AN INNOVATIVE APPROACH TO ENTREPRENEURSHIP EDUCATION USING PROBLEM-BASED LEARNING

Tan Siok San and Ng, Frank C K

Centre for Innovation and Enterprise, Republic Polytechnic

ABSTRACT

Programs do not create entrepreneurs; they can, however, provide optimal conditions under which meaningful learning can be achieved. In learning the ropes of starting and running a business, how significant is some form of formal education in helping students develop the essential skills to generate situational responses and strategies to cope with the complex business environment?

This paper describes an innovative approach to entrepreneurship education using Problem-based Learning (PBL) at the Republic Polytechnic.   It illustrates how "self-contained" problems each encompassing specific learning objectives are used, with some creativity injected into a typical classroom setting, to stimulate and encourage students to think critically and do self-directed learning about new venture creation. Based on the students' feedback and the facilitators' observation in class, the authors attempt to determine if the 'learning-driven-by-a-problem' objective of PBL has been effective in meeting the aims of enhancing an appreciation and capacity for entrepreneurship among students.

By simulating a class-in-session with the introduction of a problem at the workshop, participants will get to engage in team discussions to analyze the learning issues, peer-teach, propose and critique solutions, the PBL way. The workshop aims to help participants appreciate that 1) problems, when appropriately used as learning triggers, can create cognitive dissonance in learners, motivating them to inquire and think critically during the problem-solving process; that 2) innovation within entrepreneurship curricula is possible with the adoption of integrated classroom practices.

KEYWORDS

Entrepreneurship education, problem-based learning, creativity, simulation, innovation.

INTRODUCTION

Much has been said about the skills and knowledge needed to successfully create and develop new enterprises. Such skills, to those in the know, are essentially an application of fundamental business concepts which the silo approach of traditional business education may not necessarily impact. Entrepreneurship education which emphasizes creativity, cross-functional thinking and ambiguity tolerance, should, therefore, adopt an integrative and holistic approach.

This paper aims to explore if an entrepreneurship program delivered using a Problem-based Learning (PBL) approach at the Republic Polytechnic has been effective in enhancing students' ability to think and respond strategically towards new venture creation. Through a review of students' feedback and facilitators' observations in class, the authors of this paper, who are both the problem crafters and facilitators of the program, attempt to determine if problem triggers simulating real-life business scenarios have been effective in promoting students' entrepreneurial learning. The paper describes some challenges encountered by the students, faculty and the polytechnic in delivering the program, and puts forth some recommendations to offer a more holistic educational experience for the students.

WHY ENTREPRENEURSHIP EDUCATION?

Entrepreneurship education is, as defined by the Center for Entrepreneurial Leadership Clearinghouse on Entrepreneurship Education (refer to http://www.celcee.edu), 'the process of providing individuals with the concepts and skills to recognize opportunities that others have overlooked, and to have the insight, self-esteem and knowledge to act where others have hesitated.' Although it has traditionally been the role of business schools to impart theoretical knowledge and skills in the various business disciplines, conventional business school programs tend to 'produce middle managers for large organizations', with their over-emphasis on 'quantitative, corporate techniques' of large established corporations, developing 'the follower and steward' instead of nurturing 'the leader, creator and risk taker' (Chia, 1996; Porter, 1994; Ronstadt, 1985; all cited in Brown, 1999).

In an increasingly complex business world which calls for cross-functional management skills, the benefits that an entrepreneurship education offers can be considered from three perspectives (see GEM reports, 2001-2004; Ronstadt, 1985:12; Singh and Magee, 2001; Saffu, 2003):

I. *Industry :*
- Students looking for skills which will help them to succeed in today's dynamic and divergent business world; the realization that corporate positions no longer offer job security due to an increasing trend of downsizing and outsourcing;
- Employers looking for workers who are able to think like entrepreneurs, and who can facilitate corporate entrepreneurship to address global competition and technological changes.

II. *Academic :*
- Acceptance that entrepreneurship can be learned and taught; and that business success is not exclusive to "born" entrepreneurs;
- Increasing recognition and academic legitimacy of entrepreneurship as an important educational innovation and discipline;
- Growing demand from seasoned business people interested in attaining skills to help them further expand their business.

