

STEPPING BACK TO LOOK INSIDE THE ENTANGLED BANK

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ABSTRACT

The development of curriculum to facilitate the development of graduate entrepreneurship is a challenging task. That we can help graduate students become entrepreneurs is a frequently challenged assumption. To make matters worse there is little consensus as to how entrepreneurship education should be delivered. This paper argues that our focus should be first and foremost on the processes associated with entrepreneurship curriculum. With reference to a recent study of graduate entrepreneurship, major concerns related to developing entrepreneurship curriculum are tackled through consideration of specific educational literature. Using an evolutionary perspective, this paper provides evidence of how entrepreneurship curriculum can be developed to also account for the diversity of student abilities and the general ambiguity of the subject matter itself. In doing so, it is suggested that the designers of contemporary entrepreneurship curriculum will themselves be entrepreneurs. That the development of entrepreneurship curriculum is an evolving process without a starting or ending point.

INTRODUCTION

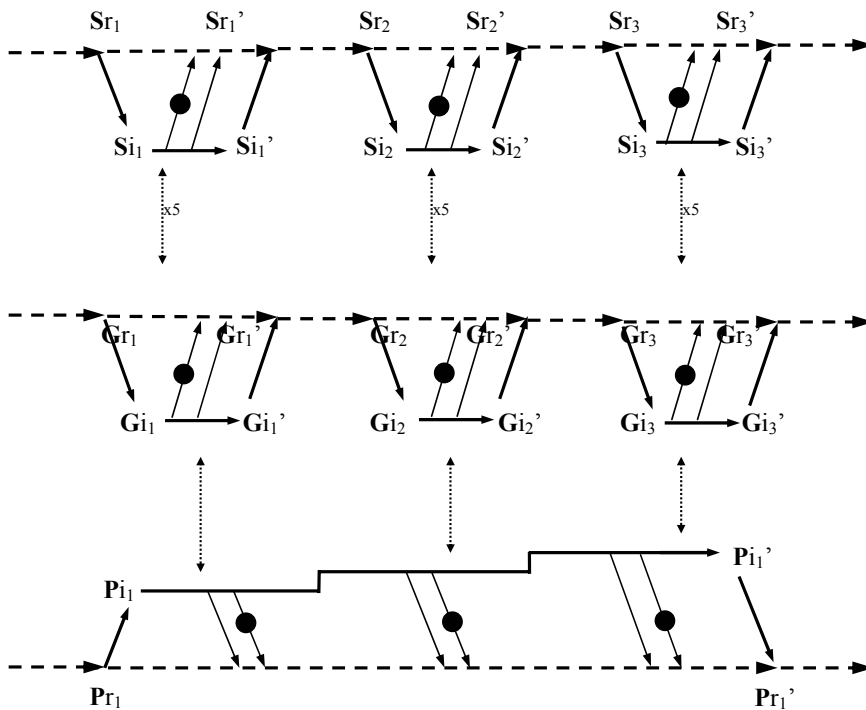
The development of enterprise curriculum represents a challenging task. In a recent review of graduate entrepreneurship education, Hannon (2005) found three key areas requiring much consideration. The first issue related to understanding the transitional factors that influence students graduating into entrepreneurs. The second issue related to the quality of entrepreneurship educators. The third issue related to the importance of developing placement programs that expose students to the entrepreneur's *way of life*. This paper focuses on the underlying process through which beneficial change associated with the transition from student to entrepreneur is made possible. Throughout the paper, continual reference is made to Charles Darwin's stunning metaphor of the entangled bank:

It is interesting to contemplate an entangled bank, clothed with many plants of many kinds, with birds singing on the bushes, with various insects flitting about, and with worms crawling through the damp earth, and to reflect that these elaborately constructed forms, so different from each other, and dependent on each other in so complex a manner, have all been produced by laws acting around us. These laws, taken in the largest sense, being Growth with Reproduction; inheritance which is almost implied by reproduction; Variability from the indirect and direct action of the external conditions of life, and from use and disuse; a Ratio of Increase so high as

to lead to a Struggle for Life, and as a consequence to Natural Selection, entailing Divergence of Character and the Extinction of less-improved forms. Thus, from the war of nature, from famine and death, the most exalted object which we are capable of conceiving, namely, the production of the higher animals, directly follows. There is grandeur in this view of life, with its several powers, having been originally breathed into a few forms or into one; and that, whilst this planet has gone cycling on according to the fixed law of gravity, from so simple a beginning endless forms most beautiful and most wonderful have been, and are being, evolved (Darwin, 1901, p. 376).

Taking into account Hindle’s (2005) concern that we should avoid thinking of enterprise curriculum as a disembodied entity, this paper considers in detail the evolutionary processes through which nascent entrepreneurs, educators and curriculum continually evolve. Adopting Hull’s (1988) interactor-replicator analysis of selection, a process of interaction occurring across multiple levels is posited to best explain how world’s best practice can be created. Illustrated below in Figure 1 are the various replicating and interacting entities they form the central focus of this discussion.

