Introduction to Competency Standards

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Competency

- A set of demonstrable characteristics and skills that enable, and improve the efficiency of, performance of a job

- The ability to perform the activities within an occupation or function to the standard expected in employment
  - Encompassing all of the attributes required for professional practice such as
    - Knowledge,
    - Skills, and
    - Attitudes

(Australia National Training Board, 1992)

~~Competency = Skills~~

- Skills are learned
- Competencies are inherent qualities an individual possesses,
- or needs to possess in order to function well and effectively

Competencies

Skills

- To that we need to add
  - Communication;
  - Collaboration;
  - Critical Thinking; and
  - Creativity

What is Competence

- Competence is a measure of ability
- Regardless of how that ability has been acquired
- Any form of competency assessment must be capable of assessing whether an individual actually has the attributes without prescribing how they have been developed.

Work to date

- Engineers Australia

- Washington Accord – Professional engineer
- Sydney Accord – Engineering technologist
- Dublin Accord – Engineering associate.

Work to date

- Engineers Australia
  - Competency standards for
    - Professional Engineer
    - Engineering Technologist
    - Engineering Associate
  - Stage 1 competencies – entry level
  - Stage 2 competencies - practicing
  - Stage 3 competencies - managing

Competencies and elements of competency

- 1. Knowledge & Skills Base

  - **Comprehensive theory based understanding** of the underpinning physical sciences and fundamentals applicable to your role
  - **Conceptual understanding** of the engineering, sciences and the human anatomy and physiology
  - **In depth understanding** of specialist bodies of knowledge within the discipline
  - **Discernment** of knowledge development within the discipline
  - **Knowledge** of design practice and contextual factors within the discipline
  - **Understanding** of the scope, principles, norms, accountabilities and bounds of sustainable practice

Competencies and elements of competency

- 2. Engineering application ability

  - **Application** of established technical and engineering methods to problem solving
  - **Fluent application** of engineering/technical techniques, tools and resources
  - **Application** of systemic methods to problem solving and design processes
  - **Application** of systemic approaches to the conduct and management of technical projects

Competencies and elements of competency

- 3. Professional and personal attributes

  - **Ethical** conduct and professional accountability
  - **Effective** oral and written communication in professional and lay domains
  - **Creative,** innovative and proactive approach
  - **Professional** use and management of information
  - **Orderly** management of self and professional conduct
  - **Effective** team membership and team leadership

Work to date

- 'White Paper' –
  - Competencies for Clinical Engineers and Biomedical Technicians in the high risk areas of practice design, maintenance and certification of medical equipment

Bruce Morrison, NCCE, EA

Work to date

- ‘White Paper’ …….13 Units of competency
  - Demonstrate a knowledge of
    - body systems;
    - the infection process and its control;
    - medical Procedures and the reasons behind them;
    - Ccinical measurements;
    - OHS procedures, guidelines and responsibilities;
    - organisational competencies required to manage & maintain medical equipment;
    - hazards, accidents & electrical safety in patient care;
    - application and interpretation of standards;
    - application of the principles of risk management;
    - use of appropriate test equipment;
    - testing, routine maintenance and repair of medical equipment;
    - competence in record keeping, CMMS, etc; and
    - ICT, networking & cybersecurity

Work to date

- Workshop at ABEC 2024
  - Primarily engineers
  - Defining competencies for
    - Graduate engineers (0 -2 years)
    - Junior clinical engineers (3 – 6 years)
    - Senior clinical engineers 6 – 8 years)
    - CE Managers (8 + years)

