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Entrepreneurship: nurturing the personal journey

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BACKGROUND

In 2010, it was decided to introduce an Engineering Entrepreneurship subject at the University of Melbourne. The opportunity existed to build on an already successful Entrepreneurship subject in the MBA at the Melbourne Business School (WBS). This paper reports the structure of the subject, its student-centred teaching methods and the subsequent student responses, which were very favourable.

PURPOSE

Companies are increasingly looking for employees who are capable of innovating in the workplace. Various reviews of engineering education have identified an entrepreneurial approach as an area for improvement in engineering graduates. With this in mind, this new subject in Engineering Entrepreneurship was planned for introduction in second semester, 2011 at final year level (either BEng or MEng). It expands traditional engineering design thinking from designing a product to designing a business. There was, however, some uncertainty about how the engineering students would engage with this non-traditional offering, which would require students to do quite a lot of work in their own time and would stretch their personal boundaries further than they had before.

DESIGN/METHOD

The content of the subject mirrors the one taught at the MBS, with the learning objectives to develop the theoretical frameworks and concepts, identify the characteristics of entrepreneurial people, use various techniques for creating business opportunities, prepare and present a business plan for a new venture, discuss the sources of finance for new ventures and describe how to work on the business and not just in the business and thus become value creators.

A key part of the teaching method is a *student-centred approach*. Each week, students were required to read some selected materials and *relate the reading to their own purpose as entrepreneurs*. Several entrepreneurs also presented as guests and role models through the semester. The subject was very participative, with each student being part of a small team developing a business proposition. The final presentation was a pitch to fund the start-up organisation.

RESULTS

Results are available in two forms. Firstly, there is a wealth of student feedback that shows that the 30 students were extremely engaged in the semester's work. This was mainly because there were already some business proposals ready to be launched and they wanted mentorship to further develop the nascent businesses. Student evaluations ranked the subject second out of all the subjects taught in the School of Engineering.

Secondly, a tangible outcome is business ventures already underway. One example is UniSquare, which is a portal to provide student services to university students. Such services include banking, housing, entertainment, employment, etc. The UniSquare team has already enlisted some major corporate sponsors, such as NAB, and are intending roll-out to other university campuses this year. UniSquare just won $20,000 from the Melbourne Accelerator Program competition from 65 entrants.

CONCLUSIONS

Engineering Entrepreneurship has proved to be a very successful subject offering in terms of both student satisfaction and also business proposals launched. This is due, in no small part, to the student-centred and human-centred pedagogical approach used by the course facilitators. These teaching approaches will be explained in the paper.

KEYWORDS

Entrepreneurship, student-centred pedagogy, professional skills, graduate attributes

BACKGROUND

In 2010, it was decided to introduce an Engineering Entrepreneurship course (subject/unit/module) at the University of Melbourne in response to industry feedback. Fortunately, a highly successful Entrepreneurship subject was already being taught in the Master of Business Administration (MBA) at the Melbourne Business School (MBS) where a closer relationship with the School of Engineering was seen as highly beneficial to the MBA students, largely because many new enterprises are built upon technical innovations.

This paper reports the structure and teaching methods of the subject. The primary focus is to explore the student-centred teaching methods and the subsequent student responses, which were very favourable. At least one start-up company has formed as a result of the course.

The paper is not intended to be a formal act of engineering education research. Teaching the subject was an act of proof of concept. How would engineering entrepreneurship work? Would the same teaching methods work? In the final analysis, there was clearly high engagement from the students as measured in the standard Quality of Teaching surveys and by the production of at least one viable enterprise. More detailed research will follow.

PURPOSE

Companies are increasingly looking for employees who are capable of innovating in the workplace (King, 2008). Various reviews of engineering education have identified an entrepreneurial approach as an area for improvement in engineering graduates (Royal Academy of Engineering, 2007). With this in mind, this new subject in Engineering Entrepreneurship was planned for introduction in second semester, 2011 at final year level (either BEng or MEng). It expands traditional engineering design thinking from designing a product to designing a business.

The existing MBA course in Entrepreneurship has run for several years with excellent student satisfaction. Each year, several students would write that it was the best course they took in the MBA. The course has led to several start-ups being formed. What was unknown was whether the same student-centred approach would work for mostly 22 year old engineers in the same way that it works for 30 year old MBA students.

We took an informal design-based research approach (EduTech Wiki contributors, 2012), which is not unlike what we were asking the students to attempt. That is, the concept (this new subject) must be tested by building and running the enterprise in order to achieve customer satisfaction.

