HOW CAN ROBOTICS BE USED TO ADDRESS TECHNOLOGY KNOWLEDGE, SKILLS AND PROCESSES IN THE AUSTRALIAN CURRICULUM?

The Australian Curriculum: Technologies Foundation to Year 10[1] outlines the areas of knowledge, understanding, processes and production skills that all students are to study via the two curriculum areas Design and Technologies and Digital Technologies.

The Australian Curriculum: Technologies describes two distinct but related subjects:

- Design and Technologies, in which students use design thinking and technologies to generate and produce designed solutions for authentic needs and opportunities.
- Digital Technologies, in which students use computational thinking and information systems to define, design and implement digital solutions.

It is assumed that all students from Foundation to the end of Year 8 will study both subjects. Schools and their governing bodies will determine how best this curriculum can be implemented. Some schools may imbed the curriculum into existing areas of study from Foundation to Year 8 , then choose to offer Year 9 and Year 10 students the opportunity to study the Design and Technologies and/or Digital Technologies courses as stand-alone elective subjects (perhaps modified to suit specific technology contexts) or integrated into other subjects. Other curriculum delivery options may be implemented by schools in accordance with state and territory school authorities.

The following table[2] from the Australian Curriculum: Technologies outlines the focus of knowledge, understanding and skills across the Technologies learning area Foundation to Year 10.

Design and Technologies	Digital Technologies
Knowledge and understanding	Knowledge and understanding
Technologies and society • the use, development and impact of technologies in people's lives Technologies contexts • technologies and design across a range of technologies contexts	Digital systems • the components of digital systems: hardware, software and networks and their use Representation of data • how data are represented and structured symbolically
Processes and production skills	Processes and production skills
Creating designed solutions by: • investigating • generating • producing • evaluating • collaborating and managing	Collecting, managing and analysing data Creating digital solutions by: • defining • designing • implementing • evaluating • collaborating and managing

Students given the opportunity to participate in RoboCupJunior challenges in a supportive learning environment gain design and digital technology knowledge and understandings while acquiring the process and production skills listed below.

---

[1] http://www.australiancurriculum.edu.au/technologies
[2] http://www.australiancurriculum.edu.au/technologies/organisation/content-structure

RoboCup Junior Australia is a project-oriented educational initiative that supports local, regional and international robotic events for primary and secondary students. Teams work in a co-operative and supportive environment in three distinct challenges; Dance, Rescue and Soccer. The focus of RoboCup Junior is the development of teamwork skills as well as technical skill and innovation in an environment of participation, fun and excitement.

Students have the opportunity to show evidence of their learning through the completion of a log book that has been developed by RoboCupJunior Australia which incorporates the content descriptors found within the ACARA Australian Technologies curriculum.

As testament to these values and in recognition of the aims of the Australian Technologies Curriculum, RoboCupJunior issue certificates to teams in order to recognise

- Engineering Principles and Systems
- Materials and Technology
- Teamwork, Planning, Producing and Evaluating solutions
- Digital Systems

In addition to the above certificates, teams will be recognised for their contribution to the supportive learning environment fostered at RoboCupJunior events. Teams will have the opportunity to nominate other teams who have been supportive and helpful for the "Spirit of RoboCup Junior Honour Roll".

Teams that have demonstrated outstanding innovation will receive an Innovation award and their work will be published by RoboCup Junior Australia. They will also be invited to share their expertise at subsequent RoboCupJunior events and workshops.

RoboCupJunior challenges have been developed with different levels of increasing complexity so that primary and secondary students can choose to take up the challenge that best suits their own skill and interest level. The three challenges offered in Australian RoboCupJunior competitions (for various ages and levels of expertise) are Dance, Rescue and Soccer.

All students and teachers can participate in RoboCup Junior challenges. Both novice and experienced teams benefit from arranging local school tournaments and/or participating in local, zone, regional, state and National competitions. National champions are then invited to compete at an international level. Whilst the challenges have specific goals, the knowledge, process and production skills employed by students throughout their robotics journey has universal application. Students are encouraged to apply their RoboCupJunior experience to any other technological endeavours.