Embedding entrepreneurship education at the University level

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Abstract

Enhancing levels of innovation and entrepreneurship to grow a more competitive economy is the focus of much government effort. Universities, aware of the importance of developing entrepreneurial potential, are focusing on equipping students with the skills and understanding to contribute to business creation and to innovation within organisations they join, through the provision of transferable skills. It is within this overall aim that this paper presents a case study of the Centre for Entrepreneurial Learning at the University of Cambridge, covering the lessons learnt so far with respect to content design for teaching the practise of entrepreneurship.

Courses are made as interactive as possible and the range and depth has been significantly increased over the past five years to meet the growing needs of students, faculty and staff both within Cambridge and elsewhere in the UK.

In essence the approach at Cambridge has been to develop the self-confidence and self-efficacy of students by enabling them to learn entrepreneurial skills and understanding, the focus being on behaviours. Through this approach the Centre has worked to establish a core curriculum focused on entrepreneurial processes that are "taught" by entrepreneurs on a pro bono basis. It is felt that they are best equipped to do the teaching and by providing additional ways for students to interact with entrepreneurs it is possible to inspire them towards a more positive attitude to entrepreneurship.

We are able to take advantage of the entrepreneurial ecosystem that exists in Cambridge, particularly as the entrepreneurial community is strongly linked with academics through networks, which in turn provide for many opportunities. Our students are encouraged to interact with both these communities in entrepreneurial environments. Thus learning about entrepreneurial processes is combined with networking and opportunity recognition.

Introduction

This paper[2] has been written to share some of the lessons learned from the Centre for Entrepreneurial Learning at Cambridge. Although the Centre is relatively young, we have travelled a long way in scaling up the provision of entrepreneurship education. The paper sets out a brief background note and is followed by a description of some of the methods, frameworks and models used to design the curriculum and delivery. Some overall data on our courses is provided with one of the "flagship" courses highlighted in a bit more detail.

A question that arises, naturally: Is the Centre having any effect? A pilot study looking at pre and post course evaluation based on enhanced self-efficacy is reported here. Finally there is a discussion on what it means to inspiration, information and implementation with respect to entrepreneurship education and conclusions are offered for those who wish to develop courses and or Centres of entrepreneurship education.

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[2] An earlier version was first presented at the AGSE conference in Melbourne early in 2005.

Background

Since 1999, UK policy has been encouraging entrepreneurship development in Universities, seeing them as long term change agents. The evidence of this comes in several ways:

In 1999 the Office of Science and Technology funded a dozen Science Enterprise Centres[3] and created a major programme through the Cambridge MIT Institute. The SECs received £25m, while the CMI received £64m. Universities have been increasingly encouraged to develop their third stream of funding[4] from commercial activity, through the exploitation of intellectual property and greater interaction with industry. More recent developments include the setting up of the National Council for Graduate Entrepreneurship, and a formalisation of funding (Higher Education Innovation Fund) to assist with the development third stream activity through the Higher Education Funding Council for England.

It is within this context that the University of Cambridge Entrepreneurship Centre was established in 1999, with a one-time grant. The objective was to enhance the teaching and training in entrepreneurship to encourage a more enterprising culture in the University and to provide practical support for those who wanted to licence out their ideas and/or to start businesses.

In 2003, the CEC was split up. The teaching and training activity remained with the Judge Business School, but the team were physically relocated to a more modern set of offices alongside the Management School's spectacular building.

Cambridge Enterprise was created to work alongside the Technology Transfer office, the University Challenge Fund and other organisations within the University to bring about greater seamlessness in the interaction between the University and industry, particularly with knowledge transfer.

The Centre for Entrepreneurial Learning

The "teaching team" is now operating as The Centre for Entrepreneurial Learning – with a **vision** statement of "Spreading the Spirit of Enterprise" while the mission statement includes: to bring about teaching in the practise of entrepreneurship largely for students of Science, Engineering and Technology, the desire to scale up the provision of teaching; provide the best source of "teachers" being interpreted as entrepreneurs who are fully briefed on the curriculum; appropriate and relevant curriculum for the practise of entrepreneurship; creating inspirational learning environments and being sustainable in the long term through financial prudence.

Sharing best practise and a growing international reputation are seen as beneficial outcomes to the tight focus described in the mission statement.

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[3] http://www.ost.gov.uk/enterprise/index.htm This link provides a landscape of UK Government policy that seeks to encourage entrepreneurship while http://www.hefce.ac.uk/reachout/heif/ illustrates that funding, especially on a long term basis is bring put in place.