The purpose of this paper is to describe how to approach such an unusual offering, one that requires substantial personal commitment and transformation from both lecturer and student.

METHOD – THE COURSE STRUCTURE

The content of the subject mirrors the one taught at the MBS, with the following learning objectives (The University of Melbourne, 2012):

- Describe and discuss the theoretical frameworks and concepts that have been developed to explain entrepreneurial behaviour
- Identify the characteristics of entrepreneurial people who operate in small and large organisations
- Use various techniques for creating business opportunities
- Prepare and present a business plan for a new venture
- Discuss the sources of finance for new ventures and the ways financiers and large corporations evaluate business plans and proposals for new ventures and be able to sell the business concept to potential funding sources
- Describe how to work on the business and not just in the business and thus become value creators

Assessment is made up of (The University of Melbourne, 2012):

- Research essay (20%; 2,000 words; week 5; individual)
- Business plan (60%; 5,000 words; week 12; group)
- Participation and learning journal (20%; 2,000 words; week 12; individual).

The "business plan" is not a typical plan. The first half of the plan documents the journey of *discovery* that the students took to find a sustainable, scalable business model. The (Osterwalder and Pigneur, 2010) model is used for this purpose. The remaining plan builds on the model in the traditional fashion and has *execution* as its focus.

A key part of the teaching method is a student-centred approach. Each week, students are required to read some selected materials and *relate the reading to their own purpose as entrepreneurs*. Several entrepreneurs also present as guests and role models throughout the semester. The subject is very participative, with each student being part of a small team developing a business model to form the basis of a subsequent execution plan. The final presentation is a pitch to fund the start-up organisation.

Entrepreneurship encompasses the overlap between *economic opportunity* and the *personal journey* of the entrepreneur, which leads to personal and professional (and sometimes financial) growth. We want students to see entrepreneurship as *design in action*. In this subject, they are designing a business, not necessarily a physical artefact, with which most engineers are most comfortable.

Student-centred

The philosophy of learning is unashamedly student-centred. The subject focuses on helping the student connect their entrepreneurial activity with their own life's purpose and career direction. For many students, this was a revelation. The course opened their eyes to a new way of being with engineering – designing real world business models as opposed to solving other people's technical problems at the product or system level.

Irvin Yalom's four existential challenges are a part of the mix (Yalom, 1980; Wikipedia, 2012): we are all faced with our own mortality, isolation, meaninglessness of life, and freedom/responsibility. Life is what we make of it. Consequently, students are encouraged to write their own story during the semester. For many students, this is the first time that anyone has asked them to do this; through the vehicle of entrepreneurship, they are asked to design and build the life that they feel passionate about.

In a course, like this, that focuses so strongly on personal meaning, and which encourages students to be vulnerable by sharing their emergent ideas, meaningful *feedback* (from the teacher and, respectfully from other students) is essential. Constructive personal feedback will ideally reflect a growing understanding of the person and their journey. Such feedback typically displays sensitivity without compromising integrity – i.e. keep it real but respectful.

For this approach to work students need to take active responsibility for their learning. They are introduced to the drama triangle (Karpman, 1968) in lecture one to clarify that they own the responsibility for success and failure. Failure is introduced as merely an indication that the student's mental model is in need of upgrading.

Pedagogy – key ideas

1. Pre-reading is important (essential). Connect the reading to *your* purpose.
2. Weekly feedback establishes that teachers *care*. Examples are given later.
3. Students learn to teach (and learn from) each other by learning to accept feedback
4. They care for each other by providing feedback to each other
5. Appreciative inquiry encourages learning from success (explained below)
6. Start where the students are at, which links to Vygotsky's Zone of Proximal Development (McLeod, 2007) and *the adjacent possible* (Johnson, 2010), explained below.

7. Build trust for the many leaps, including risk of a perception of personal failure. Test, test, test!

Appreciative Inquiry

The following description of Appreciative Inquiry shows clearly why it is so appropriate in teaching entrepreneurship. It is a positive approach where students focus on their strengths rather than weaknesses, which is not to say that they will not need to confront their weaknesses. It focuses on building capacity through teamwork and collaboration.

