



The C2C Patron His Excellency Rear Admiral Kevin Scarce AC CSC RANR
Governor of South Australia with students at the November 2010 C2C Expo

What is Concept2Creation?

Concept2Creation (C2C) was launched in 2005 as a major workforce development project in Northern Adelaide for local students to develop career awareness, employability and entrepreneurial skills and engagement with science, maths and technology in a meaningful manner.

C2C is managed by NAMIG (Northern Advanced Manufacturing Industry Group) Inc, an Industry-led consortium of Advanced Manufacturing industries, government and education . NAMIG has a vision of *“Facilitating an enduring culture of industry engagement with education and training providers.”*

Since its inception over 5000 students and teachers from 20 schools have benefited from this project based learning initiative. The C2C suite of programs delivers projects with diverse orientations suitable for students at different year levels.

In 2011 expansion has commenced into regions outside of the northern suburbs of Adelaide.

Definition of Advanced Manufacturing

Advanced Manufacturing is the utilisation of enabling technologies, incorporating design and business process innovation to deliver high value-added processes and products in ways products that are novel and competitive.



What is Advanced Manufacturing?

There is considerable scope for students to learn and explore a broad range of industries if Advanced Manufacturing is to be defined as:

- Creates the design and manufacture of high value-add products and services undertaken by, or on behalf of, a broad range of industries, and/or
- The application of advanced concepts, technologies, processes, tools and engineering related services.

The Australian economy is striving to excel in the 'knowledge' rather than the 'labour' component of industry and a shrinking percentage of the jobs will require untrained labour. Therefore, the introduction to Advanced Manufacturing and Advanced Technology that is provided through C2C presents a great opportunity for students to become engaged in an authentic approach to learning.

What are the benefits of partnering with NAMIG?

C2C offers:

- Provision of models of project and problem-based learning for teachers and students, plus opportunities to adopt them in a supportive environment.
- Development and promotion of employability, enterprise, mathematics, science and technical skills in the pursuit of successful transition to Advanced Manufacturing.
- Introduction to Career Development planning for pathways into a broad range of Advanced Manufacturing industries. These might be at a trade, technical or professional level.

Why Advanced Manufacturing?

The significant emergence of the Mining, Defence and Clean Technology industries in South Australia heralds great opportunities across a range of Advanced Manufacturing and Advanced Technology industries.

All industries regardless of focus employ the greater proportion of their workforce in administrative service and support roles. The development of highly transferable employability and enterprise skills in an Advanced Manufacturing environment that is provided through the C2C programs should be a well respected credential for any student.

What is the C2C suite of programs?

C2C was introduced as a project-based activity whereby small groups of students used a project management process to develop a product or service from concept to creation. As this generated a range of responses from various participants, it is now being presented as a suite of programs that are complementary to the learning needs of students at various levels of learning.

The C2C suite of programs has the capacity to make significant contributions to all aspects of SACE and curriculum at lower levels of learning.

The C Program (Middle Years)

“C” as in “See” programs provide an introduction to Advanced Manufacturing. This can be:

- Tours
- Talks
- Simple tasks/projects

This program provides opportunities for students to be introduced to Advanced Manufacturing through assistance with tours, talks, simple projects and linkage with a participating secondary school. Some of these opportunities might be accessed through utilising other outreach programs. At this level projects remain largely teacher directed, but introduce the key processes that underpin all C2C projects. Short courses in some relevant skills are available through partnering tertiary institutions for Year 9 & 10 students of schools that are integrated with C2C in higher year levels.

The C2C Program (Year Ten)

- Student teams initiate and develop a concept using a project management approach.
- Assistance through tours, training and mentors.
- Scope for cross-curricular recognition.
- Presentation at expos

This program supports small teams of students to identify a concept for a product or service that aligns with Advanced Manufacturing and to then utilise a project management approach to create it. There is an expectation that tours, relevant training and mentorship by industry and tertiary education partners will be key component of the program.

The C2C+ Program (Year Eleven)

- Industry-developed project briefs.
- Student teams undertake a more advanced approach to projects compared to the C2C program.
- Assistance through tours, training and mentors.
- Industry induction and project appraisal.
- Scope for cross-curricular & VET recognition
- Presentation at expos.

This program provides small teams of students with a range of concept briefs that have been developed by industry partners. Using project management skills, plus training and mentorship, teams work to take the concept to creation.

