How does making improve motivation?

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INTRODUCTION

At Scotch College we have observed students underperforming in tasks involving problem solving and critical thinking skills. In the past, students have learnt to complete tasks through direct instruction and appeared to struggle if left to problem solve simple tasks independently. More often than not, students used the model provided by the teacher, presuming that the example is the only solution to that problem. Unfortunately, this only encourages a lack of creativity and limits the personal exploration required to find another solution to the task at hand.

"Action research is becoming increasingly known as an approach that encourages practitioners to be in control of their own lives and contexts."
J. McNiff, (2002) *Action research for professional development; Concise advice for new action researchers.*

M. Meyrick, K M. (2011) *How STEM Education Improves Student Learning. Meridian K-12 School Computer Technologies Journal.* 14(1).

THE RESEARCH QUESTION

"How does Making improve motivation in Grade 9 boys?"

RESEARCH CONTEXT

Scotch College is situated in the Mid-West of Perth, Western Australia. The College has approximately 1250 students and 100 teaching staff. The College offers the students the International Baccalaureate curriculum until Grade 10 with the option to continue into the Diploma program or the Australian Curriculum for students engaging in further educational studies.

PARTICIPANTS

All students experience Design and Technology during their time but can independently choose which stream to follow from Grade 9 and beyond. We have chosen to focus the attention of the 2014 Boys as Makers research topic on a Grade 9 Engineering class of 14 students.

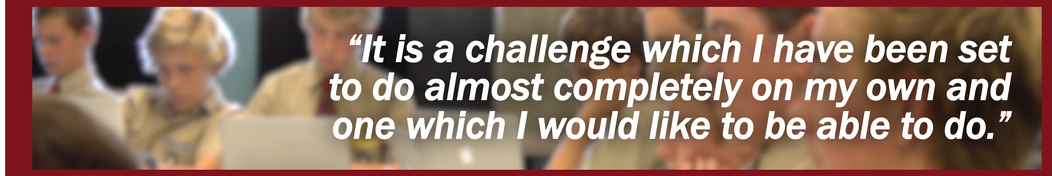
THE RESEARCH ACTION

Our action served to develop and refine new ways of teaching students that will address student motivation and help them solve design solutions on their own or in small groups with less teacher directed instruction. Boys were tasked to find their own solution to the following design problem:

You are asked to design and build a motorised vehicle capable of carrying an egg without breaking over the length of the course at the fastest possible speed.

DATA COLLECTION

Data was collected during the course through
- Task Evaluation Surveys
- iBook of Students work - research, design create evaluations
- Summation Interviews



DATA ANALYSIS

Data we looked to record were mainly qualitative; we measured the learning experiences and the motivation levels of the students during the task. This was achieved by video recording the classroom experiences and informal observations, casual questioning and we set whole class surveys to gather data to support our findings. Finally, video interviews were conducted on several of the participating students for a final presentation and to reflect their perceptions and opinions during the project.

The main reason for using qualitative recording of the data was to engage the students' genuine responses, to engage in their understanding of the problems faced with their learning and the processes they used to overcome these difficulties.

Alongside the interviews some quantitative data were used as a summary tool to enable grading of the students work. This was in the form of an iBook that highlighted the students' research, design and creation phases. The students are engaged in the International Baccalaureate Middle Years Program and written work created was used as the assessable element.

Overall opinions of the success of the project were indicted and discussed through the qualitative and backed through quantitative data analysis.

KEY FINDINGS AND DISCUSSION

We identified four emergent themes that spoke to an increased motivation in the participants:

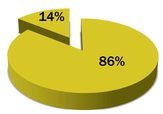
Students enjoyed the project

- 14 of 14 enjoyed it
- Fun
- Freedom
- Self-challenging
- Collaboration of ideas
- Collaboration with other students

"We weren't told exactly what to do like normal D&T classes"

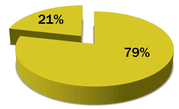
Students believed they could achieve success in the task

- Successful achievement was attained by 12 out of 14 students
- 2 students felt that they were unsuccessful because they were unhappy with their final result
- Simply the completion of the task was their achievement
- 10 out of 14 students succeeded in terms of collaboration with other student ideas or collaborative use of equipment
- 4 students preferred to work independently
- 12 out of 14 students believe they achieved success because they felt they learnt new skills and knowledge



Students are comfortable with the teaching style we adopted in this project.

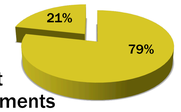
- 10 of the 14 students appreciated this different style
- 4 students stated that they would feel more comfortable with more teacher instruction
- They struggled to problem solve independently
- Never done any student led learning before



"I have liked the freedom that you get while designing our own vehicle"

Students felt an improvement in skills and or knowledge

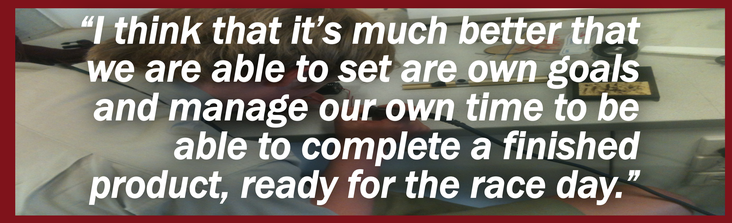
- 11 of the 14 of them learnt new practical skills
- Independence, effective problem solving and effective time management also highlighted as improvements



"Making it by myself makes me feel more successful in making"

CONCLUSIONS

- This is the first time a student-led learning activity has been run in the department.
- Strong correlation to the readings suggesting that what we have read actually happens.
  - Students engage more in projects which are relevant
  - Students engage more in projects which are achievable to succeed
  - Student engage more when they feel they will learn a new skill
  - Students are motivated to succeed by peers, parents and more importantly **themselves**
- Success was evident in terms of the atmosphere and learning environment within the class, discussions were focused on the task, there were no behavioural issues during the task and all 14 students were on task for more of the time.
- Close working relationships in department are formed through collaborative working partnerships.
- Scotch College is now implementing a STEM stream in the future to students based on the results of this project and its findings.



KEY READINGS

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FURTHER INFORMATION

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

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