Maker Learning and Intellectual Risk-Taking in the Classroom

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Introduction

This action research was undertaken to see if boys involved in Maker Learning projects developed the skills and understanding to take risks, achieve more challenging outcomes, and enhance learning. It has been my experience that there are a variety of reasons that result in boys 'playing it safe 'or not fully engaging in their projects. By restructuring the teaching and learning to provide a safe environment and embracing the concepts of Maker Learning, I hoped boys would take greater risks to test ideas. This research took part during a unit on creativity and innovation so concepts of taking chances and experiencing failure as part of learning framed student thinking.

The Research Question

How can a safe classroom environment impact intellectual risk-taking and engagement when year 9 boys are undertaking Maker Learning projects of 3D structures?

Research Context

Lindisfarne College is a Year's 7-13 integrated boys' school founded under the auspices of the Presbyterian Church. It is situated in the city of Hastings, in the province of Hawke's Bay, New Zealand. It caters to both boarders and dayboys. Of the 500 students, half are full or weekly boarders for whom the College is both their place of residence and their learning.

Participants

In this action research project I chose a Grade 9 Technology class (age 12-13); the class has 24 students and is streamed (B stream). This class allowed for the flexibility required to teach a different unit of work to other classes and also due to the absence of national examinations at this age. Within this class I used 10 students as the main participants for the action for interviewing and video footage requirements.

The Research Action

Students undertook a Maker curriculum unit on Creativity and Innovation. Students explored a range of possibilities when faced with a design problem.

Development of the safe environmen; rules established by the students so they found the optimum circumstances (safe environment) for creative productivity. Silent Design Stage, Positive Participation, No response is wrong Philosophy.

Identifying as a Maker; Student reflection and discussions around each maker activity exploring concepts of divergent thinking, productivity and collaboration.

Maker Projects; Product Disassembly, Space Station Construction

Data Collection

Pre-Survey

Video and recorded information

Group and individual interviews

Teacher reflections

Data Analysis

-Interview responses were copied verbatim from video footage as supporting student voice statements.
-Video footage was previewed and clips were noted by time frame to denote an aspect of the indicators below.
-Teacher reflection diary grouped under themes; key aspects supporting intellectual risk-taking were noted.
-Information gathered in the video interviews was unitized and grouped according to the headings below as key indicators of Intellectual risk taking (E.T. Stringer 2014):

- Task enjoyment and fun.
- When students took the greatest risk in class.
- What hindered creativity/risk taking?
- What were background attitudes to making/tinkering?

Behaviour Responses as an indicator of Intellectual Risk Taking.
Levels of enthusiasm, excitement, outward displays of enjoyment (smiles, laughter, and demeanour), task engagement, and eagerness.
Physical responses as an indicator of Intellectual Risk-Taking.
Task industry (productiveness), experimentation of ideas and materials, collaboration with other students.
By grouping under these themes it allowed me to draw conclusions from the data as clear patterns did present themselves.

Key Findings and Discussion

- *All students actively engaged and very proactive in construction process, wide variety of solutions with some observing use of materials by others and using methods themselves.*
- *Collaborative discussions regarding what their station parts do and uses in space.*
- *Lots of laughter, visible enjoyment, industrious activity. Movement around room purposeful seeking materials and equipment.*
- *Group of students returned at lunchtime and after school to work on their designs. Had to send them out on Friday so I could go home, after school for 1 ½ hours of construction. Highly enthusiastic, find building pleasurable not concerned about what others think in fact proud of accomplishments. (Good reason, as other boys are envious).*

- "The space station has been good 'cause you're creating, building like you own ideas, you basically get to make it up yourself" Boy T
- "You really get to get out there and see what you can do" Boy N.
- *Personal ideas-* "I would think 'Oh it is something for me it doesn't have to be something to you' Boy P
- "I would probably continue on maybe use whatever they say to add a few more things but still go with my idea because it is not their idea" Boy T

The **critical thinking** included concepts of compartmentalising and redundancy along with environmental issues of power and space debris were evidenced in the models made from card, tinfoil and recycled material.

Conclusions

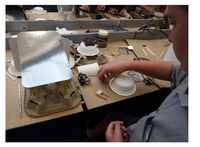
•All the boys interviewed were certain that the **physical modelling and positive environment enabled them to take greater risks** in class.

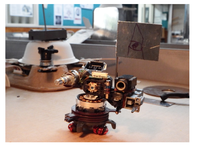
•While some boys felt the environment was a key benefit, all referred to the **engagement and ownership of their personal ideas and designs** as important in final project outcome.

•**Maker Learning, combined with both practical hands on construction and reflection time provides the bridge between the physical and critical requirements boys have to learning.** The boys often referred to how, as younger boys, they enjoyed and engaged in 'tinkering' at home and in school. As this was often supported with praise, a positive memory was formed.

•A greater focus on modelling and "hands on thinking' is an important part of the thinking process. **A safe and enjoyable environment coupled with challenge and the competition of completing maker projects enhances student experiences** in our classrooms today.





Key Readings

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Further Information

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

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