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'We Don't Need No Education?': Moving Towards the Integration of Tertiary Education and Entrepreneurship

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Introduction

The popular media image of the successful entrepreneur is a no-nonsense, all-action, money-generating innovator who is also a college dropout (Scarborough, 2010). The perception would suggest that formal education relies on pedagogies that are irrelevant to entrepreneurs and that the very things entrepreneurs do best, creating products, developing 'know-who' and an ability to sell (Aronsson, 2004) are taught inadequately in higher education. This chapter takes issue with the perception that higher education is inappropriate for entrepreneurial development and chronicles profound changes (Wilson, 2008) in this sector to adapt to a new entrepreneurial paradigm. This chapter aims to: articulate an understanding of the partial truths and inaccuracies of what can be regarded as a myth; highlight the growing role of higher education in creating entrepreneurial graduates; and assess the credibility gap that still lingers between entrepreneurs and educators. Overall we propose that entrepreneurship educators advocate that aspects of entrepreneurship can be taught as a distinctive management process (Engel, 2007) and pedagogical approaches can be deployed to develop enterprising behaviours (Kearney, 2010). The chapter explores some approaches to embedding entrepreneurship across the curriculum and assesses whether or not its initiatives are likely to yield dividends in creating entrepreneurial graduates.

Didactic classroom pedagogies may not be appropriate given that entrepreneurship learning requires simulated experiential approaches,

such as learning by doing, mistake-making, problem-solving, experimentation, coping with emotional swings, copying (Pitraway & Cope, 2007) and more holistic right-sided and interdisciplinary thinking (Kelly & Cummins, 2010). This appears to be in contrast to the lecture halls that espouse passive learning and functional management approaches by business schools, and formal and institutional learning is indeed one soundly rejected in the song 'Another Brick in the Wall' by Pink Floyd which provides the entry point for our title. However, there has been a revolution in higher education over the past decade, and in fact the investment communities consider universities as fertile grounds for innovation. In turn, many universities have overhauled their culture, curricula and pedagogies so that entrepreneurship is valued in the same way as teaching and research. Entrepreneurs cynical of the education process may believe it to be a cop-out. However, a more inclusive definition of entrepreneurship (Stevenson, 1983) as a management process for dealing with uncertainty has evolved to 'the pursuit of opportunity without regard to the resources currently controlled'. Consequently, entrepreneurship can be seen more as a way of thinking and behaving that is relevant to all graduates.

This chapter begins with the historical context for entrepreneurship in higher education and its emergence in teaching and as a field of research. More recent trends are explored in the context of rapid socio-economic change over the past decade. The evolution of entrepreneurship education predominantly in business schools to more inclusive cross-disciplinary models is outlined as along with the recognition of pedagogy, in particular problem-based learning (PBL), as a key factor in instilling entrepreneurial attributes. Examples of successful entrepreneurship education programmes are cited, and the case study of a new higher education institution, Bahrain Polytechnic, is provided (other aspects of this institution are explored in Chapter 7 of this collection). The authors conclude that while there has been a shift towards employers seeking graduates with entrepreneurial skills, much work needs to be done to understand the gap in perception of credibility between entrepreneurs and academics.

A historical context for entrepreneurship in higher education

The pioneering activity inherent to entrepreneurship has a long history in universities, particularly in the United States. Since the launch of Harvard's first entrepreneurship programme in 1945 (Cruikshank,

2002), higher education institutions in the United States have pursued entrepreneurship education as a means of stimulating graduate interest in new venture creation. In the 1930s, Stanford University students, Dave Packard and Bill Hewlett, attempted to set up a new business in their final year, focused on radio technology (Packard, 1996). Their professor, Frederick Terman, mentored his students in a way that represents a core aspect of contemporary entrepreneurship education today.

