An Empirical approach to Entrepreneurship Education

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ABSTRACT

There has for many years been top down, Government driven effort to place entrepreneurship into the agenda of the nation. This drive has extended into higher education at both administrative and curriculum levels. There has also been a growth in the research and teaching of entrepreneurship as a subject in its own right.

The University of Brighton’s MSc in Product Innovation and Development course has been running for 8 years, and is concerned with the process of engineering innovative new products for real world commercial organisations. The course includes a module in entrepreneurship module. The original concept behind module was to help students and their sponsors protect their innovations. Changing student requirements and in the commercial marketplace (significantly the decline of manufacturing) have meant an evolution in both content and delivery of the module towards exploiting their own ideas for themselves. The changes to the entrepreneurship module have not been driven by a government agenda, but from a bottom up, market and student driven need.

This paper outlines the evolution of the module as a case study. It includes content changes, which have evolved to incorporate legal, marketing, financial and key skills training, and changes in delivery which have evolved from a subject based methodology to a problem based learning method including the adoption of serviced learning and reward based models. The results of these changes, based on student pass marks, suggest an improvement in student achievement. Evidence based on benchmarking against course learning objectives also suggests a high degree of success. The module now forms the model for entrepreneurship training being used within the university to train undergraduates within the Business School, postgraduates within the School of Computing and Mathematical and Information Sciences, and for industrial short course provision.
1 INTRODUCTION

Governments have for many years taken actions that have attempted to place entrepreneurship into the agenda of the nation as a whole. The current Government, for example, has undertaken a host of initiatives aimed at promoting and supporting entrepreneurship \[^1\]. The rationale for this may include factors as diverse as competitive advantage, rapid technological change, growth of low entry barrier service industries or increasingly virtual organisations.

The scope of the government drive has extended to higher education and is again evidenced through a variety of schemes aimed at supporting enterprise \[^2\]. In addition to the general rationale, government thinking may include the traditional observation that Higher Education is good at turning research money into discovery but poor at turning discovery back into money through profit \[^3\]. The rationale is not however limited to better good housekeeping. There is a dire need for more funding in higher education. In the 1960’s, around 5% (300,000) of school leavers would proceed to one of the 31 state funded universities. Now, around 30% (1.6m) of school leavers go on to one of 115 universities. Non traditional and core income has therefore been seen as an increasingly important source of revenue by both government and universities themselves. Exploiting innovation, and by induction entrepreneurship, offers one way to achieve this. It also offers sound support for academic practice in general:

"Universities are responding positively to the agenda of company creation. They see it as a way to retain good researchers, support the university mission, maintain contact with business and provide access for students and staff to the best equipment. Income is not given as a primary reason ...." (CVCP Aug 2000)

The entrepreneurship agenda does not stop at university administrative level but has often included, either directly or indirectly, the student curriculum where levels of expertise may be less, but levels of innovation and creativity are still high. At many universities, including the University of Brighton, newly created commercial departments provide support for student entrepreneurs along with a rolling program of entrepreneurial events and competitions. At course level, many school and departments have also recognised that the globally competitive employment market mean that graduating students should be considering self employment as a career option an increasing importance. This is particularly true for declining or contracting industry sectors such as engineering, manufacturing or software production. As a consequence of the growing importance of entrepreneurship, there has
been a corresponding growth in entrepreneurial input into many courses, along with a both the teaching and study of entrepreneurship as a subject in its own right [4].

The Product Innovation and Development (PID) course at the School of Engineering in the University of Brighton is a postgraduate Master of Science course that was augmented in 1996. The underpinning philosophy was for students to be able to create well engineered, innovative solutions to industry based problems - with a view for permanent employment with the project donor company. The format was conceived as being short and intensive course delivery running in a sequential manner along the chronological lines of a new product development format.

The following text outlines in chronological order the key stages and thinking in the development of the module and aims to add to the cultural and pedagogic debate surrounding entrepreneurship and its delivery within education.

