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CHANGING ENTREPRENEURIAL PERCEPTIONS AND DEVELOPING ENTREPRENEURIAL COMPETENCIES THROUGH EXPERIENTIAL LEARNING: EVIDENCE FROM ENTREPRENEURSHIP EDUCATION IN SINGAPORE'S TERTIARY EDUCATION INSTITUTIONS

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Changing Entrepreneurial Perceptions and Developing Entrepreneurial Competencies through Experiential Learning: Evidence from Entrepreneurship Education in Singapore's Tertiary Education Institutions

Abstract

This paper examines whether the introduction of entrepreneurship education based on concepts of experiential learning into the university curriculum has had any positive effect on changing the entrepreneurial perceptions, intentions and competencies of tertiary education students. The paper uses Kolb's model of experiential learning as a conceptual framework to interpret the actions taken by the Singapore universities in introducing various forms of entrepreneurship education schemes. Although it finds that there is evidence to support claims that entrepreneurship education based on experiential learning in undergraduate courses has had a positive effect on changing entrepreneurial perceptions and intentions among Singapore university students, the findings for entrepreneurial competencies are inconclusive as important aspects of tolerance of failure and opportunity recognition do not seem to have been positively affected.

Key words: Entrepreneurship education; Experiential Learning; Entrepreneurial intentions; Entrepreneurial competencies; Singapore

Introduction

Following the success of the turnaround in the US economy in the 'Entrepreneurial Revolution' of the early 1990s, Singapore has sought to channel resources to develop home-grown entrepreneurs that can help the economy move up the value chain without reliance on increasingly scarce foreign investment (Rosenberg, 2002). As the focus was to grow entrepreneurs in the technology sectors, a substantial amount of resources were targeted at tertiary educational institutions, beginning with the local universities and cascading down to the polytechnics. This led to the start of entrepreneurship education programmes for undergraduates from 2000 onwards.

In Singapore, as in most other Commonwealth countries, the polytechnics have traditionally been more open to adopting experiential learning concepts while the universities have continued to opt for more traditional directed learning methods (Tan & Ng, 2006). However, elements of experiential learning were incorporated into the new university entrepreneurship courses that were started from 2002/2003 onwards. Given that the government specifically targeted universities first, it took a few years before the polytechnics started introducing their own programmes and hence it gave us an opportunity to investigate whether the introduction of entrepreneurship education based on experiential-learning techniques had any impact on improving entrepreneurial perspectives among undergraduates as compared to students in non-degree courses at the polytechnics.

In their examination of entrepreneurship education over the years, Greene, Katz, & Johannisson (2004) note that what distinguishes it from other forms of management education is that experiential learning often plays a key role in the courses. This study hence examines whether the introduction of entrepreneurship education based on concepts of experiential learning into the university curriculum has had any positive effect on changing the entrepreneurial perceptions and intentions of tertiary education students. Given the embryonic context of entrepreneurship research in Singapore, the research follows Donckels & Miettinen (1997) in investigating the relationship of entrepreneurship education on promoting entrepreneurial intention and perceptions. Specifically, by comparing entrepreneurial

intentions and culture among university undergraduates and polytechnic diploma students using a modified questionnaire based on entrepreneurial perceptions, intentions and competencies, this study examined the differences between both groups of students following the introduction of entrepreneurship education into the university undergraduate curriculum.

The study mainly uses Kolb's model of experiential learning as a conceptual framework (D. A. Kolb, 1984) to interpret the actions taken by the Singapore universities in introducing various forms of entrepreneurship education schemes. In so doing, it also draws on the earlier theories by Kurt Lewin, John Dewey and Jean Piaget (A. Y. Kolb & Kolb, 2005). Experiential learning has been found to be an effective sub-approach of action learning in management education (Larsen, 2004; McCarthy & McCarthy, 2006) and has been particularly useful in entrepreneurship education (Gendron, 2004). This is because experiential learning helps build self-efficacy (A. Bandura, 1977), an essential competency in entrepreneurship.