III. *Public Policy :*

Consistent findings in the Global Entrepreneurship Monitor (GEM), an international entrepreneurship research project currently into its sixth year of study, illustrate that:

- education and training is one of the most significant factors influencing the entrepreneurial sector;
- a high correlation exists between educational attainment, particularly entrepreneurship education, and an individual's confidence to participate in high potential growth entrepreneurial ventures.

Notwithstanding the general acknowledgement of the increasing significance of entrepreneurship programs, the debate about the bearing of formal education on entrepreneurial success rages on. *Can entrepreneurship be taught?* Management Guru Peter Drucker (1994) certainly thinks so:

> "Most of what you hear about entrepreneurship is all wrong. It's not magic; it's not mysterious; and it has nothing to do with genes. It's a discipline and, like any other discipline, it can be learned."

Stuart Meyer (Farrell, 1984:63, cited in Brown, 1999) of Kellogg Graduate School of Management at Northwestern University, shares similar views:

> "…I can't teach students the personality traits necessary to take risks, but I can teach them to analyse those risks, to be analytical about their choices, and to learn from mistakes made in the past."

The views of the academia are consistent with the findings from a student perspective-based study which involved two cohorts of MBA students in entrepreneurship, one American and the other, Irish (Hill, O Cinneide and Kiesner, 2003). When the students were consulted on their views of their entrepreneurship education, they indicated their approval with a positive vote of 72 percent, supporting the notion that entrepreneurship can be taught. They also registered another high score of 95 percent, in advocating entrepreneurship as a subject to be included within an MBA program. Hence, despite the occasional reservation about the ability to teach entrepreneurship, the efficacy of education and training is nonetheless, recognized.

ENTREPRENEURSHIP PROGRAM AT THE REPUBLIC POLYTECHNIC

Contextual Background

The PBL implementation at the polytechnic is structured such that a given curriculum/module is divided into 16 problems to be completed within a 16-week semester (refer to www.rp.sg/ced).   Students work in teams to solve a particular problem within a day to arrive at specific learning outcomes through inquiry, self-directed learning and peer teaching. The entrepreneurship program called "Developing Enterprise" (DE) is a free elective designed for the second and final year students of the polytechnic who have demonstrated an interest to delve deeper into the dynamics of the entrepreneurial process.

Simulating Entrepreneurial Situations Using Problems

Acknowledging that good problems are important in PBL as they 'pique students' curiosity, require analysis and encourage learning' (White, 1996), the DE elective integrates real business issues into the classroom via authentic problems which come in the form of newspaper articles, video clips, excerpts from policy documents, company financial reports and role-play to mirror real-life situations. The objective is to help students formulate their own ideas about starting a new venture and experience the realities of the business world, albeit in a risk-free and safe environment.

Table 1 gives an overview of how two problems are used in DE to heighten students' awareness about critical issues often overlooked by aspiring entrepreneurs or young startups. The first problem is about Alex's dilemma which brings to the students' attention what they should look out for before they leap into any business. Stories abound in the newspapers about how novice entrepreneurs' foray into businesses the likes of bubble tea franchises, hair dressing salons, motor repair shops or travel agencies often fold up as fast as new similar outfits sprout up. The crux of the matter is that many of these entrepreneurs fail to evaluate the industry that the business is in, and the level of competition that the new entrants face. The problem on "Alex's Dilemma" addresses the need for the entrepreneur to take stock of both the business idea and the industry the business is in. Following the polytechnic's PBL process, the problem trigger was presented to the students in the first meeting during which the students were to put down all the facts of the scenario, write down questions which they did not have answers to, and identify what were the issues which they needed to find out. Thereafter, the students in each team assigned the tasks among themselves, went on to gather information and resources, and came back to share with the class their findings in meeting 2. It was at this second meeting that the students further identified or clarified gaps to their inferred ideas, and decided among themselves the solution they would adopt and present in the third meeting. In the individual team's presentation, all three teams were able to demonstrate, to various degrees, that they understood the reasons behind the need to select the industry *before* the business. They were also able to articulate that every industry has its own lifecycle and that it is best to enter the industry at the early stage. The facilitator gained further insights into the students' learning through their reflection journals which they had to submit at the end of each PBL lesson.   Below was a student's journal entry to the journal question: "Will you open a café in Republic Polytechnic?"

