PERSONAL PHILOSOPHY OF EDUCATION:

ACADEMIC PAPER

by

Dr Fiona Malone

Submitted in part fulfilment of the
Certificate in Teaching & Learning

Module Leader

Dr. Carina Ginty

ABSTRACT

Philosophy of education is a broad concept that concerns the educator to reflect inward to the parent discipline and outward to the educational practices available and acknowledge the social, legal, and institutional contexts in which it takes place. This paper is a review of the philosophical values I employ in the modern-day engineering classroom. I also discuss the educational philosophies and learning theories that influence my teaching practice, from the classical learning theories to the more contemporary current day thinking and specifically the works of Aristotle, Piaget and Vygotsky. The aim of this paper is to reflect on and define my own teaching strategies, while analysing which schools of thought resonate mostly and how I can implement and apply these theories in an engineering classroom today and in the future.

***KEYWORDS: educational philosophy, engineering classroom, teaching strategies, educational theories*.**

1. INTRODUCTION

Philosophy of education is the branch of philosophy concerned with education and the philosophical issues arising from educational theory and practice. As that practice is universal across humanity, it is highly important to acknowledge and understand. It's significance for practice is of extreme importance as the subject is wide-ranging, involving issues in ethics, social and political philosophy, epistemology, metaphysics and philosophy of mind and language to name but a few. The educator must look inward to the parent discipline, and outward to the educational practices available and acknowledge the social, legal, and institutional contexts in which it takes place (Siegel and Callan 2018).

The aim of this essay is to establish an understanding of educational philosophies and discuss the ones that I resonate with as a lecturer and how I incorporate these into the engineering classroom. The structure of this essay proceeds by introducing my own philosophical values, relevant literature on classical, cognitive and constructive educational theories and concludes with a summary of my application of these theories to my teaching practice.

2. PHILOSOPHICAL VALUES

Philosophical values may be personal or political depending on whether they are considered in relation to the individual or to society (Cohen 1999). Examples of personal values include trust, knowledge or truth and examples of political values could include justice, equality and liberty (Cohen 1999). Literature suggests that values are not an “added extra” to education, but rather, that values are at the very core of quality teaching and that students learn best in a learning situation consciously structured around positive values of care and concern for student progress (Clement 2009).

My philosophical value is one of respect; respect for the educator, respect for the students, the equipment and above all else for the subject itself, engineering. It is a principle that guides professional action through the events and issues I face daily.

Life experiences, personal values, the environment and current affairs, interactions with others and awareness of philosophical approaches are all intertwined in my educational philosophy. Along with these, learning about the branches of philosophy, philosophical world views, and different educational philosophies and theories will help me to determine and shape my educational philosophy.

3. EDUCATIONAL THEORY

2.1 GREEK

As far back as 350 BC the Greek philosophers strived to understand human learning. Most interestingly, Plato and Aristotle disagreed on their personal learning theories (Bates 2016). Plato ascertained that knowledge was to be found within someone. Aristotle’s method of teaching is based in the teacher guiding the student to reach their potential through the wisdom of others (Ashcraft 1998). Plato and Aristotle sparked one of the oldest arguments in history: nature vs nurture. These profound thoughts ultimately were the building blocks of modern-day psychology.

During the late 1700's Descartes returned to Plato's theory of instinctive knowledge and argued that truth and knowledge exist within human beings prior to experience. Locke revived Aristotle's argument that knowledge is attained from experience (Ashcraft 1998) that a child's mind is a "blank tablet" to be filled with knowledge (Bates 2106). Aristotle's 'self-fulfilling prophecy' discussed 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).

Wherever one's philosophy resides in the nature vs nurture debate can really define their teaching philosophy (Bates 2016). Sitting in the centre of this debate, I can begin to accept that the genetic structure of the brain is capable of being modified in response to reactions to the experiences and the environment of the learner. Modernising Aristotle's 'self-fulfilling prophecy' can be seen through the theories of cognitivism.

2.2 COGNITIVISM

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).

Cognitivism began in the early twentieth century and developed from a number of theorists namely; Piaget's theory of individual cognitive development, Vygotsky's theory of social cognitive growth (zone of proximal development), Festinger's cognitive dissonance theory, Spiro's cognitive flexibility theory, Bruner's cognitive constructivist theory, Tolman's theory of sign learning (Yilmaz 2011). Currently cognitive theories of learning are the dominant paradigm for assessment (Baird *et al* 2017).

Critics argue that cognitive learning theory is too focused on personal development rather than learning outcomes and that not all people have either the capacity or the desire to spend a vast amount of time processing the info. However, I would argue that an engineer does and would enjoy it too!

Vygotsky's sociocultural theory of the 1930's was a precursor of constructivism, and it states that social experiences shape a learner's thinking and views of the world. Vygotsky echoes Aristotle's beliefs in teacher guided learning and suggests that knowledge is constructed and transferred by more knowledgeable peers and adults to learners primarily through language (Jaramillo 1996).

2.3 CONSTRUCTIVISM

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).

