

Chapter 6

Engineering Teams: Supporting Diversity in Engineering Education

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ABSTRACT

Engineering education increasingly involves working in groups. This is partly because of a growing value placed on graduate attributes relating to effective team working, and partly a response to the practicalities of working with large groups in an educational environment and the emphasis on peer learning. This chapter argues that a superficial approach to understanding the drivers for establishing and managing groups during first year activities can have negative outcomes, including re-enforcing majority dominance. This will potentially contribute to attrition amongst minority students and undermine the outcomes for the engineering cohort as a whole. This chapter provides strategies for building groups in the first year focussing on team building, valuing diversity and cultural awareness. It emphasises the importance of transferable skills for students and of understanding themselves, their heritage, attitudes and values and their contribution to a team, building an approach to support diversity in teams throughout the engineering degree program.

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INTRODUCTION

Contemporary ideas about graduate attributes across disciplines feature the ability to work in teams as an essential transferable skill. There has been considerable research into creating and maintaining these teams, both in the workplace and education. Building teams is a long established element of postgraduate studies for learning and teaching in higher education. Yet, there have been social and workplace changes that have been building up over recent years that will impact traditional views of teaching teams in education. For engineering, these revolve around the changing practices associated with an increase in internationalization and the extension of teams to include members with more diverse backgrounds. Essentially, teams are changing as the problems being addressed become more complex, and require input from a wider range of disciplines. In addition, there are changes to the way that users participate in problem solving that should impact how team-working strategies are developed for the engineering discipline, taking into account discipline-specific majority cohort profiles and attitudes.

Traditionally, there has been limited differentiation in the teaching of team working for individual disciplines in higher education. This has been the case for the education of academics as well as students, who study the same postgraduate qualification for learning and teaching in higher education regardless of discipline. This chapter considers a different approach, with the design of learning experiences and teaching strategies that foster team working specifically to recognise and respond to the challenges and aspirations for the engineering discipline.

Educational literature highlights the importance of a lecturer understanding the background, learning motivations and educational outcomes of the student cohort, and then adapting the learning experience to meet the needs of the cohort. Therefore, the education of faculty in learning and teaching needs to be based on an informed understanding of the particular disciplines they are working within. This extends to teaching—and working in—teams, based on the ideas and understandings that inform that discipline.

For engineering academics, there are challenges specific to educating students that should differentiate their education from that of other faculty and provide them with discipline-specific strategies to help students to work effectively in a team-working environment. Yet what that actually means post digital revolution (Gore, 2013) is still being explored, particularly in the light of changes to the way engineering is being taught by leading institutions such as Olin College, and the Singapore University of Technology and Design (SUTD), with their overt emphasis on experiential learning. This chapter aims to critically evaluate the role of team working specific to engineering education and presents practice-based recommendations on teaching informed by, and in response to, current theory.

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