Designing Higher Education Curricula in Innovation & Entrepreneurship

A portfolio submitted for the
Post-Graduate Diploma
in Learning and Teaching in Higher Education

Examined under the auspices of the
Oxford Learning Institute and the
Department of Education, University of Oxford



Victor P. Seidel
Trinity College, Oxford

October 8, 2012

Designing Higher Education Curricula in Innovation & Entrepreneurship

Overview

Portfolio Objective

I present a portfolio that is focused on the design of curricula covering topics in innovation and entrepreneurship within a university context. Teaching the principles and practice of innovation and entrepreneurship (I&E) constitutes a growing focus in many universities (Kuratko 2005), but this is a relatively new field in management studies, and so the means by which courses and curricula are designed are not well established (Honig 2004). This portfolio is submitted as part of the Post-Graduate Diploma in Learning and Teaching in Higher Education (DipLATHE) run during the 2011-2012 academic year as part of the Oxford Learning Institute and examined under the Department of Education.

In this portfolio I will attempt to cover the aspects of curricula and course design within I&E that may be particularly important given the applied nature of this topic and the relative youth of the discipline. I will seek to make specific recommendations for faculty developing new I&E courses, particularly in Oxford but with application to other institutions as well. My main objectives can be summarized as:

1. To provide a research-led assessment of the key components expected in an I&E curriculum
2. To summarize my own experiments in teaching I&E material

3. To investigate and summarize lessons from I&E courses and curricula from several other universities
4. To provide a specific framework for thinking about effective I&E curricula design, which I call "The Three Dimensions of I&E Learning"

The analysis of initial chapters will help to motivate why an I&E curriculum will be most successful when it works continuously and iteratively across three levels, incorporating meaningful engagement in experiential learning cycles. A representation of this approach, which I will term "The Three Dimensions of I&E Learning," is given in Figure 1, concepts of which will be developed through the portfolio and which will be developed in full in the final chapter.

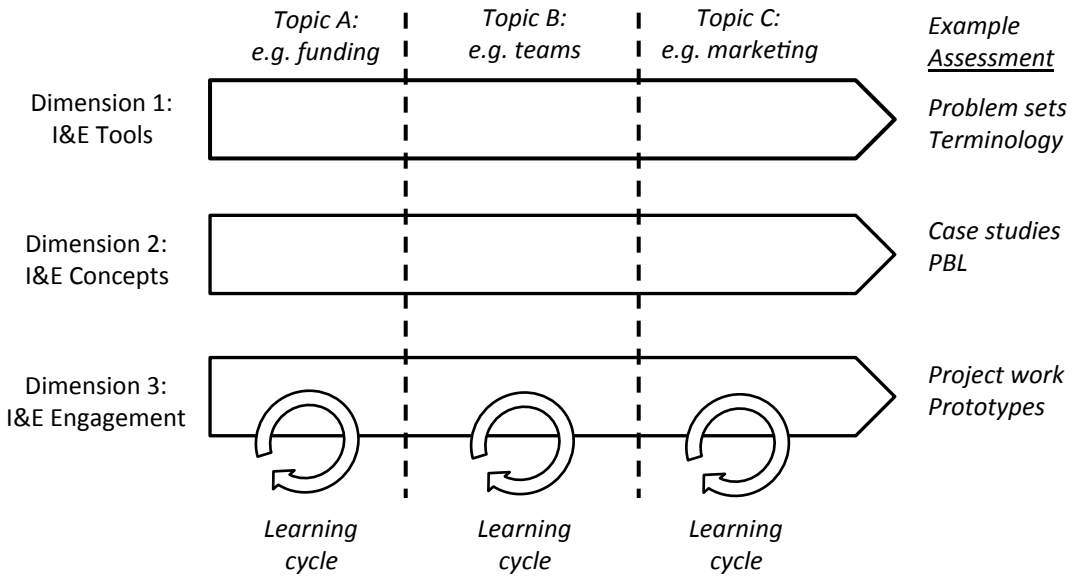


Figure 1: The three dimensions of I&E learning

How the portfolio addresses eight major course topics

Table 1 provides an overview of how this portfolio addresses the eight course topics within the DipLATHE.

Table 1: Chapters, focus, and relation to DipLATHE course topics

Chapter title	Focus of chapter	Relation to DipLATHE topics 1-8
1. Are goals and aims aligned in teaching Innovation & Entrepreneurship (I&E)?	Evaluation of teaching goals for I&E within the context of the aims of higher education broadly and the aims of business education more specifically. Review of Teaching Goals Inventory (TGI) survey and reflection on implications.	DipLATHE Topic 1: Perspective on the Aims of Higher Education and your own Teaching Goals
2. Student learning experiences in I&E settings	Review of student learning experiences for I&E courses and the use of the SPQ survey instrument. Implications for promoting deep approaches to learning.	DipLATHE Topic 2: Student learning and development
3. Models of feedback and assessment in I&E courses	Description of current approaches and experiments in new methods of feedback.	DipLATHE Topic 3: Feedback and assessment
4. Promoting diversity and inclusivity	Women form a minority of management and I&E students. What does research say about how to teach in this situation?	DipLATHE Topic 4: Diversity and inclusivity
5. Experimenting with teaching strategies for I&E courses	Report of an experiment with presenting materials in a new way is reported.	DipLATHE Topic 5: Teaching settings and strategies
6. The discipline of I&E teaching and approaches at other universities	A look at literature on management and I&E teaching as well as an overview of how other universities have adopted I&E teaching programmes.	DipLATHE Topic 6: Discipline-specific teaching concerns
7. I&E course design: A proposal and continuous improvements	This section identifies a challenge with I&E teaching and proposes a means by which a research-led initiative could be undertaken to try to address this gap. An evaluation of how to build a system that promotes on-going improvements in I&E curricula.	DipLATHE Topics 7 & 8: Course design & Leading educational change

How the portfolio addresses course criteria

Table 2: How the portfolio addresses course criteria

Criteria summary	Criteria detail	How addressed
1. Proper scope	Substantially discusses all of the 8 major topics introduced in the course	8 major DipLATHE topics are mapped onto 7 chapters as described earlier in this section
2. Relates to frameworks	Relates one's own teaching goals, philosophy, pedagogical theory or practice to conceptual frameworks from the educational literature	Draws from a number of frameworks, all of which are referenced
3. Student centred	Demonstrates an inquiring, critical, reflective and questioning approach to teaching by putting student learning and its improvement at the centre of discussions and analyses of teaching	Addresses experiments with teaching as well as learners' responses
4. Critical analysis	Critically uses educational literature to design and analyse one's own teaching or student learning support or curricular practices (or practices over which the participant has influence or authority)	A range of literature used from both the general and I&E specific academic communities. Created own "three dimensions" framework
5. Identifies research-informed improvement	Identifies a potential for improvement in the learning environment of their own programme, department, faculty, division, college, university or discipline and proposes one or more research-informed initiatives that could be pursued.	Describes how all "three dimensions" of I&E learning can be used to guide the development of new courses
6. Considers context	Considers how social, cultural, political or institutional contexts influence learning and/or teaching	Focuses specifically on gender issues in I&E education, drawing from research studies
7. Captures voice	Captures the author's voice as a teacher, giving the reader a picture of the writer as a teacher	Through experiments and self-directed and team research tries to provide a personal account
8. Well-organized	Is well-structured, well organized and clearly written, with key themes across the portfolio identified (either via an introductory piece, a conclusion or explicit linkages/ transitions from one item to the next)	Portfolio includes an overview introducing key themes as well as a conclusion
9. Contains overview	Contains an overview that shows where and how the portfolio addresses the major topics and criteria.	Two tables help to describe how the portfolio addresses 1. Topics and 2. Criteria. Overall objective of the portfolio is also included.

Table of Contents

1 Are goals and aims aligned in teaching innovation & entrepreneurship? 6
1.1 Orientations to the curriculum and relevance for I&E 6
1.2 Constructive alignment of a curriculum in I&E 7
1.3 Can I&E be taught? A comparison with medical education 8
1.4 My teaching goals: The Teaching Goals Inventory (TGI) 9
1.5 A two-level approach to I&E education? 10
1.6 Re-evaluating learning objectives for the "Strategy & Innovation" course 12
2 Student learning experiences in I&E settings 16
2.1 Exploring Deep and Surface Learning Approaches in Medical and Management Students 16
2.1.1 Methods 18
2.1.2 Findings 19
2.1.3 Discussion: Students as "strategic learners" 25
2.1.4 Critique of Theory and Possible Alternative Theories 26
2.1.5 Ramsden's (1991) implications for Teaching Practice 28
2.2 Personal reflections on the student learning investigation 29
2.2.1 What am I doing that may be inhibiting student learning? 30
2.2.2 How did the investigation help me to understand learning differently? 31
2.2.3 What has my own experience as a student suggested for my own teaching? 32
3 Models of feedback and assessment in I&E courses 35
3.1 An experiment on tutorial essay feedback 35
3.2 An experiment in interim feedback for post-graduate students 38
4 Promoting diversity and inclusivity 41
5 Experimenting with teaching strategies for I&E courses 45
6 The discipline of I&E teaching and approaches at other universities 48
6.1 Experiential learning: the Kolb Learning Cycle 48
6.2 Field visits of experiential approaches at other universities 49
6.3 Articles on experiential approaches at other universities 51
6.3.1 Summary of key practices and challenges 52
7 I&E course design: Proposal and continuous improvements 54
7.1 Proposed improvements: "The Three Dimensions of I&E Learning" 54
7.2 'Ready-Fire-Aim': Promoting continuous improvements 56
8 Conclusion 60
9 References 61
10 Appendices 64

1 Are goals and aims aligned in teaching innovation & entrepreneurship?

> *The way in which a university should function in the preparation for an intellectual career, such as modern business or one of the older professions, is by promoting the imaginative consideration of the various general principles underlying that career. Its students thus pass into their apprenticeship with their imaginations already practiced in connecting details with general principles. (Whitehead, 1929 [1967], p. 96, as cited by Hindle 2007)*

Indeed, a main thesis of my portfolio is that the challenge is how to engage students at multiple levels: a level of detail and a level of general principles. Both will be important, and I will add to this an interest in the experiential learning practices that can further a deeper understanding of material in context.

1.1 Orientations to the curriculum and relevance for I&E

Eisner (1978) presented five basic orientations to the curriculum which help us to understand some of the default cognitive patterns that underlie the presentation of material by teachers to their students as well as how students may perceive their learning experience. I summarize these orientations in the table below, along with my assessment of the relevance of these orientations on the teaching of management topics such as innovation & entrepreneurship (I&E):

Table 3: Eisner's (1978) five basic orientations to the curriculum and relevance to I&E

Orientation	Focus	Relevance to management or I&E education
1. Development of cognitive processes	A focus on helping students learn how to learn	Secondary
2. Academic rationalism	A focus on intellectual growth in those subjects worth study	Not as relevant
3. Personal relevance	A focus on personal meaning and education	Secondary
4. Social adaptation and social reconstruction	A focus on the university's role in society	Not as relevant
5. Curriculum as technology	A focus on achieving educational ends	Primary

In my evaluation of Eisner's orientations, it appears that I&E teaching and learning are most oriented with the focus of a curriculum as an educational technology: the curriculum functions to impart certain skills and knowledge toward a vocational end. I suggest there are secondary elements of the curriculum that are oriented toward personal relevance and for the development of cognitive processes. Broadly, an I&E curriculum is about a vocational objective of enabling students to function in the world, but there can be a greater or less degree of alignment between the objectives of this curriculum and the actual teaching and learning activities, as well as related assessment tasks, as will be considered next.

1.2 Constructive alignment of a curriculum in I&E

Biggs (2002) has proposed that a helpful way to evaluate a curriculum is in terms of its "constructive alignment" between teaching activities, assessment tasks for students, and the overall objectives, as illustrated in the accompanying brief figure (a more detailed elaboration of these areas is included in Biggs (2002)).

