This paper illustrates how to implement Authentic Activities and Problem-Based Learning (PBL) in social entrepreneurship courses and shows the benefits for both students and social entrepreneurs.

Despite thorough research on the nature of social entrepreneurship and therefore course content, little attention has been paid to it can best be taught (Lawrence, Phillips & Tracy, 2012). Researching, teaching or learning about social entrepreneurship is very different to more functional disciplines as it is as much a mindset as a set of activities. Identification of opportunities, learning about them, and taking actions all take place within a context. The teaching of social entrepreneurship requires the students to be richly embedded in that context. We showcase Authentic Activities and PBL as appropriate frameworks for teaching social entrepreneurship.

Relevant Literature

The theoretical underpinnings of teaching and learning in entrepreneurship need to keep pace with the demand for courses in the area. While there has been considerable attention devoted to the nature of entrepreneurship and, therefore, the content of courses, there has been little attention on how this content can best be taught. The two should be linked.

Researching, teaching or learning about entrepreneurship is very different to researching, teaching, or learning about functional disciplines such as accounting or finance, for example. For functional disciplines there is generally a well defined skill set. This is not the case with entrepreneurship as it is as much a mindset as it is a set of activities. Identification of opportunities, learning about them, and taking actions all take place within a context: Thus the teaching of entrepreneurship requires the students to be richly embedded in the context of the opportunity, the identification of that opportunity, and the execution of the planning to leverage that opportunity.

Authentic Activities and Problem-Based Learning (PBL) are proposed as appropriate theoretical rationale and frameworks for the teaching of entrepreneurship. PBL was first adopted formally in the 1960s and 1970s by schools of medicine in the United States, Canada (Biggs 2003) and Australia (Boud and Feletti 1997). PBL is not a method, but rather a total approach to teaching that can be implemented in a single subject, or across an entire course or programme (Engel 1997; Biggs 2003). Similarly, emphasising that there can be no learning without action, and no action without learning (Revans 1998; McLoughlin 2004) Authentic Activities are those based on real-world relevance, requiring students to define the problems, tasks and sub-tasks required before they are able to complete the activity. The tasks are complex, with multiple paths to solution, and require collaboration if they are to be completed: In essence, the activity does not supplement the course, it is the course (Reeves, Herrington et al. 2002).
The first objective of this paper is to provide entrepreneurship educators with a theoretical foundation of Problem-Based Learning and Authentic Activities. Following this we provide a practical framework to assist in the design and review of entrepreneurship courses. We illustrate this framework with examples from the design and redesign of four postgraduate entrepreneurship courses (three aimed at post graduate business students, and one developed for design students). Longer-term opportunities are then presented, including: the development of internal corporate entrepreneurship training; the expansion of cross-faculty participation in entrepreneurship courses; and the leveraging of incubators within Universities.

The Nature of Entrepreneurship and Implications for its Teaching

Criticisms have been directed at business schools “for failing to impart useful skills, failing to prepare leaders, failing to instil norms of ethical behaviour – and even failing to lead graduates to good corporate jobs” (Bennis and O’Toole, 2005), for failing to address the issues of creativity and entrepreneurship (Vintgen 2000), and for failing to impart the ‘softer’ skills associated with management (Mintzberg, 2004). It could be suggested that such criticism is particularly relevant for the discipline of ‘entrepreneurship’ teaching and learning.

Although there is no accepted generic definition of the term ‘entrepreneurship’ (Hornaday 1992; Amit, Glosten and Muller 1993; Ucbasaran, Westhead et al. 2001; Watson 2001), essentially the term refers to behavioural processes associated with the creation and exchange of value through the identification and exploitation of opportunities (Styles and Seymour, 2006). Successful entrepreneurs combine learning by training with learning by experience (Hjorth and Johannisson 2001) and it has been argued that training for entrepreneurship cannot be separated from entrepreneurship itself: “entrepreneurial innovation rests on a generative learning process aimed at the development of new knowledge structures embodied in an innovative product, process or service” (Ravasi and Turati 2005 p. 160).