> *Appreciative Inquiry (AI) is the name given to a strengths-based methodology or positive approach to change and improvement.*
>
> *The approach is consciously a positive search for what is working well, the successes and high points of experience and service together with an analysis of or understanding of the "root causes of success". Literally, it is asking questions about what we value or appreciate in order to "improve" and to build on what we have discovered.*
>
> *It's all about building strategic capacity and performance improvement. As it is a collaborative process it strengthens and develops teamwork and assists with getting people reconnected to their organisation.*
>
> *When people experience positive emotions, as they do whilst exploring strengths and the "good stuff" inherent in the AI approach, their "thought/action repertoire" expands. That is to say people and especially teams working together become generative.*
>
> *Organisations decide to employ the AI approach because of its catalytic-like property in generating change and innovation. (Australian Appreciative Inquiry Network, 2012)*

The Adjacent Possible

Each student in the class is at a different starting point, with different possibilities available to them during the semester (and, indeed, in their lifetimes). Any learning event can only take students a small distance from their current knowledge situation. Vygotsky called this the Zone of Proximal Development (McLeod, 2007): a teacher assists the student to move their knowledge from their current state to a new, advanced state, which explains why it is important for teachers to start where the learner is (and to understand where the learner is).

Another term used for this idea is the *adjacent possible*, which has been popularised by Johnson (2010). He lists seven opportunities for innovation: the adjacent possible, liquid networks, the slow hunch, serendipity, error, exaptation, and platforms.

The adjacent possible is the idea that every reality contains the scope for new possibilities, which are not infinite. The term seems to have been used originally by Stuart Kauffman (Brockman and Weinberger, 2003) who described four general theories for understanding the universe, one of which is the adjacent possible, i.e., that the universe can only evolve in a particular way at any given moment – the seed for the future is contained in the present. This is a concept that we take for granted, but often forget, particularly in learning situations.

Before the semester begins

Prior to lecture one, a letter is sent to all students to prompt their preparation for the first day of class. This is not on the LMS but addressed personally to each student. They are free to reply by email or phone directly to the lecturer. This sets the stage of expectations. The letter was designed, in part, to dissuade those who were not suited to the course to re-think before the semester begins. It had a paradoxical effect. Students had never received such a letter and word went around that this was a course worth doing; it was different. Student numbers almost tripled and engagement from lecture one was exceptional. This letter is reproduced below:

Email to students prior to lecture one

Good morning. I am writing to you because you have enrolled in the Engineering Entrepreneurship course at Melbourne University starting on … – congratulations on your choice!

This document contains very important information that you ***need to have read*** (and digested and acted upon!) by *a month before semester starts*, preferably sooner. I have highlighted in yellow some of the key points to speed your initial review of the document.

On this course you will develop an idea for a start-up business. Simple. The journey is probably very different from any other course you have done at Melbourne University. You need to understand what is expected of you!

Firstly, ideas. You need to come to class with at least one initial idea for a business (that you will further develop during the course). More precisely you need to come to class with a problem that in your experience, many people have and that you believe you can solve with a new business (not necessarily a product). Really good problems are a foundation for really good businesses. You should have a great understanding of the problem; ideally it should be one that you have personally encountered. See the "great problem checklist" at the end of this email.

Secondly, if you would like to attend a pre-course seminar on "finding great problems" then please email me. June is the most likely time for such a seminar and it will be run based on demand.

Thirdly, this course includes both practice and theory. You will need to read/view and learn (we use lots of video) the theory before the lecture as it will not be taught during the lecture. The lecture will be used to embed the theory in your real world business development. I expect that many of you will start new businesses as a result of the course. We will have guest speakers during the course that started their own business as a result of the course.

Fourthly, you must have easy access to the six books listed below from day one of the course; ideally you will own a copy of each. In fact I strongly suggest that you read the first three chapters of each of the six books before July 23rd. This cannot be done at the last minute!

In every case other than Timmons and Spinelli I am happy for a newer edition to be used.

1. Timmons J & Spinelli S, *New Venture Creation; Entrepreneurship in the 21st Century,* 8th Edition 2009, McGraw-Hill Irwin, N.Y.
2. Osterwalder & Pigneur, 2010, Business Model Generation, ISBN 9780470876411 Wiley
3. Chris Anderson, Free, the future of a radical price. 2009 ISBN 9781401322908 Hyperion
4. Eric Ries, The Lean Startup, 2011, ISBN 978 0 307 88789 4 Crown Business
5. Tim Brown, Change by Design, 2009, ISBN 978 0 06 176608 4 Harper
6. Steve Blank, The Startup Owner's Manual, 2012, ISBN 13 978 0 9849993 0 9 K&S Ranch Inc.

