

Science Technology and Business (STaB)

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Abstract

This module is unique in the learning experience of most undergraduate students. The approach taken is experiential (see Gibb, 2002) which, in the context of this module, is afforded in two ways:

- First the students hear presentations on the business process, including a selection from practitioners who run or work in businesses and those who provide services which are crucial to the success of a business.
- Second they learn via their own efforts, by gathering and analysing business information and by the development of an idea for an imaginary business exploiting some aspect of science or technology.

Thus the main aim of the module is to give students an appreciation and understanding of the issues involved in the commercial exploitation of scientific and technological discoveries. This activity is very high on the agenda of the current UK Government, which is looking to the science and technology community in universities and research institutes to engage increasingly in these activities. Clearly students have a role to play in this.

Background and key features

STaB is an optional level C, 10 credit, module and is offered to all final year undergraduates across the university. We usually gain one hundred students predominantly from the science and engineering faculty. However we also attract a significant minority from social sciences and a number of exchange students on the ERASMUS programme.

The taught component of the course is delivered via ten, three-hour sessions delivered weekly over the first semester. Typically each session comprises a one-hour interactive lecture from a lecturer or business practitioner followed by a group exercise where the theory is applied to a live case example. In the final hour the students work in self selected groups to consider their own business idea, using the theoretical insight gained in the first part of the session (see Detienne & Chandler, 2004). This is complemented by the students working independently and in groups between sessions. Here they direct their own learning and may address whichever component of the business plan they prefer. In this way they enhance their learning via interaction with their peers and with different mentors, who come along each week, each bringing a new perspective to the problem (see Honig, 2004).

Why run an entrepreneurship module of this kind?

This module has been running for 8 years and was initiated to fill a perceived skills gap within science and engineering students. As it has developed and grown it has shown numerous benefits both to staff and students including:

- Encouraging interaction and mutual understanding between staff, students and local technology based businesses and support services,
- Encouraging students to start their own businesses,
- Giving business school staff an awareness of the learning needs of a diversity of undergraduate students,
- Building alumni relationships, where past participants return and become speakers, mentors and help to motivate students to consider alternative career choices.

What skills and abilities are enhanced and developed?

This module develops:

Intellectual skills;

- The cognitive skills of critical thinking, analysis and synthesis, including the ability to identify assumptions, evaluate statements in terms of evidence, to detect false logic or reasoning, to identify implicit values, and to define terms adequately and to generalise appropriately.
- Effective qualitative problem solving and decision making skills.
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- The ability to create, evaluate and access a range of options, together with the capacity to apply ideas and knowledge to a range of business and other situations.

Professional practical skills;

- Numeracy and quantitative skills including data analysis, interpretation and extrapolation.
- Qualitative skills including the ability to work with case studies.
- The ability to apply business models to business problems and phenomena.
- Self awareness, openness and sensitivity to diversity in terms of people, cultures, business and management issues.
- Effective performance within a team environment, including leadership, team building, influencing and project management skills.
- The ability to conduct research into business and management issues, either individually or as part of a team, including a familiarity with a range of business data and research resources and appropriate methodologies.

Transferable (key) skills;

- Effective oral and written communication skills in a range of traditional and electronic media.
- Effective self-management in terms of time, planning and behaviour, motivation, self-starting, individual initiative and enterprise.
- Learning to learn and developing an appetite for reflective, adaptive and collaborative learning.
- The interpersonal skills for effective listening, negotiating, persuasion and presentation.
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What skills, attitudes and attributes do students need to embark upon the module?

There are no formal prerequisites for this module but the structure of the module tends to influence the prospective students. As it requires considerably more commitment from the students, when compared to other options, in terms of attendance and time spent on coursework then the majority of students choosing the course tend to be motivated and interested in the subject area.

What is the role of the lecturer and others?

The course typically requires the commitment of two lecturers and at least five business practitioners. The lecturers introduce the structure of the course, explain relevant theoretical frameworks and demystify the language of business to the students. They emphasize the experiential nature of the module and provide the first point of contact for the many

questions that arise as the students direct their own learning. The practitioners provide examples of the practical application of the theory and mentor the students as they attempt to apply the theory to the rather messy 'real world' where the businesses will trade. They also provide contacts for the students should they wish to develop their own businesses or explore different career paths (see Wenger 1998). Central to the role of all participants is helping the students approach the course in a different way than they have experienced in their other modules. Rather than using linear, structured methods to identify the optimum solution they now have to use more creative and lateral thinking and debate the relative merits of a number of viable options (see Lumsdaine and Binks, 2004).

