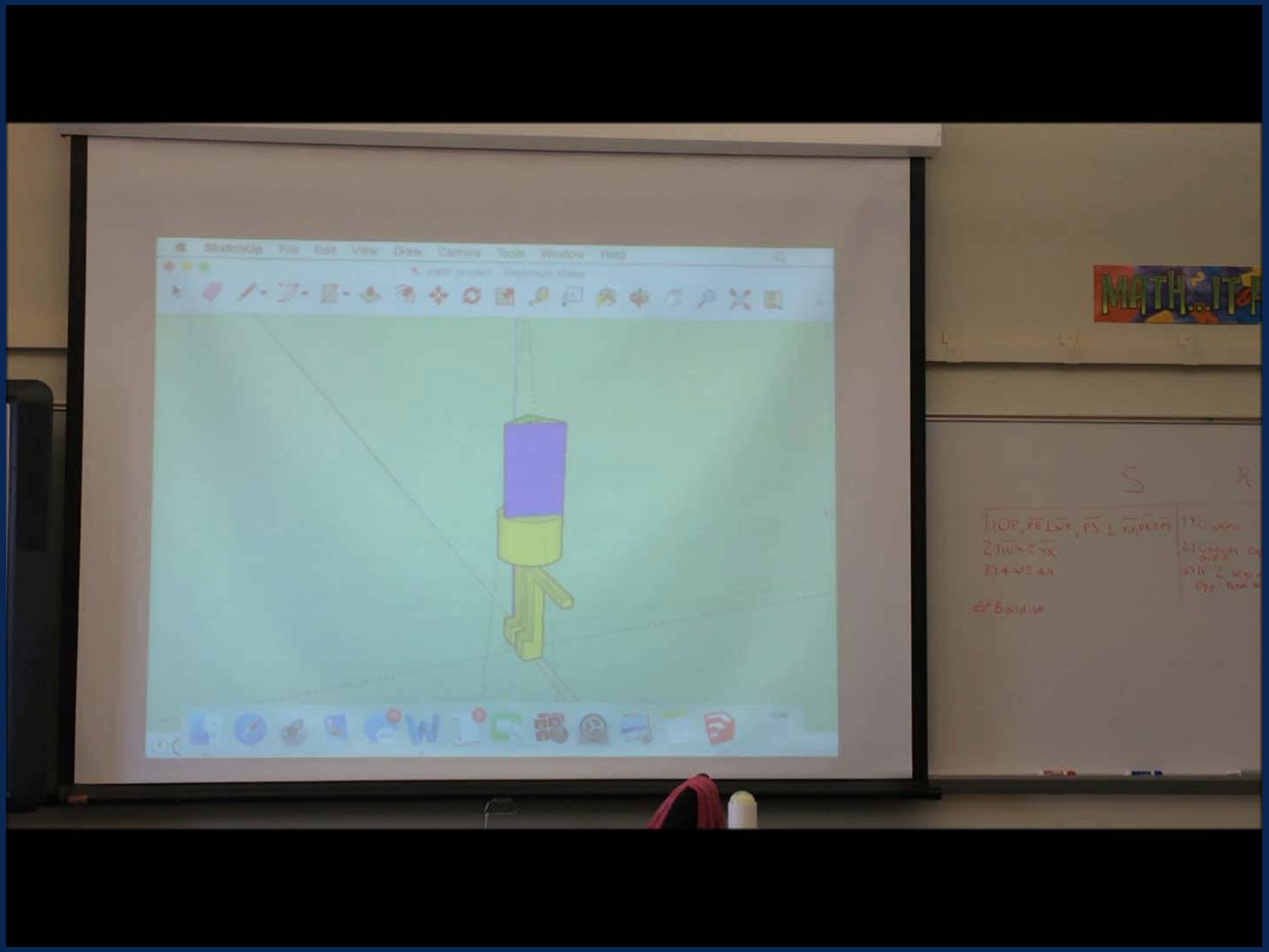
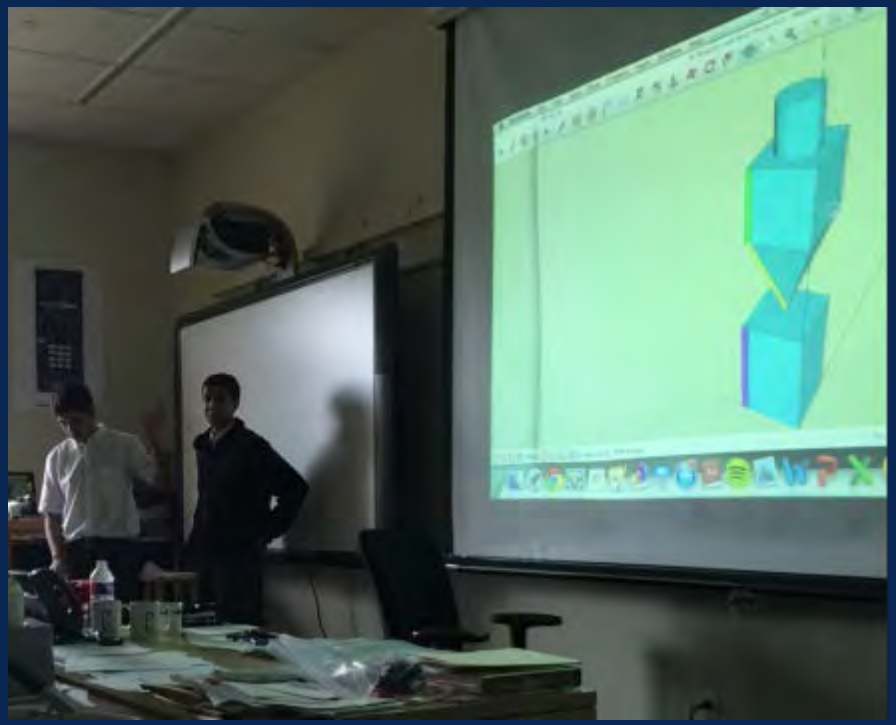
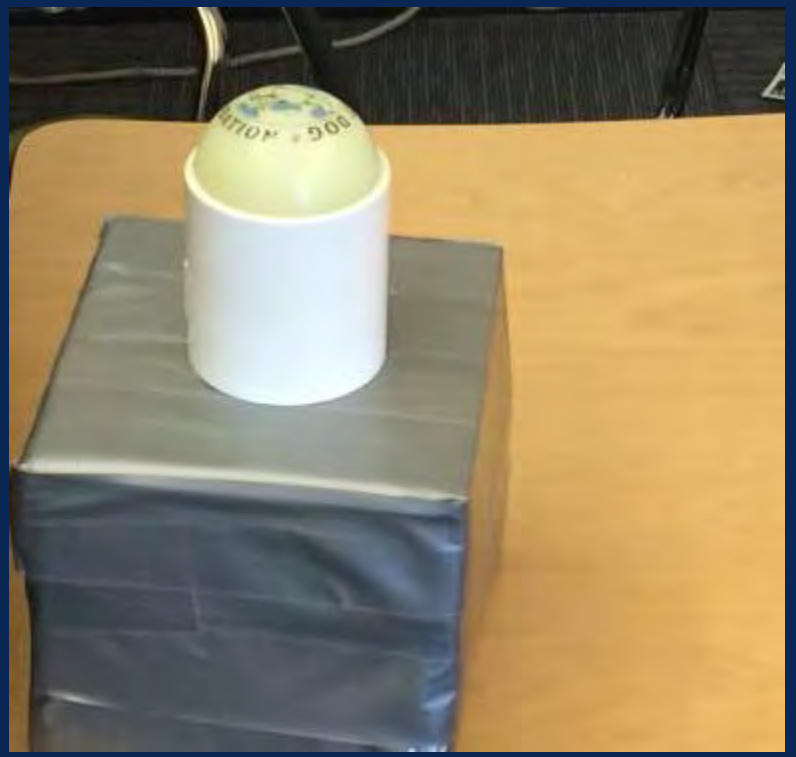