Using a modified questionnaire based on entrepreneurial attitudes, intentions and knowledge (Douglas & Shepherd, 2002; Reynolds, Bygrave, Autio, Cox, & Hay, 2003) that was administered to undergraduates and polytechnic diploma students, this study compared the differences between both groups of students following the introduction of entrepreneurship education into the university undergraduate curriculum. Overall, the study finds that there is evidence to support claims that entrepreneurship education based on experiential learning in undergraduate courses has had a positive effect on changing entrepreneurial perceptions and intentions among Singapore university students and that the entrepreneurial gap between graduates and polytechnic diploma holders may be narrowing. Building on research on self-assessed or self-perceived entrepreneurial competencies by (Chandler & Jansen, 1992), the paper also looked into the effects of entrepreneurship education on building entrepreneurial competencies. However, in terms of developing entrepreneurial competencies, the findings are inconclusive as important aspects of tolerance of failure and opportunity recognition do not seem to have been positively affected even after the entrepreneurship education courses.

By exploring the link between entrepreneurship education and entrepreneurial perceptions and competencies, this paper contributes to the research on educating future entrepreneurs in that it draws attention to the skills and attributes that are needed to be developed in order for the entrepreneurship courses to be effective in tertiary institutions. It also points towards further research needed to track whether some of the more encouraging results actually lead to more new ventures and better start-up performance.

Literature Review

The literature review examines the literature behind experiential learning and entrepreneurship education and explores whether experiential-learning based entrepreneurship education programmes have any impact on entrepreneurial perceptions and competencies.

Experiential learning concepts have existed in various forms in the last century but it received its first significant statement in 1971 when David Kolb, working with Roger Fry, built on Kurt Lewin's work, to put forward the concept of Experiential Learning Theory (ELT) (D. A. Kolb, 1971). This was formalised with the publication of Kolb's book on Experiential Learning in 1984 in which he developed a holistic learning process based on experience through a synthesis of research by people like Kurt Lewin, John Dewey, Jean Piaget, William James, Carl Jung, Paulo Fierer and Carl Rogers (A. Y. Kolb & Kolb, 2005; D. A. Kolb, 1984). ELT Learning Theory defined learning as "the process whereby knowledge is created through the transformation of experience. Knowledge results from the combination of grasping and transforming experience" (D. A. Kolb, 1984) (p.41). A person learns in a cyclical manner constantly reconciling the two opposing modes of Reflective Observation versus Active Experimentation and Concrete Experiences versus Abstract Conceptualisation. This is depicted in the Kolb learning cycle diagram below.

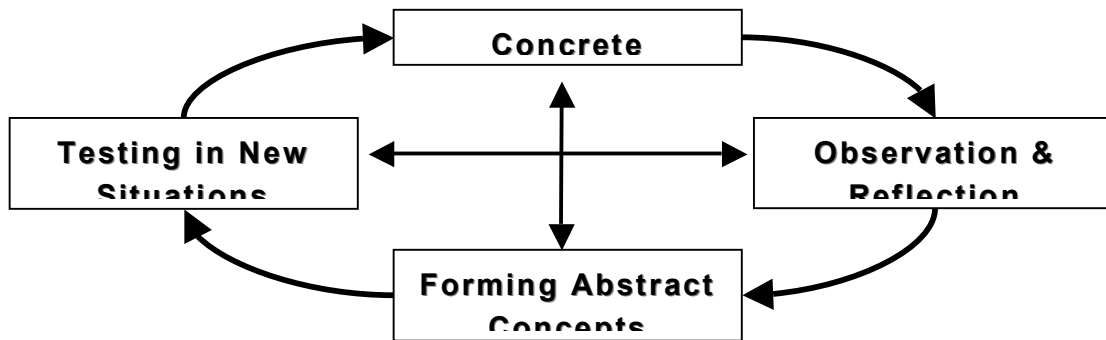


Figure 1 – Kolb’s Experiential Learning Cycle (Adapted from Kolb (1984))

