



A PARTNER SCHOOL OF
**THE UNIVERSITY OF
 SYDNEY**
 STEM TEACHER
 ENRICHMENT ACADEMY

RIVERSIDE
 GIRLS HIGH SCHOOL

Volume II, Issue 1

Where to with STEM education 2016?

Riverside's classrooms are changing. Since our STEM journey began in 2014 our teachers have introduced more problem based learning activities. Our focus is now on Year 7 and 8 and developing more cross faculty projects with rigorous Maths components.

RIVERSIDE ANNOUNCED AS A STEM ACTION SCHOOL

We are proud to be one of only 8 schools in NSW selected from 60 applicants to be a STEM Action School for 2016-2017. We are recognised by the Department of Education as leaders in this approach to teaching and learning and a school that the department can look to for informing future initiatives.

Congratulations to our teachers who attended the STEM Enrichment Academy at Sydney University they are the key players in our STEM Action School plan. They will mentor final year pre-service teachers and early career teachers of science, technology and mathematics; they will share effective STEM pedagogy and illustrate innovative practice for student engagement in STEM. They will also demonstrate effective leadership, provide professional learning for schools across the state, focus on excelling in student career path planning and extend industry partnerships.

We have been recognised for having a clearly articulated STEM vision across the school. Our teachers demonstrate exemplary teaching approaches and are finding new ways to engage students. We are investing in high quality resources such as Lego Mindstorms for robotics, a 3D printer, Stemcell units to include more electronics in science, LED and conductive thread to illuminate textile projects and fast computers to run CAD and film production software programs.

But changing the tide to get more students, particularly girls, actively engaged in STEM skills and careers goes beyond the walls of Riverside.

We have partnered with local councils, businesses, universities and industry to bring the best knowledge to our students and to get our students out into the community and engaged in real-world experiences. Such partnerships also involve mentoring for our teachers, helping bring skills from industry into the education sector.

We are implementing innovation in STEM and can think of ourselves as a school preparing students for the future.

Where to with STEM Education.....cont.

At a national level, Australia is developing a STEM school education strategy and seeking the opinions of high profile scientists, manufacturers, professionals in STEM occupations and leaders in education.

At the recent STEM Education Summit, November 2015, the NSW Minister for Education, Adrian Piccoli, opened the discussion with a call to define the types of STEM skills young Australians need to thrive in the 21st century.

In this Edition:

Riverside announced as a STEM Action School

New way of teaching Maths

Riverside students learn Design Thinking with UTS



A PARTNER SCHOOL OF
THE UNIVERSITY OF SYDNEY
 STEM TEACHER
 ENRICHMENT ACADEMY

RIVERSIDE
 GIRLS HIGH SCHOOL

In this edition we will focus on two key skills from the summit: Mathematics and Design Thinking.

Mathematics is a core skill

Mathematical literacy in particular was identified as a core capability needed across the community, not just for STEM university graduates.

So being able to do Mathematics is as important as ever.

Did you know.....

The University of Sydney has decided that students will need a BAND 4, 5 or 6 in 2 Unit Maths before they enter first year science, engineering, commerce and IT from 2019 onwards.

What are Riverside's Mathematics teachers doing differently after the STEM Enrichment Academy training for 2 of its teachers?

The Mathematics faculty has moved to using more open-ended tasks to help students build problem-solving skills and to develop reasoning. Students use and apply mathematics to everyday situations and develop resilience in 'risk taking' to solve problems.

As a result, teachers are breaking down the barriers of the "I can't do maths!" and building the view of a growth mind set in mathematical skills, "I can get better at maths!" The textbook is being replaced with discussion and collaboration about possible answers to a problem. Teachers provide students *enabling* prompts to support those needing additional support and *extending* prompts to provide extension and enrichment for the more skilled.

Initially targeting Year 8 classes, this approach is now filtering across other junior years.