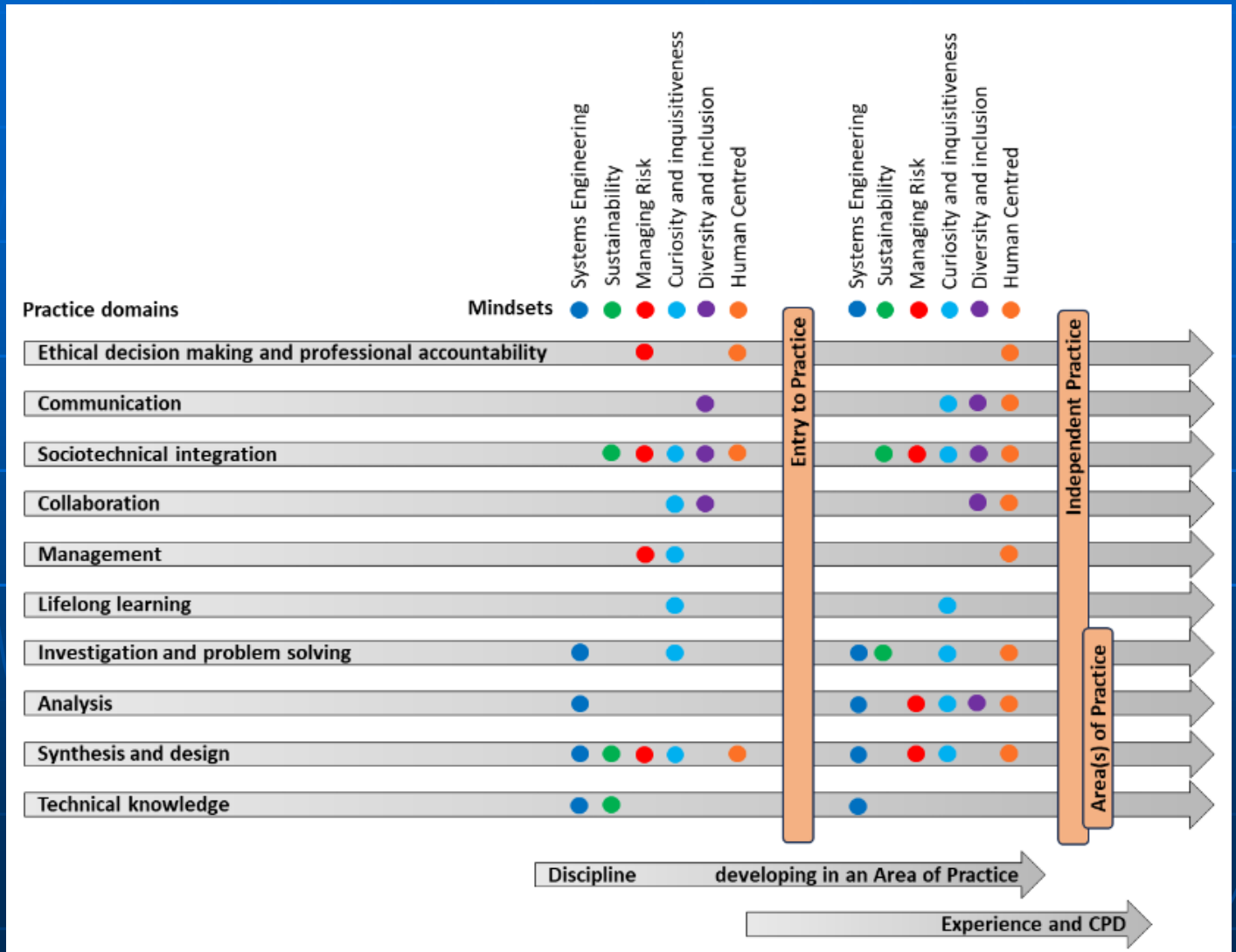
Core Competency Example

Elements	Indicators of performance	Trainee BMET Trainee TO Grade (0 – 2 years)	Junior BMET TO Grade (3 – 6 years)	Senior BMET STO Grade (6 – 8 years	BMET Manager of CE Service (8 + years)
Understanding of medical procedures and the reasons behind them	• Understanding of the various modes of patient monitoring, diagnosis and treatment. • Understanding of the pathology behind disease processes. • Understanding of the operating procedures of related clinical departments				

Technical Competency Example

Elements	Indicators of performance	Trainee BMET Trainee TO Grade (0 – 2 years)	Junior BMET TO Grade (3 – 6 years)	Senior BMET STO Grade (6 – 8 years	BMET Manager of CE Service (8 + years)
Competence in the testing, routine maintenance and repair of medical equipment.	• Employing fault-finding techniques, • Employing repair strategies, • Sourcing spare parts, • Post repair testing, • Planning and implementing routine maintenance, • Documentation.				