The C2C² Program (Year Twelve)

Two possibilities:

- Extension of C2C+ or provision of other negotiated learning, relevant to Advanced Manufacturing that can be utilised within the students’ final year subjects or research projects.
- Assistance in preparation for further study or work through:
 - a) Leadership Training.
 - b) Preparation for BAE/C2C scholarship.

The C2C Similar Program (Year Ten –Twelve)

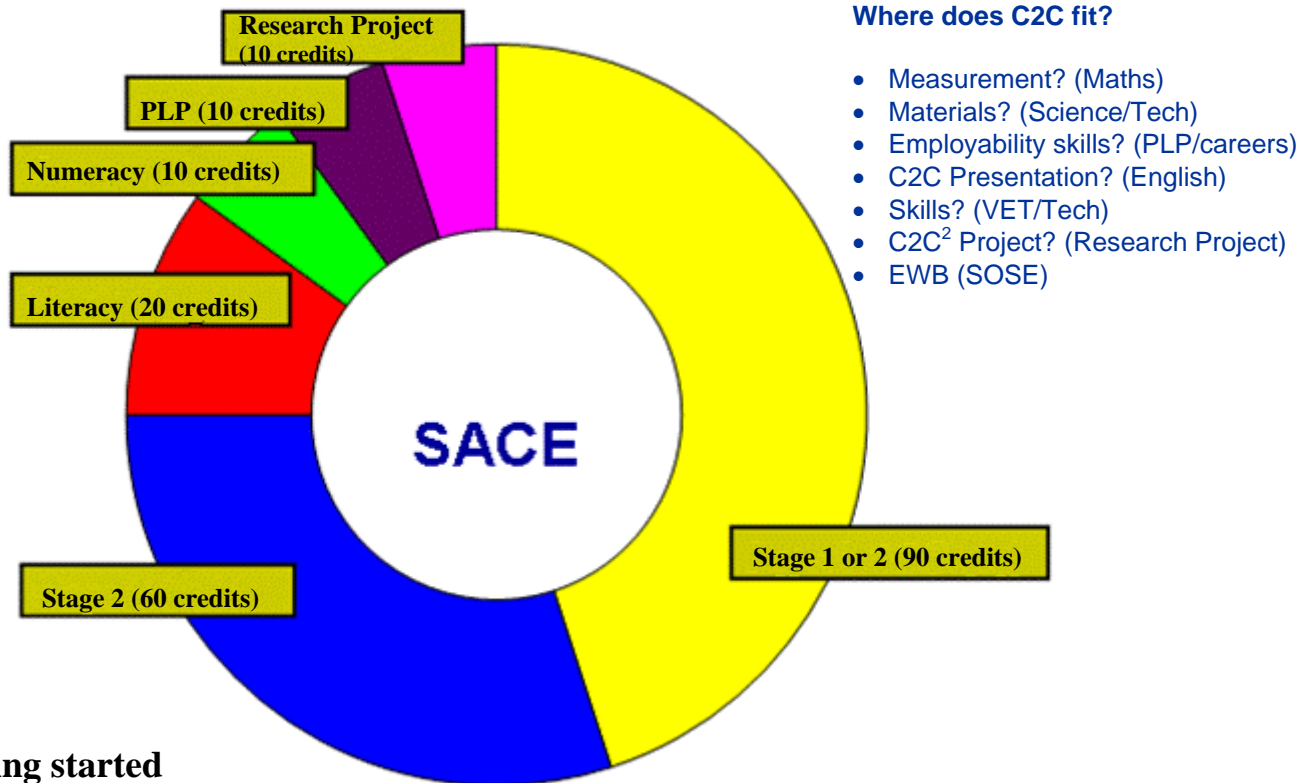
This option enables NAMIG to provide some assistance to schools that are currently conducting programs that are similar to the C2C suite of programs.

C2C is an ongoing career development process rather than a series of events

Where do components of C2C fit in your curriculum?

NAMIG acknowledges the need to align with SACSA and SACE frameworks *

* Note further suggestions for integration into curriculum within the Teacher Implementation Guide.



Getting started

The C2C Coordination Team is readily available to present or discuss the C2C suite of programs in more detail with school leaders and groups or individual teachers.

Considerable assistance is readily available to participating schools but the purpose for this funding must be respected and accessed appropriately. Therefore, a **Memorandum of Agreement** is established between NAMIG and the school to formalise a complete commitment to the program and recognition of the contributions that will be made by NAMIG and the school.

Preparatory training, tours and mentoring is provided for teachers and students and is regarded as an essential component of the preparation of programs. A Teacher Implementation Guide has been produced to assist schools and is available in hard copy and on the C2C website.