Indeed, there is some debate as to whether students can actually be taught to be entrepreneurs (Fiet, 2000). For example, Aronsson (2004 p. 289) states that, “If you want to teach people to be entrepreneurs, you can’t. If you want to teach people to work for entrepreneurs you could. If you want to encourage entrepreneurship, it should be through some kind of apprenticeship. That would be a wonderful experience”. If entrepreneurship education is to advance as much attention on the ‘how’ as the ‘what’ is required:

“On the one hand creativity and innovation are linked to the contents of education renewal. On the other hand an important objective for renewal in entrepreneurial education is the simulation of the ‘entrepreneurial attitude’ among students. In this case the focus is not so much on what is to be taught, but on how it is to be taught” (Bellini, Capaldo et al. 2001 p. 454).

Innovative Teaching Methods Required

A review of the entrepreneurship field by Katz (2003 p. 298) found that entrepreneurship education has “just gone through one of its periods of greatest growth, perhaps growth that was so fast that it might have outstripped the available intellectual resources”. It is critical that innovative teaching methods are developed for entrepreneurship (Fiet 2000b; Fiet 2000a; Aronsson 2004; Honig 2004; Bechard and Gregoire 2005).

Yet a review of 25 business schools in the USA by Clercq, Crijns and Ooghe (2001) found that it is the ‘classical tools’ (such as lectures, readings, workbook exercises and assignments) that
are widely used to teach entrepreneurship. Many of these reviewed business schools did, however, enhance the interaction between teachers and students by including class discussion, discussion with experts, guest speakers, individual coaching, role plays, team teaching and teamwork. The review found that for many classes, the writing of a business plan (integrating the more theoretical courses and the practical) often links in to a real (new) venture. These tools used from ‘outside’ the classroom include: cooperation with new-venture-incubators, dinners with entrepreneurs, internships and interviews with entrepreneurs. Encouragingly, a number of alternative models of teaching entrepreneurship have been proposed including contingency-based business planning models (specifically see Honi (2004)). However, weaknesses remain including assessment quandaries and lack of robustness (Honig, 2004).

This paper addresses these issues by providing a theoretical rationale and framework for a review of Problem-Based Learning (PBL) and Authentic Activities in entrepreneurship education.

Authentic Problem-Based Learning – A Review

The concept of Problem-Based Learning (PBL) has been most frequently applied to the schools of medicine (see for example Barrows 1986; Newble and Clarke 1986; Albanese and Mitchell 1993). However, the concepts can be applied to any course or programme (refer for example to Chen, Cowdroy et al. 1994; Boud and Feletti 1997; Biggs 2003; Wee, Alexandria et al. 2003), including nursing, architecture, engineering, social work, optometry, law and business. Essentially, PBL reflects the way people learn and develop in real life:

“...[people] do not stop to wonder at the relevance of what they are doing, or at their motivation for doing it. Formal schooling, on the contrary, operates on a fill-up-the-tanks model of knowledge acquisition. Young people are taught the sorts of things they are likely to need to know one day, and some skills for finding out more, before they are let loose on the world” (Biggs 2003 p. 232)

Surprisingly, the adoption of PBL in business educations has not been widespread, with limited use in undergraduate and MBA programs (Bigelow, 2004). In the teaching of entrepreneurship, many schools have utilised business planning and business plan writing as a core element of their teaching programmes, however have not necessarily had a sound understanding of the concepts behind such opportunities to learn (see for example Bell, et al. (2004).

The Concepts of Authentic Activities and Problem-Based Learning

PBL is the learning resulting from the process of working towards the understanding of (or resolution of) a problem (Barrows and Tamblyn 1980). In a curriculum it is the integration of knowing what with knowing how with knowing why; enabling discovery (Margotson 1997). PBL aligns curricula, teaching and assessment: if the aim is to be a professional designer, then one of the best ways to do so is to be a professional designer... if the aim is to be an entrepreneur, one of the best ways to do so is to be an entrepreneur. “The objectives stipulate the problems to be solved, the main teaching-learning objective in solving them, and the assessment is seeing how well they have been solved” (Biggs 2003 p. 232).

