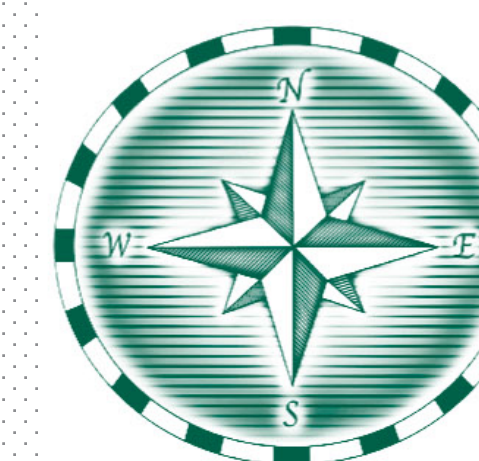




# Making in Math and Risk-Taking

Marjorie Morrison  
St. Mark's School of Texas



# IBSC

## Introduction

My research examined the impact of Making on Honors Geometry students' risk-taking when solving problems.

- My project addressed the perception that students should participate in class if and only if they know the answer to a problem.
- Abbott's *Flatland* was used as a springboard into Maker projects related to dimensionality.
- Jabalon and Wilkison's article entitled "Using engagement strategies to facilitate children's learning and success" helped define and describe risk-taking in this context.

## The Research Question

**How does creating informative videos and 3-D graphic models encourage Honors Geometry students to take risks when solving Geometry problems?**

Risk-taking when solving Honors Geometry problems involves the following components:

- Concentration
- Investment
- Enthusiasm
- Effort
- Participation
- Persistence

(Jabalon and Wilkinson, 2006)

## Research Context

St. Mark's School of Texas serves more than 850 boys in Grades 1 – 12. As a school focused clearly on the education of boys, the teachers, coaches and advisors understand and appreciate the unique nature of boyhood. With challenging programs designed to inspire, motivate, and stretch our students, St. Mark's is a place where boys can be themselves, develop respect for others, and learn what it means to be a man of true character and integrity.

## Participants

The participants were the fifteen students in my Honors Geometry class. They are Ninth Grade students, and most of them are 14 or 15 years of age.

## The Research Action

The boys made the following:

- videos explaining various dimensions
- physical or electronic three-dimensional compound solids
- physical or electronic representations of a four-dimensional hypersolid

## Data Collection

- Questionnaires were administered at the beginning and end of the research project using Whipple Hill and the school website
- Researcher observations of participants' actions, interactions, and behaviors in their natural environment were recorded
- Researcher journal entries of observations were recorded
- Photographs and videotapes of boys engaged in maker projects were taken