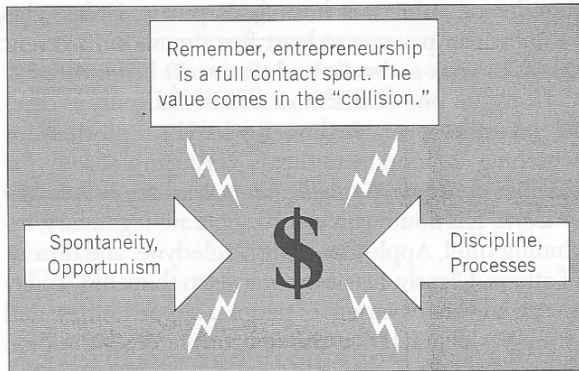
In quantitative and qualitative reviews of the validity of the effectiveness of ELT in various contexts, the model has proven to be significantly robust as a framework for the development of new learning-centred curriculum and methods (Hickcox, 1991; Iliff, 1994). The construct has been used largely in inter-disciplinary and multi-disciplinary settings and Kolb, Boyatzis, & Mainemelis (2001), in a study of a bibliography of ELT publications, find significant use in the interface of management and education.

At about the same time that ELT was being developed, entrepreneurship education was also emerging from its embryonic state. Entrepreneurship was increasingly seen as something that could be taught and should not be seen as some traits that one was born with (Kuratko, 2005). There was increasing support among prominent thinkers like Peter Drucker claiming that “the entrepreneurial mystique? It’s not magic, it’s not mysterious, and it has nothing to do with the genes. It’s a discipline. And, like any discipline, it can be learned.” (Drucker, 1985).

Entrepreneurship educators found that unlike most aspects of management education, entrepreneurship education had to engage in a context of numerous contradictions or paradoxes. As Timmons & Spinelli (2004) remark: “One of the most confounding aspects of the entrepreneurial process is its contradictions. Because of its highly dynamic, fluid, ambiguous, and chaotic character, its constant changes frequently pose paradoxes.” (p. 50)

They argue further that because entrepreneurship is untidy, non-linear, inconsistent and unpredictable, and particularly because it is chaotic and contradictory, it is from the “collisions” inherent in these paradoxes that value is created and is illustrated in figure 2 below. They postulate that

effective entrepreneurship education needs to result in the development of competencies and skills that create predictability out of the ambiguity, chaos, and uncertainty that the paradoxes create.



Source: Timmons et al. (2004)

Figure 2 – Entrepreneurship as Collisions of Dilemmas

Hampden-Turner (1999; 2002) has found that a combination of Kolb's model and Argyris & Schon's (1978) double-loop learning model is especially appropriate in understanding the development of creative individuals. ELT, with its foundations on reconciling the seemingly contradictory nature of learning provided an ideal means to drive the development of entrepreneurship education development in an innovative way that did not follow the conventional dictates of the other management disciplines. For example, Solomon & Fernald Jr (1991) and Gorman & Hanlon (1997) focus on the need for concrete experience, one of the major components of ELT, in entrepreneurship education programmes, that this could be achieved through active involvement of students in the learning process. This focus is needed especially in tertiary educational institutions given that the other 3 components of Kolb's learning cycle of Observation, Forming abstract concepts, and Testing in new situations are established components in university curriculum and that traditionally, they have been weaker in the aspect of concrete experience. Heinonen & Poikkijoki (2006) note that a major focus of entrepreneurship education has been to shift the teaching to learning in a context that was as close to reality as possible. This follows earlier recognition by Bygrave (1997) and Feldman (2001) that entrepreneurship education needs to reflect the real-world environment.

According to McCarthy & McCarthy (2006), experiential learning is especially effective in developing self-efficacy, an essential capability for

entrepreneurship. As noted by Bandura (1991), personal experience is the most important factor that affects the development of self-efficacy. However, what counts as experience in the experiential learning context is not so straightforward. The literature on the actual practice of experiential learning techniques is diverse. Hamer (2000) notes that there is significant variety in its application ranging at one-extreme of field-based methods (e.g. internships) to less demanding classroom-based methods (e.g. role-playing and simulations). Or as one entrepreneur interviewed by Gendron (2004) notes, “you being the nonclassroom activity into the box ... (or) get the students out into the real world.” (p. 311) For example, within management learning, experiential learning techniques may range from modifications of the traditional lecture format whereby students work on loosely structured experiential projects in small groups (Gaidis, Andrews, & summer, 1991) to conducting actual market research (Churchill, 1986) to full-time apprenticeships with practicing entrepreneurs (Aronsson, 2004).