Programs would ideally be conducted over a minimum of one semester period. Many schools opt for the second semester which then provides ample opportunity for preliminary training and organisation in the first semester. However once established there are considerable benefits for schools to consider a first semester start. These include increased time, better access to mentors and scope for extension to avoid student disappointments from non-completion of projects.

Projects can be completed within one program but some schools are considering ongoing refinement and expansion of projects over subsequent years.

The accompanying checklist will clarify the process.

This checklist is provided to assist schools in delivering a C2C program.

Step	Action	Check
1	Gain & maintain awareness, comfort and commitment from the school community to participate in C2C programs. This could involve presentations, publications and initial use of the C2C website.	
2	Identify a member of the school leadership team (minimum Deputy Principal) to actively advocate the program and to maintain active membership of the NAMIECC leadership group.	
3	Identify and establish support for key teacher/s to develop and deliver the school program and be a representative on the C2C Key Teachers Group.	
4	Establish a school-based C2C Teacher Group.	
5	Identify outcomes sought from the program.	
6	Map opportunities for delivery of C2C programs across curriculum and year levels. In particular, link to the PLP, projects and other components of SACE, plus scope for VET recognition.	
7	Recognise the designated year level for each type of C2C program.	
8	Evaluation of operational considerations--Site, Timetable, Staffing, Tours & Transport, Training & Support and Time Allowance (at least 10 project weeks after preparation)	
9	Provide professional development and support for participating teachers.	
10	Specific introduction of C2C to students.	
11	Lodgement of MOA with NAMIG, including an accurate nomination of student numbers and realistic budget. *	
12	Inform parents/guardians and obtain clearance for participation, travel and use of student images.	
13	Conduct & Submit Pre-program Surveys of students and staff. *	
14	Identification of chosen programs/projects and at least one full semester to stage the program/project.	
15	Ensure projects have transparent links to Advanced Manufacturing.	
16	Establish relationship with designated mentors and other partners through an introductory meeting and initial analysis of student concepts, followed by development of a meeting schedule for the duration of the project	
17	Ensure projects are structured to ensure that all participants experience all aspects of the Project Management Process and that student teams have a work schedule/time line established.	
18	Confirm & Complete tours, workshops and other training for students with C2C Coordination Team. *	
19	Advise NAMIG of any changes in participation levels.	
20	Complete & Present projects, including reports/evaluations, for school-based and C2C Expo.	
21	Submit final participation details to NAMIG and reimbursement claims to NAMIG. *	
22	Conduct & Submit Staff and Student Post Participation surveys. *	
23	Conduct an internal review of the program to establish continuous improvement and to establish that C2C is not just an event but that it is part of an ongoing Curriculum & Career Development process.	
24	Use the school review and/or C2C Focus Groups to inform NAMIG.	
25	Formally thank mentors and other partners.	
26	Celebrate & Publicise the experience.	

* Designated milestones that generate reimbursement and/or additional support for participating schools.

Strategic Industry Partners:

Active in the Governance Process as NAMIG Management Board Members as well as Operational Partners.

- Australian Industry Group
- BAE Systems
- Clipsal Australia Pty Ltd
- GM Holden
- WPC Consultants Pty Ltd

Operational Industry Partners:

Assist C2C activities through tours, projects, expert advice, mentoring and other activities for students and teachers.

- Adelaide Airport Corporation
- Air Warfare Destroyer Alliance
- Carl Zeiss Vision
- Coles Distribution
- Copeland Industries
- Defence SA
- Department for Transport, Energy & Infrastructure
- Flight Training Adelaide
- Futuris Automotive
- IMP Printed Circuits
- JS Sports
- Les Brazier Special Vehicles
- Lockheed Martin Australia
- Mincham Aviation
- Redarc Electronics
- Royal Australian Air Force
- Seeley International
- SMR International
- Sonnex Engineering
- Thiess Construction
- Toyoda Gosei Australia

Industry Associations:

- Australian Industry Group
- Defence Teaming Centre
- Innovate SA
- Technology Industry Association
- Manufacturing Industry Skills Advisory Council SA Inc

Funding Partner



Government of South Australia
Department of Further Education,
Employment, Science and Technology

Education Partners - Schools as at June 2011:

Providing representation on board, reference group, and project and curriculum groups.