Figure 1: Interacting and replicating entities



At first glance, Figure 1 appears quite complex, but just as the entangle bank embodies a diversity of interacting entities struggling for survival, so may the process of enterprise education. Technically speaking, within Figure 1 is a process of Lamarckian evolution that is nested within the Darwinian process of modification by decent (i.e. moving from left to right). As noted by Jones (2005), a Darwinian theory concerns the process of change, assigning the major (but not exclusive)

causal role to natural selection. The presence of Lamarckism is granted on the basis that “acquired characters are inherited only rarely and weakly” (Gould, 2002, p.354) relative to the process of natural selection. That is, the positions of Knudsen (2002) and Hodgson (2001) that Lamarckian processes can nest within the overarching nature of Darwinism are held, assuming that we accept that social entities acquire (heritable) characters in a metaphoric sense (Hull, 2001). Across the three levels of Figure 1, several pairs of arrows are directed towards the broken lines indicating the acquisition of acquired characters. One of the arrows has a small black circle on it signifying the acquisition of skills; the other arrow signifies the acquisition of knowledge. Let us first break down the underlying causal process in further detail before explaining the suggested process further.

Within Figure 1, three entities suggested, although we can allow for more (e.g. other programs and/or other persons not directly related to the program). However, for the purposes of simplifying the process, the focus is on the main three entities. There are the students (S), the groups (G) the students form, and the program (P) they both interact with. The symbols S_i , G_i , and P_i refer to the interacting entities, and the symbols S_r , G_r , and P_r refer to the replicating entities that are modified through the interaction of students, groups, and the program with each other. What is being suggested is that in addition to being modified by a process of natural selection, the students, groups and indeed the program are also modified through the inheritance of acquired characters. Figure 1 illustrates a timeframe related to three workshops, although in reality, there would typically be more. As each student interacts with their group the first time (S_{i_1} to S_{i_1}'), their individual performance will initially be determined by each student’s habits of thought (e.g. their capacity to communicate, think creatively, etc), and to a lesser degree by the traits they acquire through their interaction with their group. Correspondingly, the first interaction of the group (comprised of five students) will occur from G_{i_1} to G_{i_1}' .

Each group also has the ability to inherit acquired characters (or skills) through individual learning and from copying the behaviours of others. As this occurs, the replicating code of the students and their groups are subject to change that may (or may not) prove beneficial going forward to the next workshop. This process is represented in Figure 1 through the use of solid and broken lines. The solid lines signify the proposed causal relationships related to the manifest behaviour of each entity. The broken lines indicate the presence of a replicating code that is subject to Lamarckian evolution through downward pressure from each entity’s interacting elements (the two parallel arrows). So as a student interacts with his or her group (i.e. S_{i_1} to S_{i_1}'), his or her replicating code is open to alteration, thus ensuring that their next interaction with the group (S_{i_2} to S_{i_2}') is done so potentially based upon a modified set of habits of thought. Likewise, as each group interacts with the program’s workshops, (i.e. G_{i_1} to G_{i_1}'), its replicating code is open to alteration, thus ensuring that their next performance (G_{i_2} to G_{i_2}') is potentially based upon a modified set of collective habits of thought. Finally, throughout the entirety of this process, the program’s replicating code is subject to frequent and unpredictable change. The program itself is also interacting with and copying the practices related to other programs.

Within the context of this process the facilitator (e.g. the lecturer) has a general aim to increase the students’ capacity for entrepreneurial behaviour. What is not known is through what means this outcome will ultimately be achieved. The curriculum is not predetermined, but rather an unwinding process shaped through an evolutionary process. Under such circumstances the facilitator is an

entrepreneur in the true sense of the word, as are the students. Before a working example of this process is provided, let us first relate this proposed process to some specific educational literature.

THE CASE FOR AN EVOLVING CURRICULUM

When contemplating a curriculum that evolves towards a higher level, the works of several authors provide stimulating reading. In chronological order, they are Whitehead (1929), Tyler (1949), Gibb (2002) and Biggs (2003). Through a synthesising of the works of these leading commentators of educational theory, Darwin's entangled bank is no less complex, but the never-ending array of interactions become more obvious. Their collective contributions enable us to go beyond registering Hannon's (2005) concern, to understanding the inter-relation of the concerns he raises. Let us first briefly consider the focus of each of these four authors before we relate their ideas to Hannon's concerns.

For Whitehead (1929, p.93), the aim of any business school is to produce students with a zest for business that have an ability to apply their acquired wisdom to all future tasks with intellectual imagination. Whitehead maintained that the role of the university was to preserve "the connection between knowledge and the zest of life". The ultimate aim of education should be the development of an urge within our students towards new creative adventure. He also cautions against knowledge being presented as mere scraps of information. The transfer of inert knowledge must be avoided at all cost. What is required is a focus on a few large ideas. Ideas, that when taken together form principles from which one may eventually generalize. It is not surprising that Whitehead's *Aims of Education* was written as a protest against dead knowledge. For Whitehead, the issue is how knowledge is used, and specifically the time and place within which it is contextualised. He states that:

The mind is never passive; it is a perpetual activity, delicate, receptive, responsive to stimulus. You cannot postpone its life until after you have sharpened it. Whatever interest attaches to your subject-matter must be evoked *here and now*; whatever powers you are strengthening in the pupil, must be exercised here and now; whatever possibilities of mental life your teaching should impart, must be exhibited *here and now*. That is the golden rule of education, and a very difficult one to follow (1929, p.6, my emphasis).