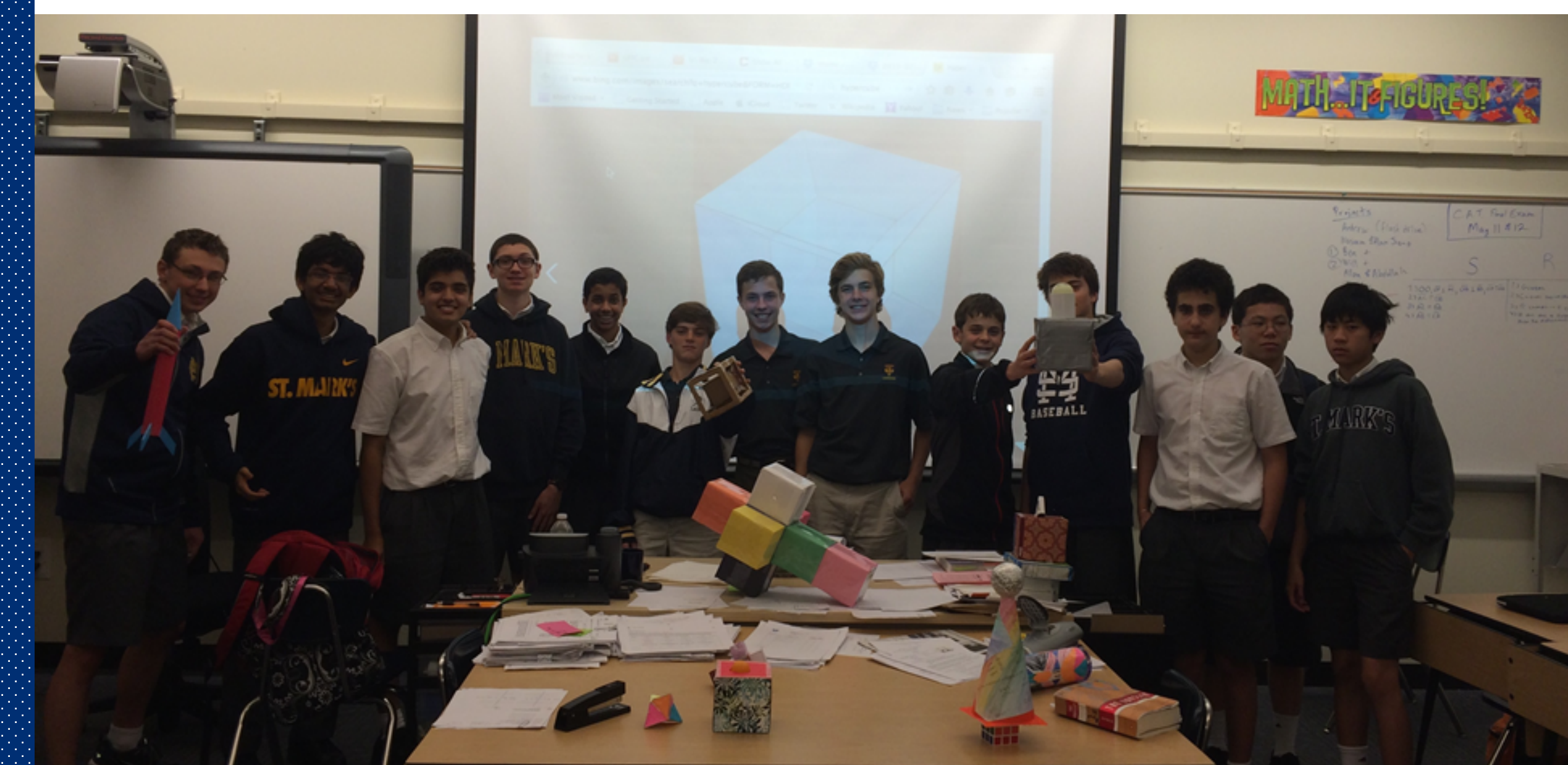
## Data Analysis

I looked for common themes that emerged from the seven groups that made up the class. Three distinct themes emerged from the boys' writings:

- increased enthusiasm for Geometry Honors class
- the need for intense effort and persistence
- an appreciation of the benefits of collaboration

## Conclusions

- One particular aspect of mathematical risk-taking, **enthusiasm**, increased greatly which led to students desiring to learn more about dimensionality and other topics of mathematics
- I observed an increased comfort level and increased levels of **participation** in certain boys following the projects
- Students agreed that these projects increased their willingness to take **mathematical risks** in Geometry Honors



## Key Findings and Discussions



The most rewarding thing about this project was creating a good looking object with our own hands. We were able to create something we were proud of.



Sometimes my partner and I had contradicting views about the definition of some 4-D objects; however, we were able to sort them out by researching our questions.



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 Readings

Abbott, E. A. (1885). *Flatland: A Romance of Many Dimensions*. Boston, MA: Roberts Brothers

Jablon, J.R., & Wilkinson, M. (2006). Using engagement strategies to facilitate children's learning and success. *Young Children*, 61 (2): 12-16

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Smith, M. S., & Stein, M. K. (2011). *5 Practices for Orchestrating Productive Mathematics Discussions*. Reston, VA: National Council of Teachers of Mathematics

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

## Further Information

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

Researcher's Blog: <http://marjoriemorrison.edublogs.org/>

Researcher's Email: [MorrisonM@smtexas.org](mailto:MorrisonM@smtexas.org)