While the debate on whether entrepreneurship can really be taught, or is worth teaching is still ongoing (Fiet, 2001; Hynes, 1996; Kuratko, 2005), there is evidence that at least some of the results have been positive. For this paper, we accept the position by McMullan & Gillin (1998) and Vesper (1994) that entrepreneurship can be taught. In terms of empirical support, Gorman & Hanlon (1997) conducted a 10-year review of literature in entrepreneurship education and found that “most of the empirical studies surveyed indicated that entrepreneurship can be taught, or at least encouraged, by entrepreneurship education” (p. 63). This was in contrast to general management courses which did not have any significant influence on entrepreneurship perceptions (Hostager & Decker, 1999). More recently Raichaudhuri (2005) has noted that more than 50 percent of students who take up entrepreneurship classes at Harvard University have subsequently started their own ventures. Donckels & Miettinen (1997) comment that the main role of entrepreneurship education is to raise consciousness and acceptance for new venture creation as a realistic and profitable career option.

In the Singapore context, Wang & Wong (2004) found that in 1998, before the introduction of entrepreneurship education for undergraduates, Singapore undergraduates had a generally low perception of and knowledge of entrepreneurship. After entrepreneurship education was introduced, Lee

& Wong (2003) found in their study on students in tertiary institutions that there is a direct relationship between attitudes towards entrepreneurship education influencing new venture creation. However, Lee & Wong's research assumed that the more positive entrepreneurial perceptions came from entrepreneurship education and thereby ignored the possibility that these may have been affected by external factors like the large efforts in entrepreneurship promotion by the government in the local media. Moreover, there were also many incentives that the government placed in front of tertiary education graduates to start new ventures especially in high-technology areas.

Polytechnic diploma students were also subject to similar media influence and could also look to starting their own ventures and thereby claiming some of the incentives. However, from 2000 to 2002, the government had yet to fund entrepreneurship education among polytechnic students. As such, it is felt that a comparative study among university undergraduates and polytechnic diploma students in the period from 2000 to 2002 would examine in more rigour whether the entrepreneurship education among undergraduates was having a significant positive impact on their entrepreneurial perceptions and intentions.

But why focus on entrepreneurial intentions and perceptions? Entrepreneurial intention can be seen as an interest in creating a new organisation (Katz & Gartner, 1988) or as the target behaviour of starting a new business venture (Krueger, 2000). Intention can be seen as the cause of an action and the higher the stated intentions to execute the action, the higher the probability of engaging in the act (Chandrashekar, McNeilly, Russ, & Marinova, 2000). Prior research has indicated a strong link between intention and actual behaviour both within entrepreneurship and in a wide variety of situations (Douglas & Shepherd, 2002; Sheppard, Hartwick, & Warshaw, 1988).

However, merely looking at intentions is too narrow and the literature also suggests that if entrepreneurial competencies are also taken into account, a more accurate picture can be developed as competencies are behavioural aspects that can be acquired and learned and thus, could be improved through education and training (Burgoyne, 1993; Parry, 1998). Although internalised aspects of competencies are difficult to change, externalised

elements could be easily acquired through proper training and education programs and could be effective through continuous practice (Muzychenko & Saeed, 2004). Specifically, research has shown that entrepreneurial competencies that are strongly related to entrepreneurial intention and actual behaviour include risk (Douglas & Shepherd, 2002) and independence (Douglas & Shepherd, 2000; Kolvereid, 1996). Wallace (1998) in a study of the impact of small business courses on competencies confirmed that training programs for entrepreneurship could achieve their aim of developing entrepreneurial competencies.

While intentions and perceptions are often self-reported or self-assessed, competencies can be measured both individually and by external parties. While it is acknowledged that external evaluation will improve the validity of the study's results, we have followed (Chandler & Jansen, 1992) who found that self-assessed competencies were useful in the entrepreneurial context as entrepreneurs, whether actual or nascent are mainly individuals working in isolation or possess some combination of unique skills and abilities that make them innovative and entrepreneurial. Moreover, although the students had completed their entrepreneurship education courses, the bulk did not have any experience starting businesses or participating in new venture creation teams.