- Aberfoyle Park High School
- Banksia International High School
- Cardijn College
- Christian Brothers College
- Christies Beach High School
- Craigmore High School
- Hamilton Secondary College
- Henley High School
- Mt Carmel College
- Ocean View High School
- Para Hills High School
- Portside Christian School
- Riverton & District High School
- Salisbury East High School
- Seaford 6-12 School
- Seaton High School
- St Mary's College
- St Patrick's Technical College
- St Paul's College
- Temple Christian College
- The Heights School
- Tyndale Christian School
- Valley View Secondary School
- Windsor Gardens Vocational College
- Xavier College

Other Education Partners:

- Association of Independent Schools SA (AISSA)
- Catholic Education SA (CESA)
- Dept of Education & Children's Services (DECS)
- Northern Adelaide State Secondary Schools Alliance (NASSSA)
- SACE Board of SA
- TAFE SA
- University of South Australia
- Flinders University
- University of Adelaide

Other Partners

- Aviation Industry Reference Group
- City of Playford
- City of Salisbury
- City of Tea Tree Gully
- Northern Futures Inc

We welcome the opportunity to add your organisation to this list

These challenging industry-designed projects are for year 11 students



Uninhabited Air Vehicle

The field of Uninhabited Air Vehicles (UAVs) holds great promise for accomplishing a wide range of exciting commercial & military missions. There is a need for highly reliable but lightweight sensory systems in order to test performance of these vehicles. Many recent advances in miniaturisation of sensors, computer processors, power supplies, and wireless technology can be incorporated into radio controlled air vehicles in order to develop these systems.



HOLDEN

GM Holden Project

Following on from the Vehicle Tracking System project held in recent years, a new C2C+ project is currently being developed.

BAE SYSTEMS

The Suburban Wetlands Acquisition and Telemetry System (SWAT)

The objectives of the challenge are to:

- Evaluate which vehicle would be best suited to this type of environment
- Design and implement a control mechanism for the vehicle.
- Design and implement data logging for position and water sample values.
- Ensure that any solution has a minimal environmental impact.
- Develop a test environment to demonstrate the capability.
- Present the data collected from the vehicle in a variety of forms.

We welcome the opportunity to develop a project for your school

C2C is an industry-led initiative designed to showcase Advanced Manufacturing and technology to school students.

C2C brings industry and education together, works on their behalf and achieves relevant objectives for each of these groups.

The in-kind contribution by industry, industry associations and tertiary institutions is currently matched financially by the South Australian Department of Further Education, Employment, Science and Technology.

C2C has a professional dedicated coordination team working with all sectors to ensure its success.

The C2C program offers engagement and hands on experience for students and teachers.

No other organisation has achieved such outstanding results with students in preparing them for their future.



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The GIVING:

NAMIG provides the following forms of assistance to enable schools for delivery of C2C projects.

- Professional Development Workshops for teachers. This includes day or part-day workshops that provide introductions to C2C projects, Project Management, Lean Manufacturing and Occupational Health & Safety, Systems Engineering (critical thinking) and other relevant topics that will enhance their preparation for delivering projects.
- Contributions towards TRT allowance for the above activities and participation in challenge components of projects.
- Student workshops in relevant topics that provide preparation for successful projects.
- Tours that create an authentic context for projects.
- Contribution towards transport to tours.
- Provision of some catering at student and teacher workshops and tours.
- A subsidy for each student undertaking a project at C2C and possibly higher levels of the program.
- Provision of project support through undergraduate and industry mentors and an online 'Ask An Expert' facility.
- An opportunity to present at a school and major C2C Expo held in November each year.
- A school plaque and awards to celebrate the experience.
- Opportunities for tertiary scholarships.
- Active relationships with industry and tertiary partners.
- Reimbursement for data collection and reporting.

The GETTING:

- Schools are required to complete a Memorandum of Agreement prior to commencement of the program or provision of any assistance.
- This MOA registers agreement that schools will undertake all components of a project. These include allowing a minimum of 10 weeks preparation prior to 10 weeks for project delivery, whole school commitment and support for the program, participation in workshops and tours, legitimate use of mentors and participation in the C2C Expo.
- There is also a requirement for schools to provide relevant representation at the occasional but highly important separate meetings of teachers and school leaders.
- NAMIG is required to submit prompt and comprehensive reports to its funding bodies. Therefore, participating schools are required to be supportive of this requirement to ensure that the program can be sustained.
- An important component of the program is the evaluation. This work is contracted to a reputed organisation and can generate information that can be utilised by all participants, particularly for continuous improvement, marketing and development of curriculum and teaching methodologies. Therefore, prompt and quality responses are required by schools in return for an incentive payment to assist with this task.