Links with outside agencies and employers

Typical outside agencies involved in delivery of the module:

- Local high technology business managers,
- Patent attorneys,
- Accountants,
- Technology transfer professionals,
- Marketing consultants.

How is the module assessed?

The module is assessed 100% by coursework.

Coursework 1 – a 2000 word Essay - Deadline: week four of the semester.

This assignment represents 50% of the marks for the module. It is an individual piece of work where students select from one of the topics below:

Select a new technology or technological invention, which is not yet in the market and analyse its potential for commercialisation. Your choice may reflect the subject of your degree course.

Use Porter's Five Forces model to analyse the industrial environment of a product of your choice. Highlight the limitations of the Five Forces model in the context of your analysis. Discuss the application of the protection of intellectual property rights for an invention of your choice that is relevant to your degree.

Coursework 2 - Business Plan - Deadline: End of the semester.

An oral presentation of the business plan is made during the final week of the semester. In addition a written business plan should be submitted as above, by 2pm on that day.

For this exercise the students work in teams of 5, which will be self selected at the start of the module. In this exercise the objective is to create a virtual company by a process which mimics the start up of many new companies, i.e. a group of individuals with different skills getting together to form the first group of directors. The team members each assume a different role in the fledgling business and together develop a business plan to raise finance for the venture..

This part of the coursework is assessed as follows:

- The written plan is given an overall mark (35%), which is awarded to the team as a whole.
- Oral presentation (15%)– again a mark is awarded to the team (see attached example presentation from students).

Issues

This type of module raises two main issues as it is different to other modules taken by the students. Firstly it requires students to work in a different way and typically commit more time than for 'traditional modules'. This could be a barrier to participation if students become increasingly strategic in their choice of modules in terms of time commitment. Secondly it requires lecturers to work in a different way both in terms of the method of delivery and in an increased time commitment. This requires recruitment of staff with the right skills and also a strong commitment to this more intensive approach.

Evidence of Success

This module consistently receives positive feedback from those concerned. Students comment on the value of looking at their potential career opportunities in a different way, how they learnt new skills and how enjoyable it was.

In addition business practitioners comment positively as they gain personally from 'putting something back in'. They often comment that they wish a similar offering had been available to them when they were students.

Reflections and future developments

This module is planned to continue and expand. It will become an option for the large cohort of undergraduate students who have completed the Entrepreneurship and Business module which is to be offered university wide and will be a core requirement for first year management undergraduates.

Teaching materials and resources

This course along with the Entrepreneurship and Business modules focus on the new text *Entrepreneurship, Creativity and Effective Problem Solving: 'Keep on Moving'* by Edward Lumsdaine and Martin Binks – E & M Lumsdaine Solar Consultants Inc. ISBN 0-9761018-0-7.

The following additional reading is recommended for the students:

Carson, D. Cromie, S. McGowan, P. and Hill, J. (1995). *Marketing and Entrepreneurship in SMEs: An Innovative Approach*, Harlow: Pearson Education Ltd.

Lang, J. (2002). *The High Tech Entrepreneur's Handbook: How to Start and Run a High-Tech Company*, Harlow: Pearson Education Ltd.

Lynch, R. (2000). *Corporate Strategy*, Harlow: Financial Times Prentice Hall.

Sullivan, N. F. (1995). *Technology Transfer: Making the Most of Your Intellectual Property*, Cambridge: Cambridge University Press. (Recommended)

Students are also directed to make use of business and agency web sites, depending upon the nature of their business plan.

References

DeTienne, D., & Chandler, G., (2004), "Opportunity Identification and Its Role in the Entrepreneurial Classroom", *Academy of Management Learning and Education*, Vol.3, No. 3, pp. 242 – 257.

Gibb, A., (2002), 'In pursuit of a new enterprise and entrepreneurship paradigm for learning:

creative destruction, new values, new ways of doing things and new combinations of knowledge' International Journal of Management Reviews, 4, pp. 233-269.

Honig, B., (2004), "*Entrepreneurship Education; Towards a Model of Contingency Based Business Planning*", Academy of Management Learning and Education, Vol.3, No. 3, pp. 258 – 273.

Lumsdaine, E., and Binks, M. (2003), "*Keep on Moving*", McGraw- Hill

Wenger, E (1998) "*Communities of Practice: learning meaning and identity*", Cambridge University Press, N.Y.