This radical constructivism based on Piaget's genetic epistemology involves students constructing frameworks of knowledge from their own experience (von Glasersfeld 2001). Social constructivism also considers the learner's environment, with learners taking an active role in their learning and educators

helping learners in constructing knowledge and skills by providing feedback (van der Kleij *et al* 2015).

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).

4. APPLICATION OF THEORY TO PRACTICE

Throughout my teaching practice, I employ a combination of classical Greek educational theories with more modern cognitive and constructive approaches to the engineering classroom. My teaching practice and use of theories is much like the discipline in which I teach. Engineering is a classical subject that continues to move with modern technologies and ideologies, however the building blocks at the core of the subject, draw from the Greeks and remain unchanged over the centuries (Hill 1984). My philosophy of education is one that employs the modern understandings of psychology and philosophy within education but is rooted within the classical teachings of Aristotle.

Aristotle's self-fulfilling prophecy resonates with me as it shows a great representation of respect between a teacher and a learner, resonating my own educational values of respect and trust. 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 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 by listening to the experiences of others to build on their understanding.

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.

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.

Piaget (1970) fundamentally believed that people construct knowledge as opposed to receiving it. In engineering terms, I believe this can sometimes be known as “the knack”, where some students are naturally more comfortable with certain tasks, i.e. taking things apart and putting them back together. Engineering is a h ands-on profession where doing is key (Feisel and Rosa 2005). I really enjoy practical classes whereby I can sometimes leave students to their own devices to work out a dissection of a small mechanical object. Piaget (1970) also believed that people react differently according to their cognitive development. I teach a variety of class groups, from undergraduates to final year students to apprentices who have returned to education after several years working in industry. All these students represent people at cognitively and environmentally different stages of their lives and thus my teaching style changes to suit these groups. Individually, I also try to cater the student’s needs as I have learners with different learning requirements and so having a good relationship, based on respect and trust, with each learner is important to know my students and their abilities so I can change my teaching strategy and balance time for learners needs.

5. CONCLUSION

The aim of this essay was to establish an understanding of educational philosophies and discuss the ones that I resonate with as a lecturer and how I

incorporate classical Greek theories with modern cognitivism and constructivism by Piaget and Vygotsky into the 21st century engineering classroom.

On reflection of my teaching, I can see that respect features heavily within my classroom, all while considering students' cognitive aptitudes. Balancing classical theories of engineering with real life problems and examples forms the basis of my teaching practices all while remaining a good engineering role model to the students.

6. LIST OF REFERENCES

Ashcraft, M. (1998). Fundamentals of Cognition. New York, NY: Longman.

Baird, J.-A., Andrich, D., Hopfenbeck, T. N., & Stobart, G. (2017). Assessment and learning: fields apart? Assessment in Education: Principles, Policy & Practice, 24(3), 317-350. doi:10.1080/0969594X.2017.1319337

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.

Clement N. (2009) Perspectives from Research and Practice in Values Education. In: Lovat T., Toomey R. (eds) Values Education and Quality Teaching. Springer, Dordrecht. https://doi.org/10.1007/978-1-4020-9962-5_2

Cohen, LeoNora M., and Judy Gelbrich. "Educational Philosophy." Educational Philosophy. OSU - School of Education, 1999. Web. 21 Apr. 2013. <http://oregonstate.edu/instruct/ed416/sample.html>.

Feisel, L D.; Rosa, A J. (2005). The Role of the Laboratory in Undergraduate Engineering Education. Journal of Engineering Education, 94(1), 121–130. doi:10.1002/j.2168-9830.2005.tb00833

Hill, D. (1984). A History of Engineering in Classical and Medieval Times (1st ed.). Routledge. https://doi.org/10.4324/9781315800110

Hill, F. , Mammarella, I. C. , Devine, A. , Caviola, S. , Passolunghi, M. C. , & Szűcs, D. (2016). Maths anxiety in primary and secondary school students: Gender differences, developmental changes and anxiety specificity. Learning and Individual Differences , 48, 45–53.

Jaramillo, J. (1996). Vygotsky's Sociocultural Theory and Contributions to the Development of Constructivist Curricula. Education, 117(1), 133-140.

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

Piaget, J. (1970). Genetic Epistemology: Columbia University Press.

Siegel, Harvey, D.C. Phillips, and Eamonn Callan, "Philosophy of Education", The Stanford Encyclopedia of Philosophy (Winter 2018 Edition), Edward N. Zalta (ed.), URL = <https://plato.stanford.edu/archives/win2018/entries/education-philosophy/>.

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.

van der Kleij, F., Vermeulen, J., Schildkamp, K., & Eggen, T. J. H. M. (2015). Integrating data-based decision making, Assessment for Learning and diagnostic testing in formative assessment. Assessment in education, 22(3), 324-343. doi:10.1080/0969594X.2014.999024

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.

Yilmaz, K. (2011). The Cognitive Perspective on Learning: Its Theoretical Underpinnings and Implications for Classroom Practices. The Clearing House: A Journal of Educational Strategies, Issues and Ideas, 84(5), 204-212. doi:10.1080/00098655.2011.568989