



CANBERRA GIRLS
GRAMMAR SCHOOL

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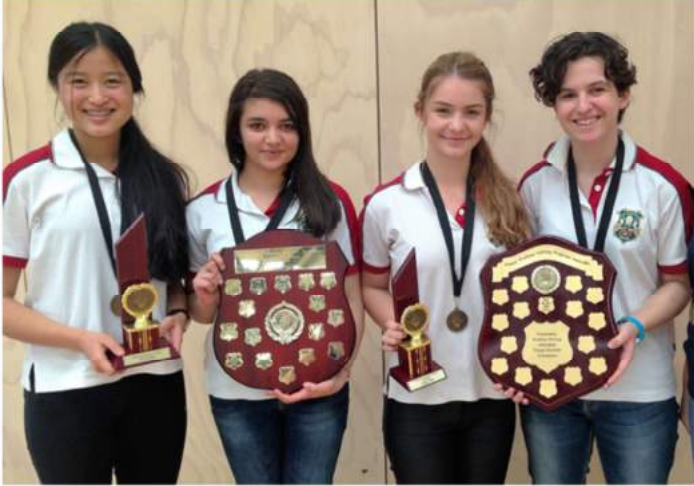
AIIS ACT CELEBRATING TEACHING AND LEARNING

Thursday, 10 November 2016

Canberra Girls Grammar School

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Electing to do STEM



A look at the pitfalls and successes of introducing a STEM elective in an already busy curriculum.

Presenters: Nicole MacKey and Yvonne McGarry

Canberra Girls Grammar School

Nicole MacKey and Yvonne McGarry

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Today we would like to take you through some of the pitfalls and successes we experienced this year.

Many were confused about what introducing a STEM course to the curriculum would mean.



What would it look like?

How would our girls access it?

What should we call it?

What disciplines should be involved?

What faculty does it fit under?

Who should teach it?

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<p>Nicole</p> <ul style="list-style-type: none"> ... has studied Maths, Science and Engineering ... has a working understanding of Experts in the Scientific Community ... has experience in Curriculum Development and Project Management 	 <p>Having a team approach to teaching STEM is important</p> <p><i>In our spare time we both like designing and building, especially innovating.</i></p> <p>We always had a clear plan of the direction in which we would take our STEM class and we were given the freedom to explore our ideas</p>	<p>Yvonne</p> <ul style="list-style-type: none"> ... has studied Maths, Science and Engineering ... has qualifications in Learning Support and Gifted Education ... has experience in teaching Project-based Learning and Curriculum Development
<p>Canberra Girls Grammar School</p>	<p>Nicole MacKey and Yvonne McGarry</p>	<p>CGGS.ACT.EDU.AU</p>

We think that they made a good choice. Nicole and I had many skills in common but also had skills that complemented each other. We also had similar interests outside of school.

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Project-based Learning

Risk-Taking

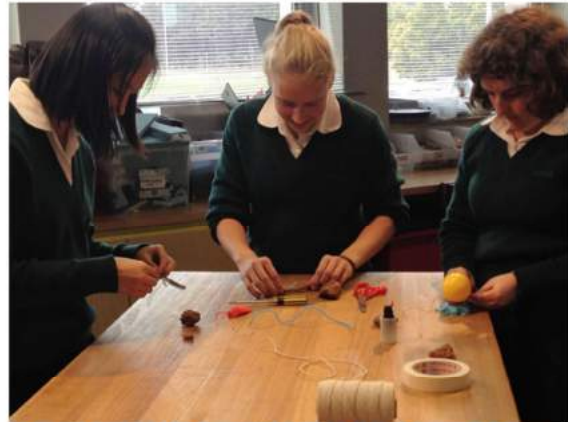
ENVIRONMENT

High Expectations

Highly-abled Students

No Marks...

just a Grade based on Competencies



Students feel comfortable to explore, design and fail without consequence.

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Our vision was a classroom full of ...

Project-based learning

Highly-abled students

High expectations

Risk-taking

No marks...just a grade based on competencies

To us the most critical thing to establish at the start of the year was an Environment, where students felt comfortable to explore, design and fail without consequences. Something these high achieving students were not usually exposed to.

Year 10 Elective...

MASTEM

Engineering

Mathematics

Science

Arts

Technology



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We started this year with a Year 10 elective subject called MAST. 24 students were enrolled in two classes; however, we always ran the class as a joint class.

MAST encompassed Mathematics, the Arts, Science and Technology. As we began to teach the course, it became obvious that the students really enjoyed our hands on activities and we decided to increase our focus on these engineering tasks.

So MAST morphed into STEM and our creative design and artistic elements fell under the broader umbrella of Engineering.



As we began writing our program, we made a few assumptions about the skills that the students would already possess. We thought that they would be able to...

- Work in a Team
- Communicate their ideas
- Follow instructions

We also thought that some of the girls may have seen some..

- Coding
- Robotics

We discovered that their skills were not quite at the level we wanted. So we added these skills to the list of others that we hoped to teach.

- The principals of good design
- How to manage a project
- CAD
- Some discrete mathematics, such as Networks and Project Optimisation and coding in the cyber security world

As well as skills, we hoped to assist the students to grow some personal trait.

- To be motivate to make a difference
- To persevere when things get tough and you can't see a way forward
- That sometimes worthwhile projects take time to complete
- That it is important to ask the right questions and that researching is the way to find answers to your questions.
- Be empowered to do things on your own

- Step outside of your comfort zone. Aim high, it doesn't matter if you get there by the end this year.
- Be creative and innovative. Think outside the box
- Tap into the experts in the field of your endeavours



This year our school's theme was innovation. We took this to heart as it was fundamental to the project work we asked the girls to do.

We ended up with many and varied project choices, but all had to be an innovated solution to an existing problem in the community.

This year student-interest project work was only part of a very busy course.

Next year a Year 9 elective will be introduced allowing skills to be taught over a 2 year period.



It is hoped that in the future students will have time to see their innovative solutions for real life problems realised.

This year we were too ambitious. The project work ended up being a smaller aspect of the course than we initially intended.

Next year the STEM elective we be introduced to Year 9, allowing skills to be taught over a 2 year period.

It is hoped that in the future students will have time to complete more of their project. This being said, we entered three of our projects into the Community Problem Solving section of Future Problem Solving Competition and all three projects placed.

Two of our students place 1st in the senior teams event, and our two individual students took out 1st and 2nd place in the senior individual event. All four students have been asked to represent Australia at the International Finals in the United States next June.

These projects and others are in the foyer, if you are interested.



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Thank you for listening.