The PBL approach should not be confused with problem-solving learning – an approach which simply means setting problems and then discussing them. With PBL, learning begins with the problem. The working context requires students to learn the skills for seeking out the required theories and disciplines of knowledge. Importantly, in addition to resolving
particular problems and acquiring knowledge and skills, participants hone self-management skills and professional wisdom (Biggs 2003). Characteristics of PBL include the following (Biggs 2003):

1. The context is pressing, so much so that it encourages students to recognise the need and responsibility of learning;
2. Learners become active very quickly, as they are assigned to small problem-solving groups and begin interacting with teachers, peers and other experts;
3. Learners start from what they already know, and build a knowledge base upon that, learning where to go to check and expand their knowledge;
4. The knowledge is functioning and is applied to the problem in hand; and
5. The problem is reviewed, and learners develop self-management and self-monitoring skills.

To these characteristics, the concept of Authentic Activities can be added. Authentic Activities are often seen as a means of bridging the gap between theory and practice, between intellectual endeavour and professional competence (McLoughlin 2004). The underlying assumption is that “there can be no learning without action and no action without learning” (Revans 1998 p. 83). Reeves, Herrington and Oliver (2002) review a number of characteristics of authentic activities, as transcribed in Table 1.

Table 1 – Authentic Activity Characteristics (Reeves, Herrington et al. 2002 p. 564)

<table>
<thead>
<tr>
<th>Authentic activities have real-world relevance</th>
<th>Activities match as nearly as possible the real-world tasks of professionals in practice rather than decontextualised or classroom-based tasks.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Authentic activities are ill-defined, requiring students to define the tasks and sub-tasks needed to complete the activity</td>
<td>Problems inherent in the activities are ill-defined and open to multiple interpretations rather than easily solved by the application of existing algorithms. Learners must identify their own unique tasks and sub-tasks in order to complete the major task.</td>
</tr>
<tr>
<td>Authentic activities comprise complex tasks to be investigated by students over a sustained period of time</td>
<td>Activities are completed in days, weeks and months rather than minutes or hours. They require significant investment of time and intellectual resources.</td>
</tr>
<tr>
<td>Authentic activities provide the opportunity for students to examine the task from different perspectives, using a variety of resources</td>
<td>The task affords learners the opportunity to examine the problem form a variety of theoretical and practical perspectives, rather than allowing a single perspective that learners must imitate to be successful. The use of a variety of resources rather than a limited number of preselected references requires students to detect relevant from irrelevant information.</td>
</tr>
<tr>
<td>Authentic activities provide the opportunity to collaborate</td>
<td>Collaboration is integral to the task, both within the course and the real world, rather than achievable by an individual learner.</td>
</tr>
<tr>
<td>Authentic activities provide the opportunity to reflect</td>
<td>Activities need to enable learners to make choices and reflect on their learning both individually and socially.</td>
</tr>
<tr>
<td>Authentic activities can be integrated and applied across different subject areas and lead beyond domain-specific outcomes</td>
<td>Activities encourage interdisciplinary perspectives and enable diverse roles and expertise rather than a single well-defined field or domain.</td>
</tr>
<tr>
<td>Authentic activities are seamlessly integrated with assessment</td>
<td>Assessment of activities is seamlessly integrated with the major task in a manner that reflects real world assessment, rather than separate artificial assessment removed from the nature of the task.</td>
</tr>
<tr>
<td>Authentic activities create polished products valuable in their own right rather than as preparation for something else</td>
<td>Activities culminate in the creation of a whole product rather than an exercise or sub-step in preparation for something else.</td>
</tr>
</tbody>
</table>
Essentially, these activities have relevance, are ill-defined, are complex, include different perspectives, require collaboration and reflection, are integrated, have diverse solutions, and are ‘valuable’ in themselves. The tasks are not simple ‘time-fillers’, they are real problems for which real people require solutions.

The similarities between the two concepts are apparent, with both PBL and Authentic Activities emphasising the complexity, fluidity, importance and relevance of the problems for learning. Critically, the two concepts of PBL and Authentic Activities are remarkably similar to the issues faced by the ‘learning entrepreneur’. These similarities include: 1) a high degree of ambiguity, as solutions are sought for imperfectly defined problems; 2) contributions required from a range of actors with complimentary skills to the entrepreneur; and 3) scarcity of time, money and attention. “These constraints affect entrepreneurial learning, imposing periodic choices about the continuation or the termination of developmental efforts” (Ravasi and Turati 2005 p. 138).

