



Current Innovative Research and Research Interest Groups

Introduction

The current trend in engineering education research examines aspects regarding feedback in engineering education, assessment in engineering internship and experiential learning, development and assessment of transferable skills, student engagement and motivation and gender perspective.

In order to encourage the discussion and exchange of information on engineering education research, HKE³R proposes to organize research interest groups under the below research topics. The main aim of each group is to develop an active network who is interested in sharing information and supporting others in engineering education research, thus offering members the opportunity to exchange experiences, collaborate and engage in scholarly research.

If you would like to join any of the research groups, please contact us at cecilia.chan@cetl.hku.hk.

1. Feedback in Engineering Education

The National Student Survey (NSS) conducted in the UK indicated a perceived weakness in feedback practice in the engineering discipline. Foundational courses in engineering are often characterized with a large cohort of students, where lectures are mostly held in lecture theatres that create a physical distance between students and teachers affecting students' interaction and involvement (Geske, 1992). The feedback loop is often difficult to initiate given that communication in large classes often operate in a single direction, offering students less opportunity to give or receive feedback. Given the challenges in implementing good feedback practice, research on feedback in large class has been a popular area of research in education and it is also gaining attention in engineering education research.

Research in the area may involve examining the feedback processes in large classes, exploring methods of enhancing feedback with the use of technology enhanced tools and understanding students' and/or teachers' perception of feedback using survey-based approach.

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2. Research in Engineering Internship and Experiential Learning

Generally, research in engineering internship and experiential learning is moving towards an exploration of learning outcomes and how these learning outcomes can be assessed. Since the late 1980s, many studies have been conducted to investigate the impact of internship/placement experience on students (see Little & Harvey, 2006, for a report on work placement in higher education). Research in this area covers a wide range of topics including: 1) student learning through internship experience, 2) the assessment of student learning in internship, 3) the relationship between placement and academic performance, 4) the relationship between placement and career outcomes.

Most of the research on internship or industrial placement in engineering has been conducted on students' perception and attitude towards their internship/industrial placement experience (e.g. Au Yeung et al., 1993; Lock et al., 2009). In fact, there is still plenty of room for exploration in terms of students' expected and actual learning outcomes, the assessment of these outcomes (Biasca & Hill, 2011), as well as how does different characteristics of an internship influence students' achievement of these outcomes in engineering internship.

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3. Development and Assessment of Transferable Skills

Inclusion of the achievement of transferable skills as part of the accreditation criteria by engineering accreditation bodies such as ABET, HKIE, and Engineers Ireland have highlighted the importance of transferable skills in university curriculum.

Research in this area may involve studies on student development of these skills and the process, methods and development tools to assess and certify transferable skills that graduates must possess in order to cope in this ever-evolving economy.

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4. Student Engagement and Motivation (particularly in Large Class)

Engineering courses are often taught through lectures, tutorials, and laboratory sessions with long contact hours involving concepts of mathematics and hard sciences. It is often hard to expect students to be fully engaged with the course materials given the complicated concepts and long contact hours. Therefore there has been a growing interest in conducting research in the area of student engagement and motivation, which may involve investigation, development and evaluation of pedagogies that can be used to engage student learning particularly in large class and motivate them to take responsibility of their own learning.

As concepts taught in engineering courses involves complex knowledge of mathematics and hard sciences (such as physics, chemistry, biology, and geology), it is not uncommon for engineering students, particularly those who are unable to keep up with the progress of the course, to lose the motivation to pursue their major and drop-out from their course. Thus, the issue of student retention and progression within the context of engineering has gained significant attention, urging universities with accredited engineering programmes to devote their efforts in retaining students in their designated major. Research conducted in student engagement and motivation can significantly target the issues in student retention and progression.

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5. Women in Engineering

A national study conducted by Beede and colleagues (2011) from the Department of Commerce in the US indicated that women only make up 25% of those holding STEM positions, suggesting an underrepresentation of women in STEM-related fields. The underrepresentation of women in engineering is further supported by data from Yoder (2012), which indicated that women only make up 18% of those pursuing engineering undergraduate degrees and only around 20% of those pursuing postgraduate and doctoral degrees in 2011. With that in consideration, universities offering engineering degrees like Purdue and Georgia Technical have developed programs for women in engineering in order to retain women pursuing engineering by providing support and encouragement.

To better understand the issues related to women in engineering, recent research has been conducted to explore strategies of bridging the gender gap. In addition, gender diversity has also been an area of research, which may involve exploring factors regarding gender differences and factors that affect teaching and learning of engineering students who are women, the reasons of their career choice, their preferred learning styles, shift in career paths and disciplines.

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