This genesis of garage start-up Hewlett-Packard and, more recently, of Google, started by Stanford students Larry Page and Sergey Brin, has been an inspiration to many technology entrepreneurs, where ideas of the intellectual mind fostered at university were brought to fruition by creative management processes and entrepreneurial values. Stanford has remained an icon for its output of entrepreneurial graduates (Ku, 2002). Its Stanford Technology Ventures Programme is world renowned for developing Silicon Valley's next generation of technology entrepreneurs.

Outside of the Ivy League, the University of Cambridge serves as a meaningful example of entrepreneurial transformation over the past 30 years. Its innovation cluster began in the 1960s with the objective of putting 'the brains of Cambridge University at the disposal of industry'. Since then, the region has evolved into an elaborate ecosystem, comprising large enterprising networks of companies and people (*Cambridge Phenomenon*, n.d; Library House, 2006). Its high-tech cluster hosts over 900 innovation-led companies across several business and technology parks, many of them spinouts from university professors, 11 of which have valuations of over \$1 billion, while its four biggest companies employ over 2500 people.

However, apart from Horace Darwin who founded the Cambridge Scientific Instrument Company in 1881, Cambridge remained, for a long time, detached from commercial opportunities. Despite its Nobel Prize winners and technological advances such as the jet engine, electron microscope and monoclonal antibodies, its isolation from the business community meant that spinouts were discouraged. Perhaps, the most significant change was the granting of permission to academics to pursue commercial roles, which contributed to the emergence of spinouts, combining technological expertise of academic staff with the business acumen of experienced entrepreneurs. The university's entrepreneurial activities are also integrated with its education provision: it offers entrepreneurship courses at undergraduate and postgraduate levels across a wide range of programmes. Courses are team-taught

by faculty and entrepreneurs, who encourage real-life problem-solving and action-based learning.

As elite universities, Stanford and Cambridge are not necessarily the role models for all higher education institutions. Their brand of high-tech and high-profile start-ups represents only one aspect of the broader understanding of entrepreneurship. By contrast, Babson College has developed a far more encompassing approach to entrepreneurship education over the past 50 years that is reflected today in its ethos of a student's learning experience that includes, as a 'living laboratory', contemporary global issues of social responsibility, environmental challenge, economics and sustainability. Although it offers a venture accelerator programme, entrepreneurial thought and action of all kinds are at the heart of education for its students.

Little has changed in education until relatively recently, but rapid social change over the past 20 years has meant that higher education is now playing catch-up. Structural shifts in post-industrial economies in the 1980s forced developed nations to rethink how they could maintain competitive advantage. Doing the same things better only yielded diminishing returns. Productivity improvements that could sustain greater income and wealth levels had to come from elsewhere. Governments of rich nations increasingly saw innovation as the key to future prosperity. The subsequent explosion in innovations with shorter life-cycles, combined with globalization and proliferation of communications technology has led to a far more complex and dynamic lifeworld for graduates. In emerging economies, the problem is more acute as there is simply not the industry to absorb graduates into low-paid jobs. Preparing students for a world of rapid job-change and self-employment has belatedly, therefore, become a priority for higher education.

Thus, the underlying problem for many countries is that the current system of education was conceived for a bygone era, underpinned by the economic imperative of the industrial revolution and the intellectual notion of academic intelligence (Eberle, 2013). A generation ago, graduating students could expect to step into an easy berth with a multinational or a Government ministry, but now graduates need to be able to cope with greater uncertainty in the job market. With the persistence of the industrial revolution model of education, it is no accident that the capacity for divergent thinking and creativity correlates negatively with time at school (Land & Jarmin, 1998). This history, therefore, is central to the myth. Perhaps, one of the most seminal papers to address the issue came from the UK National Centre for Entrepreneurship Education (NCEE), which argues that there are three drivers for broadening

the concept of entrepreneurship education (Gibb & Hannon, 2006), including the need for higher education institutions to

- impact more acutely on their regional economy;
- make their IP more widely accessible through commercialization;
- prepare students for a lifeworld of greater complexity involving occupational change, international mobility, cultural diversity and greater likelihood of self-employment.