**Goals of Authentic Problem-Based Learning**

Barrows (1986) identifies four goals that should be addressed by PBL, with Biggs (2003) adding a fifth:

1. Structuring knowledge for use in working contexts – constructing knowledge that is best put to work;

2. Developing effective reasoning processes – including problem-solving, decision-making, hypothesising etc.;

3. Developing self-directed learning skills – including generic study skills, content-specific study skills, and the meta-cognitive skills of what the learner does in new contexts;

4. Increasing the motivation for learning – the context requires immediate and committed involvement by the learners (the value of the student input is high, students are likely to be successful, and the motivation is high); and

5. Developing group skills and working with people – teamwork is a critical element of professional practice.

These nature and construction of curricula designed to reach these goals is the challenge before many teachers of entrepreneurship. Two critical variables impact on the various kinds of PBL (Barrows 1986): the degree to which the problem is structured; and the extent of teacher direction. This can be depicted as Figure 1.

Figure 1 – Forms of Problem-Based Learning (based on Barrows 1986)
The choice of the most appropriate form of PBL will depend on the levels of resources available, the educational philosophy of the teachers, and the freedom appropriate for students (Biggs 2003).

From Figure 1, problem-solving learning (discussed earlier) is not considered to be part of PBL as it is considered highly structured and highly directed. Terms for these different segments have been nominated as ‘staged’ (being highly structured programmes however with little direction); ‘workshopped’ (being highly directed programmes with little structure); and ‘pure’ programmes that are not structured and have little direction. Note that it will not always be appropriate to propose a ‘pure’ PBL programme. The categorisation is however a useful aid to develop alternative programmes.

The questions or problems for these programmes essentially must be open-ended and ‘ill-structured’. Biggs (2003) notes the following characteristics of a good problem for a PBL programme: It calls on different disciplines and integrates them in solving the problem; it raises options that promote discussion; it activates and incorporates previous knowledge; it requires new knowledge the students don’t yet have; it stimulates participants to elaborate; it requires self-directed learning; and it meets the course objectives.

Biggs (2003) elaborates on how these problems can be designed, drawing on discussions with David Johnston from the University of Hong Kong, as summarised in Table 2. From experience, this elaboration is a valuable tool for teachers.

Table 2 – Designing a Problem-Based Learning Problem (Biggs 2003)

<table>
<thead>
<tr>
<th>Designing a problem</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. map all the concepts likely to be involved from different disciplines (including knowledge and skills required to solve the situation)</td>
</tr>
<tr>
<td>2. write the learning objectives (what do you expect the students to do with the knowledge and skills?)</td>
</tr>
<tr>
<td>3. identify a real problem from a real-life situation (that is important and authentic)</td>
</tr>
<tr>
<td>4. repeat step 3 until all objectives are addressed</td>
</tr>
<tr>
<td>5. when writing the problems (use present tense, provide a context, provide specific data, and require the students to deliver something)</td>
</tr>
</tbody>
</table>
This (particularly step 3 in the design process) re-introduces the importance of Authentic Activities. The problems must be ‘real’, and in the world of business and design this reality is best obtained by exploring current and actual businesses. In the context of entrepreneurial business, there is no shortage of ‘problems’ or ‘opportunities’: from experience, the most problematic aspects associated with these alternative teaching strategies relates to assessment rather than problem identification.

Does Problem-Based Learning ‘Work’?

There are a number of studies that have sought to explore whether the PBL approach is successful (see for example Newble and Clarke 1986; Albanese and Mitchell 1993), however the results are difficult to interpret due to the non-standard nature of the PBL programmes reviewed. Biggs (2003) has more thoroughly reviewed the literature, and concludes that:

- Staff and students rate PBL highly (in a business education context see, for example Bell, Callaghan et al. (2004) and McLoughlin (2004));
- PBL graduates perform well in medical practice;
- PBL students use higher-level strategies for understanding and for self-directed study;
- PBL students do worse on examinations of basic science declarative knowledge;
- due to the increased complexity and teaching requirements, it is estimated that the approach is most appropriate for classes of between 40 and 100 students (Albanese and Mitchell 1993); and
- students learn to be more ‘data driven’ than ‘hypothesis driven’ in their approach to decision-making – something considered appropriate in the medical and many other professions.