[4] See the Lambert Review for a deeper insight to this agenda. http://www.hm-treasury.gov.uk/consultations_and_legislation/lambert/consult_lambert_index.cfm

There are a few key measurable **objectives**, including the development of appropriate courses, increased student numbers and financial prudence. The Centre is not meant to carry out research, unless it has a direct relevance to the teaching agenda

The reporting **structure** is to the Judge Business School, directly to the Director on matters of personnel, branding and finance. And to the Entrepreneurship Teaching Committee on matters of teaching programmes, quality assurance and other development issues. The Centre has 10 full time staff including the Director. Their role is best described as a hybrid between a marketing unit and air-traffic control. All the staff of the Centre is focused on planning and implementing courses, while the delivery is largely by entrepreneurs and practitioners. The structure includes the Director who also teaches, but whose primary role (with teaching) is that of curriculum design. There are Programme Managers whose role is more strategic with course delivery and who are gradually taking over the curriculum design function. A Centre Manager ensures the smooth running of the Centre, while administrative staff manages individual courses. The Centre has one full time marketing post.

In order increase the number of participants, great attention is paid to **marketing** the courses, making sure that the courses and students are matched, that we raise high levels of awareness and interest in attending our courses, especially those that are non-credit bearing and to creating the right profile for the Centre for Entrepreneurial Learning.

There are a number of **values** that guide the work of the Centre. Among these is that we want to create a spirit of co-operation and collaboration. This spirit already exists within the Cambridge network where experienced entrepreneurs already provide considerable support to novice and nascent entrepreneurs. The Centre has now stretched that by inviting some 200 entrepreneurs and practitioners (VC, Business angels, bankers and other professionals) to teach and to interact with students. The Centre takes great care not to overuse these speakers, ensuring that they get invited no more than once or twice a year for about an hour or so. They are also shown gratitude and recognition for their time and insights, because we have to ask them to support us on a pro bono basis. However the Centre also takes care to ensure that their delivery is based on the curriculum and feedback is taken seriously.

Another of the values recognises that it is for the individual to enact their entrepreneurial ambitions and that appropriate skills and understanding are learnt, not taught. It is the same as music or maths, in that people learn it if they have the will to do so and some inner talent for it. We may enhance the will and discover the inner talent by providing the skills and understanding but we must always remain humble in that the final act of learning and doing remains with the individual. Hence the name of the Centre.

Therefore the curriculum we have developed is informed by the mission statement for the Centre and the guiding values to focus on the practise of entrepreneurship, interpreted to mean entrepreneurial skills and understanding. By enabling people to learn entrepreneurial skills we aim to encourage people to consider careers as entrepreneurs or to take these skills to future employers.

It also means that in order to achieve this goal we need to attract people to attend our courses. Hence we have developed a model whereby we attempt to **inspire** and to **inform**, allowing individuals then (if they so choose) to **implement**, described in more detail below.

To inspire, inform and implement – the overall learning model at the Centre for Entrepreneurial Learning

Teaching programmes at the Centre for Entrepreneurial Learning have been framed to fit into a three-part model. In the first part we seek to **inspire** students to see themselves as possessing entrepreneurial capabilities. In the second part, when they have thought about their own ambitions they are provided with **information** about the how to take their ideas to reality and finally they are assisted with **implementation** of their ideas through mentoring, sign posting to resources and given other forms of practical support. In some cases this also manifests itself through Business Plan competitions to provide practise at implementation.

Although the three-part model emerged as a practical response to the way the terms are structured in Cambridge, it also fits well with the values of providing a learning journey to individuals. The three-part model is informed by two other authors' elaboration of the entrepreneurial process. The first by Moore (1986) is based on individual behaviours. It is a largely linear description of the process that begins with the "idea" and progresses through implementation to growth, all the while recognising the importance of personal characteristics and abilities on the one side and the macro environment on the other. The way the curriculum maps onto the entrepreneurial process as described by Moore is provided below.

The CfEL focus on skills and understanding maps onto the model by Moore in the following areas:

Skills

- Creativity with business opportunities and seeking out resources and solutions
- Information seeking to validate ideas and opportunities
- Product protection with a clear understanding of patenting and other strategies
- Team working with fellow students to understand that entrepreneurship is a largely plural activity.