So to summarise:

1. The goal of the course is to experience founding a venture
2. The course is not conventional
3. You need the books; they must be read
4. You need to learn the material before each lecture
5. The lecture is used to apply what you have learnt
6. The course is collaborative, you will learn from your colleagues
7. Entrepreneurship is full of uncertainty, the course mimics this
8. You will need to do a lot of work outside the course, most students do 10-15 hours a week beyond the lectures

I have set out my philosophies of learning below. Please reflect on them and decide if the course is for you.

Looking forward to meeting you,

Best regards David

Weekly structure of the learning program

Each class is 3 hours and most classes include guest speakers who have started their own businesses (and are often still in the process of getting their businesses off the ground). These speakers provide:

- Connection with reality
- Respect (worthy of real people)
- Multiple perspectives
- Material to apply theory
- Some similarity to the students in terms of age, life experience, etc

In starting a business, and listening to the speakers' stories, students realise that they must:

- Talk to potential customers
- Engage all of themselves and have passion to succeed!
- Build prototypes and test, test, test!

Feedback

Feedback is critical to student success. In the first four weeks, the course coordinators role model thorough feedback (see examples later) with the intention of students learning how to give feedback to others in the class.

The weekly written feedback provided in response to student reflections changes at week four. At this time each student is required to find two class colleagues to provide this feedback and in turn must provide feedback to two other students. This gives the students independence from the lecturer's input and thus a sense of empowerment after the course ends. The guidelines provided to students are set out below.

Advice for students

This course is an opportunity to try new ways of learning and thinking, perhaps even a new way of being. You may find it rewarding to try on new intellectual ideas presented by others. This is akin to descending below the "grey line" of Otto Scharmer's U curve which we met in lecture two (Scharmer, 2007).

The Agreement

In agreeing to provide or receive feedback, an agreement is implicit; making this agreement explicit can be helpful. The agreement you form between yourselves is up to you. Here is an example of one that may be useful to consider:

As provider of feedback I agree to:

- Respond to your reflections in writing by Friday at 6pm each week;
- Take the time to consider your reflections and provide thoughtful feedback and suggestions;
- Keep our exchange confidential (apart from copying the lecturer);
- Strive to provide honest and insightful feedback that can be actioned;
- Consider both the domain of the specific topic (e.g. strategy) and your own learning journey (e.g. dealing with uncertainty and personal sense of risk);
- Remain aware of your unfolding journey in what I say, seeking to invite you to move to the next most useful place.

As a recipient of feedback I agree to:

- Read what you say with an open mind, especially when what you say does not align with my current model of the world;
- Give your suggestions a genuine try (perhaps like trying on clothes to see how they feel over time) or let you know that I feel unable to do so and why;
- Retain my sense of humour!
- Thank you for your effort.

Mindset

Here are some suggestions as to the mindset that you may find constructive in providing feedback:

- You are providing feedback in the service of the learning of others;
- Relationships can be fragile; tread lightly but communicate with care and clarity;
- Facts, unlike relationships, can be corrected quite easily;
- Encouragement and invitation can often be more powerful than blunt direction;
- Some feedback can be factual; some can point to a systemic flaw in thinking. The latter, if accepted by the recipient, can be life changing.

Learning Domains

Your feedback, in the context of entrepreneurship, is likely to focus on six learning domains. Each one benefits from a particular style of feedback. The style you choose will influence the propensity of the recipient to hear your message.

- Knowledge
- Skills
- Attitudes
- Beliefs
- Relationships
- Resources

Developing finesse in providing caring feedback is a skill with which you can serve others in many contexts. Like most skills, practice provides progress. Have fun.

Example of feedback from the lecturer

Two emails to Jane, who has studied music:

Hi Jane,

Thank you for your lively reflections. They illustrate some wonderful principles and it was very pleasing to see the deft way you connected both design thinking and "being wrong" with these personal experiences. I am sure the class has much to learn from your personal experiences, which I hope you will share.

This early part of the course is very intense, unreasonably so, unreasonable in the sense that the entrepreneurial journey is unreasonable. During this phase of the course it is vital that you master the concepts, tools, ways of thinking and models. This might be analogous to the practicing in music of fingering, scales, arpeggios, sight-reading etc. Only then can full expression have a chance to emerge. I encourage you to read/view widely from the recommended pre-reading/viewing and integrate this into your thinking in much the way you have in your current reflections. Given your style it may even be good to work in a group on this challenge so as to bring in diverse viewpoints.