The role of the lecturer is to elicit energy and excitement by resonance of his or her personality. To ensure the learning environment does not dwell on and shift from one dung-hill of inert ideas to another, but rather maintain a focus on the underlying principles from which future generalization is possible. For Whitehead, the only sure path towards the development of such wisdom is marked by considerable freedom.

For Ralph Tyler, "learning takes place through the active behavior of the student; it is what he [or she] does that he [or she] learns, not what the teacher does" (Tyler 1949, 63). That in fact, the student's learning experience is a function of their interaction with the environment within which the education process occurs. That it is the changing of behaviours (both thinking & feeling and overt actions) that characterises the process of education. As the ideas of Tyler are synthesised throughout the remainder of this paper, the facilitator (the curriculum's architect) and the student will both be viewed as the learners.

Allan Gibb is widely recognised as a highly influential advocate of student-centred learning approaches to entrepreneurship education. His work, spanning more than 25 years argues strongly that students must be exposed to the entrepreneur's *way of life*. That enterprise educators must create and facilitate a learning environment through which enterprising skills, attitudes and knowledge are developed (Gibb, 2002). His ideas are well aligned to best contemporary practice for teaching and learning in higher education.

As a leading advocate of student-centred approaches to learning, Biggs (2003) builds his approach around a simple, yet exacting principle, that being constructive alignment. Constructive alignment is the balancing of desirable learning outcomes, learning activities, and assessment procedures. This simple set of steps towards curriculum design is made all the more difficult when combined with Whitehead's (1929, p. 2) plea that we should "let the main ideas which are introduced into a pupil's education be few and important, and let them be thrown into every combination possible". That this process should represent a process of discovery, that the "general ideas give an understanding to that stream of events which pour through his [or her] life". From this perspective, the starting point is never a textbook, it is what comes before the text that may or may not be ever serviced by a text.

Figure 2: Synthesizing Hannon with Whitehead, Tyler, Gibb, and Biggs

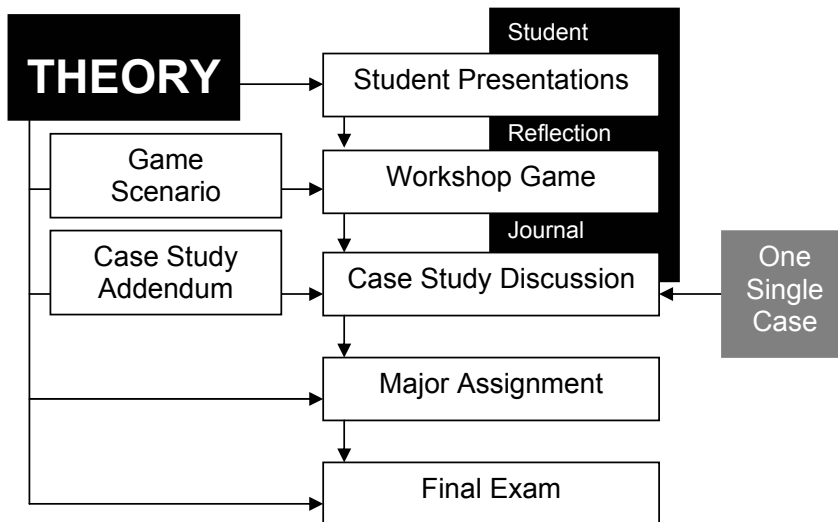
	Understanding the transition factors related to graduate entrepreneurship	Ensuring the quality of entrepreneurship educators	Ensuring exposure to the entrepreneur's <i>way of life</i>
Alfred Whitehead (1929)	Connect knowledge to life	Provide both freedom and discipline	Ensure the learning of the student relates to their here and now
Ralph Tyler (1949)	Create opportunities for student reflection	Build in opportunities for facilitator reflection	Allow for the cumulative attainment of learning outcomes
Allan Gibb (2002)	Base curriculum on development of skills, attitudes & knowledge	Use a student-centred approach	Build in student interaction with entrepreneurs
John Biggs (2003)	Get out of the way of your student's learning	Employ the process of constructive alignment	Employ authentic assessment processes

EDUCATING IN THE HERE AND NOW

As previously discussed by Jones (2005), a learner-centred enterprise program has been developing over the past four years at the University of Tasmania. Illustrated in Figure 3 below, it has been inspired by the ideas of Whitehead (1929), Tyler (1949), Gibb (2002) and Biggs (2003). The name of the framework, *hic et nunc*, is derived from the literal Latin translation of the term 'here and now'. The development of this framework provides an example of how a curriculum can emerge through the ongoing of interaction of students, facilitators and the program with each other and other outside factors. The learning activities shown in Figure 3 relates to one course

(i.e. BMA204 Foundations of Entrepreneurship), but the underlying process illustrated is used throughout all courses within the entrepreneurship major at the University of Tasmania.