Students anecdotally say they are enjoying this approach and are feeling more confident with mathematics.

We are seeing a change.

In the problem solving sections in tests there is a significant increase in the number of attempts and different approaches students are taking to find a solution. There's visibly more writing on the page as students are spending more time 'working out' evidence in the spaces provided.

There has been a 20% increase in the selection of Mathematics for Stage 6 by Year 10 students; historically being around 68% of the cohort.

The STEM education summit identified eight themes which we will explore in the next few STEM newsletters. The first is *Skills for the 21st century*.

SUMMIT STATEMENTS

"We need to get the message out to people about the fact that many existing jobs require maths and technology skills."

'Students need the basics in problem solving which maths, physics and chemistry provides.'

"Many people going into vocational occupations weren't inspired in maths and science in school, they discarded it, stepped away from it... but they need STEM skills."



A PARTNER SCHOOL OF
THE UNIVERSITY OF SYDNEY
 STEM TEACHER
 ENRICHMENT ACADEMY

RIVERSIDE
 GIRLS HIGH SCHOOL



"The Design Thinking workshop has really developed my critical thinking skills and further developed my teamwork skills. This experience has really benefited me and prepared me for Senior School. It was definitely a blast!"

Madeline yr 11

"I enjoyed the practical aspect of the day. It made me aware of my thinking pattern. It was a very new and exciting experience."

Hannah yr 10

Participation in Competitions for Mathematics

- *Maths Olympiad* targeting GATS: 30 students in both years 7 and year 8; and
- *Maths Challenge Day* run by Lachlan Macquarie College for gifted Mathematics students; two teams of 4 students. One Riverside team won the construction challenge; and
- *Australian Mathematics Trust Competition* sponsored by Commonwealth Bank for top year 7 & 8 students; 58 students entered.

Extra – curricular events for Mathematics students

- *World of Maths Day* incursion Sept 2015. 150 year 8 students engaged in hands-on & real world challenges; and
- *Mathematics Association of NSW Fun Day* at Luna Park for 145 year 8 students.

Students Embrace Design Thinking

Design thinking is a tool that is used by companies around the world, like Apple, Google, Commonwealth Bank of Australia to name a few, and encourages people to think of problems laterally and in a holistic manner. Design thinking also puts an emphasis on the process rather than the finished product.

The University of Technology Sydney invited Riverside students to explore Design Thinking in their collaborative workspace for student entrepreneurs, called 'The Hatchery'.

UTS: Hatchery coaches guided the group through core design thinking techniques from Empathy and Ideation to Prototyping and Testing.