I would be particularly interested to hear your views on what both xxxxxxxx had to say in the video as well as Dr xxxxxxxx who both talk about the sources of our motivation.

Looking forward to seeing you Wednesday.

Kind regards David

Good morning Jane,

What a pleasure it was to read your insightful reflections today. You have expressed your learning with great elegance and simplicity. Thank you.

Part of me is tempted to elaborate on what you have said but I shall refrain as you have done such a fine job. Please think of the brevity of my reply as a compliment.

Looking forward to your next reflections and to catching up in class,

Kind regards David

Grand finale

The students all do a formal presentation of their business to the class and invited investors in their last lecture. Few have ever had to present in this way. Every team member must be part of the presentation; they cannot elect a spokesperson. Knowing that they must do this is a surprisingly powerful motivator to overcome the fear of presenting. The presentations are all recorded and each year students see past presentations. This sets expectations as well as providing practical experience in what works well in a presentation. Students become their own harshest critics.

RESULTS

Results are available in several forms. Firstly, there is a wealth of student feedback that shows that the 30 students were extremely engaged in the semester's work. In fact, their first comment at the end of the semester was *when do we get to do Engineering Entrepreneurship 2?* This was mainly because there were already some business proposals ready to be launched and they wanted mentorship to further develop the nascent businesses. Student evaluations ranked the subject second out of all the subjects taught in the School of Engineering by overall satisfaction, using the standard Quality of Teaching measures at the University.

Summarising the written student comments about the best aspects of the course (from those Quality of Teaching surveys) provided these six categories of comments:

Category	Comments
Loved it!	Awesome; Very interesting; Enjoyed every second; Loved it
Different!	Complete different concept; whole new environment; different from common engineering subjects; more deep and meaningful subject
Practical	Use in my future; useful and productive for me; real life situations; hands on; Quality materials
Stimulating	Extremely intellectually stimulating; made us think, analyse, reflect; kept my mind working hard; plenty to think about and plenty to grow on; Pushed to a high level
Teachers	Great lecturers; great mentors; two great gurus; many aspiring speakers
Me	Discover who you really are; will influence paths I choose to take later on

Interestingly, there were 16 personal pronouns (I, we, us, you) out of 9 responses. Only two entries were expressed impersonally. It would seem that this course affected students quite personally.

Some quotations from students included:

> *"I learned that the entrepreneurial journey consists of the passionate pursuit of ideas and opportunities, the relentless and sometimes brutal assessment of ideas and the audacity to stomach the risks, uncertainties, ambiguity and failures along the way"*
>
> *"Be open to new ideas and embrace collaborative learning"*
>
> *"Failure is not bad, it is just a step forward in our career"*
>
> *"The relationships I have formed in this class I will keep forever"*
>
> *"Entrepreneurship is as much about you as anything else"*
>
> *"I learned more things in this class than I had hoped or imagined. I have found my passion"*

Secondly, a tangible outcome is business ventures already underway. One example is UniSquare, which is a portal to provide student services to university students. Such services include banking, housing, entertainment, employment, etc. The UniSquare team has already enlisted some major corporate sponsors, such as NAB, and are intending roll-out to other

university campuses this year. UniSquare just won $20,000 from the Melbourne Accelerator Program competition from 65 entrants.

In terms of how the subject could be improved, the main issues were to:

- Reduce the amount of pre-reading and video watching (in hand for 2013) and perhaps cover more of the theory in class
- Structure the key points each week more clearly, eg through a short summary
- Help students to understand the subject demands before the start of semester (which is addressed by the letter described above)

CONCLUSIONS

Engineering Entrepreneurship has proved to be a very successful subject offering in terms of both student satisfaction and also business proposals launched. Enrolments for 2012 were almost twice what they were in 2011. This is due, in no small part, to the student-centred and human-centred pedagogical approach used by the course facilitators and described above. The key concepts include detailed personal feedback for the first four weeks, supported by peer feedback for the remaining weeks, an appreciative inquiry approach, which encourages students to learn from success, and a willingness and enthusiasm to treat each student's journey as unique and to encourage them to do likewise. Now we know that there is a role for entrepreneurship in the engineering curriculum at the University of Melbourne.

The paper has focused on the methodology of the teaching of entrepreneurship and whether or not this would work with a final year engineering cohort. It demonstrated that the methods used for mature MBA students also work with less mature engineering students, who were, interestingly enough, more enthusiastic to engage despite their lower starting knowledge base.

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