Figure 3: The *hic et nunc* framework



The *hic et nunc* framework produces a replicating process through which several specifically chosen journal articles (and other sourced material) reinforce one major concept whilst enabling a cumulative learning process. Within other units, the framework may move beyond the development of one major concept, to support learning outcomes related to a series of specific tasks (e.g. conducting market research and preparing financial statements). The full reasoning for not using a single textbook will be explained in more detail shortly. Suffice to say, in general they are seen to be too broad in the breadth of information presented, but too shallow in depth of any information from which useful future generalisation is possible. Essentially, the learning outcomes of the unit *Foundations of Entrepreneurship* precede the selection of a theory source, and textbooks are deemed an insufficient source of theory to address the desired learning outcomes.

The Sources of Literature

Whitehead (1929, p. 2) comments that we should not teach too many subject areas, but what we teach, we should teach thoroughly. That this process should represent a process of discovery, that the “general ideas give an understanding to that stream of events which pour through his [or her] life”. The first issue clearly raises the issue of what one important idea related to the study of entrepreneurship could our students acquire and therefore gain valuable insight into their past, current, and future lives? Before attempting to answer this important question, it is pertinent at this stage to reveal the author’s view of what is entrepreneurship.

Within this paper, entrepreneurship is seen as a function of the interaction occurring between human nature and the general environment. It can be succinctly defined as any new form of new enterprise, or, any new form of business activity (Davidsson and Wiklund 2001).

Whilst such activity can range from merely attempting to reproduce the business forms of others to introducing a new innovation (Aldrich and Kenworthy 1999), the new enterprise definition is easily comprehended by all manner of students. It is therefore used as it is accurate and simple and allows students to move forward with a clear understanding of what entrepreneurship is, and who the entrepreneurs are, in their varying degrees. Is it possible that one important idea may provide illumination of the process, context, and outcomes of entrepreneurship, one that could also serve as a sense-making framework for students from all walks of life? This paper argues that it is. That recent developments surrounding an evolutionary approach to the study of entrepreneurship contain an overarching idea within which all other relevant issues can nest. That idea is the Darwinian process of selection, variation, and retention. Aldrich and Martinez (2001, p. 42) state that an:

Evolutionary theory unites in a single coherent framework a concern for the entrepreneurial outcomes and the processes and contexts making them possible. An evolutionary approach studies the creation of new organizational structures (variation), the way in which entrepreneurs modify their organizations and use resources to survive in changing environments (adaptation), the circumstances under which such organizational arrangements lead to success and survival (selection), and the way in which successful arrangements tend to be imitated and perpetuated by other entrepreneurs (retention).

A indication of the strength of calls to adopt an evolutionary perspective is that two of the domain's leading journals (i.e. *Entrepreneurship Theory and Practice* and the *Journal of Business Venturing*) have organised special editions devoted to consideration of the increasing application of evolutionary theories to the study of entrepreneurship. Importantly, an evolutionary approach enables a connection between a stated business situation, any social situation and the personal situation of all students. It provides a medium through which students can learn about entrepreneurship and its many facets in the *here and now*, with reference to the past and future.

The readings within *Foundations of Entrepreneurship* build up towards an explicit understanding of an evolutionary approach to the study of entrepreneurship. They are chosen not because they support or discuss an evolutionary perspective, but because they complement each other, and provide a means of cumulative knowledge development. The outcome of which is an ability to generalise about the process, context, and outcomes of new enterprise. The first articles used provide insights into the uniqueness of entrepreneurship (Smilor 1997), the inseparability of the entrepreneur, their new enterprise and the environment within which it occurs (Bryat and Julien 2001), and the first explicit consideration of the process, context, and outcomes of entrepreneurship (Aldrich and Martinez 2001). Further to those articles, a section of Aldrich's (1999) landmark monologue outlining the nature of an evolutionary approach, the formation of populations and the issue of legitimacy is used. Then, the work of Agarwal, Echambadi, Franco and Sarker (2004) is introduced to consider the nature of knowledge transfer, the occurrence spin-outs and issues of survival. The last piece of literature used is an article by Levinthal (1991) related to the interrelatedness of the selection and adaptation processes.

Within this collection of readings, a satisfactory degree of understanding of the context, process, and outcomes of entrepreneurship is generally achievable for all students. However, and importantly, the readings while limiting the horizontal boundaries of enquiry, place no

vertical limits on the minds of those who wish to explore the issues more deeply. Contained within the readings are no premature and unnecessary sidetracks into issues such as business plans, marketing, financing, environmental scanning, etc. Such issues while important, require proper attention at an appropriate time when their consideration can occur within a *here and now* context for those students engaged in the project-based elements of their study. Having justified the reason for and inclusion of specific literature, the next section of the paper will outline the learning activities that have been developed to achieve the (soon to be discussed) desirable learning outcomes.

