SELP Case Study Executive Summary; Promoting STEM Careers

Dr Rogan Tinsley - Blackwood high School

Purpose:
To increase student awareness of STEM careers.

Student Cohort:
This study used a cohort of 24 Year 8 students, and would be generally applicable to students in years 7-9.

Description:
Three strategies were used to promote awareness of and aspiration towards STEM careers. Data on STEM career awareness were collected using pre- and post-intervention surveys.

The interventions included:

1. **Instruction focussed on the “Science as a Human Endeavour” strand of the Australian Curriculum.** Specifically, learning activities and tasks drew on my experience from my industry placement and previous career as a research scientist. Activities were designed to focus on applied aspects of Mathematics and Science. A guest speaker from the mining industry visited the class.

2. **Inclusion of an eight-week cross-curriculum unit on forensic science.** I have taught this unit previously, in which students work through evidence from a crime scene, using mathematical and scientific skills. They also explicitly learn the role of these disciplines in police and forensic work.

3. **STEM careers promotion using RiAus STEM Career Packs (Mining and Forensics) to increase student awareness of career pathways.**

Links to the Australian Curriculum

Content during the interventions was draw from both Mathematics and Science:

**Mathematics (Year 8)**

- Choose appropriate units of measurement for area and volume and convert from one unit to another (ACMMG195)
- Find perimeters and areas of parallelograms, trapeziums, rhombuses and kites (ACMMG196)
- Investigate the relationship between features of circles such as circumference, area, radius and diameter. Use formulas to solve problems involving circumference and area (ACMMG197)
- Solve problems involving duration, including using 12- and 24-hour time within a single time zone (ACMMG199)

**Science (Year 8)**

- Sedimentary, igneous and metamorphic rocks contain minerals and are formed by processes that occur within Earth over a variety of timescales (ACSSU153)
- Multi-cellular organisms contain systems of organs that carry out specialised functions that enable them to survive and reproduce (ACSSU150)
- Science and technology contribute to finding solutions to a range of contemporary issues; these solutions may impact on other areas of society and involve ethical considerations (ACSHE135)
- Science understanding influences the development of practices in areas of human activity such as industry, agriculture and marine and terrestrial resource management (ACSHE136)
People use understanding and skills from across the disciplines of science in their occupations [ACSHE227]

Summarise data, from students’ own investigations and secondary sources, and use scientific understanding to identify relationships and draw conclusions [ACSI145]

Communicate ideas, findings and solutions to problems using scientific language and representations using digital technologies as appropriate[ACSI148]

Key Findings:
Comparison of the pre- and post-intervention data revealed several important outcomes. Following the interventions:

1. Students were aware of a greater number and diversity of STEM careers.
2. Students moved from generic terms (“scientist”, “mathematician”) to more specific terms (“coroner”, “geologist”, “palaeontologist”)
3. Students showed a marked appreciation of the requirement for STEM skills across career sectors.

Identified Issues:
While results from this limited case study were very encouraging, the specific interventions may be difficult to transfer to other contexts or scale up. Rather, it is recommended that the key approaches are adopted. These approaches (as well as their limitations) are listed below:

1. Increasing the use of Science as a Human Endeavour in the curriculum
   Issue: Most teaching resources focus on the content areas and inquiry skills. More need to be developed for this important strand.
2. Linking task to careers, contextualising problem solving
   Issue: Again, resources need to be developed to help teachers with this. The RiAus STEM Careers Packs are an excellent start. Programs like the Industry Placement make this easier.
3. Humanising STEM through visiting professionals
   Issue: Students have a poor and/or inaccurate view of STEM professionals. Visits help to remove these misconceptions, but can be difficult to organise. Interviews linked to the RiAus STEM Careers Packs are again an excellent resource here.
4. Developing interdisciplinary units.
   Issue: Developing units across learning areas requires time set aside for teachers to work together.

Future Directions:
The interventions proved to be very effective at achieving the goal of increased STEM careers awareness. Data will be shared with both the Mathematics and Science & Technology Faculties at Blackwood High School, with the recommendation that similar interventions are including across all eight Year 8 Maths and Science classes in 2015.