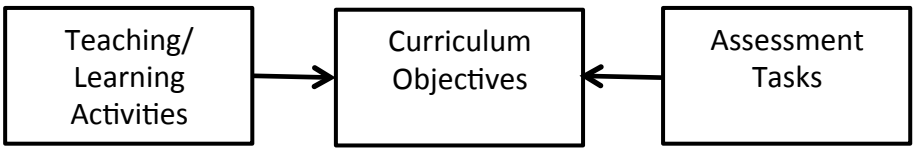


Figure 2: Overview of main elements within Biggs' (2002) model of "constructive alignment"

How well aligned is I&E teaching, and how can it be taught. In the following sections I will consider the following related aspects:

- Can I&E even be taught?
- My own teaching goals at multiple levels
- Considering curriculum goals and objectives at two levels
- Re-evaluating learning objectives for one course
- Implication for assessment tasks

1.3 Can I&E be taught? A comparison with medical education

One might question whether innovation and entrepreneurship can even be taught. Indeed, the question comes up in journal articles focused on entrepreneurship education in particular (Henry, Hill and Leitch 2005). Most serious scholars answer this question with a resounding "Yes!" but acknowledge that it is a good question as to *how* the subject can best be taught. Henry et al. (2005) note that even in 2005 there was little uniformity to the process of teaching entrepreneurship, and so this is indeed an area ripe for exploration.

To address the broad question of whether I&E can be taught, Hindle (2007) made an interesting comparison between entrepreneurship education and medical education:

> *No doctor is ever 'born', qua doctor. All are made: through education. However, some doctors are better than others… It is no different for an entrepreneur. All aspirants have to learn their craft somehow, and many do. Ergo, entrepreneurship can be taught. (Hindle 2007, p. 108).*

Given that I&E can be taught, but given the controversy of what is best to teach (Henry et al. 2005), I will next consider how my own teaching goals are reflected in a current I&E course.

1.4 My teaching goals: The Teaching Goals Inventory (TGI)

I took the Teaching Goals Inventory (TGI) with my main course in mind, a business school course for MBA students called "Technology and Innovation Strategy." The TGI results (seen in Table 4) highlighted what I would have expected to be the main implicit focus of my teaching, that I tend to emphasize "Higher-order Thinking Skills" (mean rating 4.13). As with my other courses, I have been most interested in getting students to see a bigger picture on how technologies evolve and to expose students to a number of different theoretical perspectives.

I have been worried that in my own teaching I do not put enough emphasis on specific skills, and indeed my ratings on both Discipline-Specific Knowledge (mean 3.63) and Work and Career Preparation (mean 2.75) are lower.

Table 4: Teaching Goals Inventory result

Cluster	Goals included in cluster	Percent rated "essential"	Mean rating
I. Higher-order thinking skills	1-8	50%	4.13
II. Basic academic success skills	9-17	0%	2.33
III. Discipline-specific knowledge and skills	18-25	13%	3.63
IV. Liberal arts and academic values	26-35	10%	3.00
V. Work and career preparation	36-43	0%	2.75
VI. Personal development	44-52	11%	1.67

This difference in skills highlights a tension that can be considered within Eisner's (1978) five orientations to the curriculum. I teach within both a business school and a traditional college, and so I sit between norms of "Curriculum as Technology" (Said Business School) and Academic Rationalism (Trinity College). I may expect more tension in setting aims and objectives compared with colleagues who sit within a single institution or for those where the department/faculty and

college are better aligned. A continued challenge for me will be to translate the need to address a combination of learning outcomes among colleagues, as I feel that not only higher-order thinking skills but also discipline specific skills are important for students in my discipline.

I think that currently the balance of my teaching tends to be too much on higher-order thinking skills and the development of cognitive processes at the expense of some more discipline-specific or career-focused skills. This is at times reflected in my student feedback which often indicates students have learned new ways of thinking about innovation but that they struggle to know how best to apply it.

Reflecting on the frameworks covered to-date in the course, I can start to lay out the following general teaching goals:

1. To help develop in my students higher-order thinking skills for tackling complex management issues.

2. To concurrently help provide understanding of how to apply specific innovation frameworks and develop specific analysis techniques.

3. To always set and clarify shared expectations of teaching and learning objectives with my students

4. To provide an environment where my enthusiasm for the topic is shared among teacher and student; learning in this context should be both challenging and fun.

1.5 A two-level approach to I&E education?

Hindle (2007, p 110) advocates that we should think about I&E education as 'teaching it' (vocational) and 'teaching about it' (theory and impact). As I will discuss

below, in many ways much of my teaching has been focused on theory and impact, with less focus on the vocational aspects.

Both are important. Hindle quotes Alfred North Whitehead who stated that "The function of a University is to enable you to shed details in favour of principles" (Whitehead, 1929, 1967, p. 48, as quoted in Hindle 2007). But Hindle notes that Whitehead also wrote that 'I am certain that in education wherever you exclude specialism you destroy life' (Whitehead, 1929 [1967], p. 10).

Hindle goes on to note that Whitehead "was an enthusiast for business schools...and even wrote for the Harvard Business Review…But he insisted that business school curricula should never be allowed to ossify and ought to favor experimentation." He refers to this philosophy as 'the principle of vocational transcendence'.

One theme that comes through both studies of education more generally and of teaching I&E topics more specifically is that there are multiple-levels of engagement. Bloom's (2007) taxonomy specifically lays out six levels, starting with basic knowledge, and then advancing along comprehension, application, analysis, synthesis and finally to evaluation as the highest-order cognition. The Teaching Goals Inventory also sets out those goals that are more practice-based and those that are more conceptual. A summary of how some of these concepts may be seen at two levels is given in Table 5.

Likewise, in specific studies of teaching I&E topics, we can see a dichotomy. As Lucas & Mitford (2009) refer to it in their chapter on teaching management, one can construct study as being for business (specific tools) or about business (the concepts

on which business is based). Likewise, Hindle (2007) writes of entrepreneurship education being divided into elements that are teaching 'it' (the tools that entrepreneurs have, such as how to gain financing) and those that are teaching 'about it' (about how entrepreneurial thinking can be applied to problems more broadly, for example). These perspectives are also mapped out in Table 5.

Table 5: Comparing analyses of two-levels of cognition across studies

	Lower-level cognition: "Tools"	**Higher-level cognition: "Concepts"**
General studies of education		
Bloom's (1978) taxonomy	Knowledge Comprehension Application	Analysis Synthesis Evaluation
Teaching Goals Inventory	Discipline-specific knowledge	Higher-order thinking skills
Studies specific to management or I&E		
Lucas & Milford (2009)	Study *for* business	Study *about* business
Hindle (2007)	Teaching 'it'	Teaching 'about it'

Considering these two levels of engagement, a focus on both "tools" for I&E as well as higher-order "concepts" in I&E can play a role in evaluating a specific course. I consider one such course in the next section.

1.6 Re-evaluating learning objectives for the "Strategy & Innovation" course

My main MBA teaching is on a course called "Technology & Innovation Strategy", which is a course I co-developed with a colleague in 2005. We have had the same section on "Aims and Objectives" for the past six years, and I reproduce it below:

MBA course on Technology & Innovation Strategy:
Existing Course Aims and Objectives

Technology & Innovation Strategy (TIS) focuses on the interface of nascent markets, organisational capabilities for innovation, and the strategic management of emerging technologies. The class is not about a specific kind of technology or industry, nor is it only about commercial innovation. The course design and content welcomes students from a broad range of skill sets, career aspirations, and professional expertise who are interested in strategic management in fast-moving markets. These may be people who want to start entrepreneurial ventures, who are interested in setting strategy in fast-moving markets, who want to promote social and technology innovation, and/or who will work in venture capital or private equity and need expertise in evaluating technology-based opportunities.

The course introduces generative concepts for analysing how technology-intensive markets work and the practical skills required to develop strategic approaches to innovation-- managing intellectual property, designing effective organisations for innovation, experimentation and recombination processes, developing product portfolios, and building and using social capital. By the end of the term, you will be able to formulate analyses and action recommendations relevant to key strategic challenges in technology-based enterprises, including public sector and social innovation contexts. The reading, discussion and work grapple with fundamental questions:

- Why do successful incumbent firms often founder over time?
- What is the impact of technological innovation and how does this occur?
- What are core processes in the institutional development of nascent markets?
- How do challenger firms and technologies disrupt incumbent ecosystems?
- What are the practical implications of innovation as a process of recombination?
- What innovation tools make it possible to create, deliver, and capture value?
- What are successful strategies in context of technology- and innovation-intensive industries?

In considering the above after learning more about the process of setting course aims and objectives, I can see the following difficulties:

1. A discussion of practical skills that is not delivered. We state that "The course introduces generative concepts for analysing how technology-intensive markets work and the practical skills required to develop strategic approaches to innovation"

and imply that we have a balance of higher-order and practical components, but most of our examples of questions are higher-order issues.

2. Too much description of what the course is, but not enough on specific objectives.

3. Framing the objectives in terms of questions. We describe very few objectives in concrete terms, and instead list a set of questions students should answer. I am not sure this is very effective.

I can begin to propose a set of new aims and objectives for the course, with an intent to keep this as concise as possible, as follows. These could be even further improved by applying the SMART framework (Doran 1981) of crafting learning outcomes:

S – Specific
M – Meaningful
A – Achievable
R – Relevant
T – Time-bound

MBA course on Technology & Innovation Strategy
New Draft of Aims & Objectives

Course aims
The course is designed to provide students with the ability to tackle challenging management issues related to innovation. We aim to provide a set of innovation frameworks that help students to analyze an innovation context and make well-considered strategic recommendations. We aim to broaden the range of contexts under which students can identify opportunities for innovation.

Course objectives
- To develop in students a vocabulary related to innovation to describe past and future innovations

- To develop in students an understanding of a how and when to apply a range of innovation frameworks across issues of technology, markets, and organisations
- To have students develop logically-derived strategic recommendations based on an analysis of an innovation context
- To have students be able to develop and test an innovation framework appropriate to a specific industry
- For students to understand how intellectual property can be used within the innovation process, how to search for prior patents, and how to draft initial claims for such inventions
- For students to be able to design the elements of a collaborative innovation approach for a given firm
- For students to identify the features of a social network that facilitate innovation and to make recommendations on how to analyze and change a network to promote innovation.

What are the implications of two-levels of teaching and learning in I&E on assessment? We will pick this up primarily in the next section, where we consider how students experience learning in light of a specific assessment regime. The particular problem will be when the assessment regime is focused on "tools" or lower-level cognition when we are wanting more higher-level cognitive impact on broader "concepts".

Summary of main points of this chapter:

- I&E is a topic that can be taught, but there is not much agreement in the literature on how to do so
- One can propose a simple broad two-level of engagement with I&E material, consisting of engagement at the level of "tools" and the level of "concepts"
- One's teaching goals may reflect different levels of engagement, and my TGI indicated a particular focus on concepts over tools.
- A set of course aims and objectives have been re-written for the "Strategy & Innovation" MBA course, mindful of SMART criteria

2 Student learning experiences in I&E settings

In this section I report on an exploration of learning approaches among management and medical students, undertaken with fellow DipLATHE students Susanne Sheehy and Sanja Thompson. The first major section is taken from a jointly-produced work with these students as part of our Michaelmas Term Investigation.

After reviewing our work that looked across management and medical students, I will provide personal reflections more specifically to student learning experiences in I&E settings.

2.1 Exploring Deep and Surface Learning Approaches in Medical and Management Students

Marton and Saljo (1976) introduced the importance of phenomenography to understanding student learning, conducting research that was based directly on the student experience. Rather than considering students as isolated individuals approaching their study according to their own motivation or cognitive ability, they suggested an individual student's learning approach is determined by a complex interaction between the student and their experience of their learning environment. As a result of this interaction, students will adopt a **deep**, **surface** or **strategic** approach to learning, as described in Table 6 (Biggs et al. 2001).

Table 6: Student Approaches to Learning: Dimensions, motives and strategies

	"Surface" approach to learning*	**"Deep" approach to learning***	**"Strategic" approach to learning†**
Motives	Fear of failure	Intrinsic interest	Achievement
Strategies	Narrow target, rote learning	Maximize meaning	Effective use of space and time

Notes: Table adapted from Biggs et al. 2001
* Indicates dimensions assessed by the Study Process Questionnaire (SPQ)
† "Strategic" approach sometimes called "Achieving" approach by Biggs and others

Subsequent studies have found that students who adopt surface approaches to learning are more likely to have learning outcomes of a poorer quality than those who adopt deeper approaches. (Prosser and Trigwell 1999). Whilst some have criticised the framework as overly simplistic and inherently judgemental (Fry, Ketteridge, and Marshall 2009), Marton and Saljo's framework is widely recognised as a key educational theory (Biggs et al. 2001; Fry, Ketteridge, and Marshall 2009) and as a result it might be considered "*professionally incumbent on a teacher to attempt to change the context (of learning) so that (surface learning is) not seen to be appropriate from the perspective of a student*." (Prosser and Trigwell 1999)

We were intrigued to investigate our students' understanding of deep and surface learning approaches and in particular were interested to know whether they are consciously aware of adopting different learning approaches in different situations (we postulated that student awareness of the contrasting learning approaches could be an important factor that could persuade students to avoid a surface learning approach). We also wished to better understand what factors University of Oxford students in particular feel are important determinants of the learning approaches they employ, so that we might better design our own personal

teaching strategies in order to encourage more successful learning. We therefore chose to address two related research questions:

1) Do Oxford medical and management students recognise a difference between deep and surface approaches in their own learning?