Understanding

- Tolerance of ambiguity and risk taking in order to allow individuals to test their own determination
- Organisation of teams and resources and how these play out in venture creation and early stages of growth
- Managerial ability in terms of what it takes with functional expertise such as marketing, finance and operations
- Self awareness of personal characteristics with regard to motivation and ability to build teams and commitment
- Competition and the macro environment for the business idea and how to understand the overall business context so that the opportunity can be implemented.

The second model is holistic. Here the entrepreneurial process essentially brings together an opportunity an entrepreneur or entrepreneurial team with resources (Timmons 1999). It is not such a linear description of the entrepreneurial process as the one provided by Moore

Our courses also draw on the Timmons' model to include the following additional (to Moore) skills and understanding:

Skills

- Communication – with making presentations of business plans (elevator pitches)
- Providing clarity with ideas, and the articulation of market need.
- Ability to write a business plan
- Team working with writing plans and early stages of implementation
- Networking and selling skills – largely to enable information seeking and resource accumulation

Understanding

- Resources in terms of people and money. These need to be secured, creatively and in frugal ways. Resources are in short supply in most early stage venture creation processes and entrepreneurs need to be creative and persuasive in securing resources, especially managerial talent.

- Capital markets need to be understood so that entrepreneurs can develop plans and actions that can lead them to the "right" kind of money in support of their ventures.

In summary, the section above has set out the main principles that inform the "teaching" agenda at the Centre for Entrepreneurial Learning. The next section helps to underpin the theoretical bases, providing the Centre with a rationale for doing what it does.

The role of entrepreneurship education in the development of self-efficacy

This section covers the underpinning theory of self-efficacy, first postulated by Bandura (1997) and helps to explain why it is important to develop entrepreneurial skills.

Self-efficacy is defined as "people's judgement of their capabilities to organise and execute courses of action required to produce given attainments" and have the consequence that "people's level of motivation, affective states, and actions are based more on what they believe than on what is objectively true". Therefore self-efficacy is central to the willingness to act in an entrepreneurial way, to identify and seize opportunities.

High and low levels of self-efficacy have serious consequences for an individual's belief in their ability to perform in a range of situations, for example with entrepreneurial processes. High levels of self-efficacy have been linked to various behaviours such as innovation and opportunity recognition in entrepreneurship (Ardichvili *et al.* 2003) and career persistence (Mau 2003).

The confidence and self-belief that people have in their ability to undertake actions and sub-actions is hugely important to whether or not people will embark on the entrepreneurial journey. The other factor is that enhanced self-efficacy may also raise the sense of achievement motivation, first described by McLelland (see http://www.eiconsortium.org/model_programs/achievement_motivation_training.htm for more information and links to scholarly articles.

To increase levels of entrepreneurial skills and sense of achievement motivation it is essential that courses and programmes influence self-efficacy and confidence of individuals, through pedagogical elements shown to develop particular skills and competences, linked to enhanced self-efficacy, in other words the practise of entrepreneurship.

From this perspective one comes to see that the forms of teaching may be as important as the curriculum content. Experiential and reflective methods are known to promote deep learning (Barclay 1996; Cope and Watts 2000; Krebner 2001; Loo and Thorpe 2002), and are also relevant in the development of self-belief and self-efficacy (Ndoye 2003). Entrepreneurial self-efficacy can be conceptualised as being enhanced through pedagogical approaches, which encourage the student to learn through the experience of others, as well as through their own experience (Rae and Carswell 2000). At the passive end of the spectrum students learn through the integration of brief examples into the theoretical or concept-based lecture.

The student takes a slightly more active role in his/her learning during the analysis of written case studies, which explore the entrepreneurial event, or some other aspect of the venture creation process (Krebner 2001). Guest entrepreneurs as speakers enable students to learn directly from those who have first-hand experience of the innovation and venture creation process (Cooper *et al.* 2004). Our courses also more directly encourage active participation with entrepreneurs to encourage the transfer of tacit knowledge (Polyani, 1958), a form of knowledge that goes beyond formal inputs on a course. This knowledge transfer includes social capital helping to make links at relational and structural levels with opportunities and resources (Myint, Vyakarnam and New, 2004).