Student A:
> "Well, I would first have a survey done by all the students in RP, regarding about the cost, location, product selling, atmosphere and etc. … But, after being in this school for a year and a half, I will not start a café here. The reasons are: - RP is not a very established school with lots of students (small market) - Survey are normally ignored and given incorrectly (wrong market analysis) - Not enough money (no capital) - Incomes from the Café's product and services should be at least breakeven or a bit profitable than the Megabites, but Republicans are already complaining Megabites' foods are expensive. - The Café is new and brandless, not many people will take the risk to try, - Strong competitors; Megabites and jiffy van - Republicans don't even have enough time to do research, let alone eating or sitting around in a

Café. With these factors standing in the way to my road of business success, I won't try to open a Café as most likely it will fail in a short time."

Almost 80% of the class responded with similar reflections. The facilitator found this an interesting observation as the idea of opening a café to be run by students has been mooted by many students for the polytechnic to consider. Often than not, these students noted the common grouses among their peers about the lack of alternative sources of eating places within the campus and thought it a "sure-win" idea to open a café, with scarce consideration to other factors. The DE students, having learnt about the importance of understanding the industry, were able to factor in the "RP market lifecycle" coupled with the analysis of the competition using the Michael Porter's Five-Force model, to arrive at a more rationale conclusion.

TABLE 1: OVERVIEW OF TWO PROBLEMS IN DEVELOPING ENTERPRISE

Title	Problem Context	Specific Learning Outcomes
Alex's Dilemma	The problem addressed the usually over-simplistic views held by young people towards starting a business. The problem was introduced by having 2 students taking on the roles of Alex and Joe, 2 friends engaged in a dialogue about going into business together. During the chat, the sobering fact that most businesses failed within a year was brought up, and the need to do sufficient homework before taking the plunge surfaced. That factor was brought in by introducing Joe's father who acted as the devil's advocate who pointed out that there were forces at work within an industry that had to be considered. At meeting 3, each team was required to propose an industry which it considered attractive, with sound justification to defend its proposal.	Students to learn : - the importance of considering the lifecycle of an industry for identified business opportunity - the forces that determine the attractiveness of an industry - why some industries are more favorable than others to new ventures
Who to Partner?	The problem was about Georgina, a fresh university graduate who was looking for partners to join her startup. She had to select, among 7 professionals with specialized skills in their respective fields, to form the venture team. The problem was introduced with 8 students taking on the roles of the 8 characters in the problem. Each character highlighted his/her strengths in an attempt to convince Georgina that he/she would be the right business partner for her. At meeting 3, the students had to explain and justify their team selection. It was interesting to observe that various team compositions were proposed due to difference in views towards what constituted a good team.	Students to understand: - the importance of finding partners with complementary skills-sets in the start-up team - the roles and significance of teams in building successful new ventures.

The second problem described in Table 1 focuses on getting students to look at the importance of the venture team composition. Many a time, aspiring entrepreneurs start up ventures with good friends or family members as their business partners without considering if these people add value to the business. While old friends or relatives may have the advantage of being known entities, the familiarity may result in abuse of trust or ambiguous accountability, thus increasing the tendency for a potential fall-out among the business partners at a later stage. The problem on "Who to Partner" put the students in the shoes of the founder of a new venture who had to decide who to invite to join her founding team. The students had to carefully choose, with sound justification, suitable team members from a pool of professionals (characters in the problem statement) who each brought specific expertise to the table. As the students debated on who to bring onboard the founding team, they learnt to appreciate that winning partnerships thrive when business partners share common business goals and complement one another's abilities. Some students who wished to have the best of all worlds proposed to include many of the professionals in the founding team, only to realise that it would lead to high overheads and possibly, a 'too-many-cooks-spoil-the-broth" effect. In their solutions, the students were able to demonstrate that they could analyse the information critically, do a cost-benefit analysis, and make decisions appropriate for the problem context. The following was a student's response when asked by the facilitator whom (within her circle of friends and family) she would invite to form her venture team if she were to start a business now:

> "…Personally I think that family, relatives and friends may not make good business partners. They are trustable and one may feel very comfortable working with them but many business affairs could crosslink with personal affairs. If one do not wish to put their relationship and business at stake, one should not even consider them as potential business partners…In addition, it will be better if one select a business partner, it must be someone who complements one. Partners should generally not have overlapping responsibilities within a company. If someone's role isn't clear, there's room for unnecessary duplication and confusion of duties."