A PARTNER SCHOOL OF
THE UNIVERSITY OF SYDNEY
 STEM TEACHER
 ENRICHMENT ACADEMY

RIVERSIDE

GIRLS HIGH SCHOOL

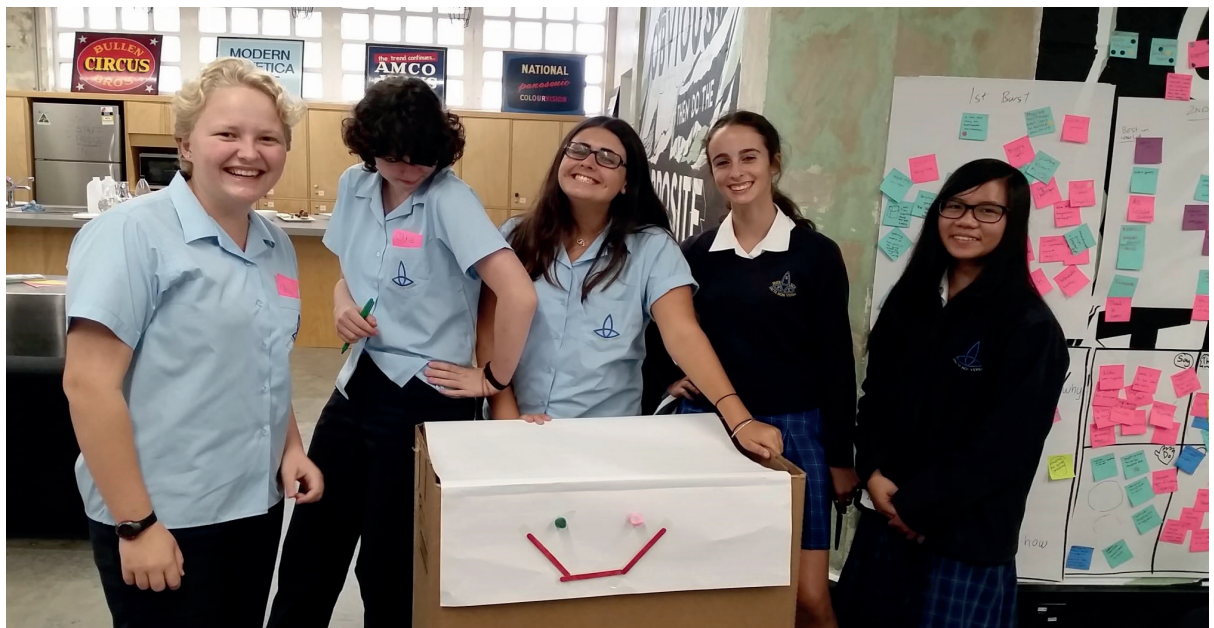


“Faculties are often asked to nominate ‘stand-out’ students or students with potential who would benefit from the opportunities offered by universities to inspire students to experience, with the intention of going on to study, STEM activities. So class participation, class discussion, enthusiasm, aptitude and interest for the subject, meeting homework & assignment deadlines all play a big part in ‘standing out’ or demonstrating potential!”
 Ms Warzecha

“How might we increase recycling amongst young people?” was the problem Riverside students tackled using the design thinking process. The students developed prototypes of their suggestions.

One design included a bin shown below that compliments those who throw recycling in and throws back the article if it is not recyclable (perhaps with a shameful throwaway line). The prototypes didn’t have to be feasible but had to address the feelings and needs of the user. Students learnt how to ask questions of users so they would be empathetic of their needs and feelings during the design process.

“My daughter found it to be an incredibly valuable experience and we are delighted and very grateful that the school was able to provide the opportunity for students to be exposed to such a progressive program at this formative stage in their learning.”
 Parent yr 9 student





A PARTNER SCHOOL OF
**THE UNIVERSITY OF
 SYDNEY**
 STEM TEACHER
 ENRICHMENT ACADEMY

RIVERSIDE
 GIRLS HIGH SCHOOL

Changing student mindsets

It was inspiring to hear students after this workshop at UTS describe themselves as ‘designers’. Before the workshop, they described themselves as creative thinkers. This label changed to ‘designers’ who could create solutions to a real world issue through the process of design thinking.

By the end of the day, all 20 students considered themselves to be designers and very creative.

Accompanying teacher, Ms Warzecha said, “‘The Hatchery’ workshop allowed students to have a discussion based on trust to be able to listen to each other and at times alter their opinions. They were able to say, ‘I’ve opened my mind to something new’ and this after all is the basis of innovation.”



“I sometimes feel alone in the ways I think but in a place like this, you feel less alone. Everyone’s so connected.”

