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You are required to submit five (5) reflections where you reflect on your professional development and communicate these learnings in a written form. Reflections may be completed during and/or after your professional practice activities.

Within each reflection, you are required to:

1. Choose one (1) of the sixteen (16) [Engineers Australia Stage 1 Competencies](https://www.engineersaustralia.org.au/sites/default/files/resource-files/2017-03/Stage%201%20Competency%20Standards.pdf). Please note that out of the five (5) reflections at least four (4) reflections must be from sections two (2) and three (3) of the Engineers Australia Stage 1 Competencies. Each reflection must address a different competency.
2. Identify one or more learning events that you have encountered whilst undertaking your 450 hours of professional practice. When identifying your learning event(s), think about all the things you have done in your professional practice activities and decide which of those things have helped you understand better or helped you do a better job as a professional engineer.
3. Discuss the learning event(s) you have identified with reference to the Engineers Australia Stage 1 Competency you have chosen. Use the Reflection Framework for your discussion (300 words per reflection).

What is a learning event?

A learning event is a significant event that has occurred whilst undertaking your 450 hours of professional practice that had an impact on you or helped you better understand what it means to be a professional engineer. A learning event could be something that confirms or contradicts your prior knowledge, theories or understanding, in particular the knowledge you may have gained at university. It doesn’t have to be an event that went well; often we learn more from things that don’t go quite as planned. If it was a negative learning event, describe what you will do differently in the future to lead to a more positive outcome and how you will use this experience to guide future behaviour.  

Engineers Australia Stage 1 Competencies

1. KNOWLEDGE AND SKILL BASE

1.1. Comprehensive, theory based understanding of the underpinning natural and physical sciences and the engineering fundamentals applicable to the engineering discipline.

1.2. Conceptual understanding of the mathematics, numerical analysis, statistics, and computer and information sciences which underpin the engineering discipline.

1.3. In-depth understanding of specialist bodies of knowledge within the engineering discipline.

1.4. Discernment of knowledge development and research directions within the engineering discipline.

1.5. Knowledge of engineering design practice and contextual factors impacting the engineering discipline.

1.6. Understanding of the scope, principles, norms, accountabilities and bounds of sustainable engineering practice in the specific discipline.

2. ENGINEERING APPLICATION ABILITY

2.1. Application of established engineering methods to complex engineering problem solving.

2.2. Fluent application of engineering techniques, tools and resources.

2.3. Application of systematic engineering synthesis and design processes.

2.4. Application of systematic approaches to the conduct and management of engineering projects.

3. PROFESSIONAL AND PERSONAL ATTRIBUTES

3.1. Ethical conduct and professional accountability.

3.2. Effective oral and written communication in professional and lay domains.

3.3. Creative, innovative and pro-active demeanour.

3.4. Professional use and management of information.

3.5. Orderly management of self, and professional conduct.

3.6. Effective team membership and team leadership

##### **The SEAL process of self-reflection**

**S** = SITUATION: What was the new experience or challenge you faced and what happened to you? In this paragraph, state the activity you are referring to.

**E**= EFFECT: What impact did it have on you and what were the consequences of this impact?

**A** = ACTION: What action did you take to deal with the new situation and any challenges, and why did you do this?

**L**= LEARNING: What did you learn from the experience and how will you apply this in the future?

# Reflection 1

## EA **competency** - 1.3

In-depth understanding of specialist bodies of knowledge within the engineering discipline

## Situation

At the beginning of my work at Controlworks QLD, I was given tasks involving translating DDC (Direct Digital Control) control points lists into electrical and mechanical schematics for use by electricians and refrigeration technicians for commissioning and installing those systems.

## Effect

I lacked the professional knowledge and proficiency to effectively comprehend the requirements given by the control point list specifications and then translate those into physical schematics. As a result, I was unable to provide the wiring diagrams required for the electricians to complete the projects. I was confused and frustrated as a result of being unable to understand what I was asking people to do, which was stressful in a professional and personal context as I could not communicate effectively with co-workers or complete my role to the standard I expected of myself.