Student Presentations

Since the program's inception student presentations have been used as a means of fostering entrepreneurial behaviours. Arranged in small teams, students are encouraged to take independent initiatives, exploit perceived opportunities, solve problems creatively, take risks in an uncertain environment, and flexibly respond to challenges, all forms of entrepreneurial behaviour (Caird 1993). Throughout the course of the semester, the following concepts are gradually introduced; Reproducer, innovator, resource profile, human capital, financial capital, social capital, the $I \Leftrightarrow NVC$ dialogic, r & k strategists, specialist & generalist, established & emerging populations, communities, societal influences, knowledge spillovers and transfers, spin-offs, population and relational density, learning and legitimacy, variation, selection, retention & struggle, and adaptation & selection. So, the presentations provide a process through which evidence of the above-mentioned concepts are presented. The presentations tend to introduce much variety regarding how the presence of such concepts (occurring in practice) can be viewed and understood. Students learn from both their peer assessment of each other's presentations, and through appreciation of how each team interprets the presence of the theoretical concepts in practice. At the conclusion of the presentations, a very brief lecturer is given to preview the literature for presentation during the next workshop. This lecturer would generally last between five and ten minutes. The purpose of this lecturer is to introduce literature, rather than explicitly explain it. It is important the students are left to make their own (collective) sense of how the literature relates to their here and now.

Workshop Game

Student presentations are followed by a game which provides another way for the students to interact with the concepts in the *here and now*. The actual game requires students (in teams of three) to make resource allocation decisions. The context of the industry, nature of the environment, and the objectives of their team are outlined in a 'game scenario' that links the appropriate theoretical concepts related to a specific workshop to a constant game model. Each team also has the opportunity to influence the payoffs received by all competing teams. The game creates a deep and repeated focus on how different types of organizational forms (i.e. r & k strategists) are favoured under specific conditions through the life course of an industry. Once each game has been played, a 'game scenario solution' is distributed to enable students to reflect upon how well they interpreted the 'game scenario' provided before the game.

Case Study Discussion

Upon completion of the workshop game, a case study discussion session is conducted. This represents a process through which students engage in a reconstructive analysis of a local industry, this time using the theoretical concepts to make sense of a historical case study situation. Despite criticism of the merits of the Harvard Case method (e.g. Mintzberg 2004), it cannot be denied that this method (in the hands of a competent facilitator) creates much excitement and energy. It energises students to go beyond the obvious, to dig deeper and assess the underlying issues present within the case. First hand observation of this method can be a compelling experience. It must however be noted that not all business schools will be as fortunate as the Harvard Business School to be attended by so many quality students. Clearly a challenge exists, how to capture the energy, attention to detail, and empowerment of this method whilst working with varying degrees of undergraduate students?

The case study discussion session is not premised on an assumption that students have already gained a sound understanding of the appropriate theoretical concepts during previous education and/or workplace experience. Rather, it is assumed that such an understanding does not exist. Therefore, the student presentations and workshop game provide learning activates during which students are primed with the necessary degree of understanding to contribute constructively to a study discussion. Whilst inspired by the Case Study method as delivered at Harvard Business School, the nature of the cases selected is quite different.

One single case study is used to illustrate an industry history. It is highly descriptive and does not seek to highlight specific decision makers or issues. It merely seeks to describe the nature of change in the industry and the drivers and consequences of such change throughout the entire life course of that industry. The chosen case then forms the sole case used during that semester. Students become very familiar with the process and patterns of change in that one industry. To begin with, this one industry is revisited during the case study discussion sessions using case study addendums. The addendum provides a link between the appropriate theoretical concepts related to a specific workshop and the industry context in the case study.

Half way through the semester, the addendums are dispensed with, and a format called an 'empty case study' is used. An empty case study is a process that relies only upon a context (i.e. the starting point) and an outcome (i.e. the end point). Students are required to construct multiple explanations that would logically explain the behaviour of firms and individuals within the discussed industry at any point in time between the starting and end points. The industry background remains the same as previously discussed so as to remove any unwanted ambiguity and to ensure students have a sound appreciation of the nature and process of change occurring in that specific industry.

Reflection Journal

The process of reflection is considered a critical element of the *hic et nunc* framework because "learning takes place through the reactions he [or she] makes to the environment in which he [or she] is placed" (Tyler 1949, p.63). Therefore, student reflection on their participation in presentations, games, and case study discussion is strongly encouraged. This is facilitated through a journal entry shortly after each workshop. The reflection journal aims to provide students with

the opportunity to pause and reflect on how they as individuals are contributing to the success of their team presentations during the workshops. How they are doing with the development of a successful strategy for the workshop game. How they are participating in the case study discussion. Students are encouraged to consider what they have learnt about themselves during the period from one workshop to the next. As the semester progresses, they are encouraged to engage in meta-reflection and consider how they have improved throughout the entire semester. This is a vital process that allows the students to take stock of their behaviours and consider what personal changes are required to improve or maintain their individual outcomes.