The emerging entrepreneurial paradigm derives its relevance from these imperatives. In this scenario, a higher education qualification is no longer a one-way ticket for lifelong employability but must reflect preparation of students for an entrepreneurial career, often first as an employee but, perhaps, later as a potential employer (Hannon, 2009). Traditional entrepreneurship education models, based in Business schools, are increasingly being questioned. Gibb and Hannon (2006), for example, advocate a model of entrepreneurship that extends beyond the business school so it remains contextually relevant to students from other disciplines. In the meantime, thought on new models of entrepreneurship education is slowly permeating public policy.

Few now argue against entrepreneurship as a global phenomenon. Yet, the myth of higher education's inappropriateness for developing entrepreneurs persists. Perhaps, this has partly to do with the current generation of entrepreneurs being out of touch with developments in higher education. Thought leadership on this issue is likely to come, if anything, from the academic community rather than the business one. With these thoughts in mind, next section explores, in more depth, recent trends in entrepreneurship education as it has evolved over the past decade. Embracing the core argument that many aspects of entrepreneurship can be taught is central to the basic assumption that these trends are based on a positive relationship between entrepreneurship and education.

Recent trends in entrepreneurship education

A number of trends have emerged to create an inflection point in how higher education is rising to the challenge of the entrepreneurship agenda. Over the past decade, many entrepreneurship educators have migrated from Business Schools to the science, technology, engineering and creative disciplines in search of more fertile grounds for developing entrepreneurs. Experiential pedagogies, such as PBL, laboratory

experimentation and creative problem-solving potentially fit well with science, engineering and technology programmes. Many examples of entrepreneurship programmes are now located in non-business schools or, more importantly, are cross-faculty. For entrepreneurship educators the challenge lies in contextualizing the relevance of entrepreneurship to diverse academic disciplines, and this requires an approach that circumnavigates the traditional business-plan metaphor for entrepreneurship so it can be valued in a non-business context.

There are other drivers too bringing entrepreneurship to the fore. Globalization is forcing developed economies to bolster the entrepreneurial capacity of higher education institutions in relation to all aspects of their operation, strategic planning and governance. This need manifests itself in the diversification of university funding as they outgrow the public purse, the growth in commercialization of university research and intellectual property and the rise of a vocational emphasis in higher education to equip graduates with the employability skills needed for frequent occupational change. Europe's financial crisis is prompting higher education institutions to consolidate. In the United States, there is recognition that the students' debt burden is unsustainable. The era when higher education was merely a matter of national government policy is fading as rapidly as the traditionally subversive idea of 'students as consumers' gains traction (*The Economist*, 2005). With shrinking budgets, academic leaders are becoming inventive out of necessity, exploring ways to improve revenue streams and reduce costs and fundamentally re-examining the way in which education is delivered (New Media Consortium, 2007). The Irish innovation economy serves as a useful microcosm for global trends. Over €1bn has been committed to Research and Development through Science Foundation Ireland since 2001 (Byrne, 2008). Advocates suggest that, over time, third-level research will create economic value through commercialization in strategic areas relevant to economic development. However, detractors cite disappointing economic returns. Now under a burden of debt, the Irish government is wrestling to achieve economies of scope and enhanced education provision from its universities and institutes of technology, which have remained largely unreformed for a generation. Despite sizeable investments in expanded campus incubators and the success of its campus enterprise centres, Irish higher education has yet to reap the commercial returns from its university spinouts. Recent research from a consortium of those colleges (Hamouda et al., 2009) highlighted contributing factors that include the following: lack of exposure of undergraduates to entrepreneurship; absence of links

between campus incubators; and academic programmes and a lack of focus on graduates as potential employers.