2. EVOLUTION OF THE ENTREPRENEURSHIP MODULE

i) The concept behind the PID course was for students to work on real, commercial projects. The aim of the original module was to provide students with the knowledge of how to protect outcomes on behalf of organisations providing the project. The subject matter, and title, of the original module was therefore “Intellectual Property Rights” (IPR). This module was delivered at the end of the course following completion of project work.

ii) It was soon recognised that companies providing projects required a number of other legal obligations, including the formal setting out of the IPR arrangements confidentiality issues. There was also a requirement for students to maintain a policy of confidentiality amongst themselves. Whilst understanding the principles of IPR, students lacked the knowledge and experience to formulate the agreements. The scope of the module was therefore expanded and re-titled as “IPR and contracts”.
iii) It was again soon recognised that the ability of students to comprehend the implications and requirements of the negotiated agreements was limited by a lack of understanding of basic law. The legal framework underpinning IPR and contracts was added to the syllabus and the module content, and title, was expanded to “IPR, Contracts and Law”.

iv) As the cohort size began to grow, reaching 14 in 1999 compared to 6 in 1996, it became harder to arrange and co-ordinate the growing number of industrial projects. Some students were also bringing, or generating, their own ideas. Students were therefore completing projects with a predominant view to selling their ideas to business. This required additional instruction in licensing, marketing, business planning and finance. Rather than extending the title yet further, a concise title was sought that captured the essence of the module and that title was considered to be “Exploitation”, in view of a student or a company’s ability to exploit any innovation.

v) Given the declining manufacturing base, it was considered that students should not only be providing ideas to aid industry but that students should be encouraged to boost industry by becoming a part of it. What seems like a natural progression in hindsight, was not in fact a straightforward decision at the time. It required acknowledgement amongst staff that manufacturing would not in fact recover and grow in cycles that it had done in the past, and that the philosophy of the course may have to change. It also required an acceptance among academic staff that students should and could be thrown into the world of high tech, high growth and high risk business.

Additional support material was therefore provided for students, including career development, business context and entrepreneurial skills. Entrepreneurship is a notoriously difficult subject to define, as the subject matter is often related to newness and initiative which are personal, vary in perception from person to person and are in themselves difficult to elucidate. The module subject material of applied contract, law, marketing, IPR and finance did however seem to be tools for newness and initiative and by implication, a module title of “Entrepreneurship” was chosen.
By the year 2001, the module had clearly expanded from its IPR roots to include a vast range of additional topics and issues. The module had however continued to be delivered through a methodology of subject centered learning. Each subject being delivered as concise islands of. This method was due partly to the tradition of subject based teaching within the modules home base of the School of Engineering, but also because the quantity of material that the module now contained suggested that material delivery should as efficiently as possible and this seemed to suggest the intense, lecture based (i.e. mostly 1 way) delivery of information. Student feedback scored the module highly. 33 % rated the module at its highest value (excellent) and 66 % rated it the next highest rating (very good). Negative comments related to the quantity of material and the dullness of lecture based delivery. An attempt was made to allow students to filter the information provided, by selecting that which was most relevant to them, and to encourage students to ‘learn’ the information rather than be ‘taught’ it. The methodology chosen to attempt this was Problem Based Learning (PBL).

PBL is an approach that provides students with a problem-based exercise as the vehicle for learning. It is characterised by being motivating, participative and challenging, shifting the emphasis away from the delivery of programmed information, structured by the tutor [Barrows, 1996]. As such, students are helped to set their own learning goals, develop interests and questions and how they will find answers and solve problems. PBL also provides a real-world context – not just real in the commercial sense of being outside the university, but real in the sense of practical opportunity within the student mindset.

The process starts with the tutor acting as a facilitator to help a group analyse a realistic problem that is nominally beyond their combined expertise at the start, and develop learning outcomes necessary for its resolution. In this case the problem was how to reduce the high failure rate in new start up businesses. Students then investigate independently, or in groups, using whatever resource are available and feed back their responses in the next PBL meeting, where critical reflection reinforces the learning. This allows the process to iterate with more refined task set. Eventually, when the problem of reducing risk has been “solved” (or at least understood and minimised), a full review and formalisation of the learning is carried out. Within the entrepreneurship module, students were then challenged to apply this new knowledge to a business idea of their own, seeking to both maximise the return and minimise the risk.
This required a step change away from considering entrepreneurship as an option, but forcing students to consider this as an option. The student feedback did not suggest any improvement in enjoyment levels. However, comments no longer included issues of dullness or quantity, but in wanting more time to absorb material and in fact wanting more material. This might suggest a far greater level of motivation in the module, and in entrepreneurship itself. The module has moved up the agenda away from its traditional end point because it provides motivation for the course in general.

vii) The range of subjects differed to the traditional management module, which might typically include for example topics of delegation, organisation or strategy. It also differed to the traditional entrepreneurship offered by the Universities Business School in offering a practical rather than theoretical perspective. The module was therefore considered ideally suited to a new MSc course in the fast moving and dynamic world of Digital Television Production and Management (DTV). By combining the cohorts of PID and DTV, a module cohort of 50 was created.

viii) There have been 2 changes to the course most recently. Firstly, to limit the delivery of skills. Skills audits were provided by serviced learning through the careers office and were then delivered according to the requirements of the student cohort. The skills of negotiation and leadership have recurred repeatedly and predominantly and are now established as core training requirements. Secondly, to offer support from the university’s business department. The module has always made use of visiting speakers and networking events, but the Business Services office has this year provided mentoring support and a financial offer.