Perhaps surprisingly, the more significant problems with the approach include ‘know-it-all’ tutors, narrower coverage of a curricula, and the ‘organisational difficulties’ (Biggs 2003):

“The reasons why PBL is not used more widely are not educational but organizational. PBL requires teachers to adopt a different philosophy of professional education, one that states that it is something more than the acquisition of separate bodies of knowledge in one of which the teacher is professed expert. It also requires considerable institutional flexibility. It is much easier for experts to give lectures on the specialty, leaving integration and application as the students’ problem to solve – and they probably will, but years down the track. It is more effective and more responsible if integration and application are seen as targets to be achieved before the profession has begun to practice rather than after (Biggs 2003 p. 240).

Structuring an Entrepreneurship Course Using Authentic PBL Principles

The following section addresses these practical issues by presenting a framework for course development and review. Course development begins with Professional Working Knowledge as the major driver of the course objectives, the problem-solving activities and the assessment. To illustrate how this framework can be put into practice, we summarise some of the key design features of four entrepreneurship courses we have designed or redesigned. Three of these courses were aimed at post graduate business students, and the other for post graduate students in design. The design features are discussed under the three major categories used in the Biggs (2003) framework (see Figure 2 above).
Alignment in Problem-Based Learning

As presented in Figure 2, professional working knowledge should drive these problem-based learning courses. Anecdotal evidence from discussions with venture capitalists, corporate advisors and other professionals has highlighted firstly the poor skills commanded by graduates in this area, and secondly the high demand for such skills.

Figure 2 – Alignment in Problem-Based Learning (Biggs 2003 p. 240)

Once the professional experience demands are identified, the second ‘stage’ of the review is the setting of objectives. As noted by Biggs (2003), objectives involve more aspects than just solving a problem and developing professional knowledge (in the entrepreneurial education context the typical problem is developing and writing a business plan or investor memorandum). The objectives should also include group skills and meta-cognition, and should encourage students to integrate theory and practice, with the emphasis on student-responsibility for learning. The elements Biggs (2003) regards as critical are: a) Solve Designated Problems; b) Professional Knowledge; c) Meta-Cognition; and d) Group Skills. Examples of these elements on the courses we designed or redesigned are provided below:

a) Solve Designated Problems

The students were very positive about the practical nature of the course, and the fact that there were real problems that they were solving (as evidenced in end-of-year teaching feedback). However, some students found that the course was a little too ‘unstructured’ and struggled with the ‘pure PBL’ (see Figure 1). Whether this is because they have not before been confronted with this type of learning, or whether is was not their preferred learning style is debatable. Taking account of this feedback, the proposed PBL focus is shifting more towards a ‘staged Problem-Based Learning’ approach (see Figure 1). The complexity of the problems will remain high, as by their very nature the problems are difficult and multifaceted. What will be refined, however, are the levels of support and guidance given to a number of the student groups (see below).

b) Professional Knowledge

A major component of courses was regular guest speakers who were industry experts (in law, accounting, finance, business etc.). The key problems addressed by these speakers included ‘how to create a business?’ and ‘how to raise capital?’. Imparting appropriate professional knowledge remains a major objective for the courses, with consultations with key industry...
players suggesting that the skills are both highly regarded by employers, and highly sought after by graduates.

c) Meta-Cognition

Developing students’ understanding of which theoretical frameworks are appropriate, and when they should be applied was, and will remain, a major objective of the course. While focusing on ‘theory’ in such an obviously pragmatic and applied course is a challenge, our experience was often that theory, frameworks and associated guidelines provided welcome structure to otherwise unstructured tasks. Frameworks from a wide range of relevant disciplines were called upon, including those from business strategy, marketing, finance, accounting and law. Other than their usefulness, it was also important that students understood that developing meta-cognition was often what distinguished University education from that gained through training programs.

d) Group Skills

The objective to explicitly develop group skills was not originally a major component of the courses. In large part, this was driven by the assumption that these skills had been developed in earlier parts of their degree programs. Therefore, the courses have not focussed on the interactions or skills behind those interactions, and instructors took a very ‘hands off’ approach to these interactions, intervening only if there were major issues (raised by the students themselves). However, this assumption proved not to be valid across the student group. While it is rare that student groups will be so dysfunctional they will not be capable of completing assessment tasks (although this does happen), such a lack of ‘failures’ should not be read as successfully developing appropriate group skills. The lack of peer review has also meant that some students are more inclined to ‘free ride’ than would be the case if review is explicitly a part of the course assessments. As a result, there will be greater focus in future classes on teamwork, negotiation and interaction skills.

