



Learning and Teaching Academic Standards Project

Engineering and ICT

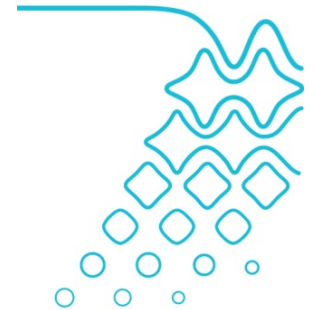
Roger Hadgraft, UMelb and Ian Cameron, UQ

ACDICT meeting, 17 Sept 2010

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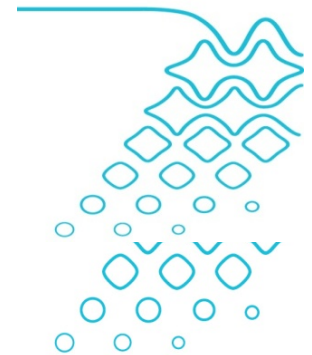
The Australian Learning and Teaching Council has received funding from the Australian Government for this project.
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Context



- New Higher Education Quality and Regulatory Framework
- Establishment of (TEQSA)
- To regulate the sector against agreed standards for higher education.
- Government committed to active involvement of the academic community in defining standards.

Drivers



- Increased and broader student participation
- Expanded set of HE providers
- ‘Brand Australia’
- Greater academic and professional mobility
- International quality trends: eg –
 - Tuning (Europe; Latin America) & Quality Assurance Agency (UK)
 - OECD Assessment of Higher Education Learning Outcomes (AHELO)
re generic testing www.oecd.org/edu/ahelo
- Sooth quality concerns (‘standards are falling’).
Outcomes focus to replace:
 - Reliance on inputs
 - Reliance on indirect evidence of output eg. student feedback

Standards Framework



TEQSA Registration

- Provider standards
- Qualification standards: AQF
- Information standards

TEQSA Quality Assurance

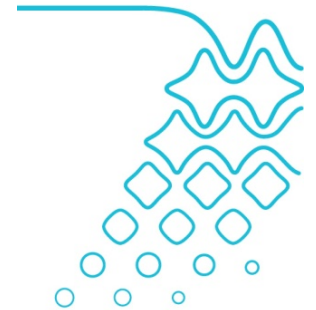
- **Learning and Teaching Academic Standards: Learning outcomes**
- Research standards: Excellence in Research for Australia Initiative (ERA)

Learning & Teaching Academic Standards Project



To define **threshold learning outcomes** for selected disciplines or programs as defined in the Australian Qualifications Framework (AQF).

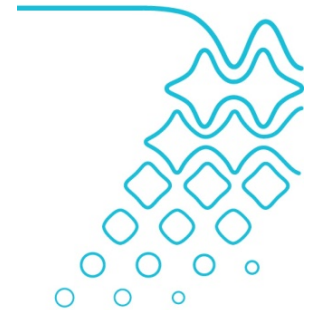
Project aims




- Facilitate discipline communities setting standards
 - Series of workshops around the country over the last 2-3 months
- Provide resources to inform institutional development of standards related processes.
- Provide resources to inform the new regulatory framework

5 major outcomes


1. Needs, Context + Systems
 - Understand the problem
2. Problem solving and Design
3. Abstraction and Modelling
4. Coordination and communication
5. Self management
 - and reflective practice



Domain	Rationale	Elements (Finer detail of Outcomes)
<p>Needs, Context and Systems</p>	<p>Recognizing, understanding and interpreting the socio-technical, economic and sustainability needs and the context of engineering and ICT challenges are vital aspects in the development of graduates. This capability of recognizing and contextualizing issues is also accompanied by the application of systems thinking which enables graduates to appreciate the individual components, interactions and functionality of a system within its environment.</p>	<ul style="list-style-type: none"> • Identify, interpret and analyse stakeholder <i>needs</i> and <i>establish priorities</i> within those needs. • Identify, interpret and analyse the <i>goals</i> of designed systems as well as the <i>interactions</i> within and between these designed systems and their contexts (social, cultural, environmental, business etc.), recognising inherent <i>uncertainties</i>. • Identify, interpret and analyse ethical <i>implications and accountabilities</i> of professional practice. 

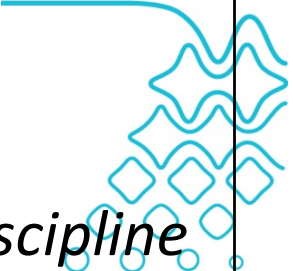
Problem Solving and Design

Engineering and ICT practice focuses on problem solving and design, whereby artefacts are conceived, created, modified, maintained and retired. Graduates must have capabilities to apply theory and norms of practice to efficient, effective and sustainable problem solution.

- **Apply** *problem solving, design and decision making methodologies* to develop components, systems and/or processes to meet specified requirements.
 - **Apply** *creative approaches* to identify and develop alternative solutions, concepts and procedures.
 - **Locate, evaluate, use and organise information** for both individual and group use.
 - **Practical skills** in operating equipment in the laboratory and the field
- 


Abstraction and Modelling

Decision making within engineering and ICT is informed by abstraction, modelling, simulation and visualization, underpinned by mathematics, basic and engineering sciences. Graduates must be able to model the structure and behaviour of real or virtual systems, components and processes.

- **Apply** *abstraction, mathematics and discipline fundamentals* to analysis, design and operation, using appropriate *computer software*, whilst ensuring the model's *applicability, accuracy and limitations*.
 - **Conduct** investigations of complex problems using *research methods*
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**Coordination
and
Communi-
cation**

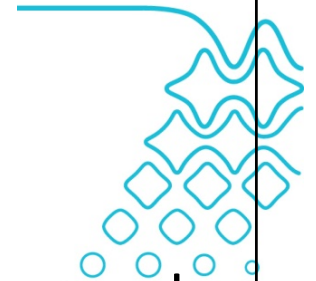
Engineering and ICT practice involves the co-ordination of a range of disciplinary and interdisciplinary activities and the exercise of effective communication to arrive at problem and design solutions.

- **Apply** basic tools and practices of formal *project management* to the planning and execution of a complex project.
 - **Function** as an *effective member or leader* of diverse teams, including those with *multi-disciplinary* and *multi-cultural* dimensions.
 - **Communicate** proficiently in listening, speaking, reading and writing English for professional practice.
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Self

Engineering and ICT graduates must have capabilities for self-review, personal development and life-long learning.

- **Review** personal *performance* and *capabilities* as a primary means of *planning* and *managing professional development*.
- **Manage** time and processes effectively: *prioritise competing demands* to achieve *personal and team goals and objectives*.



For each outcome ...



- **Where** is this outcome taught in my program?
- What are the outcomes at various **years/levels** of the program?
- **How will we assess** the outcomes at each year/level?
- What **evidence** will we show the accreditation agency?



Where to from here?



- Promulgate best practice teaching, learning and assessment materials
- Develop *rubrics* that document the required attainment
- Develop '*best practice*' teaching and learning resources
- Develop *communities of practice* around the TLOs
- *Research* how all of these steps can be integrated to deliver a higher quality educational system
 - Opportunities for future grant applications.

Summary



- Facilitate discipline communities setting standards – the learning outcomes
- Identify suitable evidence of the outcomes
- Encourage the sector to work together through shared resources and assessment tools





Thank you

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