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Procedia Economics and Finance 35 (2016) 379 – 387

Procedia Economics and Finance

www.elsevier.com/locate/procedia

7th International Economics & Business Management Conference, 5th & 6th October 2015

Entrepreneurship Education In An Engineering Curriculum

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Abstract

Malaysia Education Blueprint 2015-2025 (Higher Education) (MEB 2015-2025) requires academic programs in institutions of higher learning (IHL) to have entrepreneurship education in order to produce graduates who have acquired entrepreneurial skills. The Ministry of Education wants all IHL to produce graduates who create jobs rather than those who are just looking for jobs. Students should even be encouraged to start their own enterprises before they graduate. Universiti Tenaga Nasional already has Program Objectives (PO) and Program Educational Objectives (PEO) for bachelor of engineering degree programs that support MEB 2015-2025. The PO among others states that graduates should be able to demonstrate entrepreneurship skills upon graduation and the PEO among others similarly states that graduates should establish their own enterprises within 5 years after graduation. This paper presents the review and revision of the Bachelor of Civil Engineering (Honours) program (BCE (Hons)) to further improve its entrepreneurship education within current requirements from the relevant authorities and constraints from prospective students. A new course for entrepreneurship education, a new complementary UNITEN Entrepreneurship Program for Engineering Students, and a revised curriculum for BCE (Hons) program was therefore proposed. The revised curriculum has the same total of 127 credit hours in order to avoid any increase in tuition fees while still satisfying the requirements and accreditation from the relevant authorities for an engineering degree program.

Peer-reviewed under responsibility of Universiti Tenaga Nasional

Keywords: Entrepreneurship; Malaysia Education Blueprint; Engineering degree program; Curriculum

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Peer-reviewed under responsibility of Universiti Tenaga Nasional
doi:10.1016/S2212-5671(16)00047-2

1. Introduction

The government of Malaysia has always regarded entrepreneurship and entrepreneur development as very important to the people and economy and hence the Ministry of Entrepreneur Development was establishment in 1995 (Ariff & Abubakar, 2002). In a study by Ahmad et al (2004), it has been a growing concern in Malaysia that technical students do not have the necessary entrepreneurial skills to start their own business and they have narrow business perspectives. They prefer to become job seekers and to be employed rather than job creators. The result of the study is that entrepreneurship education should be incorporated into non-business academic programs.

Realizing the importance of entrepreneurship development in the country, Malaysia Education Blueprint 2015-2025 (Higher Education) (MEB 2015-2025) was launched by the Ministry of Education that requires academic programs in institutions of higher learning (IHL) to have entrepreneurship education in order to produce graduates who have acquired entrepreneurial skills. The Ministry of Education wants all IHL to produce graduates who create jobs rather than those who are just looking for jobs. Students should even be encouraged to start their own enterprises before they graduate (Ministry of Education Malaysia, 2015). This new direction by the Ministry of Education Malaysia sets the path for the review and revision of the Bachelor of Civil Engineering (Honours) program (BCE (Hons)) in Universiti Tenaga Nasional (UNITEN) to further improve its entrepreneurship education to develop entrepreneurial talents among its graduates.

UNITEN is a private university in Malaysia that offers engineering, information technology, business and accounting academic programs. It was established by Tenaga Nasional Berhad (TNB) in 1994 as the oldest private university that is owned by a government linked company in Malaysia. It is also a full subsidiary company of TNB that provides research and consultancy services in engineering, information technology, business and accounting (TNB, 2015; UNITEN, 2015a).

This paper presents the review and revision of the BCE (Hons) program to satisfy the entrepreneurship requirement from relevant authorities and within current academic and business constraints.

2. Literature review

2.1. Entrepreneurship, entrepreneurs, intrapreneur and engineers

Entrepreneurship is the foundation of successful economies and the beacon of hope for developing economies. For example in the United States, small firms represent 99.7% of all employer firms that employ about half of all private sector employees (Solymossy, 2008). Entrepreneurship is “the capacity and willingness to develop, organize and manage a business venture along with any of its risks in order to make a profit. The most obvious example of entrepreneurship is the starting of new businesses” (Business Dictionary, 2015).

An entrepreneurial cycle is commonly referred to as having the following phases: opportunity identification and evaluation, resource gathering, start-up and growth. Creativity and innovativeness are critical during opportunity identification, evaluation and start-up phases while other characteristics, for example leadership, confidence, and ability to manage new resources are very important in latter stages (Doboli et al, 2010).

An entrepreneur is “a person who starts a business and is willing to risk loss in order to make money” and an intrapreneur is “a corporate executive who develops new enterprises within the corporation” (Merriam-Webster, 2015). Entrepreneurs drive business, create new jobs and are very important to the economy, for example they had led the US out of every recession (Lumsdaine & Binks, 2003a). Today, engineering students should become engineers who have an entrepreneurial mindset who are called entrepreneurial engineers. They are entrepreneurially minded and innovative who could become intrapreneurs to take leadership roles in companies or become entrepreneurs to start their own business (Binks & Vale, 1977; Kriewall & Mekemson, 2010; Leibenstein, 1976). Unfortunately many engineers are learning entrepreneurship on their own after graduation (Luryi et. el., 2007).

Engineers have strong preferences for analytical, logical and quantitative thinking as well as a very structured and procedural thinking. Engineering education typically stresses adaptive thinking and therefore engineers can become very good at solving problems in routine ways but they may not be encouraged to explore innovative solutions. Entrepreneurs must be able to identify customer needs and market niches using lateral thinking skills and these skills should be taught to engineering students. In addition thinking preferences of a student can be matched to the