Returning to Figure 2, the third ‘stage’ is the development of problem-solving teaching and learning activities. Considerable guidance is provided for the central problem solving task in terms of content. A range of industry players share their experiences and expertise in selected seminars, and input is sought from a range of professionals, including venture capitalists, corporate advisors, entrepreneurs, government agencies, technology developers and new venture incubators. These parties provide the students with insight and practical opportunities to experience what is involved in the entrepreneurial process. This was supported by selected readings from the academic literature and interactive seminars/workshops to provide students with relevant disciplinary theories and frameworks as well as those from the entrepreneurship literature. In terms of process, the problem-based literature discussed above has provided useful insights that were applied to the courses under review, including: a) Groups; b) Brainstorming; c) Knowledge; d) Monitoring; and e) Review. These are illustrated below.

a) Groups

There was originally no structured approach that encouraged groups to explore different strategies for solving their problems. Students were asked to form groups (supposedly with colleagues with very different majors and practical skills). However, there was no guidance as to how to benefit from interactions with group members who had different ‘worldviews’. This has been (partly) addressed by re-structuring the literature and theory reviews each week, with the lecture material changed to be a discussion of theory by the class. Two readings are listed each week, with a third to be found by the students. Students (or at least groups) will therefore be required to actively search library resources, in particular the electronic journals
and book chapters. Groups (and individuals) will then be required to apply the readings to their projects, with random ‘responsibility’ for the discussions assigned each week to a number of students each week. This approach should also encourage an increased focus on ‘brainstorming’ as discussed below.

b) Brainstorming
In many cases, students were required to sign confidentiality agreements, guaranteeing that they will not share confidential information with other parties (including other groups). This was largely driven by technology developers who allowed their technologies to be the subject of a group project, as well as some of the students who did not want their business ideas to be made public. This meant that students could not share their experiences with those in other groups, and class discussions were not able to specifically deal with particular projects. This issue is to be resolved in future course revisions by requiring that all individuals recognise the confidential nature of all projects and all group work, and if necessary, formalise this in some manner. The second feature that has been redesigned for is increasing the opportunities for class brainstorming across as well as within groups.

c) Knowledge
The materials taught will necessarily expand to include more of the ‘softer’ skills of negotiation, interaction, creativity and other “non-core” business subjects (see 5.2.4 Group skills).

d) Monitoring
The course attempted to increase the opportunity for monitoring the problem solving abilities by including a mid-term review of the projects venture a team of capitalists who volunteered their time. This required a summary to be handed in of the market and proposed business model (the final report was due at the end of term, four days after a presentation to a panel of experts). This did not, however, have the desired impact, as the students tended to ‘manage’ the stages of the project on a ‘crisis’ basis, working in spurts to catch up for the following sections. The proposed approach for future course design has a number of specific ‘assignments’ to be handed in, the market review, and the financial model, both of which form a major part of the final project. This will enable students to determine their progress as a group, as well as in comparison to other groups.

e) Review
The opportunity for ‘self-reflection’ is a further revision for future courses. In particular, students will be encouraged to keep a record of their learning and challenges over the term, with active reflection encouraged each class.