Even in the developing world, governments face strategic challenges in scaling higher education affordably to deal with the explosion in demand. China, with 29 million students, plans to increase its university enrolment rate from 24 per cent to 40 per cent in the next ten years. Likewise, India, with 14 million students at present, plans to increase it from 12 per cent to 30 per cent by 2020. Progress towards millennium goals in secondary education will shortly create a situation where over 100 million people on the African continent will be qualified for, but will not have access to, higher education. Yet, the dominant forms of higher education, public-funded, campus-based, high-cost, limited technology, remain ill-equipped to support the phenomenal capacity build-up required to address education needs of millions of people who will need it in future decades. Drivers for entrepreneurship within higher education are being shaped by a changing environment in which globalization and social discontinuity are weakening the traditional geographical and regulatory barriers that have kept the concept of the university as a stable pillar in society for so long.

Although entrepreneurship in higher education is slowly gaining acceptance, the central focus on personality traits of entrepreneurs has lingered since the 1950s (McClelland et al., 1958), and the question of whether entrepreneurs are born or made persists. However, when you consider the many factors that impact on successful entrepreneurship, it is not surprising that firm conclusions are rarely arrived at when it comes to answering that question and there is still a lack of research-based evidence on how and to what extent entrepreneurship in higher education contributes to new-venture creation and the generation of economic wealth. This does not mean that we should give up on entrepreneurship education; quite the contrary, it suggests instead that educators should develop ways in which entrepreneurial skills and attitudes are integrated across different disciplines and in everything that we teach. Campus-wide entrepreneurship education now tends to be structured around two fundamental models: the magnet (centralized) model and the radiant (decentralized) model (Streeter, Jaquette & Hovis, 2002).

The magnet model is employed by the majority of American universities. It opens up entrepreneurship courses to non-business students through the creation of minors, specializations and joint-degree programmes where entrepreneurship elements are taught to students through a Centre for Entrepreneurship. Conversely, the radiant model facilitates access to programmes and courses within individual schools.

In these circumstances, a centre may operate in a coordinating role, but ownership for research, curriculum development and programmatic offerings resides within the school.

With ever greater attention not only on business entrepreneurs but also on academic entrepreneurs, civic entrepreneurs, social entrepreneurs and technological entrepreneurs (Abubakar, 2012), they make sense in that generic entrepreneurial attributes do not allow themselves to be captured within a single discipline. It demands a different, less compartmentalized approach to curriculum development. The traditional emphasis on deductive reasoning with a focus on 'understanding, feedback and analysis of large amounts of information' (Henry et al., 2005) is at odds with the reality of being an entrepreneur; where there is less time for critical analysis. This does not mean that there is no longer any place for critical analysis: again, quite the contrary. It rather means that we need to become serious about developing approaches that incorporate the reality of entrepreneurial life.

The examples above prompt a serious rethink of the way that universities and individual disciplines educate their students. Rather than having stand-alone courses, the challenge for higher education institutions lies in the provision of courses that embed entrepreneurial skills in the curriculum, while concurrently providing tangible links to local business, enterprise development and investment communities.

So, returning to the myth, the question remains: can we cite best-practice exemplars where formal education has adapted to the requirements of entrepreneurship? Many examples of successful entrepreneurship education programmes already exist in the leading innovation economies.

- The Norwegian University of Science and Technology (NTNU) has a School of Entrepreneurship that offers a two-year MSc in Entrepreneurship.
- The relatively small University of Wisconsin has been cited for integration of its technology incubator, its commercial technology transfer office and entrepreneurship education across a wide variety of its graduate programmes (Arton et al., 2003).
- Georgia Institute of Technology's Technological Innovation Generating Economic Results programme brings multi-disciplinary teams of graduate students together to examine the commercial potential of PhD students' research (Thursby, 2005).
- The Clark School of Engineering at the University of Maryland offers a technology venture accelerator programme that provides hands-on

entrepreneurship training for technology students seeking to form new ventures (Barb, Magids & Thornton 2005).