The incorporation of individual, small and large group activities based on action learning[5] offers the potential to develop other aspects of self-efficacy and skills important in enterprise

[5] (see http://www.jtiltd.com/reg_revans.htm for more information and references to the work of Dr Reg Revans) The way that we organise our courses is also strongly informed by the principles of action learning where individuals are encouraged to seek wisdom, challenge

creation, such as teaming, while blending those from different backgrounds and cultures is also important in developing understanding of different perspectives and subject mastery (Driver 2003; Gear *et al.* 2003; Poell and Van der Krogt 2003). Evidence from the fields of training and development regarding assessment and feedback points to their role in influencing the development of self-efficacy (Humphreys *et al.* 1997); increased regularity of assessment and feedback provides tangible evidence of changes in performance which can be influential in enhancing self-efficacy (Orpen 1999). Critical thinking and reflection have been linked to the achievement of deep learning and practices such as journaling and the use of learning logs may be used to support such activities (Barclay 1996; Jack and Anderson 1999; Loo and Thorpe 2002; Van Woerkom *et al.* 2002).

Entrepreneurial learning has been explored by a number of researchers including, Deakins & Freel (1998), Cope & Watts (2000), and Rae & Carswell (2001) and been defined as 'the process of learning to create, recognise and act on opportunities' (Rae: 2002).

In summary the literature so far has indicated that the development of entrepreneurial skills, sense of achievement motivation and understanding of the context can augment self-efficacy and therefore lead to heightened levels of entrepreneurial intent and behaviours. There are several studies that have examined different aspects of entrepreneurial behaviours from opportunity recognition through implementation to venture growth. Making direct links from education to venture creation are much more suspect and we will need to rely on indirect indicators.

The next section describes the range of courses at Cambridge, all of which build on our understanding of the curriculum and methods of teaching that can best augment a sense of self-efficacy and raise motivation to be favourable to entrepreneurship.

Entrepreneurship courses at Cambridge

There are two basic segments to our student centred activity. Non-credit bearing courses where students elect to take a course because they are interested in entrepreneurship and credit bearing where, on the whole the course is an elective but has the added bonus of being credit bearing within the main degree programme that they are on. The non-credit bearing courses are also generally open to students from other Universities and the general public (see for example www.cmi-enterprisers.org)

A summary Tables below illustrate the range of courses that are both non-credit bearing (Table 1) and credit bearing (Table 3).

The Tables indicate a number of "student hours", a metric we have had to create to obtain a single measurable across all our courses. It is fairly simple to calculate in terms of multiplying the number of hours of contact into the number of students attending. One of the main reasons for this metric is that since the courses are elective, students drop in and out according to their interests and needs.

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their own knowledge base, where critical analysis is developed through team exercises and asking the right question is just as important as having a formal knowledge base.

Table 1 – Non Credit Bearing courses on entrepreneurship

Includes courses that are run in and by other departments, but delivered by people associated with the Centre

		CEC		Change		CfEL	
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
	1999/00	2000/01	2001/02	2002/03	2003/04	2004/05	2005/06
Best practise					240	96	570
Staff development	64	56	72	64	96	96	96
Boot Camp				1800	700	700	700
Intensive week end			360	480	480	500	480
Summer School	560	480	1200	2800	2760	2730	2660
Enterprise Tuesday	1760	2000	2417	2800	2824	3074	4110
Enterprisers				4200	7680	6037	7638
Graduate - Chemistry					120	90	90
Graduate - Earth Science					12	14	14
Graduate - Architecture						20	20
Graduate - School of Clini and Vet							116
MELS	900	1300					
Masterclasses				500	620		
Enterprising students		72	120	1200			
Enterprise Fellows					320		
VLN	160						
Total teaching hours	**3444**	**3908**	**4169**	**13844**	**15852**	**13357**	**16494**

It is evident that we have grown the number of courses since the Cambridge Entrepreneurship Centre was established. We have experimented with new courses such as MELS (Master Entrepreneurs Lecture Series), Virtual Learning Network (VLN), the Boot Camp, Master classes, and Enterprising Students. The experiments have delivered students' expectations according to feedback but were stopped as they absorbed a huge amount of resources and time in the design, marketing and student administration processes. We have increasingly focused on a few courses and started to grow them. These include:

- Enterprise Tuesday (please see www.enterpreneurs.jbs.cam.ac.uk)
- Enterprisers - http://www.enterprisers.org/
- Summer School - http://www.cfel-summerschool.com/

Only Enterprise Tuesday is explained here in a bit more detail due to space limitations.

