Entrepreneurship-Technopreneurship Education For Undergraduates: Practicality vs Curriculum

Sariwati Mohd Shariff[1], Rohana Ngah[2], and Saridan Abu Bakar.[3]

[1]*Universiti Teknologi MARA, Malaysia, sariwati@salam.uitm.edu.my*
[2]*Universiti Teknologi MARA, Malaysia, rohanangah@salam.uitm.edu.my*
[3]*University Teknologi MARA, Malaysia, saridan@salam.uitm.edu.my*

ABSTRACT

This literary paper attempts to provide an overview on the entrepreneurship and technopreneurship education offered in the science and technology and business management programs in a public institution of higher education. These two courses are offered across faculties, academic programs, and in various parts of the duration of the academic programs. The objectives of this paper are firstly, to understand the scope and relevance of entre/technopreneurship education; secondly to identify the objectives, practicality and effectiveness of these courses. The implications of this study are to gain an understanding on the realities of conducting this education, to identify the attainment level of entrepreneurship learning outcomes and to find out the extent of entrepreneurial softskills development among the undergraduates as required in the new outcome-based education curricular design imposed by the Ministry of Higher Education. This paper suggests for a comprehensive practical instructional delivery techniques and teaching-learning in entrepreneurship-technopreneurship education so as to meet the national and educational aspirations to produce enterprising entrepreneurs and technopreneurs among graduate, and academic staff, and generation of more new innovative businesses towards. Last but not least, the noble intention towards human capital development and high-income economy are at least materialized.

Keywords: Entrepreneurship, technopreneurship, entrepreneurship education, human capital development; innovative businesses.

I   INTRODUCTION

Entrepreneurship is a buzzword as many policy makers, economists, academic, university students, and the public are talking about it (Ooi, Selvarajah and Meyer, 2011). There were many entrepreneurship conferences, seminars and workshops being organized in Malaysia (locally) and also across the world (global). This is evident since the Malaysian government is striving to transform the whole country aggressively to become a developed nation with high income-economy by year 2020 through the Government Transformation Plans (GTPs), Entry Point Projects (EPPs), New Economic Model (NEM) together with the National Key Economic Areas (NKEAS), National Key Results Areas (NKRAs), supported with new breakthrough policies and strategic thrusts that encompass all sectors and industries in this country (http://www.pmo.gov.my as on Jun 2011). Two of the key strategic thrusts for national transformation are focusing on human capital development and higher education in Malaysia. The aims of these strategic thrusts are to produce not only high quality and marketable graduates that meet future job markets requirements in all sectors as value-added employees, but also to produce many prospective new employers and job creators. In other words, Malaysia is now aiming to produce successful entrepreneurs who can create more job opportunities for others and generating new untapped economy (MoHE, 2011; MHR, 2011). "Entrepreneurship is blooming in Malaysia: the desire for entrepreneurship and innovation are there, along with a growing number of public policies supporting this; it is a good recipe to put the economy on the entrepreneurial path" quoted (http://www.entrepreneurs.my as on 1 Jun 2012).

Entrepreneurship has been described as the major engine driving many nations' economic growth, innovation and competitiveness. Entrepreneurship is connoted as a catalyst that creates wealth and creation of job opportunities, new products and technology (Ooi, Selvarajah and Meyer, 2011). Past research studies indicated positive relationship exists between entrepreneurship and economic growth stated by the above authors based on published works from Gorman, Hanlon et al.(1997); Lena and Wong (2003); Scaborough and Zimmmerer (2003); Kurato and Hoggetts (2004); Karanassios, Pazarskis et al. (2006), to mention a few. Ample literature and publications on entrepreneurship education, technology and innovations in institutions of learning are available

which are worthy references with acknowledgement on new insights, perspectives, knowledge and findings that add to the body of entrepreneurship knowledge such as: Siti Nor Wardatulaina and Urbano (2011), Syahida Aand Lahsasna (2011), Frank (2007), Charney and Libecap 2000), Dopfer (1992), Vincenti (1990), Constant (1980) and Laudan (1984), and many more.