2) What factors determine which approach they employ?

2.1.1 Methods

We used a qualitative research method to gather information from students about their approach to learning consisting of interviews with students and the completion of a Study Process Questionnaire (SPQ) (Biggs et al. 2001).

Students interviewed

We conducted interviews of Oxford final year graduate entry medical students and post-graduate MBA management students about their learning experiences on courses the investigators taught. Interviews took place between October and December 2011. An overview of the demographics of the students interviewed is indicated in Table 7. Students consisted of a random selection of abilities and demographics.

Table 7: Demographics of Students Interviewed.

Student	Investigator	Age	Gender	Discipline
A	SS	27	Female	Graduate entry Medicine
B	SS	30	Female	Graduate entry Medicine
C	VS	45	Male	Post-graduate MBA Management
D	VS	30	Male	Post-graduate MBA Management
E	ST	22	Female	Graduate entry Medicine
F	ST	21	Male	Graduate entry Medicine
G	ST	22	Female	Graduate entry Medicine

Notes: SS= S Sheehy, VS= V Seidel, ST = S Thompson.
For some students, ages are investigator estimates.

The Study Process Questionnaire (SPQ)

Biggs et al. (2001) developed a revised two-factor Study Process Questionnaire (SPQ) designed to evaluate approaches to learning. The SPQ focuses on the two dimensions of "surface" versus "deep" approaches and also allows a diagnostic of whether the approach is defined by student motives and/or by student study strategies. The third "strategic" approach to learning is not assessed by the SPQ. A copy of the SPQ is given in the Appendix.

Data collection

Students were asked to identify two occasions when they studied for an examination using very different approaches. For each occasion students were asked to:

- Complete the Revised Two Factor Study Process Questionnaire (SPQ) in order to identify the learning approach used as deep or surface.
- Discuss their study approach and explore reasons for the chosen approach.

Results of the SPQ for each examination were discussed with the student and their understanding of the different learning approaches explored. Students were then asked to identify a learning event that was not directly examined, discuss the study approach and explore reasons for the chosen approach. A full account of the interview protocol is given in Appendix A. In most cases, interviews were recorded and key dialogue transcribed.

2.1.2 Findings

All students were able to identify and discuss two occasions when they studied for an examination using very different approaches, suggesting they appreciated that their learning approaches were fluid and changeable. Both questionnaire scores and interpretation of transcripts from interviews showed that the students did at times employ different approaches to learning in different situations.

Table 8: Overview of Deep vs. Surface approaches for students interviewed

Student	Exam 1 topic	SPQ result	Exam 2 topic	SPQ result	Non-Examined Learning Experience
A	Short answer written exam in basic sciences & clinical problems	More **surface**: DA=26 SA=30	Neurology observed clinical examination & oral viva	More **deep**: DA=30 SA=26	Preparing presentation on autism for paediatric attachment
B	Obstetrics & gynaecology multiple choice questions and observed clinical examination	More **deep**: DA=34 SA=27	Paediatrics short answer written exam	More **surface**: DA=28 SA=37	Preparing presentation in GP attachment on propranolol treatment for child with haemangiomas
C	Innovation project	More **deep**: DA=27 SA=17	China project	SPQ n/a	How to write a good report
D	Solar case exam	More **deep**: DA=28 SA=25	Entrepreneurial finance	SPQ n/a	Participation in venture competition
E	Neurology examination (written exam- multiple choice questions and clinical exam)	More **deep:** DA=29 SA=23	4th year OSCE (clinical examination)	More **deep**: DA=42 SA=13	Learning about audit, to teach other medical students
F	Neurology examination (written exam- multiple choice questions and clinical exam)	More **deep:** DA=33 SA=19	Clinical exam (written exam)	More **surface**: DA=28 SA=40	Case presentations
G	Paediatrics exam, Short answers (written)	More **surface**: DA=24 SA=31	Not answered	n/a	A case based presentation

DA=Deep Approach score; SA=Surface Approach score. See Appendix B for SPQ details.

Questionnaire scores showed that students did not exclusively employ one particular learning approach when preparing for a particular exam, but instead simultaneously used deep and surface learning approaches, varying instead which approach was predominantly used for each particular exam. An overview of SPQ results is given in Table 8.

Generally there was agreement between questionnaire scores and interview answers regarding whether individuals predominantly used a deep or surface approach for a particular exam. We next describe the results related to each of our main research questions:

Do Oxford medical and management students recognise a difference between deep and surface approaches in their own learning?

Whilst students were aware of applying different learning strategies to different situations, most students did not appear to appreciate a difference between deep and surface learning approaches without considerable prompting. The medical students readily discussed various practical learning approaches they employed when preparing for exams (e.g. rote learning versus practising clinical examination) but did not appear to have considered independently that deep and surface approaches exist or that different learning approaches might engender different quality of learning. As one medical student put it, they considered themselves "*exam machines*" concerned primarily with passing exams rather than understanding.

> *Student A: "I think we mostly just kind of learnt the research studies so we could know the evidence to back up an arguments rather than forming our own opinions."*

Interviewer: "How well do you think you understood the topic?"
Student A: "I think my own conclusions were just based on what I'd read."

In this respect, students appeared to be following more of a "strategic" approach to learning. As outlined above, the strategic approach is defined as having a student motivation of high achievement and a student strategy to make most effective use of available resources. A strategic approach is not specifically assessed in the SPQ, but a flexible use of deep and surface approaches in different situations can serve as an indication of a strategic means of learning. Whilst students did not necessarily appreciate the difference between deep and surface learning approaches, all were aware they were applying a strategic, or in their words "*whatever was necessary to pass the exam*" learning approach.

What factors determine what learning approach students employ?

All students appeared highly strategic learners who modified their learning approach based on what they perceived would lead to the best performance in an examination. Student B: "*all my learning was geared towards the exam.*"
Interviewer: "*Did you concentrate on just what we needed to pass the exam?"*
Student B: "*Yes."*

Indeed, in our interviews repeatedly, the nature of the examination or assessment was a key determinant of what learning approach students chose for particular scenarios. As we focused students specifically on times they prepared for examinations, we generated a lot of information regarding how assessment method can influence students' choice of learning strategy:

Examination Design: If students perceive that an examination requires them to produce word perfect answers, they will adopt a surface 'rote learning' approach; Student B: "*I made little cards with the question and the answer and I just every night I learnt another 5 by rote, so I could chant them back. My answers were perfect because that's how I learnt them because that's what they wanted*." Equally if the exam set out to assess practical skills, the student would adopt a practical learning approach; Student B: "*because I was preparing for a practical exam I had to use a practical approach*."

Syllabus for Examination: Students reported that they closely followed the syllabus of what was going to be examined and based their learning stringently on this list; Interviewer: "*What was your learning approach based on?* Student A: "*What was going to be examined*." Interviewer: "*Anything else?*" Student A: "*No.*" Students suggested that huge amounts on a syllabus meant topics could only be learnt using a surface approach and that topics not on a syllabus were ignored; Student A: "*We were given a huge syllabus…. of more than 100 pages and we had to just work through that. It was quite prescriptive, set points they wanted us to learn*. *There was so much to get through in that year that I tried to keep my learning very directed and stick to the points that they wanted.*"

Assessment of Performance in Examination: A number of medical students remarked that the grade they could receive in an examination influenced their learning approach. If an examination was only assessed as pass or fail, students suggested they were less likely to adopt a deep learning approach; Interviewer:

"*How well do you think you understood the topics?"* Student B: "*Good for pass/fail only.*"

Case Based Assessment: Both management and medical students reported that assessments based around real life scenarios (whether clinical cases or business projects) were often interesting and memorable however, students varied in whether they felt this approach encouraged a deep or surface learning approach. In the case of the medical students, when preparing for assessments that involved being observed performing clinical examinations, they reported that this motivated them to go onto the wards, meet and examine real patients and hone their own clinical skills; Student A: "*I would go onto ward and examine patients, decide what I thought the diagnosis was then check the notes to see what the doctors had written and see if I got it right.*" Management student D noted that "*case studies helped me to understand technical material*". However, management student C admitted that elements of project work could be met with a surface learning approach simply "*throwing frameworks together*".

Past Exam Papers: A number of students reported consulting previous exam questions to guide their leaning; Student B: "*going through multiple choice questions was very helpful as that was how the exam was presented*."

In addition to the assessment method, students reported that **peer support and feedback** was a key determinant of their learning approach, allowing them to identify and fill holes in their own learning. Student B: "*I studied with other students. A group of us from college met up and would go through past questions and quiz*

each other, test out understanding against each other." Student C even went so far as to suggest that competitive peer pressure could be a positive motivator for a deep learning approach, suggesting teachers should "*give students a chance to compete*" as a means to increase learning.

2.1.3 Discussion: Students as "strategic learners"

Our students appeared to be highly "strategic" learners, adapting their learning approach according to the examination in question. Students did not exclusively employ one particular learning approach when preparing for a particular exam, but instead simultaneously used deep and surface learning approaches, at times varying which approach was predominantly used for each particular exam. Whilst students may perceive this strategic approach to maximise exam success, some studies suggest that students who perceive their learning environment as affording both deep and surface learning approaches (disintegrated perceptions) can demonstrate significantly worse learning outcomes than contemporaries who adopt deep or surface approaches in isolation. (Prosser and Trigwell 1999) Although our students were randomly selected, they were all academically successful, which questions whether disintegrated perceptions always lead to poor learning outcomes or whether the assessments our students undertake fail to assess/value high quality learning outcomes.

Whilst students were aware of applying different learning strategies to different situations, most students did not appear to appreciate a difference between deep and surface learning approaches. The key determinant of learning approach was assessment and students' described honing their learning style

according to what they perceived was required by examiners and would translate most effectively into examination success. Peer support and feedback was also a key factor.

2.1.4 Critique of Theory and Possible Alternative Theories

We were aware that Marton and Saljo's framework could be considered overly simplistic and felt this criticism was borne out in our study, where simply describing students' learning approaches as deep or surface did appear overly rigid; our students' learning approaches appeared more complex, constantly adapting to different situations.

We found Bigg's SPQ a useful tool, as it allowed us to appreciate the relative contribution simultaneously of deep and surface learning approaches in an individual student. The scale also gave us an insight into students' motives and strategies for learning which we feel helps to address some of simplicity of Marton and Saljo's original framework. Indeed further analysis of our interviews could look more specifically at whether motives (e.g. a fear of failure) or strategies (learning to just memorize lists) of our students determined which particular learning approach they chose.

Marton & Saljo's framework does not consider how deep, surface, and strategic approaches might vary according to discipline. Both medicine and management are applied subjects (as mapped by Biglan's (1973) classification of disciplines) where the acquisition of practical skills are important part of learning. Often such skills can only be acquired by 'doing.' We were unclear where practical

training and 'learning by doing' would fit into the framework. To call the acquisition of these skills 'surface learning' we feel would be an oversimplification.

In our tutorial we learned of the concept of the "hidden curriculum" (Snyder 1973), which consists of those values not explicitly taught as part of the formal curriculum. Via a hidden curriculum, tutors can unintentionally prioritise one topic or set of skills over another. For example, in some medical education tutors have been shown to have a hidden curriculum which prioritise practical skills over ethics (Hafferty and Franks 1994). In management and medicine courses at the University of Oxford, tutors may have "hidden curriculums" that emphasize the strategic nature of exam preparation at the expense of depth. This concept could be used to more fully consider how context affects learning approaches.

Limitations of study

There are of course limitations to this small exploratory study, three of which we highlight here. First, by asking students to think about particular learning approaches they adopted when preparing for an *examination*, we were in danger of skewing the data we collected by encouraging students to overemphasis the importance of assessment method on the learning approach they adopted.

Second, students often acquire skills and values whilst studying of which they are not overtly aware (the "hidden curriculum"). In our interviews, students were only able to discuss the learning they were aware of and so our conclusions do not necessarily apply to the influence of a hidden curriculum, but a future study could probe this area further.

Third, whilst the SPQ was a useful tool to broadly classify students' learning approaches in different situations, it was less useful as a vehicle to aid discussion of students learning approaches in different situations as the large number of questions meant it took considerable time to grade the responses, making it cumbersome to use as a discussion tool in real time interviews.