The final stage (referring to Figure 2) aligning the PBL approach is the development of aligned assessment tasks. This is perhaps the most pressing issue for most courses. While there has been some explorations of these practical courses (see for example Wee, Alexandria et al. 2003) there has been less written about particular methods of assessment and review. As PBL is a “divergent or open-ended mode of teaching that is not aligned to the more common convergent formats of assessment” (Biggs 2003 p. 237), a focus on integrating assessment with learning is critical.
Essentially, an assessment strategy should reflect the nature of the learning and of the problems. The issue with Authentic PBL is that some of the problems become unexpectedly more difficult to solve than others. In the context of entrepreneurship, for example, some business ideas are proven to be invalid, or research identifies existing competitors that control a new market. Grading students solely on the strength of a business plan, or investor memorandum is not always fair. The assessment should also, however, be performance-based, holistic, and allowing scope for students to execute their own strategies and ideas (Biggs 2003). Feletti (1997) has developed a three-stage structure to evaluate problem solving:

1. dealing with the initial problem – the diagnosing, hypothesizing, use and re-formulation of information;
2. review of independent study – the evaluation of information, and knowledge gained; and
3. final problem formulation – synthesis of concepts, application to problem, self-monitoring, and responses to feedback and critiques.

Such a structure enables a staged-approach to assessing student performance, and ensures that students are encouraged to reflect on their own learning process.

Entrepreneurial learning is also an appropriate context for utilising peer assessment, as the teacher is not an all-knowing, all-wise participant in the course, and many of the participants have valid and deep experiences to contribute. The issue is whether the assessment is a formal one (contributing to the final grade), or encouraged throughout the course in an informal manner (with students learning how to critique and respond to critiques as part of the learning process).

In the courses we redesigned, assessment had been heavily-based on the group work which develops the investor memorandum, supplemented by examined individual components. There was no peer-evaluation, PBL approaches, or reflective review required from the students, as can be seen in Table 4.

Table 4 – Previous Assessment Approach

<table>
<thead>
<tr>
<th>Method of Assessment</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Mid-session Exam</td>
<td>20%</td>
</tr>
<tr>
<td>2. New Venture Proposal (Group)</td>
<td></td>
</tr>
<tr>
<td>• Preliminary report</td>
<td>10%</td>
</tr>
<tr>
<td>• Oral presentation to panel</td>
<td>10%</td>
</tr>
<tr>
<td>• Investor Memorandum</td>
<td>30%</td>
</tr>
<tr>
<td>3. Final Exam</td>
<td>30%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100%</strong></td>
</tr>
<tr>
<td>Group component</td>
<td>50%</td>
</tr>
<tr>
<td>Individual component</td>
<td>50%</td>
</tr>
</tbody>
</table>

In an attempt to maintain the ‘problem-solving’ approach to the courses, the final exam had been written with an ‘applied’ focus – requiring students to apply the relevant theories, frameworks and guidelines to case scenarios. Including an exam was to some degree a result of expectations by University administrators to conform to the norm of using this kind of
individual assessment. However, the exam format did not adequately reward students for their problem-based abilities. From the above literature review, and from experiences to date, a number of major changes were be implemented to address these weaknesses: the removal of any mid-session or final exam; the inclusion of a specific self-reflection technique; the individual grading of class participation and presentations; and the separate grading of the financial and (interim) market strategies.

TABLE 5 – Revised Assessment Approach

<table>
<thead>
<tr>
<th>COMPONENT</th>
<th>DESCRIPTION</th>
<th>TYPE</th>
<th>VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Venture selection &amp; descriptions</td>
<td>A single page outline stating the unmet need in the market and how the innovation will uniquely meet this need. Brief resumes for the team should be attached.</td>
<td>Group</td>
<td>Not graded</td>
</tr>
<tr>
<td>2. Marketing Strategy plan paper</td>
<td>A 5-page paper describing the (preliminary) overall marketing strategy and the current environmental and industry situation (including competitors and their strengths). The strategy overview should include (not necessarily in this order) what the product is (in the eyes of a consumer), who and how attractive the target customer is, how the product will be sold, positioned and distributed to the customer, the businesses proposed competitive advantage.</td>
<td>Group</td>
<td>15%</td>
</tr>
<tr>
<td>3. Financial Model</td>
<td>Excel spreadsheet model addressing Profit &amp; Loss, Cash Flow statement, Balance Sheet, with a summary “control panel” of key financial ratios, main assumptions, and sensitivity analyses</td>
<td>Group</td>
<td>15%</td>
</tr>
<tr>
<td>4. Investor Memorandum, one-page overview, and documentation</td>
<td>The submissions should include: 1. 1-page summary sheet setting out the opportunity as a ‘blind’ company (to be submitted in week prior to presentation as PDF document); 2. 25-page document plan plus appendices (up to 40 pages in total). Group presentation to an external assessment panel; 3. updated/corrected modelling</td>
<td>Group</td>
<td>40%</td>
</tr>
<tr>
<td>5. Reflection</td>
<td>A two page (max) review of your (individual) learning during the course</td>
<td>Individual</td>
<td>10%</td>
</tr>
<tr>
<td>6. Class Participation</td>
<td>Presentations &amp; participation during the term plus final presentation.</td>
<td>Individual</td>
<td>20%</td>
</tr>
</tbody>
</table>