Major Assignment

Also, students are required to meet with and document a specific occasion in which an entrepreneur has, was, or is engaged in new enterprise, as defined previously. Each assignment will vary in content whilst maintaining a similar the structure. Students are required to outline the context of the new enterprise, discuss the main character/s, the predicament/opportunity encountered, the process through which the new enterprise unfolded, an assessment of the outcomes, and conclude as to what can be learned from considering the events discussed. Students are required to blend whatever theoretical concepts they feel assist in articulating the events considered. The aim is to get students to connect practice and theory, and to articulate themselves in an interesting way that still relates to the theory and situation at hand.

Final Exam

The last task for students is the final exam. The final exam represents a final check on the students' ability to demonstrate their understanding of the relationships between the various theoretical concepts used throughout the semester. An 'empty case study' format is used, with the task being to construct a coherent explanation that connects the case study context and outcomes. The students may use as many of the concepts (and any others they deem appropriate) to develop one or more explanations that complete the empty case.

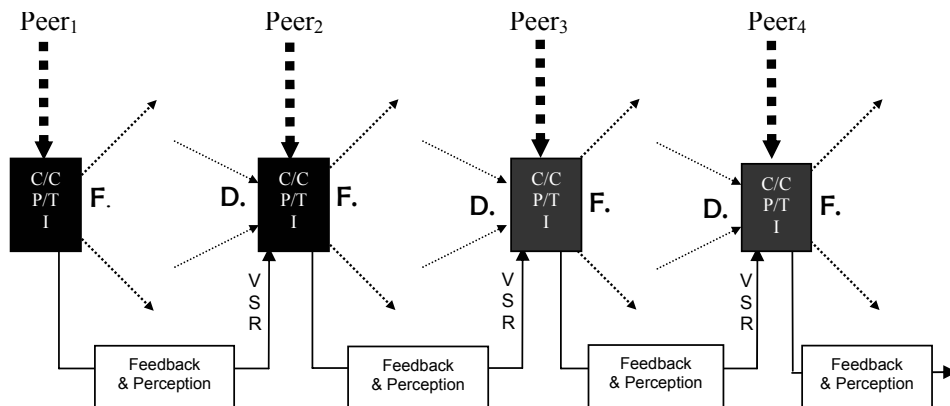
In summary, when taken together, and repeated across each workshop, the learning activities within the *hic et nunc* framework provide the means for continual interaction and replication. As this process is applied across other units throughout the entrepreneurship major, it provides access to a process through which those transitional factors related to graduate entrepreneurship are exposed. Returning Darwin's entangled bank metaphor, across three levels of selection (i.e. the students, the facilitator and the program), the learning activities described above take the place of Darwin's plants, birds, insects and worms. A continual process of variation, selection and retention is occurring through the simple is replaced with the more complex. What is so unique about the *hic et nunc* framework is that what the students are studying (i.e. an evolutionary account of social change) is occurring to them as individuals and within groups. Awareness of this fact allows for heightened reflection on how the theory under consideration relates to practice in their here and now. Lets us take a moment to consider this process in more detail.

TANGLING THE UNTANGLED

When students commence interaction with *hic et nunc*, it is common for them to see the learning activities as separate process designed to achieve a similar learning outcome. What soon becomes apparent to the students is that each activity is interrelated and that a set of powerful (and overarching) laws is determining their progress. This evolutionary process can be explained with reference to the student presentations. While space does not permit a deeper coverage of the nature of the evolutionary approach previously outlined by Jones (2005), it can be summarised as following. This evolutionary approach works towards a causal explanation where discussion of outcomes is dependent upon the illumination of context and process. Individual habits and group routines are cast as generative structures through which potential behaviours are facilitated. These mechanisms are adaptable and can be altered to vary the fitness of interacting entities within a given operating environment.

Student presentations occurring within workshops serve as the primary interacting vehicle through which feedback is received. Repeated interaction enables groups and therefore individuals to alter their routines and habits to achieve better fitness. A process of peer evaluation acts as a selection mechanism that is repeated many times to enable modification and/or reinforcement of the interacting elements of the performance. Ultimately, individual habits are differentially selected due to the nature of positive or negative (external and internal) feedback received concerning the group's performance. Students are influenced by interaction with other group members and through observation of other group performances that also introduce forms of variation. Figure 4 provides an illustration of how this evolutionary process unfolds.

Figure 4: The process of evolving presentations



The process begins with each group of students being required to address a research task that arises from a preview lecture. At this point, the students have little feel for what elements of a presentation will determine the fitness of the forthcoming performance. Nevertheless, they will make decisions regarding the content and context (C/C) of their presentation. They will choose which persons who, using specific technologies (P/T), will facilitate the delivery of their chosen content and in which context. In doing so, irrespective of their intentions, an image of their group based on its projected identity (I) will also be offered for consumption. It is argued

that these three areas when taken together represent elements of interaction through which the group's ongoing fitness will be determined. Importantly, the students themselves are now involved in the same process of social change that they are studying.