Thus, with this foreground, entrepreneurship courses or programs are capturing attention from students, academics, institutions, government and national level (Kuratko, 2004). Entrepreneurship topic/area has also emerged as one of the popular research domain among academics and popular subject areas in colleges and universities (Lee, Chang, et al, 2005; Ooi, Selvarajah and Meyer, 2011). The engineering and medical, allied health and applied sciences, architecture, arts and humanities (music, mass communication) faculties are now offering entrepreneurship and technopreneurship courses/programs to their students for both tertiary degree and diploma programs apart from the dominant business management faculty. In addition, various ministries and agencies, private institutions and consultants too, are also competing in the entrepreneurship businesses through provisions of unique and customized entrepreneurial training programs and workshops to cater to the demands for entrepreneurship skills among the school children, school leavers, public, working adults, professionals, potential retirees, small scale and self-made entrepreneurs, and also graduates that had never had the chance attending entrepreneurial courses; or refreshing and updating oneself with life-long learning on new entrepreneurial knowledge.

This demand were explicitly written in massive literature (Ooi, Selvarajah and Meyer, 2011; Siti Nor Wardatulain and Urbano, 2011). The flare that creates the demand for entrepreneur education and knowledge transpired as the nation foresee the potential growth of small and medium enterprises (SMEs) that account for the 90% of the national economic growth and gross domestic products (SME Corp, 2012). Additionally, entrepreneurship is now seen as a viable career option being self-employed and creation of new jobs apart from the limited job offers in the job market (Kuratko, 2004).

The key objective of introducing entrepreneurship-technopreneurship education is to instill and foster the entrepreneurial culture for all people and the young generation. Entrepreneurship education is to promote entrepreneurship as a career option and alternative source income generation for those who aspires to kick start a new venture, to open a business, or to improve or expand an existing business; and to challenge oneself to move forward by taking bigger risks and exploiting new opportunities in business.

Thus, the aim of this literary paper is basically to probe on the provisions, availability and adequacy, and the objectives of the entrepreneurship and technopreneurship courses offered in a selected local public university from the curriculum's perspectives and the practicality aspects on teaching and learning of entrepreneurship and technopreneurship courses among the students and the academics. With this insight study, it is hoped that areas for improvement can be identified so to achieve the desired entrepreneurship learning and course outcomes stated in the new outcome-based education (hereafter termed as OBE); and to improve the instructional delivery and teaching-learning of entrepreneurship or technopreneurship education, courses and programs in institutions of higher education.

II LITERATURE REVIEW
There is an enormous collection of literature on entrepreneurship; numerous scholars from various disciplines ranging from sociology, psychology and economics had carried out research studies on entrepreneurship education, its implementation and effectiveness as mentioned in the introduction of this paper (Siti Nor Wardatulaina and Urbano, 2011; Syahida and Lahsasna; 2011), Frank, 2007).

A. Entrepreneurship Development Policy
Entrepreneurship education is an important component to produce a creative and innovative society as desired under the Innovation Human Capital Development Plan. The Higher Education Entrepreneurship Development Policy was launched in 2010 to enhance the Entrepreneurship Program. The aim of this policy is 1) to encourage the development of a more holistic and well-organized entrepreneurship program that aimed at producing graduates from institutions of higher education with thinking and entrepreneurial attributes; 2) to increase the number of entrepreneurs among graduates involved in business that can serve as a catalyst for the achievement of economic transformation of the country towards a high income economy, and 3) to

produce academics with values, skills, thoughts and entrepreneurship attributes. Coupled with the Malaysian Critical Agenda Program, one of the strategies to address graduate employability is the provision of entrepreneurship education program (MoHE, 2011; MHR, 2011).

In 2006, RM171 million was spent on the implementation of 121 programs on building capacity and capability of small-medium industries (SMEs). These outreach programs were extended to over 250,000 SMEs with the focus of capacity building, entrepreneur development, human capital development, marketing and promotion of SMEs and their products in Malaysia (SME Annual report, 2006; www.bnm.gov.my). The key outcomes of these programs in 2006 where a total of 86,651 SMEs and 42,144 entrepreneurs benefitted from the seminars, workshops, courses, trainings on technical and management skills; meanwhile 34,000 SMEs and entrepreneurs (women, students and graduates) received entrepreneurship development training, assistance and advisory services.