- McMaster University's MSc in Engineering Entrepreneurship & Innovation promotes the commercial success of engineering innovation by providing its students with the opportunity to translate scientific ideas into commercially viable products.
- Purdue University, most noted for its award-winning service-learning Engineering Projects in Community Service (EPICS) programme, launched its entrepreneurship initiative (Coyle et al., 2003). It provides students with the opportunity to learn about entrepreneurship in the context of products they develop for service organizations in the local community.
- In Sweden, a national programme (PIEP) allows technology graduates to gain valuable experience in commercialization by supporting real product-development initiatives.

Perhaps the fastest learners have been the higher education institutions in the United Kingdom where there is now an annual 'Entrepreneurial University of the Year' award. Participating universities are evaluated across four dimensions. Recent winners of this highly prestigious award have included Nottingham University, Queens University, Belfast and Coventry University.

The criteria for UK Entrepreneurial University of the Year Awards (Willets, 2011) are fourfold. One of these criteria is the institutional environment, with emphasis on whether there is the transformation of culture to provide an environment aligned to supporting graduate entrepreneurship, and if there is institutional leadership for driving enterprise? If there are innovative and entrepreneurial staff members at institutions demonstrating innovation and growth in their approach to the institution's enterprise and entrepreneurship offerings, as well as reward mechanisms for developing excellence in entrepreneurship practice. A further criterion is evidence of entrepreneurial mindset among students and graduates and an improved attitude towards enterprise and entrepreneurship as a career and life choice. Finally, there is the measure of entrepreneurial impact, with a focus on entrepreneurial outcomes of staff, students and graduates.

It's not what we teach but how we teach it

The question therefore arises: what are those approaches to teaching that are gathering pace? In the first instance, there is an increasing

recognition of intelligences and aptitudes beyond the dominant benchmarks in academia today. While deductive reasoning, literacy and numeracy are important for success in a traditional academic environment, there is growing currency for recognition of creativity, emotional intelligence, employability skills, physical intelligence and entrepreneurial aptitude. In fact, there is an increasing acceptance that entrepreneurship and employability are interrelated: the phrase '21st-century skills' is increasingly cited in academic literature as the panacea for coping with uncertain futures. At Bahrain Polytechnic, for example, these skills have been unpacked and encoded into the curriculum (Huiser & Wail, 2012). Skills have included communication, teamwork, problem-solving, demonstration of initiative and enterprise, planning and organizational skills, self-management and learning and technology skills.

In recognizing these skills, tests for assessing entrepreneurial aptitude can be deployed as entry criteria or within entrepreneurship programmes. The General Enterprising Tendency (GET) test, developed by Durham Business School, following research into ways to measure entrepreneurial attributes, has been validated and amended for use in different entrepreneurship programmes (Gibb, n.d.). It rates participants under the following characteristics:

- Need for achievement
- Creative tendency
- Drive and determination
- Need for autonomy
- Calculated risk taking
- Resilience

Although the GET is used in a variety of ways in entrepreneurship education, universities still have some way to go to developing robust measurements of the underlying skills that would allow them to be used extensively.

Understanding these attributes and inventing tests to measure them is one thing; understanding how entrepreneurial people learn and applying it to teaching is another. A recent study perhaps provides some clues (Kelly & Cummins, 2010). *EntreBRAINeur* sought to establish if there was any discernible pattern of learning among successful entrepreneurs. It found that they are primarily 'right-brained' and demonstrate a pattern of thinking that is both 'random' and 'concrete'. Education has traditionally valued left-brain dominance (Swallow, 2012) where thinking is 'sequential' and 'abstract'.

'Concrete', 'random' people have preferences for intuition, calculated risk taking and experimentation. They thrive best in an environment in

which they can trial by error, compete with others and work through problems. They dislike bureaucracy, routine and record-keeping. Negative characteristics may include opportunism, recklessness and ego. While learning preference theory is acknowledged as beneficial, there are some who reject it as a neuroscience myth (Dembo & Howard, 2007). However, there is an increasing acceptance by entrepreneurship educators that experiential pedagogy is critical to addressing entrepreneurial learning preference.