The next event to occur is that of peer assessment (i.e. Peer₁, Peer₂, Peer₃, etc) within the workshops by fellow students. There is an explicit focus upon content and context, with each element graded from 0-100%. Students are required to specify what they liked and disliked about each performance. Within their assessment there is of course consideration given to the projected identity of the group through its choice of specific technologies (i.e. delivery processes) and the persons who have been physically present during the performance. Therefore, peer assessment acts as a selection mechanism. The outcome of which is a summative-based assessment (i.e. a grading) and a formative assessment through which valuable written feedback is generated.

This process of generating both summative and formative assessment performs two important functions. First, the summative feedback provides an indication of the immediate fitness of the group's performance vis-à-vis their fellow students at that particular moment in time. Second, the formative feedback provides feedback through which future change is possible. So the "difference between them is that at some point the judgement has to be final" (Biggs 2003, p.142). The other factor that influences the composition of the interacting elements is that of the internally held perceptions within the group that may be altered to produce many different outcomes. Whilst space does not permit a full discussion on this process, students gradually become aware of the evolutionary process occurring within their group. It, not surprisingly mirrors the process they seek to study. The difference being that, it is now their individual habits and skills that combine to produce group routines that are the foundations of their group performance. Nevertheless, the group's interacting elements are continuously subjected to the evolutionary process of variation, selection, and retention (VSR). Post performance, each group must find a balance between the freedom (F.) to recombine their interacting elements and maintain the discipline (D.) to adhere to the workshop timetable and the perceived requirements of their audience.

Just like the firms they study, they also are subject to potential operational and marketplace misperceptions (Langlois 1997). At an operational level, they may make sudden ill-conceived change to their interacting elements and/or fail to notice ways in which their time spent together could be improved. From a marketplace perspective, they may offer for consumption a mix of their interacting elements that do not create value, and/or they may fail to understand how their interacting elements can create value. While it is the group's performance that is assessed, it is the eventual differential selection of individuals within groups that determines overall individual outcomes. Those individuals unable to express themselves or contribute effectively are at the mercy of the environment within which they move about. Those students, who are capable of expressing themselves and contribute to a balance of general enterprise skills within their group, have greater control over their respective fitness.

CONCLUDING COMMENTS

The use of freedom is essential to provide space for all interacting entities to experience variation. Conversely, the presence of discipline provides moments throughout time when judgement must be brought to bear on what will be selected for and against. In the fullness of time, the learning environment will pass judgement on what has been successful, and what has not. This process requires an acknowledgement that there is no starting or end point to the development of graduate entrepreneurs, facilitators and the programs within which they meet. The facilitator must act in an entrepreneurial manner at all times. Just as students must continually reflect on the task at hand, so must the facilitators.

Throughout the above discussion, the importance of developing a curriculum through which freedom is provided to students to fail, recover, and make sense of their tasks has been highlighted. The use of frequent assessment processes provides the means of discipline through corrective behaviours can be conceived. This requires the facilitator to ignore any predisposition towards automatically adopting a prescribed text unless it proved the best means of assisting students to achieve the learning outcomes associated with the process. Learning outcomes that *must* be determined before any text is considered. Therefore, the facilitator is the creator of learning outcomes, learning activities, and assessment procedures. In short, the development of a dynamic learning environment that exposes students to the entrepreneur's way of life cannot and should not be outsourced to a publisher. Around and through this very point, the quality of entrepreneurship educators is determined. The literature is very clear (Gibb, 2002) that entrepreneurship education is not just an extension of management education, that it should not be taught from a traditional lecture-centred perspective. So, the argument presented here is that quality entrepreneurship educators are entrepreneurs who provide a role model for their students. They demonstrate persistence, tolerance of ambiguity and creativity in the way they approach curriculum development. Most importantly, they encourage student involvement in this process.

In doing so, exposure to the entrepreneur's way of life is never a difficult challenge. It surrounds students within and outside the classroom, always incorporating each student's here and now. The manner in which students progress from start to finish is not determined by their skills of memory, but rather by their ability to reflect, persist, and react. The process of trial and error learning takes centred stage as uncertainty and ambiguity become commonplace and the cumulative development of knowledge and skills acts to eliminate error. At any point in time, the objectives of the students, the group and the program are under threat. That which adds value will be retained and that which does not is eliminated over time. Importantly, all three entities are developing an acute appreciating of what adds value vis-à-vis any prior perceptions of opportunity.

Through a desire to connect the studied knowledge to our students' lives and to get out of the way of this process, a clearer view of the transitional factors aiding graduate entrepreneurship are possible. We are able to see differences in student personality that manifest themselves as positive or negative determinants of entrepreneurial behaviour. Through allowing our students to fail we allow them to succeed. Only through stepping back can a true observation of any such transitional factors be made. The challenge is that we must recognise that while our students truly do differ, there is a common outcome they can work towards. Heath (1964) calls this common outcome the becoming of an reasonable adventurer, that is, someone capable of making their own

opportunities for satisfaction. Given that we know not every student will become an entrepreneur, this common outcome may represent an achievable and less soul destroying journey for undergraduate students.