In 2007, RM945 millions were spent on 135 entrepreneurship development programs for SMEs to develop 2,000 entrepreneurs, inclusive of 200 technopreneurs, organizing 10 international conferences, 15 mentoring programs, 20 workshops and 200 entrepreneurs were trained in financial management skills reported by Bank Negara and SME Corp Malaysia (SME Anual report, 2007; www.bnm.gov.my). Based on the above and the entrepreneurship development policy, the government is seriously spearheading entrepreneurial development for nation building. Thus, institutions in Malaysia are now encouraged to provide entrepreneurship education or programs to inculcate students with entrepreneurial values and skills, leadership, innovation, creativity, resilience, competitiveness, independence, and the ability to create business opportunities.

B. **Entreprenuership Education (EE)**

There is no single definition to state or explain entrepreneurship education (Cheng and Chan, 2011). Entrepreneurship education (hereafter termed as (EE) is different from the normal business management programs as it requires a different teaching pedagogy and different sets of education objectives (Kirby, 2002; Cheng and Chan, 2004). If the objective of EE is to provide entrepreneurial knowledge, then one attains it though attending workshops, classes, lectures and seminars. However,

if the objectives are to equip students with entrepreneurial skills which are directly applicable to the businesses, then the program is practical through relevant entrepreneurial training processes and doing it themselves or via business simulations and roles execution (Hytti and O' Gorman (2004) quoted by Cheng and Chan (2004).

Thus from the educationists and learning theorists' perspectives, EE is all about learning to integrate knowledge, skills and experiences within the learner to equip him with the needed know-how and know-what, doing and exploring towards recognizing business opportunities, understanding market and customers' needs, exploiting with creative minds and innovativeness, developing business plans and initiating the business processes to kick start a new business until success. As Kuratko and Hodgetts (2004) defines "entrepreneurship is a dynamic process of vision, change and creation: it requires an application of energy and passion towards the creation and implementation of new ideas and creative solutions, the willingness to take calculated risks, a career that requires fundamental skills to manipulate all resources (man, machine, materials and methods.

To become successful entrepreneurs, one must therefore equip oneself with the relevant entrepreneurial knowledge either through formal learning, informal learning through formal and/or informal education, internships, trainings, workshops and sharing knowledge/experience sessions. Henceforth, the EE is now widely available and being offered throughout various institutions of learning, schools and learning centers to those who have the needs to acquire entrepreneurial knowledge, techniques and skills development to become successful entrepreneurs and businessmen (Cheng and Chan, 2004).

C. **Technopreneurship Education (TECE)**

The term entrepreneurship is generically used for ordinary entrepreneurs who manage small-medium businesses and enterprises. Nowadays, for business to survive and to remain competitive in market entrepreneurs must keep abreast with modern business and product strategies and technology advancement and market changes; thus entrepreneurship alone does not suffice. Entrepreneurs may also come from various backgrounds. Nowadays, we see engineers, scientists, researchers, system analysts, programmers, architects and doctors are venturing into the business world. Modern businesses are

moving towards technopreneurship; and technopreneurship has being in existence as early as 1960s and 1970s in the Western countries. Bailetti (2012) in his extensive research work on technopreneurship, definitions and distinctive aspects from entrepreneurship stated that technology entrepreneurship (coined word: technopreneurship) has become an increasing global phenomena. Technopreneurship is perceived as necessary for business growth, differentiation and competitive advantage at the organizational, national and global level. Hence, Bailleti defines technopreneurship as, quoted:

"an investment in a project that assembles and deploys specialized individuals and heterogeneous assets that are intricately related to advances in scientific and technological knowledge for the purpose of creating and capturing value for a firm'.