2.1.5 Ramsden's (1991) implications for Teaching Practice

Our results strongly suggest that the assessment component of a course can dramatically influence students' choice of learning approach. Ramsden (1991) suggested that five areas of course experience can aid in deep learning approaches:

1. Good teaching
2. Clear goals
3. Appropriate workload
4. Generic skills development
5. Appropriate assessment

Our study focused mainly on the relationship of learning approach to appropriate assessment. Based on our interviews, we suggest that the following features of assessment could encourage students to adopt a deep learning approach. These recommendations are broadly consistent with those suggested by Ramsden (1991):

- Design an assessment process that aims to assess skills that can be acquired through a deep learning approach. Case based questions that test analytical skills will be particularly useful. For example, in a written examination rather than asking students to "list 10 cause of chest pain" perhaps present a clinical

scenario and use the questions to probe students understanding of the presentation and their treatment plan.

- The syllabus for examination content should be manageable and phrased in a way to encourage students to adopt a deep learning approach.
- Provide results in a graded manner rather than pass/fail.

In medical education, teachers have a responsibility to train students to be safe and responsible medical practitioners. This means that huge amounts of facts as well as practical skills must be learnt. The medical students in our study appear well trained to acquire and regurgitate facts however, appear to prioritise less analytical skills or independent thought, a worrying finding for future doctors. Given that for the medical students in our study the main determinant of learning approach was assessment design it is this that we think can be modified by teachers to encourage a deep learning approach.

Our findings also highlight the important resource that students find in their peers. We suggest that teachers should seek to maximise and encourage the use of this resource, perhaps formally adding peer work and assessment into course design. Indeed peers could be considered a fourth 'P' in Biggs's model of student learning (Biggs 1989).

2.2 Personal reflections on the student learning investigation

I have summarized three main insights from speaking with four students as part of the investigation. While there were other points that developed from my

interviews, the following may be the most helpful for me to focus upon going forward.

Table 9: Main insights from the study on student learning

Primary insight	Representative student quote	Actions
1. Students want deep learning, but need opportunities to engage.	"there was too much Powerpoint...for thirty minutes, just let us engage. Get us up and moving"	Informed the experiment in Chapter 5 on using handouts in class to help teams work on problems together.
2. Students want to know more what is expected of them.	"I wish [you] could teach students how a paper is marked"	Informed an experiment on new feedback sheet, described in Chapter 3
3. Students may gain deep learning through friendly competition with one another	"Give students a chance to compete" [as this was helpful in other courses]	Partly explored through the handout worksheets used by teams for in-class exercises.

A more general learning point was that my students were surprisingly more focused on deep rather than surface learning approaches according to the SPQ survey instrument. All of my students exhibited strategic learning, shifting back-and-forth between approaches depending on the time available to complete a task. This is unsurprising: what was most surprising was how they could approach many of their management subjects quite deeply—and wished to do so.

2.2.1 What am I doing that may be inhibiting student learning?

Considering the feedback further, there are a few factors that may be specific factors inhibiting student learning in the classes I teach. The three things to highlight are covered in Table 10.

Table 10: Possible factors inhibiting student learning

Possible factor inhibiting learning	Further detail	Possible remedy
1. I assume students know more than they do about what is expected of them.	One quote was: "I didn't know what a literature review was". Often I get upset with students for their missing what I feel is obvious.	Provide more opportunities for questioning the elements of an assignment. Be more prescriptive or clear in what to include.
2. I may be providing too many frameworks.	Some feedback reflected that they had too many PowerPoint slides and not enough time for reflection. This probably promotes more surface learning.	Evaluate the number of concepts I introduce. Move from covering much material in little detail to fewer areas in more detail.
3. I may be not explicit enough on learning objectives. (I also may be focusing too much on higher-order thinking skills at the expense of work and career preparation skills)	There may be some objectives that are implicit, like how to write a really good analysis report. If we do not state that we are providing this opportunity to do this, then students may not appreciate all the skills they are learning.	Be far more clear on learning objectives, and design the course such that it allows for both higher-order thinking skills and work and career preparation.

2.2.2 How did the investigation help me to understand learning differently?

I think that the distinction between deep, surface, and strategic learning is a helpful one for me to keep in mind as I develop course content. I was interested to take the SPQ myself in the context of the DipLATHE and find that, indeed, I was working primarily as a strategic learner. My own response to the SPQ was as follows:

Table 11: SPQ results for my learning approach on the DipLATHE

	Surface approach	Deep approach
Motives	SM=11	DM=13
Strategies	SS=14	DS=8
total	Surface total=25	Deep total=21

From the results, it appears that while my motives are to adopt a deep approach, I am resorting to surface learning strategies. Just being aware of the

difference between motives and strategies underlying a learning approach is helpful in knowing how to relate to my students' learning process.

2.2.3 What has my own experience as a student suggested for my own teaching?

One thing that has been very valuable, and which I had not expected, has been the experience of being a student again. I find this "turn of the tables" is very helpful as I consider what my students must experience in their own learning.

I teach at the undergraduate, Master of Business Administration (MBA), and Diploma in Management / Executive Master's levels. At the Diploma and Executive Master's levels, I am often teaching to people much like myself: professionals with many commitments outside of their educational aims. The DipLATHE has certainly put me in my place in being sympathetic to the needs of especially such students. There are a few specific items that I have been thinking most about:

1. Make information readily accessible, and reinforce the information

I have found the organisation of the Course Handbook invaluable for navigating the requirements of the course—the work that went into making all this information accessible is very worthwhile. I have been surprised at how many times, even if I have been told repeatedly where something is, that I still have questions about how to access some information. I have to remember that providing guidance is essential, and the DipLATHE has provided good models at how to do this.

2. Organize learning activities into discrete, numbered units

The DipLATHE has provided very helpful means to break down a large subject into smaller discrete units. There was a very good correspondence between our pre-reading, the activities in class, and the assessed work. I think this thoughtful way of making these elements correspond provides a model for my own course design.

Related to this, it was helpful just to have numbered modules and assignments that corresponded to each module (for example, this as assignment 2.4). For a busy professional, having this easy way to see how each module and assignment corresponds was extremely helpful.

3. Consider making learning more colourful

This is a minor point, but I found it very helpful how so many of the materials we were provided were printed on coloured paper. This helped me as a student to keep track of different material, even if there was not necessarily a rigid system of colours matching to different tasks. It was also helpful that certain aspects of the programme—such as the main schedule and the group assignments—had colour coding. In general, this all made it much easier to navigate through the material.

4. Be wary of groups that are too large and consider the mix

I have enjoyed my tutorial group, but even with only three people it is often difficult to find time to meet and to coordinate our activities. Some of the programmes I teach on ask that students form teams of five or six students. I had heard complaints about the size of such teams, and now I can really sympathize!

Groups can provide a very helpful learning experience, and the MTI project was certainly enriched by what our perspectives had to offer. We were fortunate

that we had a group of three students, as this enabled us to learn from each other, while also not suffering the coordination costs of a larger group.

I also appreciated the care by which the teams were put together. I felt that our tutorial group's combination of medical and management faculty helped us to have a common focus on vocational subjects while also allowing us to learn from each others' experiences in very different areas. I appreciated that in other exercises we had groups of students that might be aligned by other factors (e.g. just social sciences).

5. Don't take things too personally

Even though we are self-selected as students to be very eager to do the best job possible, I did catch myself having my thoughts drift off to thinking about how I was going to pick up the kids in time that night, how I would fit in an overdue academic review, etc. So, even though I enjoy and committed to the material, at times I am not the best student. When I catch some of my own students apparently drifting off, I should cut them (and myself) some slack!

3 Models of feedback and assessment in I&E courses

Theories of feedback and assessment point to the need for alignment between goals, activities and assessment (Biggs 2002). In the following sections, I report on two experiments in revising a means for providing feedback for students.

3.1 An experiment on tutorial essay feedback

I have been running one experiment since 2010 regarding how I give tutorial feedback. While the course that this feedback was given for is not solely focused on I&E topics, I think this provides an example of the type of experiments in effective teaching that I would like to provide more generally in my teaching.

The process within Oxford of giving feedback on tutorial essays is very heterogeneous; an example of the range of approaches is given in Table 12.

Table 12: Ranges of feedback scales for tutorial teaching in Oxford

Mark	Class	Grade	Criteria
70-85	First	α α– α–– ααβ αβ	Work displaying analytical and argumentational power, with good command of the facts and/or arguments relevant to the questions and evidence of ability to organise them with clarity, insight and efficiency.
60-69	Upper Second	βα ββα β++ β+ β	Work displaying analytical power and argumentational power, but with less comprehensive and thorough command of evidence; or work showing considerable thoroughness but less analytical skill or less clarity in organisation.
50-59	Lower Second	β– β–– ββγ βγ	Competent work with no major defects, but giving an incomplete account of the question, or marred by inaccuracies; or work which demonstrates lapses in (but does not lack) analytical and argumentational skills.
40-49	Third	γβ γγβ γ++	Work that is generally weak with muddled argumentation, but containing some evidence of knowledge of facts and analytical skill; or work that, while competent and knowledgeable in itself, does not address the question asked by the examiners.
30-39	Pass	γ	
29 and below	Fail	δ	Very poor quality work, showing little if any evidence of effective study.

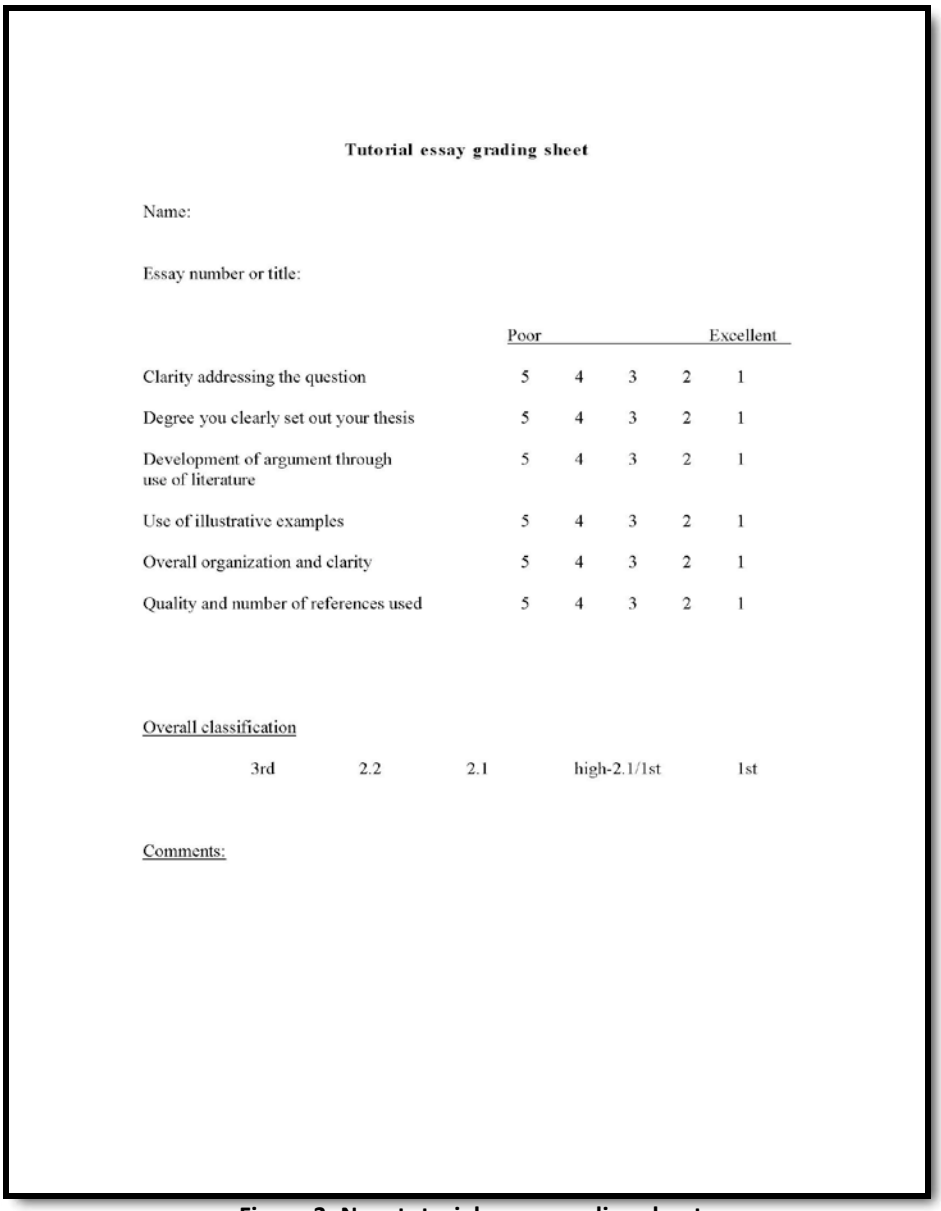
Note: This table was developed by Oxford student M. Preibsh

Individual essays would be marked on any one of these feedback scales and would include various comments as the marker saw fit. The new tutorial essay grading sheet is given in Figure 3. The goal was to better link how student receive feedback on a weekly basis to the aims we set out for them for management tutorials. Another objective of the sheet is to link directly to the system that summarizes student achievement for the term, under the university-wide OXCORT system. The scale used for overall assessment for each week's work is the exact same as on the OXCORT system. This means that a simple average of the weekly work can then result in a value that can be linked directly to OXCORTs assessment scale, so students will not likely be surprised at their final result.