In the DE classroom, the problems introduced real-world business issues within a specified context to stimulate students to think critically and do self-directed learning about new venture creation. The facilitator encouraged the students to expand their research sources, for instance, by getting them to interview entrepreneurs and/or their family members and friends who were in business. When students shared anecdotes and discussed their observations in class, they were able to relate better to the learning issues of the day. The students were also given the space to creatively articulate their solutions in a variety of ways. Some of the presentation formats which the students had adopted during the 16 weeks included:

- Role-play by simulating a formal meeting between the executives of a business enterprise and officers from government agencies such as IE Singapore
- Sketch to showcase the artistic talents of a mock-up company in a bid to solicit funds from business angels
- Debate on the attractiveness of an industry
- 3- minute elevator pitch to potential investors
- Sharing of findings from personal interviews with ex-entrepreneurs-turned-RP-staff and/or family members
- Presentation of a business plan to panel of judges (made up of students and facilitators)

Very often, the presenting teams delivered their presentations in an earnest yet humorous manner, which the other students responded with critical and challenging questions. The facilitator would, at appropriate times, draw the students' attention to key issues which were brought up in the midst of discussions, or encouraged further elaboration of ideas that were explored. This interactive process of engagement allowed the students to better appreciate the key learning objectives of the lesson; at times, it led to unexpected but desirable learning outcomes.

Student C:
> "I think that today's (meeting simulation) is a good re-enactment of the future situation that we will face regardless of which business that we are going to do… I think that we have gone beyond just today's objective... we brought home more than what books and resources cannot."

Student D:
> "From my observation, I feel that as a class, we are beginning to apply more and more of what we learnt to "real life situation" in the problem statement as our knowledge on business start-ups accumulates. This module had also allowed me to think broadly about issues not only applicable to start-ups or business but also individually. I had learn some interpersonal skills, for example, the role play allows us to learn and practice at the same time good business etiquettes, like how should we exchange name cards and how could we conduct a formal meetings etc."

DISCUSSION

PBL as a Pedagogy for Entrepreneurship Education

Can problems modeled on real-world issues mirror real-life business situations? Stevenson (quoted in Roberts, 2002) believes so, suggesting that a vast body of collective knowledge in the minds of experienced entrepreneurs can actually be distilled into a set of practical problems to be taught in the classroom. Similarly, the authors of this paper are of the opinion that entrepreneurship education can take advantage of the dynamics prevailing in problem scenarios to help students experience 'some of the anxiety, excitement and action

associated with a new venture' (Robinson, 1996). While the authors are keenly aware that the world outside the classroom is the best teacher in entrepreneurship, many entrepreneurs shared that if only they were made aware of potential pitfalls prevalent in business, they would have done things differently. Simulating entrepreneurial situations via problems within the classroom environment can pre-empt students of what-is-to-come in the business world, help them grapple with critical issues that may arise, and provide them with broad ideas of how to solve the problems. Moreover, when students work in teams, peer discussion and teaching occur, enabling concepts to be remembered better as the students get to engage in the affective aspects of the business. The authors believe that this approach offers students reasonable insights into the actual operations of a business, and allows them to transfer and apply their learning to real-life situations.

This learning-by-proxy is akin to the often-used scenario-planning simulated exercises employed by the army, government agencies, hospitals, and big corporations. In major events like transferring a new technology from a country to another, handling crises like building collapse, terrorist attacks, epidemic breakouts or major disruptions in transportation, a command and control centre group will usually be assembled and gathered in a "war room" to monitor, direct, coordinate and marshal resources to deal with the situations. Such simulations are taken seriously by all as they are aware that when the real situations do happen, the actions rehearsed during the simulation will be carried out, and that every person or resource planned for that particular incident will be used. Even though the simulations are not real, they nevertheless help the participants to be accustomed to the probable problems so that they will demonstrate a level of comfort reacting to and managing the real incidents when they do occur.

