Exciting teaching tools for STEM students

Thomas Kuys, Phillip Kuys and Thomas Moyle with their STEM project

A new interactive teaching resource, STEM Teaching Activity Platform, or STEMTAP for short, was developed by young and enterprising final engineering students from Adelaide University. It was presented as their final year project at the University's Ingenuity engineering expo last October. The group of engineers was sponsored by the Advanced Technology project

The students Thomas Moyle, Thomas Kuys, Gwilyn Saunders and Phillip Kuys were awarded Best Mechanical Engineering Project at the Ingenuity expo for STEMPTAP, which provides a standard digital and physical platform for teaching a wide range of STEM topics for students in years 5 to 10.

The young engineers have gone on to form MK2 Engineering Solutions, a company whose goal is to engage and inspire Australian primary and secondary school students in STEM.

"We think STEMTAP will be a valuable and affordable resource for schools wanting to expand their STEM curriculum," Thomas said.

STEMTAP has 4 main components: activity platform, activity modules, software and learning guide.

The activity platform is a physical platform with embedded electronics that allows 'plug and play' connectivity of activity modules. These consist of 3D printed housings with embedded electronic components and dedicated control circuitry. The modules can be designed to be virtually anything to teach a variety of STEM subject matter, including enabling students to design and make their own 3D printed housings, assembled with STEMTAP electronics.

The activity platform and activity modules are controlled by a graphic user interface or by code, dependent on the desired learning outcomes. The learning guide assists teachers with STEMTAP's operation and details lesson examples that align with the Australian Curriculum. The learning guide also details how activities performed with STEMTAP are relevant to the real world.

Thomas explained further that the 4 components of the STEMTAP system combine to provide students with "a unique and exciting learning experience". The resource can be used to teach most of the Australian STEM curriculum, including new additions such as coding and digital technologies.

"STEMTAP is also very helpful for teachers, especially those teaching out of their usual field or who may be inexperienced," he said. "The use of a teaching system with a standard base allows students and teachers to become familiar with the resource as they learn and improve."

Robotics and the Andy Thomas Scholarship

Student Alexandra Schutz is Pedare College's second recipient of the Andy Thomas Scholarship, offered by the University of Adelaide to one student who has demonstrated outstanding academic merit each year.

Students are invited to apply for the scholarship based on their ATAR and course selection of a Bachelor of Engineering (Mechanical, Mechatronic or Mechanical and Aerospace) program at the university. The student's leadership qualities and extra-curricular involvement during their studies are also taken into account.

In February 2016, Alex applied for the Andy Thomas scholarship as she was keen to study mechatronics, which would allow her to explore engineering pathways to apply her love of mathematics in more depth.

Pedare College began developing STEM initiatives through the technology learning area and purchased a class set of LEGO NXT sets with some of the initial ATP budget.

STEM units were developed using the programming of the robots designed in technology classes to collect data for maths and science problems in the middle school. Students also had the opportunity to become involved in the First LEGO League competition as an extra-curricular activity.

Alexandra participated in the robotics classes, competed in the First LEGO League and then went on to mentor this year's students with the First Robotics competition. She also attended university visits and competed in mathematical and science competitions.

After winning the scholarship, Alex said that Pedare should be known as a math and science school.

"Pedare has consistently achieved high results in these areas. Students at Pedare are given lots of support from friendly staff who encourage students to achieve their best and offer extra support after school, such as maths help, as well as improving the infrastructure, and providing new, inspiring science laboratories," she said.

"Senior students feel that their teachers are passionate in their fields and easy to communicate with, which is reflected in a positive class atmosphere that encourages camaraderie and keen student interest."

The continuity of effective maths teachers through the senior years and the opportunity to be 'fast-tracked' in certain subjects has also had a positive impact on students' pathways at Pedare.

When asked how she felt about winning the scholarship, Alex said, "I am excited to be recognised for my talent in academic subjects and will now have lots of opportunities to meet people in industries. This puts credit to my name."

Alexandra is looking forward eagerly to participating in functions and marketing for the university. The Andy Thomas Scholarship provides an allowance of $6,000 per year in addition to tuition fees.