Samples of Students’ Work





Samples of Students’ Work

Key Findings -- Enthusiasm

We were, "…creating a good looking object with our own hands. We were able to create something we were proud of."

"It was fun to see how my classmates prepared their projects and to see so many different perspectives on the same project."

Key Findings – Effort and Persistence

- Students persisted when concepts were difficult to understand by emailing questions to the teacher and by conducting internet research.
- Several students felt the projects involved "hard work".

We encountered a difficulty in the calculation part of the project. The surface areas for the whole thing ended up different from the ones on the actual shapes, to fix this I had to go back and look at all the calculations and fix all the broken ones.

Key Findings – Effort and Persistence continued

- “We were able to overcome [obstacles] by making sure everybody had an assigned job and knew what he was supposed to do.”

Key Findings -- Collaboration

- Although collaboration was not originally one of the key ingredients of risk taking, it played a prominent role in these projects as evidenced by
  - Students helping each other
  - Electronic messaging
  - Mutual respect

Boy H helped, "… the entire class gain a deeper understanding of dimensionality."

I learned to work in a group better through these activities.

Key Findings – Collaboration and Enthusiasm Combined

“In [Boy A] and I's project, we both had considerable contributions to the project itself. [Boy A] was the face of the project, and he spoke about the dimensions while I held the camera. I drew the representations of the dimensions on the board, and we both came up with ideas on how to correctly express what the fourth dimension would look like. We both played big roles in this project, and ultimately, our contributions and how we worked together made the experience of the project very fun.”

Helpful Links

- https://www.learner.org/courses/mathilluminated/interactives/dimension/
- http://hi.gher.space/classic/introduction.htm
- http://im-possible.info/english/articles/hypercube/
- https://www.youtube.com/watch?v=Q_B5GpsbSQw
- http://www.ahsd.org/mathematics/pricci/honorsgeometry/Honors%20Geometry%20Surface%20Area%20and%20Volume%20Project.pdf (Abington Heights School District – Mr. Pricci)
- http://www.lib.udel.edu/multimedia/getting_started/documents/vanderveldе-rubric.pdf (University of Delaware Library)

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Expressing the Dimensions