Current enterprise policy across the globe reflects a pervasive espousing of entrepreneurship promotion built on a premise that people have an innate capability, which merely needs to be nurtured. Another trend relates to support programmes for local entrepreneurs around a strictly market-focused model, based on the business plan metaphor, of bringing ideas to reality. Invariably, these programmes comprise three levels of engagement: pre-seed, start-up and expansion. This approach assumes a latent talent pool of entrepreneurial people, yet typically only 10–20 per cent of the general population have the necessary inclination and aptitude. Why have people do something to which they are not suited?

Only lately has developing entrepreneurial capabilities been the focus of curriculum. Even Business schools, which for so long have driven entrepreneurship education, recognize that their traditional syllabi are designed to teach the opposite of entrepreneurship: how to be conforming and loyal employees. Enterprising behaviour mirrored by students is very often a by-product of the teacher's approach, irrespective of the subject (Kearney, 2010). The desired entrepreneurial outcomes in any education programme present a major challenge, therefore, in reflecting on what needs to be taught and how the appropriate learning environment can be created (Sarasathy, 2007). The development of the students' entrepreneurial capacities requires developing their mindsets, attitudes, beliefs and emotional intelligence as well as their technical skills. Achieving entrepreneurial propensity requires a learning approach that emphasizes experience, action and reflective processes (Herrman, 2008), as well as building self-confidence and self-efficacy, which can only be achieved through immersion in entrepreneurial environments. Pedagogy, therefore, is critical to shifting from transmission models of teaching, centred on the teacher, that is learning 'about', to experiential learning, that is, learning 'for' where students can learn to apply entrepreneurial techniques in a wide range of contexts.

Programmes designed to expand beyond the limited set of pedagogical tools traditionally applied (cases, lectures, projects and visits, with

some basic skills training) are emerging. The European Entrepreneurship Educators Programme (3EP) provides practical training for teachers in the application of over 50 different pedagogies linked to entrepreneurial learning. These pedagogies have much in common with the approach of PBL.

PBL focuses on the process as well as content. Furthermore, clear links can be drawn between new ways of thinking about entrepreneurship education and PBL. For example, it is argued that 'entrepreneurs learn, not through structured teaching, but through experience and trial and error' (Henry et al., 2005), which goes to the heart of the learning environment that PBL tries to establish. Contrary to popular myth, entrepreneurship is a team pursuit: there is simply no way to be successful without developing a strong team orientation and a capacity to build networks. The PBL concept is critical to facilitating teaming skills and the provision of 'live' approaches to learning. The concept of students working in teams on 'live' case studies facilitates a number of entrepreneurial outcomes, including: relationship building; problem-solving; identifying and creating opportunities and relating practice to theory.

These points suggest that considerable expertise is needed to design interdisciplinary problems that can stimulate the entrepreneurial characteristics that we are seeking to develop. If problems can enable 'conditions of autonomy, fluctuation and creative chaos, redundancy, requisite variety, and trust and commitment' (Tee & Lee, 2011) then students will discover and learn the necessary knowledge not only to address the problem but also to design ways of selling and marketing their solutions. More still needs to be done, particularly in the areas of curriculum development, training of teachers and cross-disciplinary research collaborations. The next section examines how a new institution in the Middle East, Bahrain Polytechnic, is seeking to establish its entrepreneurship provision.

Entrepreneurship education at Bahrain Polytechnic

The case study at Bahrain Polytechnic is indicative of many similar institutions that aspire to fulfilling the entrepreneurship agenda. Bahrain's strategic location as merchant trading route between East and West has sustained its economy over this period. Even today this trading legacy is reflected in the multi-ethnic makeup of commerce across the island, and Bahrain remains a gateway to the region's largest and fastest evolving economy, the Kingdom of Saudi Arabia.