Finally, while there is no general link between gender and entrepreneurial perceptions and competencies in the literature (Birley, 1989; P. Greene, Hart, Gatewood, Brush, & Carter, 2003), in the Singapore context, Ghazali et al. (1994) had suggested that one reason why the polytechnic students were more entrepreneurial was because there were more male students enrolled in polytechnics as compared with female students (almost double the proportion of university students). As such, this study also seeks to explore whether this is still valid in the current situation.

The Context - Entrepreneurship Education in Singapore's Tertiary Institutions

Gorman & Hanlon (1997) and Young (1997) have noted that it is important to distinguish between the contexts in which entrepreneurship is practiced. The following discussion highlights the context of entrepreneurship education in Singapore in its tertiary education sector.

The three local universities that were established by the government in Singapore all used different approaches to entrepreneurship education. This was partly due to the different traditions, strategies and resources of the universities but also partly due to experimental approach of entrepreneurship education among educators with different universities adapting different models from mainly US-based institutions to see whether they would work in Singapore.

The National University of Singapore (NUS) was the first to offer entrepreneurship courses for its undergraduates with a Minor in Technopreneurship Programme for Engineering Undergraduates launched in July 1999 and expanded to the science and computing faculties in 2000 before being made available university-wide in 2002. Undergraduates met basic pre-requisites could take on the courses that could be spread over 6 semesters. The bulk of the students engaged in classroom-based experiential learning techniques, however about 50-100 students per year were selected for a field-based experiential learning scheme called the NUS Overseas Colleges (NOC) programme. This targeted NUS undergraduates with better academic results and entrepreneurial drive and provided for a fully sponsored one-year joint study and internship stint in various overseas colleges established by NUS at technology enterprise hubs around the world whereby they served as interns in high-technology start-ups when they were not doing courses. The first one started in Silicon Valley in 2001 and the NOC students only needed to pay regular NUS tuition fees although they were taught by faculty from other institutions (e.g. adjunct Stanford University faculty in Silicon Valley) and were given a monthly stipend by their internship companies.

The Nanyang Technological University (NTU) used more localised concepts for entrepreneurship education. For the general undergraduate population, an Entrepreneurship Speaker Series was started in 2001 to provide a platform for NTU staff and undergraduates to network with successful entrepreneurs and venture capitalists and to establish ideas and contacts for feasible business ventures and an entrepreneurship elective was started at the business school with students encouraged to participate in the campus-wide business plan competition. In 2002/2003, the elective was expanded to a 5-module entrepreneurship 'minor' programme with additional experiential-learning techniques like case studies involving real entrepreneurs and the use

of computer-based simulations. As for those who wished to move on into formal entrepreneurship education, in their summer break before their honours year, they were eligible to apply for the Graduate Diploma Technopreneurship & Innovation Programme (TIP), which was a full-time sponsored course jointly conducted by NTU and the University of Washington which combined coursework as well as experiential learning with Singapore and Seattle-based entrepreneurs and scientists. Students received a two-thirds scholarship from the university and the Singapore Economic Development Board and paid for only one-third of the course. The students spent the first ten weeks of their course in Singapore with the subsequent six weeks in Seattle.

The Singapore Management University (SMU) was the last university to introduce entrepreneurship education as the university was only officially incorporated on 12 January 2000, and took in its first students in that year. Its administrative and educational practices are modelled after American institutions, in particular the University of Pennsylvania's Wharton School, which has played a major role in SMU's development. As such, instead of formal entrepreneurship education courses, at SMU, learning has been via loosely structured experiential projects in small groups instead of the usual lectures and tutorials, which enhance interaction and critical thinking. Through this different approach, SMU hopes to produce creative thinkers, challengers to the prevailing mindsets, who bring different perspectives to business.

The polytechnics have always had some form of entrepreneurship promotion activities in their history by funding innovative student start-ups from the mid-1990s onwards but they only incorporated this into their curriculum from 2002/2003 onwards. For example, learning from the universities' experience, Nanyang Polytechnic decided to use simulation and internship methods. Temasek Polytechnic, in contrast, has adopted an action-learning perspective by setting up, within its premises, an on-campus retail store managed by business students.

