New Defence Pathways Programs

The Advanced Technology Industry School Pathways Program and the Maritime High School are providing students the opportunity to learn skills for careers in the growing defence and maritime industries in South Australia.

Nineteen schools participating in the project are clustered together in the northern, western and southern metropolitan regions to share resources and services. Henley High School, Aberfoyle Park High School and Valley View Secondary School are the lead schools and St Patrick’s Technical College is a curriculum focus school.

Le Fevre High School which is a partner school in the Western Adelaide region is the lead Maritime High School.

Hamilton students blown away

Year 9 students from Hamilton Secondary College who designed, manufactured and tested their own wind turbines have become the first group of secondary students ever to display a project at the University of Adelaide’s 2011 Mechanical Engineering Expo (also known as MechExpo) for mechanical engineering honours students.

“Students were set the task to design and build a model of a wind turbine to be highly efficient and produce the highest power output,” explained Ms Karen Palumbo, Key Teacher of the Advanced Technology Project at Hamilton Secondary College.

“They worked in small groups to build their wind turbine in Design and Technology, test their turbines in Science and then statistically analyse their results in Maths with the aim of constructing the most efficient turbine.”

Students researched horizontal and vertical axis wind turbine designs and experimented with two- and three-blade models. They produced a series of annotated sketches to develop their design ideas.

“The key difference between the student turbines was in the blade design. Students designed an airfoil using an industry-standard computer-aided design program and then manufactured their designs with a laser cutter”, said Karen.

The students then tested their wind turbines in University of Adelaide’s wind tunnel facilities in the School of Mechanical Engineering.

Sophia Li was awarded with the best turbine design on the day by the Centre for Energy Technology and the School of Mechanical Engineering. Sophia was presented with her awarded during the awards ceremony at the Mechanical Engineering Expo at Wayville Showgrounds on 27 October 2011.

Hamilton is one of 19 schools participating in the South Australian Advanced Technology Industry School Pathways Program. The project is aimed at increasing student interest in the study and employment opportunities available to students who study science, technology, engineering and maths (STEM) at school.

“At the MechExpo, students were asked questions by many academics, the general public and other school students; all of which were impressed by the students explanations as well as the project itself”, Karen said.

“I believe the project was a huge success and look forward to involving more students from Hamilton in the Renewable Energy cross-curricular project in years to come. The Integrated Renewable Energy Project draws upon the overlying social issue of climate change and encourages students to look at ways to build a more sustainable future”, said Karen.
International award for Aberfoyle science students

Early in 2011, Aberfoyle Park High School was one of only two Australian schools invited to the Singapore International Science Competition. Fifty schools around the globe took part in the competition.

In May, the Principal, Ms Elizabeth Mead, physics teacher Ms Donna Riordan, and three students journeyed to the National Junior College, Singapore, which hosted the competition.

Donna explains, “With only three months lead time, we had to produce a poster of scientific research done by the students themselves. The students, Jack Mesecke, Bailey Nassau and Joshua Peters had a crash course in research methodology and how to write it up for publication.”

The Aberfoyle Park students produced the poster ‘An investigation of the relationship between local meteorological factors and the peak performance of a photo-voltaic array’ and prepared a 10-minute presentation about their research to present to the judges. They also answered questions about the project.

“They efforts were rewarded with a distinction (only one of four awarded at the competition) and a medal each, which was well deserved for all their hard work and dedication,” said Donna.

“They also participated in a Design and Build Challenge and a Future Problem Solving Challenge, and came home with many new friends,” she said. “This event really gave the students a deeper appreciation of science, mathematics and the role of research in solving future and current problems, as well as the global language of science and maths.”

Student Jack Mesecke summed up their experiences: “When we first arrived in Singapore I was completely amazed, everything was so different, it was so clean and everybody was so polite. The climate was very different to what we have here in Australia. We quickly settled in and enjoyed the company of students from all around the world… During our stay we got the opportunity to experience several keynote speeches by world class scientists and the opportunity to visit international corporations like A-STAR (Association of Science, Technology and Research), which was an amazing experience. The trip was great fun and gave me a once-in-a-lifetime experience I will never forget.”

2011 University of Adelaide - Mechanical Engineering Exhibit

The University of Adelaide’s Mechanical Engineering Expo provides a great opportunity for students and teachers to interact with the mechanical engineering final-year honours students to view and discuss their final-year project.

More than 80 advanced technology students were involved in the Expo in October 2011.

Each exhibit represents a culmination of a full year’s work by the mechanical engineering students and reflects the diverse opportunities available in the field of engineering.

The Expo featured displays from the following fields:

- robotics, automation and control
- material science
- aerospace and vehicle
- sports and biomechanical
- sustainability and environmental.

The aim of the visit by students was to investigate the range of engineering career pathways, tertiary studies, skills and teamwork required for the final-year honours project. This experience helps students connect real-world engineering applications with the study of science and mathematics.
As a ‘curriculum focus’ school in the Defence Materiel Organisation-funded Advanced Technology Project, St Patrick’s Technical College has developed an applied engineering course that provides opportunities for students studying an industry skills pathway to access higher standards of mathematics and science. These subjects enable pathways into trade or a tertiary qualification.