In conclusion, Darwin's brilliant entangled bank metaphor has been evoked to bring attention to the myriad of interacting and replicating entities associated with entrepreneurship education. Darwin's bank is alive, its present form has been determined by the process of natural selection, and this process will determine its future state. The task of creating curriculum for entrepreneurship education is complex and seemingly impossible to predict with accuracy. However, the process through which this development will continue to occur is not impossible to predict. We can be sure that the process of social change surrounding our students, their social groupings, and the programs they encounter will be based on laws acting around us. Our challenge is to stand back from the bank frequently enough to admire the diversity of life occurring (and changing) within our classroom. To reflect upon our role as co-creator of the learning environments we shape, and to continually ask questions. Questions that relate directly to how can we assist in developing the entrepreneurial capacity of our young students.

REFERENCES

- Aldrich, HE 1999, *Organizations evolving*, Sage Publications, London.
- Aldrich, HE & Kenworthy, AL 1999, 'The accidental entrepreneur: Campellian antinomies and organizational foundings', in JAC Baum & B McKelvey (eds), *Organization Science: In Honor of Donald T. Campbell*, Sage Publications, London..
- Aldrich, HE & Martinez, MA 2001, 'Many are called, but few are chosen: An evolutionary perspective of the study of entrepreneurship', *Entrepreneurship Theory and Practice*, vol. 25, no. 4, pp. 41-56.
- Agarwal, R, Echambadi, R, Franco, AM & Sarkar, MB 2004, 'Knowledge transfer through inheritance: Spin out generation, development, and survival', *Academy of Management Journal*, vol. 47, no. 4, pp. 501-522.
- Biggs, J 2003, *Teaching for quality learning at university: What the student does*, 2nd edn, Open University Press, London.
- Bruyat, C & Julien, PA 2001, 'Defining the field of entrepreneurship', *Journal of Business Venturing*, vol.16, no. 2, pp. 165-180.
- Caird, SP 1993, 'What do psychological tests suggest about entrepreneurs', *Journal of Psychology*, vol. 8, no. 6, pp. 11-20.
- Darwin, C 1901, *The origin of species by means of natural selection*, J. Murray, London.
- Davidsson, P & Wiklund, J 2001, 'Levels of analysis in entrepreneurship research: Current research practice and suggestions for the future', *Entrepreneurship Theory and Practice*, vol. 25, no. 4, pp. 81-99.
- Gibb, AA 2002, 'Creating conducive environments for learning and entrepreneurship: Living with, dealing with, creating and enjoying uncertainty and complexity', *Industry & Higher Education*, vol. 16, no. 3, pp. 135-148.
- Gould, SJ 2002, *The structure of evolutionary theory*, Harvard University Press, London.

- Hannon, P 2005, 'Making the journey from student to entrepreneur: A review of the existing research into graduate entrepreneurship', Proceedings of the 14th Internationalizing Entrepreneurship Education and Training Conference, Surrey, UK.
- Heath, R 1964, *The reasonable adventurer*, University of Pittsburgh Publishing, Pittsburgh.
- Hindle, K 2005, 'Teaching entrepreneurship at university: From the wrong building to the right philosophy', Proceedings of the 2nd AGSE International Entrepreneurship Teaching Exchange, Melbourne, Australia.
- Hodgson, GM 2001, 'Is social evolution Lamarckian or Darwinian', in J. Nightingale, J & Laurent, J (Eds.), *Darwinism and Evolutionary Economics*, Edward Elgar, Cheltenham, UK.
- Hull, D 1988, *Science as a process: An evolutionary account of the social and conceptual development of science*, Chicago University press, Chicago.
- Hull, DL 2001, *Science and selection*, Cambridge University Press, New York.
- Jones, C 2005, 'Creating employability skills in SMEs: Modification through interaction', *Industry & Higher Education*, vol. 19 no. 1, pp. 25-34.
- Knudsen, T 2002, 'Economic selection theory', *Journal of Evolutionary Economics*, vol. 12, no. 4, pp. 443-470.
- Langlois, RN 1997, 'Cognition and capabilities: Opportunities seized and missed in the history of the computer industry', in R Garud, P Nayyar & Z Shapira (Eds.), *Technological Innovation*, Cambridge University Press, New York.
- Levinthal, DA 1991, 'Organizational adaptation and environmental selection – interrelated processes of change', *Organization Science*, vol. 2, no. 1, pp. 140-145.
- Mintzberg, H 2004, *Managers not MBAs: A hard look at the soft practice of managing and management development*, Berrett-Koehler Publishers, San Francisco.
- Smilor, RW 1997, 'Reflections on a subversive activity', *Journal of Business Venturing*, vol. 12, no. 5, pp. 341-346.
- Tyler, R 1949, *Basic principles of curriculum and instruction*, University of Chicago Press, London.
- Whitehead, A.F 1929, *The aims of education and other essays*, Free Press, New York.