With reference to the above, it implies that the technopreneurship education is about engineers or scientists attempting to operate small businesses with (new) applications or solving problems using technology, or exploiting opportunities that make use of scientific and technical knowledge, and launching new ventures, and working with others to produce technological change and products/services. Contrarily, Syahida and Lahsasna (2011) interpret technology entrepreneurship as a combination of two words from two disciplines: technology from the innovation discipline, and entrepreneurship from the business discipline. Technopreneurship is the integration of technological and entrepreneurial realms.

Metcalfe (1995) termed technology as the ability to carry out productive transformation and includes the ability to act and a competence to perform; while Dopfer (1992) said technology is viewed as engine of growth. Layton (1974) defined technology as knowledge, skills and artifacts. Technology has its own specific framework of concepts, ideas, and relationships within which it develops over time, and this framework is reflected as innovative expertise (Constant, 1980; Laudan, 1984; Vincenti, 1990). To sum up, technology entrepreneurship relates to the theory of the firm (business theory), entrepreneurship theory and technology theory.

Thus, technopreneurship education (hereafter termed as TECE) involves specialized human resources (engineers, scientists, researchers, technologists) tapping their skills and ability to collaboratively explore and exploit scientific and technological changes to create values and benefit the firm (business) (Bailetti, 2012). TECE is now gaining attention from the non-business students in institutions of higher education. TECE produce outcomes that promote inter-disciplinary, team-based, project-focused learning opportunities for students, graduate students and faculty investigators (researchers); and that TECE increase that rate of successful commercialization of innovations and development of successful spin –out ventures as proven by Marshall, et al (2005).

III   EFFECTIVENESS OF EE-TECE IN MALAYSIA

The most common cited objectives of EE education and programs are to: 1) acquire entrepreneurship knowledge; 2) develop business skills and techniques, analysis and synthesis of plans, strategies and actions; 3) stimulate entrepreneurial talent, attitudes, values and drives and to manage risks in business (Marshall, et al, 2005). On the other hand, Bailetti (2012) stated technopreneurship education is based on four elements outcomes: 1) ultimate outcomes: value creation and capture; 2) target of ultimate outcomes: setting up the business; 3) mechanism to deliver the ultimate outcomes: project and the investment; and 4) interdependence of mechanism with scientific and technological advances.

Study done by Cheng and Chan (2004) on EE in Malaysia, only thirty percent of the respondents (degree and masters) declared that they had taken entrepreneurship courses with a majority of seventy percent had never been exposed to entrepreneurial knowledge. Additionally, this study also found that the level of entrepreneurial knowledge was still low despite the relative high level of entrepreneurial interests and directions in Malaysia.

Muhammad Azmi, et al (2011) in his paper revealed that the need for technopreneurship knowledge for engineering students/graduates. The new OBE curriculum-design electrical engineering programs have incorporated technopreneurship course in the final part of the academic programs even though this constituted only seven percent (3 credit hours out of 41 credit hours) of its curricular structure as compared to the core and elective courses/research projects in their academic programs. Mechatronic engineering graduates must acquire technopreneurial skills in order to stay employable as they need to have business and interdisciplinary skills, and the desire for lifelong learning concluded by Muhammad Azmi, et al (2011).

Survey conducted by MoHE in 2005 showed that only 2.8% of a total 22,016 working graduates were self-employed; an only 1.4% of respondents from 11,313 diploma holders were self-employed. In order to boost entrepreneurship education, universities, polytechnics and community colleges nationwide must review their entrepreneur courses and programs so as to enhance the effectiveness of these EE programs. The effectiveness of EE does not limit to achieve the desired learning/program outcomes and focusing only on business and entrepreneurial theories and principles, but to produce students who would become successful entrepreneurs, knowledgeable and technologically capable (http://www.smecorp.gov.my).

The major challenge of EE-TECE is the relevance or appropriateness of the curriculum and teaching methods to develop students' competencies (Garavan and O' Cinneide, 1994 cited by Ooi, Selvarajah and Meyer (2011). Brown (1999) mentioned that entrepreneurship course content should be informal with more hands-on teaching methods with focus on developing critical thinking, building up experiences, stimulating thinking towards being entrepreneurs or entrepreneurship as one's career and inviting guest speakers who are experienced and successful entrepreneurs. In the conclusion of their study, Ooi, Selvarajah and Meyer (2011) posited that the university's role in promoting entrepreneurship and the curriculum content of EE-TECE are statistically significant towards the effectiveness and attainment of entrepreneurship among graduates. Students themselves must adapt themselves towards more practical learning and active participation, particularly in entrepreneurial learning processes and skills development.