The applied engineering course has proved very popular in the initial year with Stage 1 enrolments increasing from 14 to 19. Projected enrolments anticipate an increase to 24 students and an additional 12 students continuing their applied engineering Stage 2 course in 2012.

Celina Bolding, the Advanced Technology teacher at St Patrick’s says that “students, families and employers are increasingly seeing the value of a dedicated trade-focused college like St Patrick’s. Our applied engineering program, which provides students with the ability to pursue a tertiary pathway to complement their technical training, has undoubtedly enhanced our reputation with these stakeholders. ”

Alexander Nikielski won the Trade Schools for the Future 2011 School-based Apprentice of the Year. Alexander is undertaking a Certificate III in Electrotechnology at St Patrick’s Technical College and is employed by Broens Industries Pty Ltd. Alex was the sixth finalist in the school-based apprentice category from St Patrick’s in the past four years.

Terry Neville, Deputy Principal of St Patrick’s commented that, “Our employer network has been valuable in helping to secure apprenticeships for students such as Alex, as well as helping them to complete their SACE by tailoring their education to their needs and those of the workplace. In the coming years we look forward to seeing graduates of the applied engineering program opting for a university pathway to go along with the 75% of graduates currently exiting directly into apprenticeships.”

Henley High School has seen a significant increase in the number of students electing to study science and advanced technology in 2012 and this reflects the successful achievement and progress of the project at Henley. For the first time, the school has two (Stage 2) physics classes next year. In addition, a Year 10 advanced technology course will increase from one class in 2011 to three classes in 2012.

The Principal of Henley High School, Ms Liz Schneyder believes the main reason for the increase in numbers is the enthusiasm shown by the young group of science, maths and technology teachers involved in the advanced technology project.

Liz also says “Henley High School’s success is also due to the management of the Advanced Technology Project by Assistant Principal Brenton Evans.”

Brenton has been involved since the start of the project in 2010 and comments that “the Advanced Technology Project has provided the school with a focus and more importantly support for professional development and curriculum change in areas of maths, science and technology. The professional discussions between teachers that have occurred have inspired change and have led to the development of a more engaging curriculum.”

Adam Spencer a young science and mathematics teacher at Henley High School says that he believes the project’s success “can be attributed to allowing students to experience practical exposure to how mathematics and science learning is applied in innovating ways.”
The Advanced Technology Industry School Pathways Program encourages and supports project schools to develop sustainable and meaningful partnerships with local industry. This involves developing a memorandum of understanding that provides a framework within which schools and employers can work effectively together.

Memoranda of Understanding clearly set out a broad range of opportunities for schools and industry to work together and develop vocational learning across the academic and vocational curriculum.

Some examples of developing partnerships include:
- Henley High School and Hendon Semiconductors
- Valley View Secondary School and Lockheed Martin
- Aberfoyle Park High School and Kadego
- Le Fevre High School and the Australian Maritime College.

Lockheed Martin, an international engineering company, trialled with Valley View Secondary School ‘Engineers in the Classroom’ (EIC) program, a successful program run by Lockheed’s parent company in the United States. EIC is a practical-based program that provides students with the opportunity to explore different aspects of engineering design, development and testing. Activities involved three 90-minute sessions about areas of software engineering (presented to 17 Year 11 mathematics students); mechanical engineering (presented to 16 Year 9 SOSE students); and aerospace (presented to 21 Year 9 science students). Four engineers and a human resources person from Lockheed Martin helped to design, prepare and implement the three components of the program.

Mr Bob Haskard, Lead Teacher at Valley View said that, “Lockheed Martin has been instrumental in supporting the Advanced Electronics Trade Training Centre Laboratory at the school, by providing expert and timely advice regarding the layout and equipment needs and in addition are working with us to produce industry standard electronics programs”.

Similarly, the personnel from Lockheed Martin identified the value of the partnership around the positive public relations and branding as an industry leader as well as the personal development of engineers involved around mentoring skills, presentation skills, interactions with teachers and students, and being role models for the students.

Bob added that in relation to the EIC program, “Lockheed Martin worked with our teachers to develop workshop sessions for students in aerospace, mechanical and software engineering disciplines. The programs were a great success and teachers are embedding ideas in mathematics, science and technology programs for 2012,” he said.

The EIC sessions were presented by young engineers who spoke about their educational pathways and how they came to be employed at Lockheed Martin.

The Advanced Technology Pathways Broker works with Industry Skill Managers to support schools to broker partnerships with suitable employers that match school and regional needs.

For more information, contact the Advanced Technology Project team on 8226 3633.
Student scholarships in maths, science and technology

With a goal of encouraging students to pursue tertiary study and careers in mathematics, science and technology, Advanced Technology student scholarships were announced in Term 4 of 2011.

The scholarships will support the student to:
- investigate a topic or issue within science, mathematics and or technology
- collaborate with a university and or industry mentor
- pursue a career pathway in the defence industries.

Financial assistance will be available to students for travel and other related expenses. Students will be assisted to establish suitable university and or industry mentors.

