Chapter 10
Online Postgraduate Program Development

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ABSTRACT

Due to changes in business requirements, a defence consortium has the desire to develop the Master of Systems Support Engineering program for professional development of their future leaders. The challenge in this industry-sponsored program development is the need to fully integrate expert knowledge in the field to the fundamental theories in the subject matter and to deliver this body of knowledge to working professionals online. The initial online course design was delivered to the first cohort. The students were surveyed, and the results were reviewed by the industry steering committee. After re-design of the online course delivery, the survey outcome showed marked improvement. In this chapter, the author describes the systems approach that was adopted and outline the steps taken to develop a Master program for online delivery.

INTRODUCTION

In asset intensive sectors such as defence and energy industries, the ability to manage the performance of highly complex engineering systems is critical to the continuity and success of companies. A new service business model known as “performance based contracting” has emerged in recent years as one of the favourable choices of contracting mechanisms (Shen, 2003). Under performance based contracting, a third party contractor takes responsibility for the management of a specific part of the business. The advantage of performance based contracting is the sharing of
risks and benefits for both sides of the business (Marmo et al, 2009). Efficiency gains are shared between the contractor and the owner of the business (Heinrich & Choi, 2007). An earlier example of this new business model in complex engineering industries is the development of the ANZAC Ship Alliance (ASA). The ASA was established to manage design and implementation of changes to the in-service ANZAC class frigates over the life time of the “product”, that is, a service life of over 30 years. The long product life time means that people, skills, experience, companies, society and government will change (Mo et al, 2006).

Compared to traditional support arrangement, this shift in business model of supporting in-service assets changes the service contractor’s roles and responsibilities. The service provider is responsible for the full spectrum of support, including ownership, sustainment and operation of assets. Furthermore, contracting arrangements will include incentives and penalties against levels of support service or delivery. The service provider will need to think like the customer and design the support system that delivers the desired outputs as well as generating profit. This is a different type of business with unfamiliar contractual metrics and risks (Neely, 2009). Research has shown that support and services of complex engineering systems is a highly individualised business (Mo & Menzel, 1998). It is extremely knowledge intensive and labour rich.

In addition to the technical requirements of supporting complex engineering systems, a key feature of the new engineering discipline is the concept of designing service systems according to specific support requirements. A service is a negotiated exchange with the customer to provide intangible outputs that are usually co-produced with the customer (Baines et al, 2007). Services cannot be transferred to other owners in the same way that products can. It is consumed at the time of delivery.

The new business environment demands professionals who are highly motivated and have the ability to design and run the support system (Behn & Kant, 1999). It is under such a complex industry environment that the Master of Engineering program in Systems Support Engineering is developed with support from the defence industry consortium led by BAE Systems. The industry consortium specified that the program design should be creative and able to transform the thinking of students to a new paradigm. The industry oriented development required that expertise from a much deeper knowledge of the new business environment should be accommodated in the program. Hence, research outcomes in UK defence support system have been used as reference when defining the body of knowledge of systems support engineering. To cater for the needs of industry participants who have full time day-to-day work commitments as well as frequent travelling, the online learning mode has been adopted. This chapter outlines the lessons learnt from an initial year of operation and improvement process.

**INDUSTRY ORIENTED PROGRAM DEVELOPMENT PROCESS**

To develop an education program that is industry oriented and produces graduates with the ability to manage support function for complex systems, a Steering Committee (SC) is formed with heavy involvement of members of the industry consortium. From the outset, it is clear that the industry consortium aims to develop business leaders of the future in Systems Support Engineering (SSE). It is important to design the curriculum with a learning methodology aiming at change of mindset (Neill, 1994). The SC makes reference to educational theories including CDIO (http://www.cdio.org/).

The development project by itself is a system design and development project. An important part of the project is the structured approach to program development management. Figure 1 shows the work breakdown structure (WBS) for development of the program. Course developers
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