Charney and Libecap (2000) wrote the strength of university EE lies on its core courses: competitive advantage, venture finance, market research, business plan development, apart from MIS and management. Additionally an internal business plan competition where all students must present and defend their plans with attractive incentives and rewards; and this institution in USA had a total of 81 out of 289 business plans been launched successfully. "EE has proved vital and are now in demand as: firstly, the study of enterprise creation and the development of business plans allow students to integrate accounting, economics, finance, marketing and other business disciplines" mentioned by these authors. These authors further elaborated that having the right curriculum, EE-TECE offer an enriching, integrative educational experience and exposures to students. Secondly, EE-TECE promotes the founding of new businesses by prospective graduates' it builds critical decision making skills, enhancing the success of graduates in the job market. Thirdly, EE-TECE aids to upscale technology transfer from the university to the market through the development of technology-based business plans and expose students' involvement in technology licensing.

A comparison study carried out on business graduates without entrepreneurship course versus with entrepreneurship course in 1985–1998 highlighted positive impacts on graduates whom had undergone the entrepreneurship programs. Those attended the EE were three times more involved in the creation of new business ventures; eleven percent more likely to own businesses; the outcomes on the students: they were self-sufficient and enterprising individuals (Charney and Libecap, 2000). At the same time, EE-TECE forges linkages between the business, industries and academic communities.

IV   EDUCATIONAL REFORM IN MALAYSIA

The most important asset of a nation is its human capital. In the Malaysian Budget 2011, the Prime Minister Datuk Seri Najib Razak quoted "a nation which effectively manages its human capital will achieve greater success than a nation that relies on natural resources (Malaysian Budget 2011; New Straits Times, 2010). In an effort to strengthen the institutions of higher learning to be world class, the government's key agenda is to upscale the socio-economic development of the nation. Therefore, to achieve these aspirations, some of the strategic thrusts are to: 1) increase the number of Ph.D qualified academic staff to 70% in research universities (and 60% in public institutions of higher learning); 2) improve opportunities for promotion of lecturers in public universities; 3) to further intensify the Industrial Skill Enhancement Program in State Skills Development Training Centres to enhance skills of engineering graduates and technical employees; Professional Certification Program, Sports Development, Entrepreneurship Development and Graduate Employability Management Scheme (New Straits Times, 2010; 10MP).

For Malaysia to be competitive and to become an education hub in the ASEAN region, the Ministry of Higher Education (MoHE) had directed that higher

education curriculum and programs to be reviewed, reformed immediately to develop human resources who can think critically, present and manage ideas creatively, innovative to benefit themselves and society; able to comprehend issues in the context of societal realities; risk takers, team players; have zest for entrepreneurial commitments; professionals with managerial skills and life-long learners and to re-accredited using a new standards (MoHE, 2011; Omar and Abu Bakar, 2010; Shariff, S. et al, 2011). To this effect, the Malaysian Qualifications Agency (MQA) was set up under MQA Act 2007 and established the Malaysian Qualifications Framework (MQF). MQF is Malaysia's quality and certification standards for its education system.

The higher education sector in Malaysia has undergone complete transformation starting from 2007-2010. All higher educational programs must now be accredited using the MQA framework and standards; that simply means all academic programs must account for its learning and educational outcomes (Shariff, S. et al, 2011; MQA, 2007). In view of this, MoHE had detailed out nine imperatives towards developing holistic educational program, lecturers and graduates towards realization of the Vision 2020 (MoHE, 2011). Two of these initiatives relevant to this paper focused on EE and entrepreneurial skills, quote:

"To design and develop dynamic and relevant curriculum and pedagogy, with interdisciplinary approaches to stimulate creativity, innovation, leadership and entrepreneurship; to equip undergraduates with skills in an ever-changing market. Curricula is to be reviewed, those that are no longer relevant must be removed. Peer review and industry collaboration to be enhanced in curricula development and evaluation. To develop holistic program that will cut across all disciplines and focus on communication and entrepreneurial skills; to build a balanced perspective in students that will expose them to subjects beyond their area of specialization."

