Introduction

Through my action research project I wanted to address the need for improved perseverance and an appetite for challenge in Grade 8 boys in Design and Technology.

Often, particularly in Grades 7 and 8, the boys are quick to ‘give up’ when the going gets tough with a project. They are also very dependent on the teacher’s instructions, rather than thinking for themselves about how they might construct their projects.

I undertook this research to observe the effect of making on Grade 8 boys’ appetite for challenge, risk taking, perseverance and independence. Maker Learning is important to boys as school is fine-motor orientated and making helps boys develop these fine motor skills, which helps them to be more successful at school.

I also wanted to see the ‘take home’ rate of projects increasing as a result of the changes I will make in the classroom.

The Research Question

How does Maker Learning impact Grade 8 boys’ perseverance in Design and Technology?

Research Context

Poole Grammar School is a selective state run boys’ high school with some 1200 students. There are 179 boys in Grade 8. Due to the practical nature of Design and Technology, there are no more than 20 boys in a class.

Participants

I chose to work with Grade 8 for this project. Without having seen the list of students I would be teaching, I chose one of my Grade 8 Resistant Materials groups, which has 18 boys. For a selective grammar school, this was quite a diverse group of students with quite a wide range of abilities. I did not teach any of these students in Grade 7, which made them an ideal group of students with quite a wide range of abilities.

I did not teach groups, which has 18 boys. For a selective grammar school, this was quite a large group. Design and Technology, there are no more than 20 boys in a class.

The Research Action

I reduced the teacher input into a design and technology project in terms of practical demonstration by using ‘flipped learning’ to teach Health and Safety considerations for workshop safety and safe tool use.

I encouraged ‘trial and error’ in the making process and allowed complete freedom in terms of final design and functionality (but there was still a loose brief).

I changed the project brief to be that of a ‘Maker Learning’ project rather than a ‘design, watch and copy and make’ project.

The Research Findings

Key Findings and Discussion

**Team Work and Its Impact on Perseverance**

**Key Findings and Discussion**

**Changes in confidence levels and its impact on perseverance**

Progress was rapid during the first 4 lessons of the practical element of the project. From the analysis of my data, four stages of ‘Learning how to persevere’ were identified.

The freedom of choice and it’s impact on perseverance

Boys’ motivation levels were high and after listening to the student interviews carried out at the end of the project and reading some quotations written by my observer in the final lesson of the project, I established that the boys loved having the freedom to write their own project briefs.

*The entire design of my grabber was a choice. We were given complete freedom in coming up with the design and the mechanism, so the mechanisms and the design were all a choice I made.*

*The best part was having the freedom to do what I wanted with it. I could pretty much do what we wanted and I thought that was really good.*

**Data Collection**

* Growth Mindset rubric * Pre and post project questionnaires * Student journals for homework * Audio recordings * Video recordings of practical lessons * Video recordings of students interviews * Observations

**Data Analysis**

1. Reading of data a number of times and listening and creating transcripts of interviews, audio and video recordings for accurate perception of information.
2. Compiling a collection of useful/insightful quotations
3. Key observations annotated and categorised from recurring patterns identified in transcripts
4. Making note of any comparative analysis (to other previous practical lessons for example)
5. Summative analysis – categories
6. Categories to be used: Before project feelings, broken down into ‘excited’ and ‘worried’, ‘positive’ and ‘negative’, Boys during project feelings, Start of first practical lesson, End of first practical lesson, Critical breakthrough points in manufacture, Post project feelings.
7. Codes generated for each category - Excel spreadsheet style format
8. Relationships between key concepts identified using concept webs
9. Findings organised into ‘themes’ from concept webs as areas for further discussion

**Conclusions**

• Maker Learning had a positive impact on Grade 8 boys’ perseverance, whatever stage they may have been at in the process of ‘Learning how to persevere.’

• In some cases there was a reduction in quality of finished outcomes, compared to outcomes from prior rotations when a ‘demo lead’ approach was taken, but this was not something that any of the boys voiced as a concern at any point during the project. The benefits far outweighed a small reduction in quality of outcome or a prolonged route to a finished outcome.

• Maker Learning gave the boys the confidence to be flexible and there was no doubt that the boys suddenly had to learn to be flexible!

- I learnt that Maker Learning was a very effective way to increase challenge in the classroom. By not truly challenging our boys, we are potentially doing them a disservice.

- I will be sharing my research findings with other staff in other subjects. I look forward to being a part of a new approach to Maker Learning in our school.

“Making helps boys develop these fine motor skills, which helps them to be more successful at school.”

“‘My grip was originally going to be my trigger, but in the end I modified it. I tried to make a very complicated mechanism to begin with and when I put it together it didn’t work, so I had to take it all apart and have another go again.’”

“I have definitely made several mistakes while I have been working, but the good sides to all of my mistakes is that I have learned from them and there is more towards learning from mistakes, than there is in getting everything right first time.”

**Key Readings**

* Action Research readings
  - ‘Maker’ readings
    - McWilliam, E. (2009) Teaching for creativity: from sage to guide to meddling
    - Paul, A. M. (2013) How do we inspire young inventors?
  - Gerstein, J. (2012). The Educator as a Maker Educator
  - Gerstein, J. (2014). The Educator as a Maker Educator
  - Gerstein, J. (2013). Is Project-Based Learning, Maker Education or Just Projects?

Further Information

This poster and further information is available at [http://www.theibsc.org/](http://www.theibsc.org/) Researcher’s Email and Blog Link: barbarab@poolegrammar.com and [http://barberannabel.edublogs.org/](http://barberannabel.edublogs.org/)