The design of Enterprise Tuesday has been developed to inspire and to inform. The marketing effort that goes into ensuring high levels of attendance and participation is considerable. It includes sponsorship from Cobra Beer and alliances with organisations such as The Indus Entrepreneurs, Chartered Institute of Marketing and the Cambridge Enterprise Agency. This enables us to bring students, staff and people from the business community together to assist with networking and creation of opportunities and to sign post people to sources of practical assistance should they wish to start businesses. The course is aligned with the student society's business plan competition and for those who complete the entire course with evidence; a certificate of completion is issued by the Centre for Entrepreneurial Learning. In order to inspire, the speakers who are invited to contribute to the course are thought leaders in their field and have a high level of credibility. This is illustrated in the sample of the forthcoming timetable for the autumn term 2006.

Table 2 – Speaker and topic list for most recent Enterprise Tuesday

24 Oct 06	**Motivation:** *Ask our entrepreneurial panel what motivated them to become entrepreneurs, and why enterprise and entrepreneurship is so important and relevant.*	*Chaired by* **Peter Day** BBC Radio 4 Presenter with **Richard Green,** CEO Ubisense and **Andy Hopper** FRS, Co-Founder of Ubisense and Acorn
31 Oct 06	**De-bunking the myth that entrepreneurs are born**: *Understand the key behaviours of successful entrepreneurs and be inspired to become more entrepreneurial yourself!*	**René Carayol MBE,** Presenter of BBC's *Pay Off Your Mortgage in 2 Years*
07 Nov 06	**Recognising opportunities and avoiding dead ducks:** *Find out how to determine potential opportunities, test your ideas and gather support in the early stages.*	**Julie Meyer,** Founder of First Tuesday and Ariadne Capital
14 Nov 06	**Understanding your customers' needs:** *To have a successful business, you really have to understand exactly what your customers need – hear an example of how to achieve success!*	**Lord Karan Bilimoria, CBE DL** Founder and CEO, Cobra Beer
21 Nov 06	**Gathering Resources:** *How to gather the resources to make your ideas happen, i.e. securing the team, the premises, advice, etc.*	**Prof Chris Lowe** & **Frank Craig CEO**, Smart Holograms
28 Nov 06	**Learn how to pitch your ideas:** *Selling your ideas and persuading people that you are the most capable person to lead and generate interest from investors and customers is one of the keys to success.*	**Mary Spillane**, *Whitehead Mann. Also Founder of Imageworks.*

More detailed information is available from www.entrepreneurs.jbs.cam.ac.uk.

One of the unexpected benefits that has been created by using this clear format has been the copying og the format by a number of other Institutions. One of the early transfers was to Oxford's Said Business School, then Luton University, Auckland (NZ), Reading, Essex and Sussex. More recently we hear that the format is being replicated by the Institute of Productivity and Management in India and by QinetiQ in Farnborough. CfEL are very happy to make this openly available and has made 8 of the lectures that were videoed viewable from the website.

The curriculum and learning experience is very much based on the content drawn from entrepreneurial processes, the context being a mix of science enterprise and entrepreneurship more generally and finally the credibility of the speakers is ensured by asking people who have a clear track record in their professions.

Table 2 – Credit Bearing courses on entrepreneurship

	1999/00	2000/01	2001/02	2002/03	2003/04	2004/05	2005/06
BiosciEnt			168				
Biochem		24	24	24	24	24	24
Chemeng			180	180	240	384	380
CommEnt		240	240	240	240	240	240
CompSci				1500	1500	1500	1500
Matssci			70	90	90	96	96
Physics		160	220	228	228	256	256
MBAECPint			240	260	480	480	490
MBAECPSuper			60	200			
MBAete					180	196	196
MBAhowto			168	168	168	240	240
MBAinnov	240	240	240	240	240	240	240
MBAVC					180	450	450
Total teaching hours	**240**	**664**	**1610**	**3130**	**3570**	**4106**	**4112**

There has been a growth of credit bearing courses at Cambridge, from the one that existed in 1999 on innovation to thirteen. There are two types of courses, one aimed at undergraduates on science and technology degree programmes and the other mainly on the MBA.

On the undergraduate programmes there is an outlier in terms of student hours and this is run by Jack Lang, a graduate of Cambridge Computer Labs. In addition to being a serial entrepreneur Jack Lang is also Entrepreneur in Residence at the Centre for Entrepreneurial Learning and has written a book (The high-tech entrepreneur's handbook: how to start and run a high-tech company**,** by Jack Lang. London: Pearson Education, 2002), which is recommended to our students.