3. **OUTCOMES**

The MSc in Product Innovation and Development was originally focussed on providing industry with trained recruits. It now includes the subject of self employment through its module in entrepreneurship. The change has evolved through bottom up, student driven demand, rather than a top down agenda. It has also impacted on the entire course itself which has to a large extent driven the focus of the entire MSc in Product Innovation and Development towards enterprise.
Academically, the module changes have been so wide ranging to make trend analysis of student performance problematic. There is however some evidence to suggest that there have been improvements in student achievement. The average mark of student cohorts prior to 2000 was 49%. Thereafter yearly grades have averaged at 59%.

Table 1. Average PID grades since 1999

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<th>Year</th>
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<tr>
<td>2003</td>
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<td>1999</td>
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There is no evidence to suggest that the intake quality of the students has changed nor the robustness of the assessment process or standards. Nor is there evidence to suggest that problems are encountered are localised, as intake patterns have randomised yearly on gender, nationality and background. However, this step change in achievement has coincided with the change in module emphasis to entrepreneurial, or self-centered innovation, and the introduction of PBL. The lack of quantitative evidence also makes measurement of student enjoyment problematic. However, qualitative assessment of student feedback forms suggests a greater level of engagement with course material.

The University of Brighton Business School has adopted some of the principles of the module for the delivery of their Entrepreneurship module in 2004. A link for example has been created between undergraduate business and design students allowing business students to tackle real world problems.

Outside of the academic framework, 1999 was an apogee of entrepreneurial success with 50% of graduating students then proceeding to start their own businesses within 6 months of graduating. The experiment of using Business Services officers as mentors and providing financial prize has surprisingly not been taken up by students. The meeting of top down and bottom up entrepreneurship in this case still has some scope for thought. However, the Business Services Office has recognized that the academic module has industrial value and is adopting the module as the model for training entrepreneurs and entrepreneurs in its discussions with local enterprise hubs.
4 KEY LESSONS

The benefits of experiential, hands-on, student-directed learning have been declared for over 100 years, finding particular credence within the medical professions [Barrows, 1996]. Its value is also well recognised in the teaching of craft-based design [Morris & Katz, 2004]. For example, advocates suggest that students learning through PBL receive the following benefits:-

- Overcoming the dichotomy between knowledge and thinking or applying, helping students to both "know" and "do";
- Assessing performance on content and skills using criteria similar to those that might be used “in the real world” outside of academia and thus encouraging accountability, goal-setting and improved performance;
- Meeting the varying skill levels and learning styles associated with the differing needs of groups of learners;
- Providing confidence and relevance to post study career through opportunities for applying practical knowledge;

Support for its wider role within education and the importance of its position in the range of teaching approaches within HE have also gathered momentum within the last 25 years [Katz, 2000]. The methodology appears therefore well suited to the teaching of entrepreneurship where the vehicle of learning is real. It may even provide a better subject matter:-

- The problem is highly self centric – rather than being assigned to a patient or a craft object for example thus supplying relevance and connections to real-life issues, encouraging deeper learning and increasing levels of motivation
- The learning is deep rooted and it has been conjectured that knowledge gained through PBL is retained for longer [Dochy et al]. This is again ideal as entrepreneurship may not be something required by the student until some later stage in his or her life.
- It is also a ideal for bringing together the highly interdisciplinary subject matter of entrepreneurial knowledge and allowing the integrating of subjects to achieve a wider contextual understanding
PBL improves relationships with peers through a common and visible shared experience. It supplies additional and complimentary skills such as planning, communicating, team working and decision making. It also develop a ‘learning community’ through closer working and consultation with tutors and supervisors [Engels, 1997]. It therefore help to equip students with the networking and communication skills which are required for the practice of entrepreneurship.

Where PBL is problematic to entrepreneurship is in specific points of delivery:-

- It became more important to provide students with access to course material that may not have been covered. The result was that material delivery had to be thorough and electronically available.