My colleague Richard Whittington and I had developed a set of guidelines to help students understand what tends to make for the most successful answers on Oxford "collections" (termly mock exams) and final exams. The guidelines have gone my various names as we changed the focus, but have been known as the "5,4,3 rule":

- Five (at least) academic references
- Four examples from industry
- Three lines of argument

These guidelines link directly to the course rubric and general teaching practice.



Tutorial essay grading sheet

Name:

Essay number or title:

	Poor				Excellent
Clarity addressing the question	5	4	3	2	1
Degree you clearly set out your thesis	5	4	3	2	1
Development of argument through use of literature	5	4	3	2	1
Use of illustrative examples	5	4	3	2	1
Overall organization and clarity	5	4	3	2	1
Quality and number of references used	5	4	3	2	1

Overall classification

3rd 2.2 2.1 high-2.1/1st 1st

Comments:

Figure 3: New tutorial essay grading sheet for feedback linked to course aims

In summary:

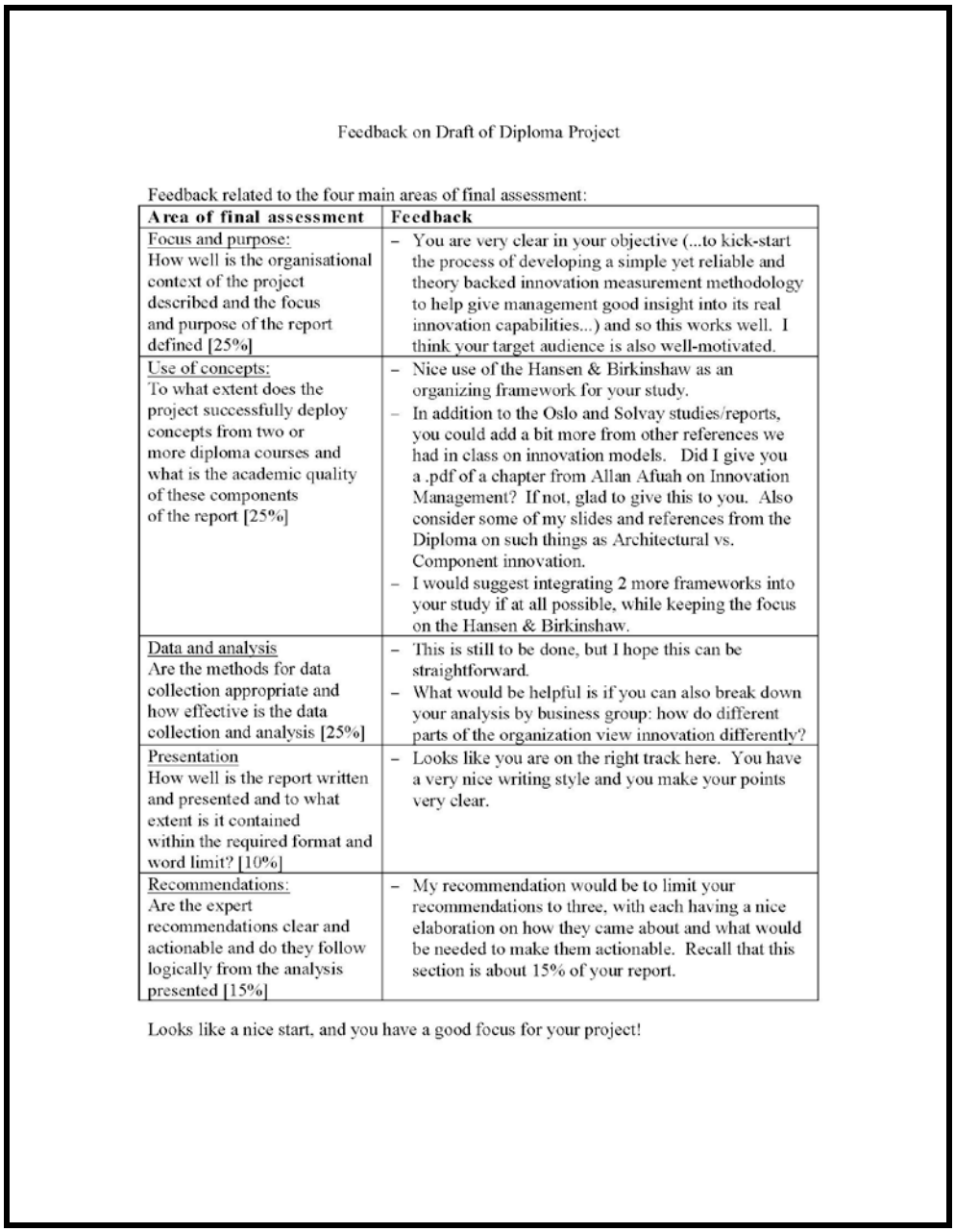
- New tutorial essay grading sheets were designed to more clearly link to desired learning outcomes and future assessment requirements
- Grading sheets have been used with over 25 students in the past year

- Overall assessment feedback scale links directly to OXCORT university-wide system, making it easy for instructor to calculate marks that will be entirely consistent with prior feedback to student
- Grading sheets have been shared with other tutorial instructors, both within the business school and within the DipLATHE community

3.2 An experiment in interim feedback for post-graduate students

After the course began, I decided to look at the means by which I was giving feedback to my post-graduate students doing a diploma course in "Strategy and Innovation". On this course, students are in session in Oxford for four four-day modules over the course of a year, and at the end they have to submit a 10,000 word project.

I thought feedback more closely tied to our assessment criteria would be helpful to students as they proceed on their projects. To this end, I provided two sheets for students. The first sheet outlined how I can best work with students over the course of their project and what my role as project supervisor was. The second sheet was the Diploma Project Feedback Sheet, which is illustrated in Figure 4.



Feedback on Draft of Diploma Project

Feedback related to the four main areas of final assessment:

Area of final assessment	Feedback
Focus and purpose: How well is the organisational context of the project described and the focus and purpose of the report defined [25%]	– You are very clear in your objective (...to kick-start the process of developing a simple yet reliable and theory backed innovation measurement methodology to help give management good insight into its real innovation capabilities...) and so this works well. I think your target audience is also well-motivated.
Use of concepts: To what extent does the project successfully deploy concepts from two or more diploma courses and what is the academic quality of these components of the report [25%]	– Nice use of the Hansen & Birkinshaw as an organizing framework for your study. – In addition to the Oslo and Solvay studies/reports, you could add a bit more from other references we had in class on innovation models. Did I give you a .pdf of a chapter from Allan Afuah on Innovation Management? If not, glad to give this to you. Also consider some of my slides and references from the Diploma on such things as Architectural vs. Component innovation. – I would suggest integrating 2 more frameworks into your study if at all possible, while keeping the focus on the Hansen & Birkinshaw.
Data and analysis Are the methods for data collection appropriate and how effective is the data collection and analysis [25%]	– This is still to be done, but I hope this can be straightforward. – What would be helpful is if you can also break down your analysis by business group: how do different parts of the organization view innovation differently?
Presentation How well is the report written and presented and to what extent is it contained within the required format and word limit? [10%]	– Looks like you are on the right track here. You have a very nice writing style and you make your points very clear.
Recommendations: Are the expert recommendations clear and actionable and do they follow logically from the analysis presented [15%]	– My recommendation would be to limit your recommendations to three, with each having a nice elaboration on how they came about and what would be needed to make them actionable. Recall that this section is about 15% of your report.

Looks like a nice start, and you have a good focus for your project!

Figure 4: Diploma in Strategy & Innovation project feedback sheet with explicit links to assessment (example material filled in for right-hand column)

The feedback sheet was designed using what we provide as assessment criteria before the project begins. Prior to the use of this sheet, project supervisors could use a range of ways to provide feedback, but this was often uneven and not necessarily well-linked to the assessment regime (with implications for the final mark that would be given by another faculty member serving as examiner).

The feedback sheet was first used during the 2011-2012 academic year, with five students under my supervision. As a faculty member, I found this an easier more directed way to provide helpful feedback to students. My students appeared to appreciate the form as well, as it seemed to help them better focus their efforts according to what would be part of the final assessment.

After the success of this limited experiment, the feedback sheet has been shared with the course directors of this diploma program, and the sheet is expected to be in wider use from a broader range of faculty in the future.

In summary:

- An experiment was run to provide interim feedback to diploma students on their innovation-related projects that expressly related to evaluation criteria.
- The process within the DipLATHE was used as a guide to design a new feedback sheet
- Five students were given feedback using this method during the 2011-2012 academic year and anecdotally reported it was helpful in focusing their efforts
- New feedback sheet now shared with course director and other instructors for possible wide-spread adoption on the programme

4 Promoting diversity and inclusivity

There would appear to be the following main challenges in promoting diversity and inclusivity in I&E teaching:

1. Gender imbalance: The general gender imbalance in management education
2. Role models: The lack of role models in case studies of the phenomenon
3. Cross-cultural teams: Possible cultural difference in team work exercises

I will focus on the first of these challenges in this section. Business schools, when compared with other professional schools such as law schools or schools of medicine, have much greater gender imbalance. Where medical schools often have a 50/50 gender balance, it is not uncommon for business schools to be two-thirds to three-quarters male. In my own experience, my I&E classes at Oxford reflect this ratio as well.

One exception to this imbalance in gender is at Babson College in the Boston area. However, a college like Babson may be able to manage its admissions process in a way that graduate-level admissions committees would find hard to do, as there is a perceived wider interest in business among women at the undergraduate level when compared with the MBA or other post-graduate qualifications.

The implication of gender on I&E education has been considered by educational scholars in the I&E field. Two of the most highly-cited studies considering the role of gender are summarized in Table 13.

Table 13: Selected studies on gender and I&E education

Authors	Title	Main findings
Kourilsky & Walstad (1998)	Entrepreneurship & female youth: Knowledge, attitudes, gender differences, and educational practices	• Women are more aware of their deficiencies in I&E topics • Women are less likely to start own businesses • Women may be less likely to make adjustments in their pricing to attract new business
Wilson, Kickul, & Marlino (2007)	Gender, entrepreneurial self-efficacy, and entrepreneurial career intentions: Implications for entrepreneurship education	• Women are less self-confident about the ability to pursue an I&E career • Effect of I&E education in MBA programs on self-efficacy were stronger for women than men.

The earlier Kourilsky & Walstad study of 1998 relied on a large sample of American students at the high-school level. In this study they found that women appeared more aware of the material they needed to learn and were less likely to pursue a new business even after education on the topic of entrepreneurship. The Kourilsky & Walstad study provides an outline of two initiatives that help females to better learn I&E tools and concepts. However, both of the initiatives described had a single-gender environment for learning, focused entirely on females.

The more recent Wilson et al. (2007) study looked at both MBA students and younger students. They found that self-efficacy, or self-confidence, was lacking when compared with male counterparts, similar to the Kourilsky & Walstad study. Importantly, they found that women were able to considerably further in this measure when experiencing MBA education on this topic.

My review of these studies suggests that there are two possible paths to facilitating the adoption of I&E tools and concepts by women. The first is to provide opportunities for women to teach each other and reinforce concepts together. This

could be in the form of informal study teams or a women's entrepreneurship society. There are some such measures underway at Oxford, and so there appears a real research basis to support such efforts.

Secondly, there may be ways in which I can help students in a mixed gender environment by being more attuned to possible unintentional bias. For example, if female students are less confident, then they are less likely to provide a voluntary answer to a case in class, from which they might benefit offering. I may have unintentional bias in dealing with female students: they don't seem to volunteer answers, so I do not include them, and so I think less of their abilities.