All these courses lead to either exams or written assignments that draw on a summary business plan idea. The courses vary in terms of contact hours from the 4 hours on Biochemistry (Second from left), twelve hours on the Chemical Engineering course to 16 hours on Physics and Computer Science courses. The terms in Cambridge run for eight weeks and contact hours are based on segments of eight, hence two hours a week on Physics down to four hours in biochemistry. The curriculum varies in detail from the more developed courses in Physics and computers on entrepreneurship to improved understanding of entrepreneurship on the shorter courses.

In summary, the CfEL has increased the range and depth of courses over its seven years (see total teaching hours in Tables 1 and 3). The core curriculum is common to all the courses, but the delivery varies according to context. The learning experiences are provided on a pro-bono basis by entrepreneurs and other practitioners. CfEL works with a total pool of over 200 entrepreneurs, business angels, venture capitalists, lawyers and other professionals. In recognising that some of these people have a particular empathy for and willingness to provide the equivalent of one week a year of teaching, we have created a "benefit" package for a group called "entrepreneurs in residence". In addition we now have a smaller group of individuals who are also very inspiring to students and have a cv that we recognise with the title of Visiting Entrepreneurs[6].

[6] Should anyone from a University require the terms under which this scheme is operated, please contact the author for a confidential briefing.

Entrepreneurship education - Does it work?

There are two hardy perennials in terms of questions that one is asked in this field. (1) Can entrepreneurship be taught and (2) how do you know if you have had any impact? Whether it can be taught or it cannot has been answered earlier, as part of the guiding values of the Centre, but whether it has any impact is dealt with here, briefly.

The main problem area for evaluation is how to measure a single intervention, entrepreneurship education, when it is but a small part of the overall development of the person and the idea? Entrepreneurship occurs over time, as does appropriate education, but most methods of making an assessment are based on one-time surveys at the end of a course.

One possible solution has been developed by the work of W Lucas and S Cooper, 2004, followed a cohort of students who attended CMI-Enterprisers at Strathclyde University. They have developed a "before and after" survey instrument based on the self efficacy work of Bandura.

Self-efficacy can be measured in a variety of ways (Gecas, 1989) but the two dominant forms are task and domain specific. Meanwhile Bandura (et al, 1982) consistently stress that self-efficacy is based on the performance of quite specific tasks. On the other hand the study (Lent et al. 1986) of career self-efficacy and interests represents an extreme domain approach, asking students about their confidence performing the work of an occupation based on the career title, without any detailing of specific tasks. Some fields see both approaches used, such as work on mathematics self-efficacy, a critical predictor of persistent pursuit of science and engineering careers. Pajares (1996) for example asks students to examine specific problems and then asks a series of separate judgments about their confidence that they could solve each one. Conversely, Betz and Hackett (1983) use a domain approach asking for the individual's confidence that they can get an A, then a B, and then a C grade for each of a variety of maths courses. The research on entrepreneurial self-efficacy by Lucas and Cooper (2004) takes a mid-range approach, asking about capabilities in types of skill areas like the ability to "design something novel", "apply an abstract idea to a real problem" and "recognise an opportunity". Specific to entrepreneurship, participating students are also asked about their "understanding about what it takes to start a company" and whether they could "start a company if you chose to".

Another difference in approaches to the measurement of self-efficacy is found in how one addresses the frame of reference. Bandura (1986) holds the position that while students might use other students as a standard of comparison to judge some self-concept measures, judgments of their abilities on specific tasks are not relative and not influenced by external frames of reference. Marsh et al. (1997) suggest that while Bandura may well be correct that judgments about specific tasks are generally less influenced by peer capabilities, when the tasks are not familiar and the subject has no prior experience with performance, frame of reference effects may not be avoidable. In such cases, the dilemma is whether one makes the frame of reference explicit (e.g., comparing oneself with "other students"), allowing it to influence judgments although in a consistent manner; or risk that individuals might be drawing on unknown and different frames of reference (other students or "friends"). Because it was thought that the CMI-Enterprisers students might have difficulty answering questions about their ability to perform tasks they had never encountered without some referent, particularly at the pre-test when entrepreneurial activities had as yet not been experienced or even described to many of the participants, the students were asked to rank their ability relative to other university students on a six point scale from poor to excellent.