Students' Performance in the PBL Entrepreneurship Class

As the DE class size was relatively small, the authors could not do a statistical analysis to gauge the students' performance. Nevertheless, based on classroom observations and the students' journal reflections and feedback, the authors found that students who attended the DE elective generally demonstrated a better understanding of what it takes to be an entrepreneur. They were able to assess opportunities more critically, understood the various factors which might impact entrepreneurial success, and showed more caution when proposing solutions. Within the class, some teams performed better than the others, which the authors attributed to the different team dynamics, rather than the individual performance of the students within the teams.

The students' PBL training over their two years with the polytechnic was also evident in the way they approached the problem-solving process - they could find and filter information effortlessly; put together good presentations quickly and succinctly; asked good questions when critiquing their classmates' solutions; and articulated relatively well when doing presentations. As PBL's process-driven and multi-solution approach is characterized by flexibility and diversity, students from different backgrounds were able to bring different perspectives to the table, thus contributing to a rich variety of thoughts and experiences within the classroom.

Challenges in Program Implementation

With the end of the first run of the DE elective, the authors reflected upon the program outcomes and identified a few challenges, outlined as follows:

Student -related:
- Much as the students were reasonably engaged by the problems, they also tend to get bored very fast. Hence, there is a need to add variety to problem formats as well as to allow different methods of team presentations.
- As the senior students were already familiar with the polytechnic's PBL process, they were generally quite impatient to go on to the "real thing" - writing a business plan, instead of following a step-by-step problem-solving process. They need to be reminded time and again by the facilitators the importance of doing systematic analysis and the need for going in depth on each learning issue.
- Students tend to feel overwhelmed when they were confronted with too many learning issues in a given problem, which invariably led to superficial learning. This requires certain problems to be reviewed and refined such that meaningful learning can be achieved within a day.
- Despite the availability of external industry visits (outside official school hours) which were organised to enhance the students' learning experience, some students were either too busy or not motivated enough to participate in them.

Faculty-related:

- As entrepreneurship is a multi-disciplinary field, the faculty responsible for crafting problems may not have sufficient knowledge in all business disciplines. To overcome this shortcoming, the faculty could either collaborate with industry practitioners to further enhance the entrepreneurship curriculum, or, to participate actively in industry activities through networking or short stints with start-up companies. They could then transfer the experiences gained in the outside world back into the classroom.
- The entrepreneurship teaching materials could be further improved through acquiring interesting video clips, simulation or board games, which the faculty could then use as part of problem triggers.

Infrastructure-related:
- In accordance with the polytechnic's one-problem-a-day PBL structure, the authors could only extract key elements from real-world issues and condense them into problem scenarios to be solved within a day. This invariably limits the scope for students to fully comprehend more complex business issues.
- Although students have expressed keen interest to pursue more hands-on learning by starting small enterprises within or outside the polytechnic, it is a challenge to do so as these initiatives require a considerable amount of time and resources, and are difficult to be fitted into the polytechnic's PBL curriculum structure.

Supplementing Entrepreneurial Learning with Extracurricular Activities

Recognizing that a holistic educational experience and a strong entrepreneurial culture can be further strengthened with outside classroom activities, the polytechnic offers a wide variety of entrepreneurial initiatives which offers much scope for those DE students who wish to put their enterprise knowledge to practice. There is a student business club which provides a platform for students to hone their marketing and event management skills; regular on-campus guest lectures, workshops and networking sessions; student participation in external business plan competitions, and joint collaborative initiatives with industry partners and other tertiary institutions. There is also a Student Venture Fund administered by the polytechnic management which can be tapped on for seed funding of promising student-led enterprises.

CONCLUSION

Having discussed extensively about how problems can be effectively used to teach entrepreneurship, the authors present a case to suggest that the classroom, with the aid of properly-contextualised problems, can be transformed into a microcosm of the business world, providing a 'safe haven for the constructive sharing of ideas' (Gundry and Kickul, 1996). The authors believe that the positive reinforcements towards the students from weekly problem-solving can help them hone desired attitudes and develop integrative responses towards the business creation process. The inter-disciplinary and 'learning-by-doing' approach of entrepreneurship education further lends a credible case to suggest that PBL as an educational strategy, may facilitate more meaningful entrepreneurial-learning (Tan, 2004).

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