The educational sector is now compelled towards producing quality and marketable graduates that are able to meet the market demands and employers requirements, and also to produce more successful entrepreneurs in the country.

V   CASE STUDY OF EE-TECE IN A LOCAL INSTITUTION

This institution is one of the earliest public institutions that had crafted its niche and a pioneer providing EE for the *bumiputra* entrepreneurs in early 1960s. Basic entrepreneurship course (ETR300) had been offered to all diploma students across faculties and branch campuses throughout the nation. Over the years, this basic ETR300 course had been revised to ENT300; and technopreneurship course (ENT600) is offered for the degree students.

With the onset of OBE curriculum design and to support the national education transformation agenda, an additional core compulsory course Principles of Entrepreneurship (ENT530) is recently introduced for all eleven business management programs to maximize business students' exposures to businesses with effective 2010. Table 1 provides an overview on formal EE (courses) offered in this institution with the objectives to inculcate entre/technopreneurship and entrepreneurial skills in the students. Additionally, the Faculty of Business Management has also introduced a new entrepreneurship degree program in 2011 with entrepreneurship courses encompassing: New Venture Creation, Franchise Management, Small Business Management, Corporate Entrepreneurship, Innovation Management and introduction of three series of practical entrepreneurship workshops and industrial training attachment in the industry.

Table 1: Overview of Entrepreneurship Courses

ENT300 Course Synopsis	Program Outcomes
The course provides an overview of the requirements towards entrepreneurial career and starting up an entrepreneurial venture. The focus of the course is to prepare the students with the essence of entrepreneurship and business planning skills for the success of new ventures.	The ability to analyze and differentiate the concept and roles of entrepreneurship. To prepare and demonstrate a business plan for the success of new ventures creation. To demonstrate the knowledge and skills in business planning to the benefit of the new venture.
ENT600 Course Synopsis	**Program Outcomes**
The course inculcates the entrepreneurial skills in the students and to promote the development of technology-based entrepreneurship knowledge.	The ability to apply technology entrepreneurship knowledge and skills and identification of technological-based business opportunity. To evaluate and translate cutting edge technology into marketable products. To develop a feasibility study of technology-based business idea.
ENT530 Course Synopsis	**Program Outcomes**
This course aims to nurture entrepreneurship culture among students so that they can appreciate the values, theoretical and concepts of entrepreneurship and individual entrepreneurial development.	The ability to demonstrate concepts of entrepreneurship and entrepreneurial culture in any profession. To demonstrate concepts of creativity, innovation, risk taking and approaches in establishing new ventures.

An estimated twelve faculties with fifty-seven courses provide EE and TECE in the institution encompassing both diploma and degree programs. Based on inputs given by Malaysian Academy of SME and Entrepreneur Development (MASMED)-the entrepreneurship education centre in the

institution, an estimated sixty academic staff (lecturers) are teaching EE and TECE courses. A majority of these teaching staff are from the Faculty of Business Management who serviced these various faculties. MASMED itself has forty staff; 16 are lecturers teaching EE-TECE internally and external customers and organizations. Table 2 shows the provision of EE-TECE in the institution. This demonstrated the increasing awareness on the importance of EE-TECE for all science and engineering, social and art disciplines.

