Chapter 13
An Innovative Offshore Delivery of an Undergraduate Mechanical Engineering Program

Firoz Alam
RMIT University, Australia

Gregory Plumb
RMIT University, Australia

Aleksandar Subic
RMIT University, Australia

Mark Shortis
RMIT University, Australia

Reddy P. Chandra
Stansfield College, Singapore

ABSTRACT

In the era of globalisation, traditional onshore education providers have the opportunity to offer offshore education to meet student needs. Although a number of many non-engineering programs have been offered offshore for some time, the engineering programs generally lag behind due to insufficient laboratory and workshop facilities off campus and the difficulties encountered when trying to emulate this learning experience. RMIT University's offshore mechanical engineering program is designed to overcome these difficulties by combining traditional teaching and learning with flexible learning modes. The program represents a hybrid approach and has drawn significant interest among students, educational developers, and professional bodies.

INTRODUCTION

Describe the general perspective of the chapter. Toward the end, specifically state the objectives of the chapter. Engineering education is an organised set of activities that implement learning achievements for individual students to perform creative engineering tasks and solve real-world engineering problems. Off-campus engineering education is an organised effort to realise engineering learning using remote delivery. This effectively removes time and place constraints from education thus enhancing lifelong learning by creating professional capabilities. Today, computer-based information systems have altered the meaning of traditional communication and coordination, making global

DOI: 10.4018/978-1-4666-0951-8.ch013

opportunities possible and global competition inevitable—all of these have significant impact on the delivery of education. In today's rapidly changing world, educational institutions are forced by financial, social, political and moral reasons to embrace these changes, especially in delivering traditional on-campus education (Alam, Dilla, Subic, & Tu, 2007; Becker, 2006, Bourne, Harris, & Mayadas, 2005; Condit & Pipes, 1997; Downey, et al., 2004; Fiedler, Deans, Loch, & Palvia, 1996). As a result, many engineering education institutions are delivering off-campus/offshore education, including engineering programs (Alam, et al., 2007). However, most off-campus programs in engineering are currently offered at postgraduate level as working engineers find it difficult to access campus based learning. Also, postgraduate programs (such as Masters' programs) require relatively less contact hours and hands on laboratory work (Bourne, et al., 2005). On the other hand, any traditional undergraduate engineering (mechanical, chemical, civil engineering, etc.) requires more than four times contact hours and significant amount of hands on laboratory practices and facilities. Off-campus learning, where the total learning resources can be taken remotely from the education provider—often in a self-paced form—is more common for social science and general science education (Alam, 2008). It is relatively difficult to provide engineering education in this form, especially mechanical engineering education as engineering education is predominantly science and mathematics based and the courses are relatively difficult to offer off-campus due to the need for hands on laboratory work and more elaborate connection between theory and practice. Traditional engineering program needs hands-on laboratory, workshop, and a range of learning activities in order to achieve the desired learning outcomes (Feisel & Rosa, 2005; Gillett, Latchman, Saltsman, & Crisalle, 2001). In today's competitive world, employers (from industry and research organizations) wish to employ work-ready graduates with hands-on practical and theoretical knowledge who are ready for immediate work assignment often without even induction training. Engineering educators have vast responsibilities to educate and train the undergraduate student with hands-on knowledge, especially when fewer students come to the university with experience of so called shade tree mechanics or amateur radio operators as hands on laboratories are the only means to provide students the look and feel of physical systems or to develop a feel for engineering (Moore & Voltmer, 2003; Rover, 2008a, 2008b).

Among all engineering branches, it is no doubt that the mechanical engineering is one of the oldest and vast. It emerged as an engineering field during the industrial revolution in Europe in the 18th century; however, its development can be traced back several thousand years (http://en.wikipedia.org/wiki/Mechanical_engineering). Since its inception, the mechanical engineering has gone through continuous evaluation and changes over the time by incorporating the advancements in technology, science, and applications. Today mechanical engineering encompasses many closely related engineering such as manufacturing/production, aeronautical/aerospace, marine/naval architecture, and in some extents civil, electrical, chemical, and other engineering. The quality of mechanical engineering education is ensured at a highest standard level by various professional bodies globally. The professional accreditation for mechanical engineering is usually conducted by the individual country's professional engineering organisation or equivalent body. The accreditation body in collaboration with the education provider ensures that the education is of global standard, uniformity in fundamental course materials and their contents, competency of graduating students, and professional ethics.

In recent times, economical, political, and socio-cultural needs forced world communities to globalise trade and commerce, education, people movement, sports and cultural events. It is no doubt that the higher education has become more