- Problems also had to be well structured. Classic PBL works best through the students’ interaction in co-operative tasks, but much entrepreneurship work has a high degree of personal ownership and therefore can be difficult to share. Splitting problems into 2 (as outlined in 2 vi) allowed students to work in groups on common entrepreneurial problems (such as business research, finance or risk) before migrating to individual problems. Entrepreneurs success v academic success

- Staff need to be courageous in not delivering a set pattern of material but to respond to the ebbs and flows of the learner(s), capable of coaching and facilitating in not just the variety of entrepreneurial subjects but in the range of industries that students explore. One of the notable features of the module is how few students actually use the subject matter of their degree (in this case either engineering or IT) but instead base their business models on areas of alternative interests.

The results of adopting PBL seems to be consistent with findings experienced within the medical practice [Michel, et al] and design [Morris & Katz, 2004]. Student’s performance is improved either slightly or not at all but they do enjoy the process more.

Another interesting point to note is the apparent variation in achievement between the DTV and PID students. The lack of history makes analysis problematic, but in the DTV cohort outperformed the PID cohort by 4 % in 2003/03 and by 10 % in 2003/04. Course teams consider that this year the DTV students have arrived with higher levels of prior academic achievement. However, they are also a
more mature cohort and many have had or are running their own IT related businesses. Future work may monitor these points to ascertain if age, experience and/or industry are (a) key factors for entrepreneurs in commercial practice and (b) key factors in the academic achievement of students of entrepreneurship.

The bigger cohort achieved by combining PID and DTV students is also considered a rare example of where an increasing class size was beneficial:

- Mixing 2 groups of innovative students from different disciplines created more creative overlap
- Having worked closely together for many months, some student relationships had also become distinctly stale. The larger cross discipline group of PID and DTV resolved some of these issues.
- A bigger pool of students allowed greater opportunity for students with differing levels of entrepreneurial interest to mix at critically important masses.
- The larger group made it more justifiable to arrange greater academic support such as visitors and events.

By arriving, ethnically, at its current position, the module would strive to add to the academic debate surrounding entrepreneurs, supporting the ontological argument that entrepreneurs exist, and can be defined by what they are [6], and epistemologically that they can be taught. The implications for government policy may be noted that the increasing adoption of entrepreneurship, particularly in its PBL format, has implications that relate to facilities, timing, timetabling, administration, staff development, applicant recruitment policy/criteria and resources available. It is perhaps here that juxtaposition of government initiatives and entrepreneurial students can best be met.

5 FURTHER WORK

A wide ranging case study such as this has an equally wide scope for exploration. However, areas of particular immediate interest might include the following:

- More precise qualitative and quantitative student feedback and benchmarking
- Deeper benchmarking into the business problem perceptions of students
- Monitoring the entrepreneurial (and intrepreneurial) activities of alumni

- Exploring generic issues of PBL with regard to definitions, standards, outcomes, performance and accountability.

- Exploring comparisons between the UK and US approaches to supporting entrepreneurs. The US model seemingly providing a greater degree of grass roots resources rather than the top down structural support offered within the UK [Brockhaus, 2004].

**NOTES**


[2] Examples include projects such as Higher Education Reaching out to Business and the Community (HEROBAC), the Higher Education Investment Fund (HEIF), the Dearing report (1997) and the Science Enterprise Challenge (1999)

[3] The UK is second only to the US in terms of creating papers and citations. For every 1000 papers published in the UK however, only about 87 obtain a patent compared to 488 in Japan (Patent Office, 2000), and, worse still, other countries are able to capitalise on this weakness. 57% of Japanese technology is reported to have originated in the UK (Times Higher Education Supplement 21.7.00).

[4] The first entrepreneur course began at Harvard in 1947, the first dedicated journal (Entrepreneurship: Theory and Practice) arriving in 1975. By 1991, at least 31 courses linked to entrepreneurship were being offered by UK universities rising to around this number in the South East region alone in 2003. Around 41 entrepreneurship journal journals had also appeared by this year.

[5] Models of cognitive and behavioral learning show that understanding, cognition and action within learning are interrelated. Cognitive research has also revealed more about the nature of problem-solving and how this is related to experience. Learners not only respond by feeding back information, but they also actively use what they know to explore, negotiate, interpret, and create. Learning is also shown to have a socially contingent context, taking place within the realms of emotion, culture and community. Solutions are thus constructed rather than prescribed. PBL is a more natural way of learning [Sadlo, 1997].
Caird (1990) noted confusion over what entrepreneurial competencies actually are but that in any case they are all defined by what they do. Academic definitions tend therefore to concentrate on psychological attributes and behavioral characteristics. By contrast, business definitions of entrepreneurs tend to define them by what they do.

REFERENCES


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