PD Philosophy Statement

My philosophical value is primarily one of respect; respect for the educator, respect for the students, the engineering equipment and above all else, respect for the subject itself, engineering. It is a principle that guides professional action through the events and issues I face daily not only in teaching but professionally as an engineer. This philosophy ties in with Domains 1, 2 and 4.

Domain 2 is concerned with professional identity, values and development. My values resonate a lot with ancient teachings of Aristotle as well as with the more modern teachings of Piaget and Vygotsky. Aristotle's 'self-fulfilling prophecy' discusses the belief that if the educator has high expectations of a learner and that when the learner is aware of this, the learner will perform at the level expected of them. This belief was developed further by Merton in the 1960s (Merton 1968) and the converse was also shown to be true (Winch and Gingell 2005). Aristotle's self-fulfilling prophecy is something that intrigues me as it shows a great representation of respect between a teacher and a learner, resonating my own educational values of respect and trust, supporting Domain 2. I think believing and trusting that a student can achieve and succeed can instil a work ethic in the student to the push beyond their zone of proximal development, and lead to great work.

I consider myself using the best of both cognitive and constructive techniques in the classroom or laboratory. Cognitivism is based on the principle that information is actively processed inside the mind of the person and that behaviour modification takes place by searching for the relationship between all the relevant pieces of information and putting them together until they begin to form a complete picture. Cognitivists view the human mind as performing similarly to a computer with logic-based operations (Stoilescu 2016). Cognitivism focuses on the processes involved in learning rather than on the observed behaviour and it replaced behaviourism as the dominant learning theory in the late 1950's (Clark 2018).

Constructivism emerged through the works of cognitivist Piaget and Vygotsky (Stoilescu 2016; Bodner 1986). Piaget believed that conceptual knowledge cannot be transferred from one person to another, but rather constructed by the person themselves (Piaget 1970). In other words, that a learner's reaction to learning was not a result of their age but a result of their cognitive development. Piaget developed genetic epistemology (von Glaserfeld 1995) which was at odds with traditional philosophy and behaviourism at the time, that knowledge exists independent of experience and awaits discovery (von Glasersfeld 2001). Constructivism is a dominant research perspective in education, specifically in relation to the teaching and learning of science, engineering and mathematics (Sjoberg 2010; Stoilescu 2016).

Domain 4 is about professional knowledge and skills. Mathematics is the foundational knowledge and skill required for engineering and I find the teaching of it fascinating. I find the strategies of Vygotsky particularly useful in my mathematical teachings. Testing prior knowledge of the mathematical topic is a great way of engaging with learners and their experiences with the subject prior to the lecture or tutorial. Mathematics can be a subject that deals heavily with negative connotations from a lot of students (Hill et al 2016) so it's important to understand their feelings and attitudes before the topic is introduced. I'm a firm believer that nothing grows in the comfort zone, and I enjoy challenging students to step out of their comfort zone and challenging their views on mathematics.

I also try to make sure that education of engineering should not be separate from life itself. Behaviour modification occurs when the individual can relate the behaviour to their experiences (Bates 2016). Therefore, I am required to keep my educational material up to date and interesting for student engagement. Using real world mathematical problems or engineering problems, students can share

what they have learned with their peers, and I too can learn from them. This concept is also an important element of Domains 4 and 5.

From reflecting upon Domain 1, a major personal value of mine is integrity and the duty I have as an educator to be a good role model. One can never underestimate the effect they can have on others (Bates 2016) and in terms of teaching first year undergraduate engineers especially, it is something I keep to the forefront of my mind in the engineering classroom. By creating a solid rapport with new students and earning their respect and trust, I can help students who find the parts of the course difficult and give them the confidence they need to succeed.

I also care a lot about promoting engineering for everyone. I was unable to study Physics in my old school and as such had to go to the boy's school for class. I whole heartedly believe that science and engineering can be for everyone, and I get frustrated when I hear such antiquated ideation that engineering is a typically male orientated career. Our world needs more diversity at the helm of science and engineering to create for the future and this is what drives me to be a good teacher, role model and engineer. I am a creative person with my own likes, dislikes, wants needs and I am engineer. Stereotypical perceptions are so harmful for the profession, and I do feel like it my duty to change that and turn it on its head. Employing the teachings of the ancient Greeks with the modern teachings of cognitivists and constructivists underpinned by the 5 Domains is what I strive to do in myself, in my classroom and in my students everyday.

References

Bates, Bob. (2016). Learning Theories Simplified: and how to apply them to teaching Los Angeles SAGE Publications.

Bodner, G. M. (1986). Constructivism: A theory of knowledge. Journal of Chemical Education, 63(10), 873. doi:10.1021/ed063p873

Clark, K. R. (2018). Learning theories: Cognitivism. Radiologic Technology, 90(2), 176-179.

Merton, R.K. (1968). Social Theory and Social Structure. New York: Free Press

Sjoberg, S. (2010). Constructivism and Learning (Third ed.).

Stoilescu, D. (2016). Aspects of Theories, Frameworks and Paradigms in Mathematics Education Research. European Journal of Science and Mathematics Education, 4(2), 140-154.

von Glaserfeld, E. (1995). Radical Constructivism. London: Reoutledge.

von Glasersfeld, E. (2001). The Radical Constructivist View of Science. Foundations of Science, 6(1), 31-43. doi:10.1023/A:1011345023932

Winch, C. and Gingell, J. (2005) Key Concepts in the Philosophy of Education. Abingdon: Routledge.