## **Action**

To address this lack of domain-specific technical understanding, I consulted with the senior engineers, technicians and electricians and clarified with them the established best practices for creating the diagrams and interpreting the requirements. This ensured that I was interpreting the requirements with technical accuracy and also creating functional, usable documents for the electricians and technicians. I understood that this was a crucial component of my role and prioritised the creation of a library of common components which could be used in drafting these schematics, which assisted in future projects and ensured that I could continue to acquire and effectively build upon my technical understanding.

## **Learning**

This experience has taught me the value of consulting with multiple groups when establishing the use of functional technical documents, especially when communicating with groups of different proficiencies and technical backgrounds. In addition, it has codified the importance of building a lexicon of not only vocabulary but also technical tools and techniques when dealing with knowledge specific to a particular field.

# **Reflection 2**

## **EA competency - 2.3**

**Application of systematic engineering synthesis and design processes.**

## **Situation**

About halfway through my time at Controlworks QLD my duties expanded to include the synthesis of quotes and tender documents for new projects. I had to analyse incoming technical documents, layouts, and schedules to create detailed distillations of the qualitative technical requirements of a client’s specifications. I had no experience interpreting client’s requests into specifications which could be acted upon by our technical team but have been given numerous specifications I was confident I could create them.

## Effect

I was completely lost. Part of creating a tender is taking the qualitative or industry specific brief given by a client and translating it into the nomenclature of an engineering discipline. Industry specific schematics detailed the requirements of the mechanical electrical contractors, but only implied the requirements for us. The mechanical specification documents were byzantine and communicated what was required, not how. I had only even dealt with processed and refined specifications and was unable to interpret the clients desires into proper specifications.

## Action

I consulted with my senior engineer and began to work with him to understand and implement his process for abstracting client requirements into a usable model; which could be priced, fulling the tender requirements, but also passed on to the technical team for design and commissioning. Together we created a process for reading through and comprehending the key sections of the specifications and a scaffolding document which allowed for compartmentalisation and categorisation of client’s requests into models that accurately represented their requirements.

## Learning

The experience reinforced the engineering fundamentals of creating design processes to systematically approach problems. I was able to gain experience in translating client specifications and open ended requirements into design specifications for multidisciplinary teams, while also developing costing targets. In future when confronted with challenges that may involve more qualitative aspects I will still attempt to understand and apply systematic engineering principles to create methodologies for qualitative solutions.

# **Reflection 3**

## **EA competency - 2.4**

**Application of systematic approaches to the conduct and management of engineering projects.**

## **Situation**

## Effect

## Action

## Learning

# **Reflection 4**

## **EA competency - 3.2**

**Effective oral and written communication in professional and lay domains.**

## **Situation**

## Effect

## Action

## Learning

# **Reflection 5**

## **EA competency - 3.3**

**Creative, innovative and pro-active demeanour.**

## **Situation**

A component of preparing documentation for clients is ensuring that all references to dates, versions, project identification numbers, and client names are updated, true, and correct. Part of my job was scouring documentation for every reference; which was time consuming, tedious, and with large documents susceptible to human error.

## Effect

When preparing large numbers of documents for numerous clients there were several near misses where upon review it appeared I have missed several references to a client on a document. The document was to be sent to Client A, but was filled with reference to client B. I was embarrassed and relieved that the error had been found (before it was sent to client). However, at the time of submission I had honestly believed that I had gone through the document with a fine-tooth comb and found any and all references.

## Action

To avoid further blunders, in my own time I began to use document properties and autotext to create templates where all the common values (e.g. the date and client names) where linked to a single piece of text. When that text was updated all other reference in the document were updated, saving time and preventing errors. Once I was confident with the solution I presented it to my superiors as a method of ensuring that documentation was correct and produced faster, which they adopted.

## Learning

Since the original implementation the methodology of internal document referencing has been applied beyond the original documents, to speed up production and prevent errors. The key takeaway is that when presented with a task with inefficiencies, stepping back and looking at it from other angles can provide valuable solutions. Instead of trying to get better at the tedious inefficient task, it was better to consider all problems, not just explicitly engineering problems, through engineering paradigms.