Given that there was a difference in the time between the start of undergraduate entrepreneurship education programmes as opposed to polytechnic diploma programmes, there was an opportunity to investigate whether the introduction of entrepreneurship education has had any impact

on improving entrepreneurial perspectives among undergraduates as compared to students in non-degree courses at the polytechnics.

Research Objectives and Hypotheses

Our primary research objective was to examine whether entrepreneurship education was having an impact on undergraduates' perception of entrepreneurship as compared to their cohort undergoing polytechnic education. Earlier research had indicated that the commonly-held perception of polytechnic students being more entrepreneurial was a valid one (Ghazali et al., 1994; Phan, Wong, & Wang, 2002). If entrepreneurship education was having an impact, then the gap between undergraduates who had completed or were undergoing entrepreneurship education would be smaller or less significant than before. To that end, the primary hypothesis to be tested was:

H1: Undergraduates have the same level of entrepreneurial intention as polytechnic students.

As mentioned above, Ghazali et al. (1994) suggested that gender differences could explain why polytechnic students were more entrepreneurial than university students. As such, in order to test whether it was entrepreneurship education and not gender that was causing the difference, the following hypothesis was also tested:

H2: Male students are more likely to set up their own business than female students.

In order to see if entrepreneurship education was having an impact on entrepreneurial competencies, we included a tongue-in-cheek question that asked what the university students thought about their polytechnic counterparts and vice-versa in terms of 19 factors broadly grouped into 7 types of entrepreneurial competencies. Based on past evidence, most of the competencies would be identified with the polytechnic students. However, if entrepreneurship education was having an impact, then there would be some competencies that the university students would fare better in. As such the third hypothesis is:

H3: Undergraduates have the same entrepreneurial competencies as polytechnic diploma students.

Data Collection

As not all the students in the university were allowed to take entrepreneurship courses, respondents for our questionnaire were selected on

a purposive basis. We collected our data at premises of the four polytechnics and the three universities in the 2002/2003 academic year. Responses were solicited from students and undergraduates randomly at various locations like canteens and study benches in different faculties. Different races and both sexes were approached in order to achieve a representative sample. Screening questions like “Are you a Singaporean?” and “Have you undergone or are you undergoing an entrepreneurship course?” helped to ensure that only target respondents were included in the sample.

There were several benefits from the purposive sampling method. Firstly, the data set was controlled. As the respondents were approached personally, it was probable that the questionnaires were more likely to be completed by the intended persons. Hence we are confident of the integrity of the data. Secondly, questionnaires were examined upon submission, and most incomplete ones were returned for completion. Incomplete questionnaires as well as those that do not meet the requirements were voided. Thirdly, the rate of response was greater than typical mail survey. Approximately only one out of thirty individuals who were approached refused to participate in the study.

Therefore, while still existent, non-response bias is not as problematic as mail survey. Furthermore, since responses were checked for completeness, item non-response error was dramatically minimized. Only around 15 out of 760 completed surveys had missing data. Thirdly, this method enables a large sample size to be generated. Central limit theorem suggests that the level of confidence of a large sample approaches that of a random sample. The size of the sample hence improves statistical power.

We recognise that purposive sampling may only result in high internal validity and may limit generalisability but as this research was conducted in a unique window of opportunity with limited resources and the sample was selected based on subjects that were appropriate to the study.

The actual sample size and distribution is summarized in table 1 as follows:

Table 1 - Sample size and distribution

Institution	Business/ Accountancy	Information Technology	Engineering	TOTAL
National University	34	20	118	172

of Singapore (NUS)				
Nanyang Technological University (NTU)	37	-	137	179
Singapore Management University (SMU)	21	-	-	21
Nanyang Polytechnic (NYP)	25	25	50	100
Ngee Ann Polytechnic (NP)	28	24	38	91
Temasek Polytechnic (TP)	22	25	49	100
Singapore Polytechnic (SP)	25	23	45	97

The sample has a high proportion of engineering students and hence may not be seen as representative of the entire student body. However, as the distribution of the students across the 3 main discipline groups is similar between the universities and polytechnics, the data is appropriate for comparison.