To counter this possibility, I could consider making it a goal to be more inclusive in reaching out to students during interactive classroom discussions. There is an important distinction between goal intentions and implementation intentions, as reviewed in a summary from the Oxford Learning Institute, drawing from Kandola 2009. In Table 14, I outline examples of a goal intention and an implementation intention. The first comes from the DipLATHE course, and the second is a possible means by which I could address gender issues in my teaching.

Table 14: Examples of goal intentions and implementation intentions

Goal intention	Implementation intention
"I will not be prejudiced"	"I will pause 15 seconds prior to making a hiring decision on a BME candidate"
"I will be gender neutral in my teaching"	"I will record the gender of each person I engaged in a case study, so I can be sure it represents the proportion in the class"

In advanced economies, women own 25% of businesses (Wilson et al. 2007) and deserve to benefit equally with men from an education in I&E. It will be

important to address possible biases in teaching I&E tools and concepts, and I can provide the following summary of my learning in this area.

Summary of main points:

- Women remain a minority in business education generally
- Women lack the same confidence in engaging with I&E topics but benefit greatly from education in this area
- Two possible solutions are proposed: 1. Women-focused support networks and 2. the use of implementation-intentions for participation in participatory teaching environments

5 Experimenting with teaching strategies for I&E courses

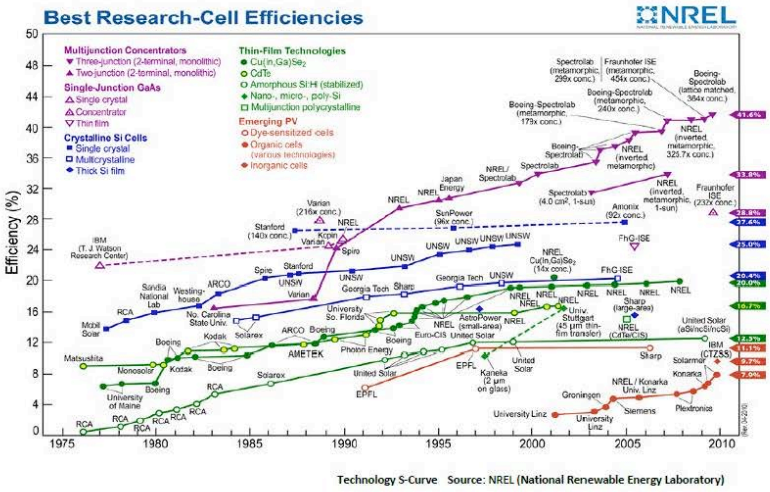
During the 2011-2012 academic year while the diploma course was running, I found that being a student in the course helped me to reflect on my own learning experience. One thing that I found very helpful was the use of in-class worksheets that allowed us to work with the concepts we were being introduced to. The worksheets allowed us to synthesize course concepts either individually or as part of a team, providing us with an artefact that we could then have as part of our learning material.

Worksheets provide a means to encourage more meaningful engagement with material, perhaps in some ways allowing some elements of the Kolb Learning Cycle (Kolb 1984), discussed next, to be attended to. The worksheets allowed in-class collaboration in small groups, promoting a type of learning dynamic often encouraged in business education (Lucas & Milford, 2009).

An example in-class worksheet is given in Figure 5. This sheet allowed teams of 4-5 students to work through the concept of the S-curve through three questions; by walking through the room I could see how well teams were progressing.

Technology S-Curve exercise

You are an entrepreneur seeking to bring to market a solar cell technology. Consider this data regarding Solar-Cell efficiencies from research labs through 2011. You do not yet have full cost data, but you are starting to assess options.



Q1: If you had access to one of the **Organic (Emerging PV)** cell technologies, what might your main priorities be as you develop your organization?

Q2: The main performance metric listed here is % efficiency. Even with no knowledge of the field, can you speculate on other technical performance metrics that might be interesting?

Q3: How could a discussion of these S-curves help your entrepreneurial team? How could it be used "incorrectly" and hinder you or others in this industry?

Figure 5: Example of an in-class worksheet introduced during the 2011-2012 teaching of Strategy & Innovation

A second more modest change to my teaching was to include learning objectives at the front of each class session. Learning objectives have been proposed as a means to ensure that students are aligned with faculty on the aims

and outcomes of a learning process (Biggs, 2002; Fry et al. 2009). I found that discussing learning objectives and asking students if they wished to suggest any further objectives, was very helpful in providing a positive teaching environment. I received feedback from at least some students that they found this improvement helpful. An example slide from Spring 2012 experiment is included as Figure 6.

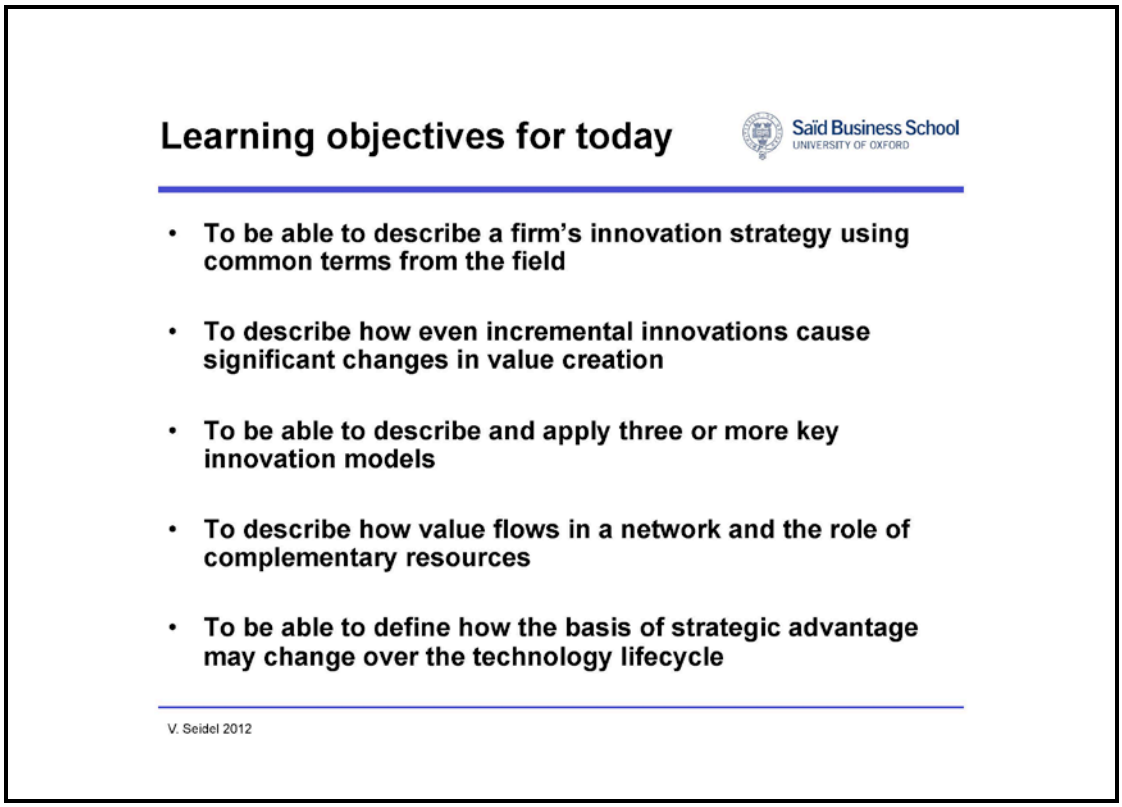


Figure 6: Example of including learning objectives at the start of class. From Spring 2012 lecture.

The experiments described were modest in scope but were very helpful in improving the teaching and learning environment. Coupled with experiments in feedback described previously, there were many ways in which the courses improved. However, there is still room to think about the curriculum more broadly and lessons from other institutions, themes which are taken up in the next sections.

6 The discipline of I&E teaching and approaches at other universities

In this section I review how the discipline of I&E teaching is conducted at some comparison universities, as ascertained through both site visits and through literature about such programmes. A common theme will be the use of experiential learning and reflection, and so I will preface this section with a consideration of the Kolb Learning Cycle.

6.1 Experiential learning: the Kolb Learning Cycle

The nature of I&E education, as with other vocational disciplines, lends itself to experiential learning approaches. Indeed, a traditional form of I&E teaching has centred around the development of a "business plan." As one entrepreneurship scholar has noted, "despite the ubiquity of business planning education in entrepreneurship, there is little evidence that planning leads to success." (Honig, 2004, p. 258). Instead of focusing on planning, there is increased interest in "doing."

A major theoretical treatment of such approaches is known as the Kolb Learning Cycle (Kolb 1984). As Fry and colleagues (2009, p. 15) summarize it, "Experiential learning is a continuous process and implies that we all bring to learning our own knowledge, ideas, beliefs and practices at different levels of elaboration that should in turn be amended or shaped by the experience—if we learn from it." There are four types of activities within a Kolb Learning Cycle, which I will outline below in Table 15, with possible areas of application for I&E:

Table 15: The four elements of a Kolb Learning Cycle with application to I&E

Cycle step	Description of step	Possible application to I&E
Concrete experience (CE)	Learners involved in new experiences	Team-based work on developing new innovations; with frustration along the way expected
Reflective observation (RO)	Time and space to reflect on experiences	Individual and group sessions to capture learning
Abstract conceptualization (AC)	Process experiences into new concepts	Facilitated discussion of principles involved in I&E
Active experimentation (AE)	Provide means for new problem-solving	Opportunity to prototype new approaches

In summary, the Kolb Learning Cycle can provide a means to promote four distinct activities in learning about I&E tools and concepts. Indeed, one theoretical treatment of entrepreneurial education argues for the importance of students confronting "critical events" in their learning that would only come about through struggle and occasional failure in an experiential context (Cope, 2005). I will next consider some models of I&E courses, all of which include an experiential component.

6.2 Field visits of experiential approaches at other universities

I was able to get some insight into some leading I&E programs through a visit to California in March 2012 as well as a post-visit briefing of a visit by business school colleagues who visited programs in August 2012. Furthermore, I visited two Boston-area programmes in September 2012. A summary of some of the elements of different programmes is given in Table 16.

Table 16: Overview of approaches in select California universities

University	**Elements focused on tools**	**Elements focused on concepts**	**Elements focused on experiential learning**
Stanford (d.school and engineering)	Well-described design methodology	Academic articles written on underlying concepts	Dedicated space for teams and projects; Reflection part of many courses
Berkeley (Lester Center for Entrepreneurship)	Software to support "Lean Launchpad" tools	7-stage "passport" for illustrating curriculum	Hackathons instead of mixers; course requires 10 customer interviews per week
Babson College	"Entrepreneurship of all Kinds" promotes tools across contexts	"Entrepreneurship Thought and Action" book and support materials	All students start company in first year and disband at end context
Harvard (i-Lab)	48-hour "Start-up Scramble" session for entrepreneurs to learn key tools	Long history of case studies on entrepreneurship	i-Lab has 700 events a year and open experimentation space

While this summary will by necessity be brief, the programmes are all seen as providing an interesting approach to I&E education, and each can be considered in terms of the way in which they address tools, concepts, and experiential learning. At Stanford, they have a very well-described methodology which helps students to learn the tools of needsfinding, brainstorming, and prototyping, and they can also convey conceptually why these work through academic engagement on this topic. Stanford, like the programmes at Berkeley and Harvard, have a dedicated space that enables teams to work with actual projects over an extended period of time.

The Berkeley Lester Centre had an interesting way to describe the broader curriculum to students, by developing an Entrepreneur's "Passport" that described different steps students could take on their route to learning I&E tools and concepts. In experiential learning, entrepreneurship educator Steve Blank has promoted a Lean Launchpad methodology backed by a software tool, and in experiential terms

has teams interview ten potential customers a week as a means to engage with practice and reflect on lessons from such conversations.

Babson College provides a set of concepts underpinning their approach to I&E education, providing a curriculum design, centred around a trade-marked "Entrepreneurial Thought and Action" approach that faculty were able to describe well. While Babson does not necessarily have a dedicated space for student projects, all students are required in their first year to form a company, for which they are given funds. Over the course of the year they try to make the company as successful as possible, and then in the end they disband the enterprise—a very novel approach to experiential learning.

6.3 Articles on experiential approaches at other universities

There have been academic articles written about various approaches to I&E education, and I summarize a few well-cited articles in Table 17.