For more information, contact the Advanced Technology Project team on 8226 3633 or visit http://dlb.sa.edu.au/atmoodle

Professional development showcase

A final presentation day was held in August 2011 at the Education Development Centre to showcase the five-day professional development program delivered by the Australian Science and Mathematics School. More than 80 teachers participated in the program. At the presentation day, teachers presented their interdisciplinary middle school units of work developed in terms 1 and 2, which were trialled during terms 3 and 4 in 2011. A pre and post evaluation for teachers and students will gauge their level of understanding of the defence industries, advanced technologies and attitudes to the importance and teaching of science, maths and technology.

The purpose of the program is to provide teachers with industry background information and context, and to develop an interdisciplinary middle school learning and teaching approach. The inquiry-based units of work will be published on the Advanced Technology Moodle http://dlb.sa.edu.au/atmoodle

Industry work placements for teachers

One of the aims of the Advanced Technology program is to develop stronger industry links with schools. Teacher industry placements provide opportunities for teachers to get out of their classroom and experience life in industry. Wherever possible the placement needs to be tied to an industry that has commonalities with defence-related industries.

By placing teachers in work placements within relevant industries, we hope to build:
- sustainable partnerships between education (the school or region) and industry
- science, mathematics and or technology curriculum resources that can be directly used and shared across the Advanced Technology project schools.

So far, seven teachers from program schools have applied for an industry work placement. We are working on refining the expected placement outcomes and arranging suitable industry placements.

For more information, contact The Advanced Technology Project team on 8226 3633 or visit http://dlb.sa.edu.au/atmoodle
Maritime High School initiative

The Maritime High School initiative is attached to the Advanced Technology Industry School Pathways Program and is based at Le Fevre High School in the Western Adelaide Region.

The Advanced Technology Western Adelaide lead school based at Henley High School and Le Fevre High School are working together to establish future advanced technology and maritime industry pathways for their students. From Term 2 2011 onwards a variety of maritime pathways have been scoped for students from the Western Adelaide Region.

In August 2011, a successful maritime careers seminar was held in conjunction with Western Futures and Le Fevre High School at the Lakes Resort, West Lakes. Schools from the Western Adelaide Region were represented by principals, key teachers, students and caregivers. In addition an extensive range of maritime and defence industries and key speakers were represented on the night to provide the audience with a overview of the maritime careers, job opportunities and skills required in this area.

Mr Art Shrimpton from the Australian Maritime College (AMC) conducted ‘Applying Maths in Maritime Engineering’ workshops to 120 students and 30 teachers from the Advanced Technology schools during September 2011. The workshops were supported by Natalie Hills, Marketing and Academic Officer, Flinders University to promote maritime pathways, and the 2 + 2 Maritime Degree partnership between the AMC and Flinders University.

Involving TAFESA, defence and local marine Industries, a successful five-day Maritime Taster program that explored maritime skills and career pathways for 17 students from the Western Adelaide Region was held in September 2011.

Students experienced a range of industry pathways that apply to maritime at Regency TAFE including pneumatics, fabrication, electrical, computer-aided manufacture and sheet metal. Students then spent a day immersed in local maritime industries and history that included visits to the Australian Submarine Corporation, Maritime Museum and a local boat builder Theodore Marine on the Port River.

From Term 1 in 2012, students will be able to enrol in a new Maritime Engineering Pathways Program based at the new Le Fevre High School Trade Training Centre.

The Australian Maritime College and Le Fevre High School signed a memorandum of understanding (MOU) on behalf of the Western Adelaide schools. The general intention of the MOU is for the Maritime High School and the College to promote maritime industry pathways plus explore educational and training opportunities for students in the Western Adelaide Region.

Evaluation will guide future directions

Flinders Centre for Science Education in the 21st Century has been contracted to evaluate the Advanced Technology Industry School Pathways Program.

To date, the Program schools have been supplying quantitative data at the end of each semester for years 8-12 students’ achievements and participation in maths, science and technology.

The qualitative evaluation aims to gather information about the teaching of science, mathematics and/or technology along with teacher perceptions about the professional development being provided as part of the program. It involves online surveys and face to face interviews.

Captured in this way it will be possible to compare baseline data with the longitudinal data for cohorts of students collected over the duration of the program. Importantly, interim reports completed each year will provide recommendations and insights to the Advanced Technology Program that will guide future directions.

Dates for Term 1 2012

- Friday 10 February - Week 2: Semester 2 Quantitive data due
- Wednesday 29 February - Week 5: ATP Key Teachers (all schools)
- Wednesday 14 March - Week 7: ATP PD (SOUTHERN SCHOOLS)
- Friday 16 March - Week 7: ATP PD (NORTHERN SCHOOLS)
- Tuesday 20 March - Week 8: ATP PD (WESTERN SCHOOLS)
- Wednesday 28 March - Week 9: ATP PD (NORTHERN SCHOOLS)
- Friday 30 March - Week 9: ATP PD (SOUTHERN SCHOOLS)
- Monday 2 April - Week 10: ATP PD (WESTERN SCHOOLS)