Assessment Results

Entrepreneurial awareness and exploration. The very early stages of an entrepreneurial journey includes intent and information seeking (Moore, op cit) and both of these are explored by Lucas and Cooper (op cit) by asking about the frequency of talking about ideas for starting a venture, with those reporting that they talk about such ideas a half dozen times a month or more increasing from 28.6% to 39.3%, this change is within a range that could

have occurred by chance. The results for those who take such discussions further are more consequential. Six months after the Enterprisers event, 28.6% pursue such ideas six times a month or more, doubling the 14.3% found at the pre-test. Going beyond talking, those who take active steps to investigate an idea are at the cusp of entrepreneurship, engaging in exploring possibilities and developing their skills to evaluate opportunities. Comparing their pre-test reports with their behaviour six months later, the respondents have more than tripled their activity levels, with 25.0% reporting that they engage in these behaviours six times a month or more, compared with only 7.1% at the pre-test.

In summary, the evaluation of the curriculum of Enterprisers has provided a useful insight to the methodology of evaluation, a point of focus on self-efficacy and tentative results showing a positive causal link between the event and increased levels of entrepreneurial intent and activity.

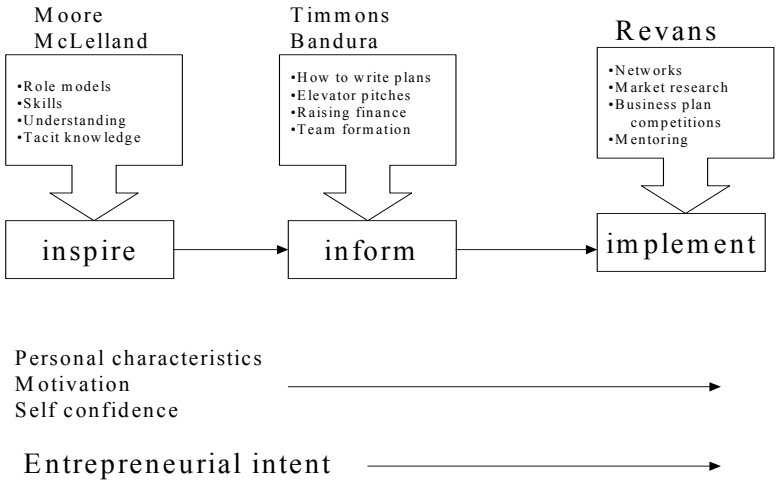
The paper now turns to the implications of how all this comes together, in terms of sustaining the growth of courses that build on increasing levels of self-efficacy and self confidence through the three part model used at the Centre for Entrepreneurial Learning.

Discussion

The title of this paper suggests that we need to examine the role of entrepreneurship education in **inspiring** people, providing **information** and supporting with **implementation** for increased levels of entrepreneurship within individuals and within society at large.

The three-part structure was partly the result of the three-term structure of Cambridge University, but it seems to be a valid way of thinking about our role as entrepreneurship educators. That we need to inspire students to take to entrepreneurship in a more positive way and if they decide that this is right for them, then to provide information on the "how to" and the where to access information, resources and so forth. Assuming all this goes well and the individual is motivated to make a start, then the third part of the provision is to assist with implementation.

Figure 1 – How the three-part structure is informed by frameworks and theories



The work of Moore and McClelland inform us about the processes needed to unleash entrepreneurial creativity, self-confidence and to raise the possibility of entrepreneurship. The

work of Timmons and Bandura help with practical aspects of entrepreneurship education as a means of encouraging latent entrepreneurship while the final stage being informed by Revans suggests that we need nascent entrepreneurs to engage in deep questions about themselves and their ideas to overcome barriers, mitigate risks and make the possibility of success even greater.

In summary, the courses at the CfEL have been developed to enable students to learn entrepreneurial skills and gain an understanding of entrepreneurship. These courses have drawn on behavioural literature of Moore and Timmons to guide curriculum development. They also fit well with the more philosophical issues of what we are trying to achieve with this effort – to raise self-confidence and self-efficacy. A pilot project on the measurement of entrepreneurship education, where it is concerned with entrepreneurial skills and understanding has been started through a particular course and it seems at first sight that entrepreneurship education is having an impact on inspiring, informing and encouraging implementation.

So, the question then arises of what the lessons might be for the future?

Conclusions

Entrepreneurship is not new to society. It can be traced back at least 7000 years when goods were traded between Central Asian towns and China and there is evidence that the Romans knew about China and the silk traded from there as far back as the first Century BC. (Wood, 2002). Indeed the spice trade was an even more global business during the same period (Keay, 2005). However, what is relatively new is the involvement of Universities in attempting to research, codify, disseminate and generalise from what has been learnt. A puritan view of the role of Universities would not normally account for the promotion and teaching of entrepreneurship, because that would be seen as a role suited to industrial placements, apprenticeships and other forms of informal learning.