Table 17: Overview of experiential I&E approaches in published articles

University	Authors of study	Elements focused on tools	Elements focused on concepts	Elements focused on experiential learning
Stanford and Michigan	*Lovejoy & Srinivasan (2002)*	Use of general purpose machine tools for prototyping Seven specific fault areas addressed	Five areas addressed, including broad marketing and design concepts	Faculty set the context (e.g. to develop a bike pump).
Minnesota	*Cordozo et al. (2002)*	Many specific 'deliverables' listed	Concepts focused on product development processes	Companies provide real design problems
Comparison of sixteen courses or programmes	Fixson (2009)	Several example topics listed	Focused on working in multidisciplinary teams	Almost all have a working prototype as a required outcome

What was interesting about the Lovejoy and Srinivasan (2002) approach at Stanford and Michigan was how they were able to tailor the development of the

course to the context. At both universities they have product prototyping facilities, and the course is designed around this capability but also mindful of the costs. The instructors estimate that the course costs about $400 per student in materials. The course does not involve sponsor firms to avoid coordination challenges. As the course is multidisciplinary, it also creates challenges for participating faculty. The authors expect that it takes about 50% more teaching time to run this course than other courses. The authors noted that while the course takes more time to teach, they have been able to collect some data on innovation processes from the students' participation in the class; some of this data has led to peer-reviewed research publications. They suggest that there are possible synergies between teaching I&E and being able to investigate I&E research questions.

The Minnesota study suggests that some of the drivers of a successful experiential course are multidisciplinary teams *and faculty*. They provide pitfalls to avoid, such as poor choice of projects lacking meaningful business and design components, lack of student commitment to a full year engagement, and dominance by one school or department. The focus on gathering a multidisciplinary set of faculty who like to work together is echoed in the Fixson (2009) article comparing multiple courses and programmes across 16 courses and programmes.

6.3.1 Summary of key practices and challenges

This section has allowed me to consider a range of experiential programmes that can further enhance a focus on tools and concepts. The use of high-order concepts was less in some programs than others, and it would appear that the

considered use of all three areas would address the range of student needs in this context. I will consider the design of a curriculum next, after summarizing the main ideas in this section:

- An Entrepreneurial "Passport", as at Berkeley, can serve as a model to show all the elements of an I&E curriculum to both students and faculty
- Lovejoy & Srinivasan (2002) proposes being very clear on course costs up-front: e.g. 50% more teaching required and $400 per student for materials
- Dedicated physical space such as in the d.school or i-Lab can facilitate practical aspects of the curriculum
- Courses in I&E can also provide opportunities to research I&E phenomena, making it less academically costly for faculty involved
- The most widely-known programmes match experiential learning with elements addressing tools and concepts

7 I&E course design: Proposal and continuous improvements

All of the above evaluations of research on learning and teaching point to the importance of all three dimensions of learning for a vocational programme such as for I&E. As I summarize in Table 18, the portfolio has developed three broad dimensions of learning as important, motivated by literature (as in Chapter 1 and 3) and evidence from interviews with students (as in Chapter 2).

Table 18: Evidence of importance of all three dimensions of I&E learning

Dimension	Evidence from general literature	Evidence from I&E literature	Evidence from interviews
1: "I&E Tools"	Bloom (1978) taxonomy includes both lower and higher-level	Hindle (2007) focus on specific practices important	Specific tools helpful: "S-curve of innovation [an important tool] has stayed with me"
2: "I&E Concepts"	Introduction to concepts can promote deeper understanding (Bloom 1978)	Hindle (2007) focus on teaching 'about' I&E concepts	Broader concepts recalled: "The TMO framework was interesting"
3: "I&E Engagement"	Kolb (1984) learning cycle appropriate	Cope (2005) focus on "critical events" in I&E	Student recalled how discussion among team members could lead to an 'ah-ha' moment

7.1 Proposed improvements: "The Three Dimensions of I&E Learning"

My proposed improvements for an Oxford curriculum on innovation & entrepreneurship is to ensure that we provide all three dimensions of I&E learning. It is too easy for a programme to address one or two of the elements well at the expense of a third. For example, some have criticized the Oxford MBA programme for having a complete I&E engagement dimension through business planning, but at the expense of a complete set of either I&E tools or I&E concepts. In converse, some programmes are rich in case studies of I&E concepts, but students come away

without any full engagement with the material through actually starting businesses or building product prototypes.

In Figure 7, I chart out how one might think about building "The Three Dimensions of I&E Learning" into a course curriculum.

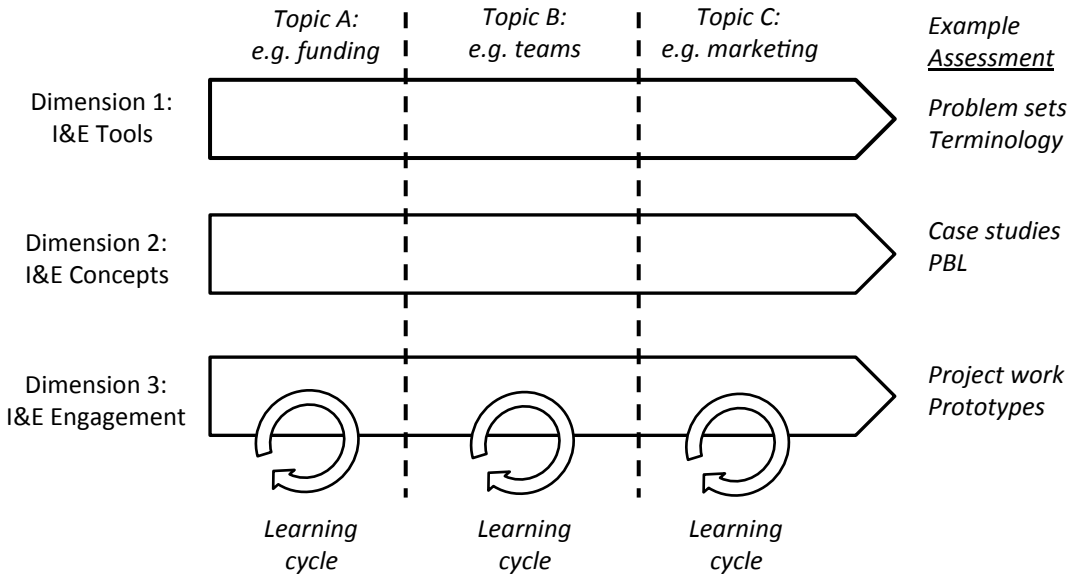


Figure 7: The three dimensions of I&E learning

In this model, each course within a curriculum should explicitly address all three levels of I&E learning: tools, concepts, and engagement. This is not to be overly prescriptive, as engagement with experiential learning can take many forms (project work, the building of prototypes, simulation). The third dimension should provide elements of a Kolb Learning Cycle that reinforce other learning on the dimensions of tools and concepts.

While in the illustration topics may seem to stand alone (e.g. funding, teams, and marketing), the intent of the dotted-line borders is that cross-disciplinary teaching can also be encouraged. Example forms of assessment appropriate to each

level are indicated, attempting to address the need for constructive alignment (Biggs 2002) among teaching activities, objectives, and assessment. Explicitly calling for addressing the three dimensions of I&E learning for each course would be a major step forward compared with usual approaches.

7.2 'Ready-Fire-Aim': Promoting continuous improvements

The following quote from the entrepreneurship education researcher Kevin Hindle speaks well to the need to continuously assess I&E curricula:

> *The particular mistake made in most of the current entrepreneurship education debate – experts talking about expertise – is that commentators often focus disproportionately and anachronistically upon one unit of analysis, the curriculum, as if it were a disembodied entity. But an academic curriculum (or a single course within it) is a dependent variable. Most importantly**, it depends on the combined interaction of the teacher, the students, and the environment** in which the transfer of information between them takes place. (Hindle 2007, p. 105, emphasis added)*

Indeed, it is helpful to consider how a "three dimensional" curriculum is not static but provides an organizing framework for faculty, students, and administrators to work with as they sort through the details of individual courses. Specific tools, concepts, and experiences can be mapped out as part of an entrepreneurial journey.

It would seem that a curriculum in I&E should apply best-practices in I&E itself. So often, it is all too easy for lecturers to fit within a comfort zone, and this can be true of entrepreneurship educators as much as others (Kuratko, 2005). Fullan and Scott (2009) describe a 'Ready, Fire, Aim' approach to course and curriculum development—a model completely consistent with an I&E perspective on prototyping and adjustment. Indeed, Knight (2001) suggests that a mistake can be

to overly rely on a rational approach to curriculum design—trying to arrange meetings that develop every last aspect of 'constructive alignment'—but instead it may be more productive to look at a process-model of curriculum development. Indeed, I believe the proposed general focus on "Three Dimensions of I&E Learning" provides guidance that is not overly "tightly coupled" (Knight 2001) and so can promote needed flexibility and experimentation, while also making sure all three types of engagement are catered to.

Fullan and Scott (2009, p. 75) outline the following guidance that will be important as part of leading changes in I&E curricula.

- Direction and engagement
- Capacity-building with a focus on results
- Supportive infrastructure and leadership
- Managing the distractors
- Continuous evaluation
- Inquiry and two-way communication

While not all of these can be dealt with in-depth, the list points to the need for top-to-bottom commitment within the organisation, something that is often difficult to develop. We can focus on continuous evaluation as one concrete element to manage, considering especially Ramsden's (1992) guidance on categories of questions in a course experience questionnaire.

The current approach is often to question students about how they 'rated' the teacher overall as a lecturer as well as how they rate the course organisation and delivery. Ramsden (1992, p. 104) suggests a five-level approach that helps to cover a

broader range of feedback on all three of Bigg's (2002) areas of constructive alignment. The five areas that are suggested be helpful to capture are listed in Table 19, along with the current situation with courses:

Table 19: Ramsden's (1992) Categories of course experience questionnaire

Category	Elaboration	Current situation; improvements
Good teaching	Teaching staff here normally give helpful feedback on how you are going	Covered currently; could be improved with this focus on quality of feedback
Clear goals	You usually have a clear idea of where you are going and what's expected of you in this course	Not included; would be helpful to adjust shared learning goals
Appropriate workload	The sheer volume of work to be got through in this course means that you can't comprehend it all thoroughly (negative scored)	Covered currently in number of hours; investigate this wording and value of negative scoring
Appropriate assessment	Staff here seem more interested in testing what we have memorized that what we have understood (negatively scored)	Not included; interesting means to evaluate surface vs. deep learning
Emphasis on independence	Students here are given a lot of choice in the work they have to do	Not included; interesting means to probe degree of experiential work

While students are the main stakeholders in higher-education, within perhaps I&E particularly there can be other stakeholders of interest that can help to enrich and develop I&E offerings. For example, given that many experiential aspects of I&E education may call on broader community members—such as business leaders serving as mentors or alumni offering project placements—it can be important to consider them and to measure their vision of a successful curriculum. For example, how many companies have been started? How many innovation have been patented? While beyond the focus of the current portfolio to develop criteria on all these levels, it is important to consider them in course and curricular design.

Hindle (2007, p. 119) provides a helpful representation of these stakeholders as existing around a curriculum, a modification of which is outlined in Figure 8.

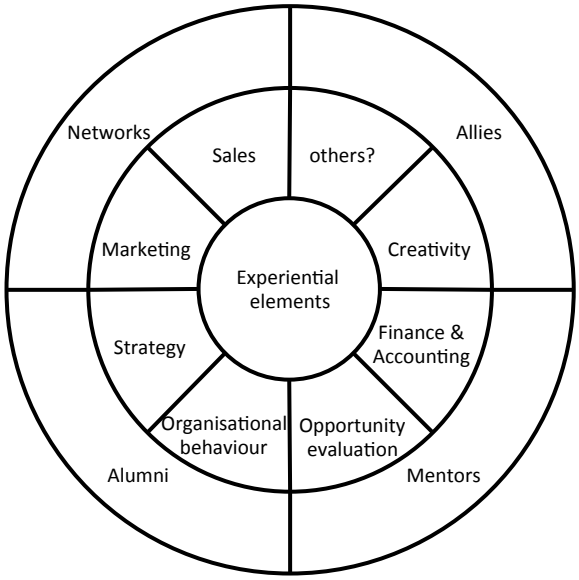


Figure 8: Wheel template for building an I&E curriculum to include additional stakeholders. Adopted from Hindle (2007)

In this template, experiential elements such as team-based activities are at the core, with supporting disciplines surrounding this activity, and supporting stakeholders also playing a role. Different authors would put different subjects as primary. For example, Fiet (2000) cites 18 syllabi as having the following as common: Strategy, Managing growth, Idea generation, Risk, Financing, and Creativity. While the modification of Hindle's (2007) template summarizes seven areas and keeps others in question, it does not attempt to provide a focus on levels of learning; instead, it can help us to ensure we are thinking of broader stakeholders when designing, measuring, and improving our curricula.