As was set out in Figure 2, the assessments seek to deal with how the students deal with a problem, develop their knowledge base, synthesise and review their learning, and develop their social skills. A self-reflection task has been added to the assessment tasks, requiring students specifically to explore their problem-solving abilities, failures and successes, specifically:

− Dealing with the initial problem – how you went about diagnosing, hypothesizing, using and re-formulating information;
− Review of independent study – the evaluation of information and knowledge gained over the course;
− Social skills – what interpersonal and/or communication skills were gained or implemented by you or others particularly well or poorly during the course; and
− Final problem formulation – what you did well, whether you resolved the problem, what you would have done differently or better with hindsight etc.
Although the individual component perhaps could be higher, it reflects the social nature of the problem solving, and the important of effective group collaborations. The individual component can also be more accurately reflected if there are ‘problem groups’ through the peer assessment task (which will only lower the performance of non-performing students, rather than raise that of ‘over-performing’ students).

**Opportunities for Continued Authentic PBL Improvement**

The above framework for review can provide a strong foundation for the development of an Authentic PBL course. We argue that PBL alignment is only the first stage of activity for any programme.

There are also a number of longer-term improvements that will further strengthen an entrepreneurship course. Our recommendations are for the programme to develop corporate entrepreneurship training, expand the cross-faculty participation, and ensure a longer-term involvement in activities.

There is a wealth of literature describing the concept of ‘intrapreneurship’ (entrepreneurship inside a corporation whereby individuals champion new ideas or products from concept through to launch (Pinchott 1985)). Corporate entrepreneurship is a major force in American business, leading to a desire for this type of activity inside organisations (Kuratko, Hurley et al. 2001). Corporate Entrepreneurship training would enable a rich stream of revenues to be sourced for the university, with cash-rich, bureaucratic organisations anxious to reinvent themselves.

Secondly, an entrepreneurship course would also benefit from the input and participation from other disciplines (including engineering, industrial design, science, fine arts, humanities as well as the traditional commerce streams). The University of Strathclyde in Scotland (among others) has developed a cross-faculty programme, emphasising “the commercialisation of knowledge gained in the study of core subjects, on internationalisation, and on issues associated with high-growth businesses” (Yendell 2001 p. 307). Our experience is that while this attracts considerable support ‘in principle’, its implementation often faces philosophical problems (e.g. disciplinary ‘silo’ mentalities), as well as pragmatic ones (e.g. teaching load and resource allocations). This suggests that organizational and systemic changes are likely to be required for truly cross-disciplinary courses such as entrepreneurship to be run effectively.

Thirdly, incorporating ‘ongoing’ interactions between student learning and practical projects is another longer-term objective. This enables the students to experience the growth of a firm and retain involvement with entrepreneurs over time. Just as some PBL medical programmes organise their structure around the ‘life cycle’ of a human, business programmes could encourage students to develop their skills around the ‘life cycle’ of early start up enterprises. This could be developed by leveraging incubators focused on design and engineering-based businesses within Universities. This could also link students and ideas to capital and to markets, involving students developing the most promising ideas or designs identified from other faculties over a number of years, essentially becoming the ‘first chance’ for the most promising students.

Authentic PBL is a powerful strategy for teaching and learning within the contexts of entrepreneurship and design management practice. The approach also has growing support amongst academics and industry professionals. This paper provides the theoretical foundations for development of an entrepreneurship course. The practical review framework
and suggestions for ongoing development can help ensure a systematic design and revision of courses.

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Bibliography