Table 2: Provisions of EE in Faculties

Faculties	Entrepreneurship ENT/ETR300	Technopreneurship ENT600
C Sc. & Mathematics	√	√
Mechanical Engineering	√	√
Electrical Engineering	√	√
Chemical Engineering	√	√
Sports Sciences	√	√
Health Sciences	√	√
Applied Sciences	√	√
Hotel & Tourism	√	√
Information Management	√	√
Creative Arts & Technology	√	√
Business Management	√	√
Academy Languages	√	

The Faculty of Business Management itself has the Marketing, Retailing and Entrepreneurship Centre that manage three main departments/programs namely: Marketing, Retailing and Entrepreneurship. The Entrepreneurship department has thirty academic staff teaching EE-TECE courses. At the present moment, a total of forty-six academic staff are entrusted in teaching EE and TECE courses; and there are other management lecturers who are at times being requested to teach these courses when class demands exceed. Table 3 shows the demand for EE-TECE courses and academic staff available (masmed.uitm.edu.my; fbm.uitm.edu.my (2012).

Table 3: Courses Demand and Teaching Strength

Centres	Academic Staff Teaching EE/TEC	Faculties Courses
MASMED	16 staff	
Entrepreneurship Department	30 staff	Faculties: 18 Courses: 57
Management/Others Departments Supporting	10 staff	

VI TEACHING AND INSTRUCTIONAL DELIVERY

From the above scenario, the demand for EE and TECE classes and courses are on the increasing trend over the years; likewise the demand for academic staff to teach EE and TECE courses in the institution also increases. The teaching and instructional delivery of EE and TECE among these teaching staff may also differ. EE and TECE also differs among the programs, students and offering of these courses differ in various parts (semesters) of each program study. Furthermore, the context of EE and TECE may also varies from pure and applied and health sciences to civil, electrical and mechanical engineering; likewise from creative arts to social sciences such as laws and languages.

In the year 2007, the Ministry of Higher Education (MoHE) through the Malaysian Qualifications Agency (MQA) launched the new academic and accreditation standards and framework for tertiary education system throughout the nation. As a result, the new OBE curriculum design academic programs were introduced and implemented with effective in July 2010 in the faculties (Shariff, 2011). New program educational objectives, program and course outcomes were established. The academic staff was given OBE trainings so as to comply with these new requirements. Students are expected to demonstrate the achievement of the learning and course outcomes upon completion of the courses and programs. Table 4 highlights the nine program outcomes (POs)/learning outcomes (LOs) for the business management (BM) programs with emphasis on nine graduates' attributes to be achieved. The entrepreneurship skills are stated in learning outcome LO8 and program outcome PO8.

Table 4: Program Outcomes (Pos) versus Learning Outcomes (LOs)

Upon completion of the degree BM programs, the students would be able to: (POs)	MoHE Learning Outcomes (LOs)
Apply business management fundamentals. (PO1)	Knowledge (LO1)
Apply systematic approach in solving business problems. (PO2)	Practical skills (LO2)
Use appropriate methodologies in gathering and analyzing information pertinent to decision-making. (PO3)	Thinking & scientific skills (LO3)
Demonstrate effective communications skills in business environment. (PO4)	Communication skills (LO4)
Work in a team. (PO5)	Teamwork skills (LO5)
Analyze and critique business decision within ethical framework. (PO6)	Values, ethics & moral (LO6)
Relate current events in their specialized area. (PO7)	Lifelong learning (LO7)
Integrate entrepreneurial skills in business decisions. (PO8)	Entrepreneur skills (LO8)
Exhibit leadership skills. (PO9)	Leadership skills (LO9)

With these changes taking place, teaching and learning emphasis is dependent on students' active learning and participation. Likewise, learning and course evaluations are streamlined to measure the achievement of intended outcomes.

The teaching methodology across all faculties in this institution is generally generic whereby continuous assessment encompasses individual assignment, group assignment or projects and case studies that constitute fifty percent of grading; while the other fifty percent is derived from students' achievement in their final examination.

Hence, teaching EE and TECE courses are challenging to both the academic staff and the students due to too many constraints such as: other courses had similar assignments, activities and assessments. Carrying out practical entrepreneurship activities and projects consume much self-learning time even though exposure and hands-n activities are the practical grounds to instill entrepreneurial values and cultures.