However, Bahrain's economy has two key issues it must address to realize its economic potential: the petroleum sector accounts for 76 per cent of Gross Domestic Product despite attempts at economic diversification, and Bahrain still faces challenges of youth unemployment and reliance of public-sector jobs (Roudi, 2011; see also Chapter 7 in this book). Although Bahrain has made significant progress in developing macro-economic environments that are globally competitive, it continues to rank little better than other Arab States for many measures of higher education and innovation (McGlennon, 2010). The most recent global competitiveness index report (out of 147 countries) highlights that Bahrain's biggest challenges remain in the innovation sphere.

Bahrain's greatest competitiveness gains can come, therefore, from bridging the gap (on its innovation rankings) with leading innovation economies such as Finland and Singapore. As Bahrain transitions its economy, the fusion of long-standing polar opposites, its community of entrepreneurs and its higher education sector may offer dividends. Bahrain Polytechnic was set up in 2009 to address a gap in the higher education landscape. Positioned between the traditional university sector and post-school technical and vocational training, it faces a particular challenge in providing graduates for sectors of the economy strategically linked to future job growth. Chapter 7 explores in detail the institution's establishment; in the present chapter the focus is confined to the entrepreneurship embedded in what the Polytechnic teaches.

As with many Middle-East countries, youth unemployment is well above base unemployment rates. Consequently, in 2013 the Polytechnic reoriented its original mission from producing 'work-ready' graduates to producing 'professional and enterprising graduates'. As the critical mass of industry simply does not exist to support large numbers of high-productivity graduate jobs, the new mission reflects a growing recognition of entrepreneurship as one solution and aims to embed entrepreneurship. The Polytechnic offers a range of courses that accommodate different contexts for entrepreneurship. It is worth exploring briefly what these comprise. The course 'Bahraini Perspectives' is mandatory to all students and explores Bahrain's place in the world. It addresses aspects of cultural, economic and social well-being. The course is usually facilitated in a cross-disciplinary setting and is problem-based. Students are asked to explore solutions to complex problems in Bahrain: from the bottleneck problems on the Saudi-Bahraini causeway to environmental issues. 'Entrepreneurship Laboratory' is an elective

course for all students who wish to explore entrepreneurship as a career. Team-taught by academic staff and guests from the enterprise community, it embeds Bahrain Development Bank's Entrepreneurship Orientation Programme, which focuses on idea generation and opportunity recognition. 'New Venture Finance' applies financial theory to the uncertainty of the entrepreneurial context where risk is inherently high. It addresses issues of financial need and sources, valuation, contracting, deal structuring and negotiation. Case studies are used to explore principles, which students get to apply in role-play scenarios with legal advisors and investors. 'Enterprise Development' is a more advanced course for near-graduate students, which uses the traditional business-plan pedagogy as a means of stimulating interest in new venture creation. 'ICT [Information Communication Technology] Innovation Laboratory' is for students studying ICT, for whom the Polytechnic provides an innovation space that facilitates software product development, prototyping and testing. Students are mentored both in core technical aspects of creating their product and in the wider aspects of commercialization, including the following: market research, developing a business model, beta testing, licensing and business development. 'Think Outside the Box' is an activity-based course that aims to foster students' teaming, creativity and problem-solving skills in dynamic and stretching scenarios, including the following: 3D puzzles, dealing with problems with little or no data, activities for enhancing imagination, activities for thinking logically, avoiding mental blocks and appreciating cultural diversity. It could be argued that there is hardly anything new here: this, however, is exactly the point. More frequently, higher education institutions are adapting their curriculum to widen the contextual relevance of entrepreneurship to all students.

Concluding remarks

Small and micro enterprises represent the lifeblood of most economies. Across the globe, a village, town or city has small businesses run by enterprising people. The question of the day turns to how we can encourage more people to consider turning their talent and energy to building up a business. The answer lies partially in educating our younger generations for a new way of life. Efforts at the Bahrain Polytechnic can be placed in a wider context of demand and prioritizing in education centres around the world and the way it is responding to the need to embed entrepreneurship.

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