SAIMechE's Professional Development Programme (PDP)

The Skills for Success in Mechanical Engineering

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Success

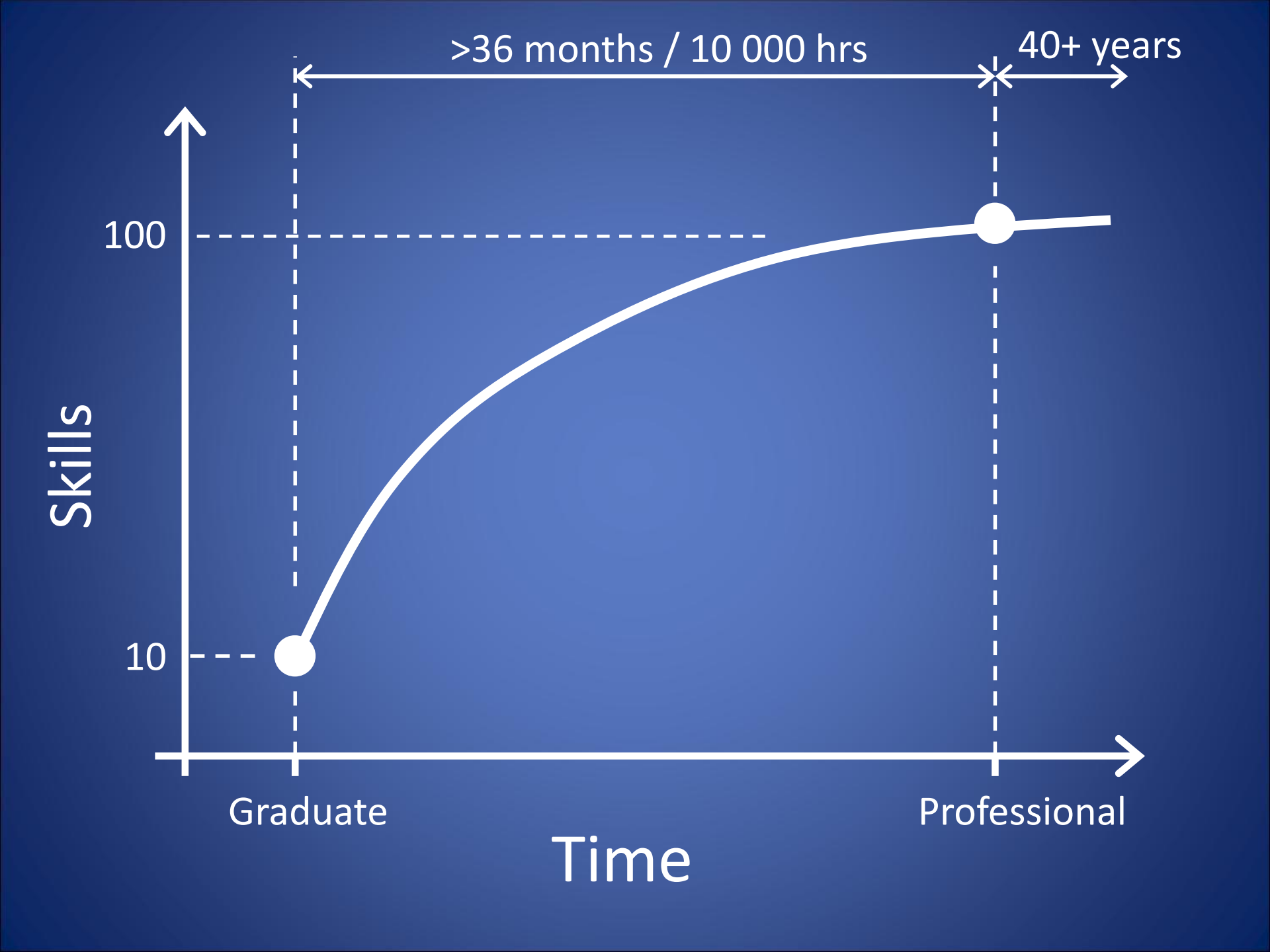
- How do you see “success” in the professional environment?
- What affects the likelihood of your success?
- What can you start doing right now to achieve success?

Skills

- Examples of skills.
- How do you get skills?
- How do you know that you are developing skills?
- What can help you to develop skills?
- Your skills can be physical, intellectual or emotional.
- You cannot buy skills

Q: I have a tertiary qualification - isn’t that enough?

A: No.


>36 months / 10 000 hrs
40+ years
100
10
Skills
Graduate
Professional
Time

Two skill sets

- Technical skills
  - Build on qualification
  - Industry specific
  - Determined by employer or client
  - Developed largely in-house through training and practice
- Professional skills
  - Universal, generic skills
  - How to practice as a professional
  - How to engage with the professional environment
  - Developed by practising in the work environment

What “professional” skills do you want to develop?

SAIMechE Standard of Professional Competency (SPC)

An outcome based standard describing professional skills as learning outcomes and assessment criteria, particularly ordered to reflect professional practice.

Based on various ECSA competency standards for professional registration

Professional Skill Groups

Group A: Engineering Problem Solving

1. Define, investigate and analyse **problems**
2. Design or **develop solutions**
3. Comprehend and **apply advanced knowledge**

Group B: Managing Engineering Activities

4. **Manage** part or all of engineering activities
5. **Communicate** clearly

Group C: Impacts of Engineering Activity

6. Recognise and address **social, cultural and environmental** impacts
7. Meet **legal and statutory** requirements

Group D: Judgement, responsibility, ethics

8. Conduct activities **ethically**
9. Exercise sound **judgement**
10. Take responsibility for **making decisions**

Group E: Continuing Professional Development

11. Undertake **professional development activities** sufficient to maintain and extend competence

How do you practice these skills?