VII   IMPLICATIONS

Based on this intensive literature and discussion, the implications derived are firstly: there is need to interpret the culture of entrepreneurialism and develop entrepreneurship practical learning rather than entrepreneurship education. No doubt EE and TECE courses are provided, these are insufficient to instill true entrepreneurialism in the students' mind and behaviors. EE and TECE courses are provided as 3 or 4 credit hour subject along with other core courses which are more important to the grading system. Fifty percent of the assessment for these courses is examinable; hence students are prone to be examination-oriented and to achieve high grades rather than entrepreneurial activities and doing impactful business plans.

The second implication is teaching entre/technopreneurship is actually complex (Frank, 2007).Numerous practical skills such as communication, team work, networking, organizing and problem-solving are necessary to support the entrepreneurship agenda. Project-based and service-learning activities are actually needed to foster entrepreneurship skills and character development. Attitudinal characteristics such as leadership, self-efficacy, risk taking are lacking in the discipline and in the students themselves as well as academic staff (Frank, 2007).

The third implication is time factor. Time factor is one the major limitation factor to inculcate entrepreneurial values and attitudes. Incorporating entrepreneurship curricula and the skills require investment in time and resources by universities, schools and departments. An ordinary student generally takes up 4 to 6 courses in a semester of

14-15 weeks. Doing group projects, business plans, meetings, organizing entrepreneurial activities and seminars consume long hours and student-learning time. Thus, support from the faculties and academic staff would help to alleviate stress/time through proper planning and scheduling of lesson plans prior to the commencement of a new semester.

Projects involving oriented-entrepreneurialism and community involvement are likely to motivate students and provide the excitement in university education; focusing on innovation and creativity together with the aims in social and environmental improvement could prove an inspiring agenda for the profession (Frank, 2007).Thus, the fourth implication is having group projects is appropriate to engage students' active learning and participation in EE-TECE. Having entrepreneurial competition and incentives trigger motivation and interests in the students themselves. Brown (1999) and Ooi, Selvarajah and Meyer (2011) highlighted the delivery of EE-TECE course content should be informal with emphasis on more hands-on teaching methods. These researchers recommended that the core structure in teaching-learning delivery should draw on: critical thinking, reliance of experiences, thinking about entrepreneurship and using guest speakers from successful entre/technopreneurs in delivery.

The fifth implication is teaching technopreneurship for science and engineering students is more complex. As Syahida and Lahsasna (2011) postulated there are eight key dimensions of technopreneurship education that must be fostered:

i. awareness	the ability to recognize pertinent environmental changes and the need to improve.
ii. search	the ability to explore for opportunities and threat.
iii. strategy	the plan of action to achieve the envisioned goals that are significant for the economic growth of the firm.
iv. core competency	the economic strength of the firm that needs to be identified and build upon.
v. technology paradigm:	the ability to understand the existing platform of technology;
vi. linkages:	form of collaborative effort established by the firm.
vii. learning	effort to encourage acquisition of codified and tacit knowledge on continuous basis;
viii. leadership	the ability of the entrepreneur to lead his firm to achieve competitive advantage and sustain it.

Cheng and Chan (2004) in their study on teaching effectiveness of EE in Malaysia posited that there is a need for higher education institutions to examine the objectives of offering EE-TECE as well as teaching deliveries. The persistent respondents' feedback was lecturers were not equip with the

skills to teach EE-TECE, the teaching methods were not appropriate, and EE-TECE was taught in a too abstract manner which students found difficulties to understand. Nevertheless, their study found that the most popular teaching delivery is giving group projects (90%), followed by lectures (80%) and short essays (60%).

Successful entrepreneurs have also pointed out the need for better education: "Universities need to produce highly competent graduates, be it in technical or non-technical fields. Coupled with the scarcity of skilled workers is still a major problem faced by the job market, what even more to produce successful entrepreneurs among graduates.

VIII. CONCLUSION

This paper concludes that entrepreneurship education (EE) and technopreneurship education (TECE) are gaining acceptance and attention in the institutions of higher education. Despite the challenges, limitations and complexities in teaching-delivery of the courses, every interested party and stakeholders encompassing the institution, students, academic staff, graduates and the government have their own roles towards attaining their specific objectives. The relevance of EE-TECE programs are crucial towards human capital development and also nation building; as well as towards generating a high-income economy.

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