



077

# Evaluating and Developing Project-Based Learning

## An empirical approach to evaluating CDIO

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**Conference Topic:** Engineering Education Research

**Keywords:** CDIO, Innovation, Curriculum, Evaluation

**A**s a global profession, engineering is integral to the maintenance and further development of society. Indeed, contemporary social problems requiring engineering solutions are not only a consequence of natural and ‘manmade’ disasters (such as the Japanese earthquake or the oil leakage in the Gulf of Mexico) but also encapsulate 21st Century dilemmas around sustainability, poverty and pollution [2,6,7]. Given the complexity of such problems and the constant need for innovation, the demand for engineering education to provide a ready supply of suitably qualified engineering graduates, able to make innovative decisions has never been higher [3,5]. Bearing this in mind, and taking account problems of attrition in engineering education [1,6,4] innovation in the way in which the curriculum is developed and delivered is crucial. CDIO [Conceive, Design, Implement, Operate] provides a potentially ground-breaking solution to such dilemmas. Aimed at equipping students with practical engineering skills supported by the necessary theoretical background, CDIO could potentially change the way engineering is perceived and experienced within higher education.

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Aston University introduced CDIO into its Mechanical Engineering and Design programmes in October 2011. From its induction, engineering education researchers have 'shadowed' the staff responsible for developing and teaching the programme. Utilising an Action Research Design, and adopting a mixed methodological research design, the researchers have worked closely with the teaching team to critically reflect on the processes involved in introducing CDIO into the curriculum. Concurrently, research has been conducted to capture students' perspectives of CDIO.

In evaluating the introduction of CDIO at Aston, the researchers have developed a distinctive research strategy with which to evaluate CDIO. It is the emergent findings from this research that form the basis of this paper.

Although early-on in its development CDIO is making a significant difference to engineering education at the University. The paper draws attention to pedagogical, practical and professional issues – discussing each one in turn and in doing so critically analysing the value of CDIO from academic, student and industrial perspectives. The paper concludes by noting that whilst CDIO represents a forward-thinking approach to engineering education, the need for constant innovation in learning and teaching should not be forgotten. Indeed, engineering education needs to put itself at the forefront of pedagogic practice. Providing all-rounded engineers, ready to take on the challenges of the 21st Century! ■

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