- You understand the skill
- You understand what mechanical engineering related work will enable you to practice the skill
- You do the work, starting simple and becoming more complex
- You keep work evidence for evaluation by self and others
- Repeat for the rest of your life

Portfolio of Evidence

- Keep as much evidence of your own work as possible – sort it out later
- Possible sources:
  - Scribbles, sketches, drawings
  - Emails, letters, memos
  - Spreadsheets, computer models
  - Reports, proposals, opinion
  - Meeting minutes, attendance registers
  - Etc.
- Connect to skills

Feedback

- How do you know that you are making progress?
- Self-evaluation using evidence
- Evaluation by others using evidence
  - Supervisor
  - Mentor

Mentors and Supervisors

- Mentor:
  - Focuses on developing professional skills
  - Preferably external
  - Should be trained and accredited
- Supervisor:
  - Line manager – working in same company
  - Supervises day-to-day activities
  - Focuses on employer objectives

Professional Development Programme (PDP)

- A complete system designed to accelerate the development of professional skills
- Teaches:
  - An understanding of the skills in the literal sense
  - An understanding of the skills in the professional engineering context
  - Tools for the Candidate to identify work opportunities for developing competencies

Recommended PDP operation

- Max 6 Candidates per Mentor
- Meet monthly with strict agenda:
  - Meeting etiquette
  - Presentations from all Candidates on previous outcome
  - Review of portfolio of evidence
  - Structured teaching on next outcome
  - Discussion on work towards next meeting
- Annual cycle of outcomes covered at each meeting

Cost

- PDP material (manuals, forms, presentations, etc.) *available on open platform to SAIMechE members as free downloads*
- SAIMechE offers to provide a system for the successful implementation of the PDP
- Full-house SAIMechE PDP: R30 000 per annum (includes Mentor)

Full skill definitions to follow on request.

Thank you.
Do you have a question?

SAIMechE Standard of Professional Competency available via homepage link at www.saimeche.org.za

Skill 1: Define, investigate and analyse problems

a. Identify and formulate an agreed definition of the problem
b. Collect, organise, and evaluate information
c. Use conceptualisation, abstraction, modelling
d. Make and justify assumptions
e. Use analytical methods, both mathematical and non-mathematical
f. Evaluate result of analysis, using judgement
g. Express understanding emerging from analysis

Skill 2: Design or develop solutions to engineering problems

a. Analyse the design requirement and draw up specification
b. Synthesise a range of potential solutions to problem
c. Evaluate the potential solutions against requirements
d. Present reasoned arguments and proposal for preferred option
e. Fully develop design of selected option
f. Evaluate resulting solution
g. Produce design documentation for implementation

Skill 3: Comprehend and apply advanced knowledge

a. Display mastery of understanding of engineering principles, practice and technologies in the practice area
b. Apply general and underpinning engineering knowledge to support analysis and provide insight
c. Use a fundamentals-based approach, building models as required
d. Display working knowledge of areas that interact with the practice area
e. Apply related knowledge: financial, statutory, safety, management

Skill 4: Manage part or all of one or more activities

a. Manage self
b. Work effectively in a team environment
c. Manage people, work priorities, work processes and resources
d. Establish and maintain professional and business relationships

Skill 5: Communicate clearly with others

a. Write clear, concise, and effective communication
b. Read and evaluate technical and legal matter
c. Receive instructions, ensuring correct interpretation
d. Issue clear instructions using appropriate language and communication aids
e. Make oral presentations appropriate to the audience and purpose

Skill 6: Recognise and address social, cultural and environmental effects

a. Identify interested and affected parties and their expectations
b. Identify interactions between technical and social, cultural and environmental factors
c. Identify environmental impacts of the engineering activity
d. Identify sustainability issues
e. Propose and evaluate measures to mitigate negative effects of engineering activity
f. Communicate with stakeholders

Skill 7: Meet legal and statutory requirements

a. Identify applicable legal, regulatory and health and safety requirements for the engineering activity
b. Select safe and sustainable materials, components and systems
c. Identify risk and apply defined, widely accepted risk management strategies

Skill 8: Conduct activities ethically

a. Identify the central ethical problem
b. Identify affected parties and their interests
c. Search for possible solutions for the dilemma
d. Evaluate each solution using the interests of those involved, accorded suitable priority
e. Select and justify solution that is best resolves the dilemma

Skill 9: Exercise sound judgement

a. Consider several factors, some of which may not be well defined or unknown
b. Consider the interdependence, interactions, and relative importance of factors
c. Foresee consequences of actions
d. Evaluate a situation in the absence of full evidence
e. Draw on experience and knowledge
f. Justify judgements on risk associated with decisions

Skill 10: Take responsibility for making decisions

a. Demonstrate a professional approach at all times
b. Have due regard to technical social, environmental and sustainable development considerations
c. Seek advice from a responsible authority on any matter considered to be outside area of competence
d. Make decisions on and take responsibility for work output

Skill 11: Undertake professional development activities sufficient to maintain and extend competence

a. Planning own professional development strategy
b. Selecting appropriate professional development activities
c. Keeping record of professional development strategy and activities
d. Displaying independent learning ability
e. Completing professional development activities