Engineers Australia generic competencies



Alignment of CE Competencies with EA Stage 2 Generic Competencies and NER Requirements

Clinical Engineering Competencies	EA Stage 2 Chartered Elements of Competency														
	Deal with ethical issues	Practise competently	Take responsibility for clinical engineering activities	Develop safe and sustainable solutions	Engage with the relevant community and stakeholders	Identify, assess and manage risks	Meet legal and regulatory requirements	Communication	Performance	Taking action	Judgement	Advanced engineering knowledge	Problem analysis	Creativity and innovation	Education
Manage knowledge															
Display ethical behaviour															
Manage medical assets															
Manage medical device trials															
Manage medical assets procurement															
Manage medical device contracts															
Plan and schedule maintenance															
Provide professional services															
Manage device alerts and recalls															
Manage device incident reports															
Manage device configurations															
Provide expertise in medical devices															
Develop standards, policies & procedures															
Standards and policy implementation															
Medical device integration															

NCSE – Entry to Practice Competencies

Practice domains		Competency Statement	Occupational Category profile		
			Professional Engineer	***Engineering Technologist***	***Engineering Associate***
Ethical Decision Making and Professional Accountability	ETP-ED1	Discern ethical issues that relate to the engineer's role in society, the community and the profession.	Display personal ethical and professional responsibility and accountability. Commit to uphold the Engineers Australia - Code of Ethics. Understand the need for 'due diligence' in certification, compliance and risk management processes.		
Communication	ETP-CM1	Apply communication approaches using a range of media appropriate to and effective within a range of contexts demonstrating an understanding of others' perspectives.	Communicate effectively and inclusively on **complex** engineering activities with the engineering community and with society at large, so as being able to comprehend and write reports and design documentation and to make effective presentations. Take into account cultural, language, and learning differences. Be aware of different ways in which different communities, including Indigenous communities engage.	Communicate effectively and inclusively on **broadly defined** engineering activities with the engineering community and with society at large, so as to be able to comprehend and write reports and design documentation and to make effective presentations. Take into account cultural, language, and learning differences. Be aware of different ways in which different communities, including Indigenous communities engage.	Communicate effectively and inclusively on **well-defined** engineering activities with the engineering community and with society at large, so as to able to comprehend the work of others, document their own work, and give and receive clear instructions. Take into account cultural, language, and learning differences. Be aware of different ways in which different communities, including Indigenous communities engage.

NCSE – Independent Practice Competencies

Practice domains		Competency Statement	Occupational Category profile		
			Professional Engineer	*Engineering Technologist*	*Engineering Associate*
Ethical Decision Making	IP-ED1	Conduct activities ethically.	Anticipate the ethical consequences of decisions, intentional action or inaction and be attuned to how these are managed collectively by your organisation, project or team. Respond appropriately to ethical issues when they arise.		
Communication	IP-CM1	Communicate using a range of mediums.	Communicate in a variety of ways to collaborate with other people or organisations. Take into account the knowledge, expectations, requirements, interests, terminology and language of the intended audience. Display an understanding of others' perspectives within oral and written communication and by actively listening.		
Socio-Technical integration	IP-ST1	Operate within an appropriate risk management system.	Apply the principles of safety engineering, risk management and the health and safety responsibilities of the **professional engineer**, including legislative requirements applicable to the area of practice. **Identify hazards, assess and manage risks** through control methods appropriate to engineering activities.	Apply the principles of safety engineering, risk management and the health and safety responsibilities of the **engineering technologist**, including legislative requirements applicable to the area of practice. **Understand and analyse** a hazard and risk framework appropriate to engineering activities.	Apply the principles of safety engineering, risk management and the health and safety responsibilities of the **engineering associate**, including legislative requirements applicable to the area of practice. **Understand and operate within** a hazard and risk framework appropriate to engineering activities.
	IP-ST2	Meet legal, regulatory, societal and cultural requirements.	**Take into account** the laws, regulations, codes and other instruments which you are legally	**Take into account** the laws, regulations, codes and other instruments which you are legally	**Identify** the laws, regulations, codes and other instruments which you are legally bound to

Next Steps

Following the work you have done at this workshop, the NCCE working group will:

- Complete draft CE competency standards for CEs and BMETs
- Map CE competencies to the EA stage 2 generic competencies
- Socialise the draft far and wide amongst clinical engineering practitioners
- Receive feedback and revise and finalise the document
- Seek endorsement from the College of BME and EA and publish
- Work on a mechanism for competency assessment against these standards

CE Competencies and the EA Generic Competencies

- We have defined **13 clinical engineering competencies for BMETs**
  - In this workshop we need your help to **determine**
    - If these are appropriate
    - If there are more that we need to include
    - If we need to delete some
  - In this workshop we hope you will help us to **fill in** the tables, with
    - Indicators of performance
    - Where different grades should be at
- There are **16 EA stage 2 competencies**
  - Next step, we will need to map the CE competencies to the EA stage 2 generic competencies

Now let's really dive in to it

……. Questions?

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