Zoe yr 10

More news about STEM in education:

There are several new initiatives and changes in the STEM education space for 2016:

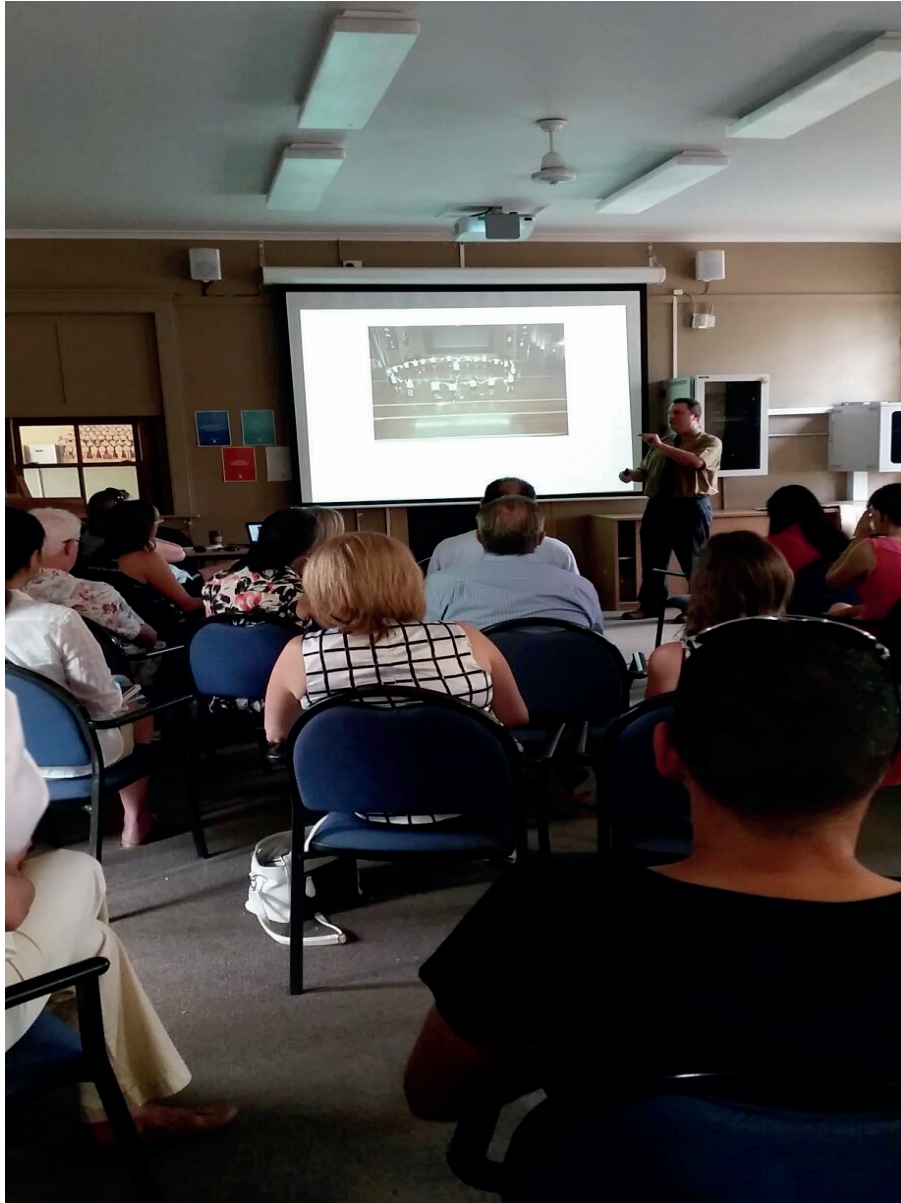
- BOSTES (The Board Of Studies) is developing STEM support materials for release during 2016;
- ACARA will share the outcomes of their STEM Connections project in 13 schools across Australia; and
- Prof. Alan Finkel has started in his role as the Chief Scientist of Australia.

We were delighted to have 30 parents at the STEM morning tea for term 1 to hear how Mathematics is going ahead with the STEM approach to teaching.



A PARTNER SCHOOL OF
THE UNIVERSITY OF
SYDNEY
STEM TEACHER
ENRICHMENT ACADEMY

RIVERSIDE
GIRLS HIGH SCHOOL



Our next STEM morning tea is on Week 4 of term 2, Friday May 20th, from 9 am to 10am.

This will include a hands on activity using new resources donated by our P and C. More later.....