The Threshold Concept That Science and Engineering are Gendered


“Threshold concepts” have been explained as concepts that can be difficult or count-intuitive to understand but which provide a new perspective and transformed way of experiencing phenomena once they are understood (Meyer and Land 2003). I suggest that understanding that science and engineering are gendered is a threshold concept.

Acker (1990) described gendered organizations. Such organizations reinforce a gendered hierarchy. Men and women in these organizations adopt a culture in which it is assumed that all of the characteristics associated with the dominant gender, including communication styles, leadership styles and family responsibilities, are normal and ideal.

Findings consistent with gendered cultures have arisen in engineering organizations (Fletcher 1999, Gill *et al.* 2008) and engineering faculties (Godfrey 2003). Individuals, scientific and engineering professions, and consequently society, suffer due to gendered cultures. A recent study of mine found the presence of subconscious bias towards stereotypically masculine competencies among senior engineers who rated the importance of competencies for engineering work (Male *et al.* 2009). This could undermine development of stereotypically feminine competencies in engineering education, bias recruitment and promotion of engineers, and contribute to identity conflict. At the WISENet 25th Anniversary Forum, Rosemary White highlighted the prevalence of subconscious gender bias in judgements made by women and men related to recruitment and promotion in science (White 2009).

A difficult part of the threshold concept that science and engineering are gendered is that the concept is both foreign and hidden for scientists and engineers. That engineers’ assessments could be affected by culture, conflicts with their prowess in identifying with objectivity and is therefore a foreign concept. It is difficult for people within a culture to be aware of the culture and the assumptions arising from it (Ihsen 2005) and therefore the concept is hidden. A method many female engineering students use to survive the masculine culture is to demonstrate support for its practices (Jolly 1996), which makes it difficult to acknowledge the culture’s limitations. I suggest that many engineers never accept an understanding that engineering is gendered and many cross the threshold too late. By this time they have already suffered from not having the understanding that the concept provides, for example, by individualising experiences that are systemic in the gendered culture.

We have a responsibility to society, and especially to female students in science and engineering, to take steps to ensure that women and men in science and engineering understand the threshold concept that science and engineering are gendered. If more scientists and engineers understand this threshold concept, then there will be a better chance that subconscious gendered assumptions will be recognised and questioned, and
eventually the limitations arising from the gendered cultures of science and engineering might be removed.

References


Sally Male is the Women in Science Enquiry Network (WISENet) Convenor for Western Australia.

Email sally.male@uwa.edu.au
Telephone +61 8 6488 1242