8 Conclusion

As was discussed in Chapter 1, the notion of I&E education is sometimes questioned at the core, along with the role of business schools within the university. Given the relative youth of business education, and with few teaching paradigms that are unquestioned, it is easy to question the validity of the enterprise. However, it is interesting to look back to the 1920s, when Whitehead noted:

> *The novelty of business schools must not be exaggerated. At no time have universities been restricted to pure abstract learning . . . There is however this novelty: the curriculum suitable for a business school, and the various modes of activity of such a school, are still in the experimental stage. Hence the peculiar importance of recurrence to general principles in connection with the moulding of these schools. (Whitehead, 1929 [1967], p. 92, as cited in Hindle 2007).*

Over seventy years later, business schools are still often seen as a novelty, and the curriculum is still undergoing experimentation. However, this continued experimentation can be seen as a strength. The small teaching and learning experiments reported in this portfolio are one step on the path to continuing to improve our delivery of I&E education, and thinking along the "Three Dimensions of I&E Learning" are a means of providing a focus on the links between abstract learning, general principles, specific tools, and experiential engagement. This portfolio hopes to reflect some modest contributions and ways forward for furthering our continued experimentation in the realm of I&E teaching and learning.

9 References

Biggs, J. B. 1989. Approaches to the enhancement of tertiary teaching. *Higher Education Research and Development*, Volume 8, pp. 7-25.

Biggs, J. 2003. *Teaching for Quality Learning at University*. Philadelphia: SRHE & Open University Press.

Biggs, J., D. Kember, and D. Y. P. Young. 2001. The revised two-factor Study Process Questionnaire: R-SPQ-2F. *British Journal of Educational Psychology,* Volume 71, pp. 133-149.

Biglan, A. 1973. The characteristics of subject matter in different academic areas. *Journal of Applied Psychology* 57 (3), pp. 195-203.

Cope, J. 2005. Toward a dynamic learning perspective of entrepreneurship. *Entrepreneurship Theory & Practice,* Volume 29 (4), pp. 373-397.

Cordozo, R. N., W. K. Durfee, A. Ardichvili, C. Adams, A. G. Erdman, M. Hoey, P. A. Iaizzo, D. N. Mallick, A. Bar-Cohen, R. Beachy, and A. Johnson. 2002. Experiential education in new product design and business development. *Journal of Product Innovation Management.* Volume 19, pp. 4-17.

Doran, G. T. 1981. There's a S.M.A.R.T. way to write management's goals and objectives. Management Review, Volume 70 (11), pp. 35-36.

Eisner, E. W. 1978. *The educational imagination: On the design and evaluation of school programs.* New York: Macmillan.

Fiet, J. O. 2000. The theoretical side of teaching entrepreneurship. *Journal of Business Venturing*, Volume 16(1), pp. 1-24.

Fixson, S. K. 2009. Teaching innovation through interdisciplinary courses and programs in product design and development: An analysis at sixteen U.S. schools. *Creativity and Innovation Management,* Volume 18(3), pp. 199-208.

Fry, H., S. Ketteridge, and S. Marshall. 2009. *A handbook for teaching and learning in higher education: Enhancing academic practice*. Third ed. New York: Routledge.

Fullan, M. and G. Scott. 2009. Making it happen. Building quality and capacity. In *Turnaround leadership for higher education*. San Francisco: Jossey Bass. Chapter 4, pp. 73-96

Hafferty, F. W., and R. Franks. 1994. The hidden curriculum, ethics teaching, and the structure of medical education. *Academic Medicine* 69 (11), pp. 861-871.

Henry, C., F. Hill and C. Leitch. 2005. Entrepreneurship education and training: Can entrepreneurship be taught? Part II. *Education & Training*, Volume 47 (3), pp. 158-169.

Hindle, K. 2007. Teaching entrepreneurship at university: From the wrong building to the right philosophy. In A. Fayolle (Editor) *Handbook of Research in Entrepreneurship Education*, Cheltenham: Edward Elgar, pp. 104-126.

Honig, B. 2004. Entrepreneurship education: Toward a model of contingency-based business planning. *Academy of Management Learning and Education* Volume 3 (3), pp. 258-273.

Kandola, B. 2009. *The value of difference: Eliminating bias in organisations*. Oxford: Pearn Kandola Publishing

Katz, J. A. 2003. The chronology and intellectual trajectory of American entrepreneurship education 1876-1999. *Journal of Business Venturing*, Volume 18, pp. 283-300.

Knight, P. T. 2001. Complexity and curriculum: A process approach to curriculum-making. *Teaching in higher education,* Volume 6 (3): pp 369-381.

Kolb, D. A. 1984. *Experiential Learning*, Englewood Cliffs, NJ: Prentice-Hall.

Kourilsky, M. L. and W. B. Walstad. 1998. Entrepreneurship and female youth: Knowledge, attitudes, gender differences, and educational practices. *Journal of Business Venturing,* Volume 13, pp. 77-88.

Kurathko, D. F. 2005. The emergence of entrepreneurship education: Development, trends, and challenges. *Entrepreneurship Theory & Practice*, Volume 29 (5), pp. 577-597.

Lovejoy, W. S. and V. Srinivasan. 2002. Ten years of experience teaching a multi-disciplinary product development course. *Journal of Product Innovation Management* Volume 19, pp. 32-45.

Lucas, U. and P. Milford. 2009. Key aspects of teaching and learning in accounting, business, and management, Ch. 24 in Fry, H., S. Ketteridge, and S. Marshall. (Eds.) *A handbook for teaching and learning in higher education: Enhancing academic practice*. Third ed. New York: Routledge.

Marton, F. , and R. Saljo. 1976. On qualitative differences in learning. *British Journal of Educational Psychology,* Volume 46, pp. 4-11.

Prosser, M., and K. Trigwell. 1999. Students' Approaches to Learning, Chapter 5 in Prosser and Trigwell, *Understanding Learning and Teaching: The Experience in Higher Education,* Buckingham: SRHE and Open University Press.

Ramsden, P. 1991. A performance indicator of teaching quality in higher education: The Course Experience Questionnaire. *Studies in Higher Education*, Volume 16 (2), pp. 129-150.

Ramsden, P. 1992. *Learning to teach in higher education*. London: Routledge.

Snyder, B. 1973. *The hidden curriculum*. Cambridge: MIT Press.

Whitehead, A. N. 1929 (Reprinted 1967). *The Aims of Education and Other Essays*. New York: The Free Press.

Wilson, F., J. Kickul, and D. Marlino. 2007. Gender, entrepreneurial self-efficacy, and entrepreneurial career intentions: Implications for entrepreneurship education. *Entrepreneurship Theory & Practice,* Volume 31(3), pp. 387-406.

10 Appendices

APPENDIX A: Interview Protocol for Exploring Deep and Surface Learning Approaches in Medical and Management Students

Explanation to Participating Students In Advance of Participation

"We are conducting this research in order to better understand how students learn at the University of Oxford. This research is not part of your present course and you can choose whether or not you would like to take part. Your decision whether to participate or not will not affect your relationship with your tutor or the mark you receive in your course.

We will ask you to complete a short written questionnaire and discuss how you prepare for exams.

The interview will be recorded although your answers will be completely anonymous. It is important for you to note that there are no right or wrong answers."

In preparation for the interview, we would be most grateful if you could take time to think of two occasions when you studied for an examination but used a different approach to prepare for each exam. We will discuss the approaches you used at the interview.

The Assessment

Part I: Approach to a recent exam

The student will be asked to: "Recall an exam you recently studied for."

The student will be asked to complete the SPQ with regard to their preparation for this exam (see appendix).

The student will then be asked;

- What was the nature of the exam (e.g. multiple choice, essay, viva)
- How did you prepare for this exam? Why did you choose this approach?

Possible prompts:

1. How much did the following influence your approach to learning: workload, quality of teaching, the nature of the exam and importance of the topic?
2. Did you concentrate only on what was required to pass the exam?
3. What course resources did you consult whist preparing for the exam? Why? What else did you used? (e.g. lecture notes, course handbook, reading materials, course curriculum?

4. How clearly did you understand what was expected of you in the examination?
5. How well did you feel you understood the topic?
6. How much time in advance of the exam did you start studying?
7. What do you feel the exam was testing? (Factual recall or understanding?)
8. Do you think the exam / assessment was fair or appropriate? What do you understand by this?
9. Did you prepare alone or with other students?
10. How effective did you think your exam preparation was?
11. In retrospect, would you have done anything differently?

Part II: Alternative approach

The student will be asked; "Recall a time you prepared for an exam in a very different way."

The student will be asked to complete the R-SPQ-2F with regard to their preparation for this exam (see appendix).

The student will then be asked to discuss;

- What was the nature of the exam (e.g. multiple choice, essay, viva)
- How did you prepare for this exam? Why did you choose this approach?
- How did this approach differ from your preparation for the previous exam?

Possible prompts (as above)

Part III: Discussion of changes in approach and awareness

The student and interviewer will discuss the results of the R-SPQ-2F for each exam. If different learning approaches have been identified the students' awareness of these approaches will be explored.

Possible Prompts:

- How do you think your approach to exam preparation varied between the two examples?
- What do you think affects your decision to alter your approach to study and why?
- Were you aware that you use different approaches to studying?
- Do you consciously tailor your study approach to the situation?
- What do you think determines which study approach you choose?

Part IV: Learning when you are not assessed

The student will then be asked to "Recall something you needed to learn that was not directly examined (ex: reading around case on a ward round / learning how to prepare for a consultancy interview)."

The student will then be asked to discuss;

- What was the learning task?
- How did you approach this learning tast?
- Why did you choose this approach?
- How did this approach differ from your preparation for the previous exams?

APPENDIX B: Revised Two Factor Study Process Questionnaire (Biggs et al. 2001).

NB minor changes have been made to the wording of the original R-SPQ-2F to make it applicable to this setting.

This questionnaire has a number of questions about your attitudes towards your studies and your usual way of studying. There is no right way of studying. It depends on what suits you own style and the course you are studying. It is accordingly important that you answer each question as honestly as you can.

Think about an exam you recently prepared for and answer these questions with this particular study in mind.

A – this item was *never* or only *rarely true*
B – this item was *sometimes true*
C - this item was *true about half the time*
D – this item was *frequently true*
E – this item was *always* or *almost always true*

1. I found that at times studying gave me a feeling of deep personal satisfaction.

2. I found that I had to do enough work on a topic so I could form my own conclusions before I was satisfied.

3. My aim was to pass the exam whilst doing as little work as possible.

4. I only studied seriously what was given out in class or in the course outlines.

5. I felt that virtually any topic could be highly interesting once I got into it.

6. I found most new topics interesting and often spent extra time trying to obtain more information about them.

7. I did not find the course very interesting so I kept my work to the minimum.

8. I learnt some things by rote, going over and over them until I knew them by heart even if I did not understand them.

9. I found that studying academic topics could at times be as exciting as a good novel or movie.

10. I tested myself on important topics until I understood them completely.

11. I found I could get by in the exam by memorizing key sections rather than trying to understand them.

12. I generally restricted my study to what was specifically set as I thought it was unnecessary to do anything extra.

13. I worked hard at my studies because I found the material interesting.

14. I spent a lot of my free time finding out more about interesting topics which had been discussed in different classes.

15. I found it was not helpful to study topics in depth. It confused and wasted time, when all you need was a passing acquaintance with topics.

16. I believed that lecturers shouldn't expect students to spend significant amounts of time studying material everyone knew wouldn't be examined.

17. I came to most classes with questions in mind that I wanted answering.

18. I made a point of looking at most of the suggesting readings.

19. I saw no point in learning material which was not likely to be in the examination.

20. I found the best way to pass the examination was to try and remember answers to likely questions.

<u>The responses to items are scored as follows;</u>
A=1, B=2, C=3, D=4, E=5

<u>To obtain main scale scores add item scores as follows;</u>
Deep Learning Approach: DA=1+2+5+6+9+10+13+14+17+18
Surface Learning Approach: SA=3+4+7+8+11+12+15+16+19+20

<u>Subscale scores can be calculated as follows;</u>
Evidence of Deep Learning Motives: DM=1+5+9+13+17
Evidence of Deep Learning Strategies: DS=2+6+10+14+18
Evidence of Surface Learning Motives: SM=3+7+11+15+19
Evidence of Surface Learning Strategies: SS=4+8+12+26+20