The issue then, for Universities, is to recognise their changing roles and the signs are that this is happening with greater enthusiasm in many countries and as lessons are learnt about how Universities can and should engage in this field so the field itself will improve, sustaining entrepreneurship by altering societal views and expectations. It is with this agenda in mind that one has to understand how to inspire and inform future generations with entrepreneurial and transferable skills. This paper hopefully provides some insights but probably raises many lessons yet to be learnt, including:

- **What the content needs to be**. The focus at CfEL has been on entrepreneurial skills and understanding at the pre-start phase of entrepreneurship, but there are as yet many lessons to be learnt about teaching within given contexts, with variety of resources and desired outcomes. For example should a course on entrepreneurship be a common platform or should it be designed to suit very particular situations (such as teaching on a physics course and teaching within the creative media sector)
- **How best it can be learnt** in terms of pedagogical approaches and therefore how to design the learning experience to suit the needs of those who wish to learn about entrepreneurship. Careful thought has to be given to supporting materials, links to institutions and individuals for a complete learning experience and how this will fit with resources available.
- **Who should be teaching** credit bearing courses within Universities? With credit bearing courses there is a need to demonstrate academic credibility. Students are assessed for individual endeavour, but the practise of entrepreneurship encourages team based activity creating barriers to the blend of theory and practise. For credit bearing courses one needs faculty to navigate a course through the assessment processes, yet to inspire and inform students we need to learn from entrepreneurs and practitioners. This is an area of challenge to organisers of courses, especially as provision is scaled up. So far we have managed this tension by having a clear focus on the curriculum and drawing on well-established models as described earlier.

- **How to manage the delivery?** There is also much work to be done in how to manage the delivery of entrepreneurship education by entrepreneurs, when they have anecdotal perspectives of their experience. What they bring is the context, the passion and the spirit of enterprise. As educators we have to mediate this with the learning needs of a particular context for our students.
- **How to organise the learning experience**, when resources are constrained and issues of timetabling and scheduling get in the way of ideal learning experiences. In the main, entrepreneurship education can be thought of as a "contact sport", whereas for a variety of reasons it also needs to be delivered through the Internet, books, videos, case studies and lectures. There is simply not enough accumulated knowledge on what is the best approach for each context and often the approach is designed by the lead tutor and based on his or her own experience and capability. But is this sufficient for the task?
- **What are the best learning methods and styles?** Since entrepreneurship is largely a process and the focus of effort is with the practise of entrepreneurship, then what are the best learning methods/styles that need to be used for constructing teaching events that best transfer this knowledge? If one is to inspire and to inform in active and participative ways this is a very different experience from the lecture mode and the question is; would the way the topic is taught have a greater or lesser impact on entrepreneurial intent? This calls for control experiments providing scope for the development of new tests and methodologies.
- **How to assess the outcomes and impact?** We indicate, by way of early results, the potential use of Bandura's self efficacy and entrepreneurial intent indicators as a measure of teaching. Ideally this is based on a before and after methodology. In addition there is an emerging tool from www.tristart.co.uk that has the potential for easing the data gathering and analytical resource requirements[7].
- **There are moral hazards** of encouraging people into an entrepreneurial career an area that seems full of risk and ambiguity. If one is successful with encouraging increased "take-up" of entrepreneurial careers what are the moral hazards? Are these hazards the same as or different from our peers in other fields such as law, history, medicine etc.? In our desire for success do we overlook the risks of failure when it is not us who have to pay for it?

In summary, although there has been great progress with entrepreneurship education even in a relatively brief period, there are still many questions to answer. Having said that, the evidence is that collectively this field is making more of a positive difference than we had dared hope and with new evaluation methods and imagination from the people working in this field it becomes possible to see how entrepreneurship education can play a role to inspire, inform and help implement. These final thoughts result from many years of working in the field of entrepreneurial skills and understanding and hopefully some of the material in this paper can help those who are tasked with developing entrepreneurship education or Centres of enterprise.

There is one final thought on this. Being brought up as a Hindu with its pantheon of deities, one is aware that the Goddess of Learning (Saraswati) does not reside in the same temple as the Goddess of Wealth (Lakshmi). One detects similar tensions among University scholars and their colleagues in enterprise, even in Business Schools.

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