Entrepreneurial Intentions of University and Polytechnic Students Compared
Our first objective was to find out and compare the level of entrepreneurial intentions among local undergraduates and polytechnic students. As noted earlier, research and perception had shown that polytechnic students were more entrepreneurial, as compared to undergraduates. We attempted to find out if this perception still held after entrepreneurship education among undergraduates by comparing the entrepreneurial intentions between the two groups of students. Tables 2 and 3 below show the results.

Table 2 - Proportion of our Survey Population Who Have the Intention to Start Their Own Business

Intention to set up own business?	Frequency	Percent (%)
Yes	455	59.9
No	305	40.1
Total	760	100

Table 3 - Proportion of our Survey Population Who Have the Intention to Start Their Own Business (Breakdown by Institutions).

Intention to set up business? (university students)	Intention to set up business? (polytechnic students)					Total
	NYP	NP	TP	SP	Total	
Yes	65 (65%)	53 (58.2%)	55 (55%)	50 (51.5%)	223 (57.5%)	231 (62.5%)
No	35 (35%)	38 (41.8%)	45 (45%)	47 (48.5%)	165 (42.5%)	140 (37.5%)
Total	100 (100%)	91 (100%)	100 (100%)	97 (100%)	388 (100%)	371 (100%)

Testing the hypothesis (H1) that Singaporean undergraduates would have the same level of entrepreneurial intentions as polytechnic students yielded the results as shown in Table 4:

Table 4 - Test Statistics for Hypothesis 1.

Proportion of university students who have intention to set up business (x1)	Proportion of polytechnic students who have intention to set up business (x2)	Test Statistic (z)
0.624	0.575	1.375

Since the test statistic falls in the non-rejection region, we did not reject the null hypothesis and conclude that the difference between the two groups is not significant. We believe that the perception may have been true in the past but that entrepreneurship education among university students was having a positive effect in changing perceptions. This may have been reinforced by the recent recession of 2001/2002 caused in part by the

aftershocks of 9/11 and SARS. In the past, undergraduates had no problem getting a stable salaried job. However, with the onset of the recession and the surge in the unemployment rate, many fresh undergraduates have difficulties in securing a job. Also, a university degree was no longer a guarantee to a secured job and this may have unleashed the entrepreneurial streak within them.

We also sought to examine in more detail if there were differences in the perceived opportunities and obstacles to starting their own ventures between university and polytechnic students. Table 5 below and the subsequent discussion reinforce the general finding that entrepreneurship education among the undergraduates was reversing the stereotypical view of polytechnic students were more likely to become entrepreneurs than university students.

Table 5 - Reasons that Prompt Respondents to Start their Own Business - University versus Polytechnic Students.

Reasons holding Singaporeans back from venturing into their own business	Percentage	
	Polytechnics	Universities
a) Profit-driven; able to earn more money	76.2	78.0
b) Desire to meet challenges	53.8	50.9
c) Dislike working for others	32.7	36.6
d) Opportunity to use one's knowledge in a certain field	56.1	35.8
e) Influence of friends and family members	20.6	11.2
f) Sense of satisfaction/achievement	83.0	87.1
g) Has been my ambition since young	32.3	22.0
h) Others, please specify	4.0	5.2

A comparison between the two groups of students reveals that there are no major differences in the reasons that prompt them to start their own business. The existence of profit and a sense of satisfaction/achievement are the two most frequently cited reasons by both groups. This finding reinforces earlier research that shows that entrepreneurship education can have a positive impact on encouraging students to consider new venture creation as a viable career alternative.

Earlier research had indicated that there was a gender bias in entrepreneurial intention among tertiary level students. However, when we tested this as hypothesis H2, this bias is no longer significant (see table 6 below).

Table 6 - Male versus Female Undergraduate Students

Proportion of male undergraduates who have intention to set up business (p1)	Proportion of female undergraduates who have intention to set up business (p2)	Test Statistic (z)	P-value (1-tailed)
0.624	0.558	1.825	0.034

Since the test statistic falls in the rejection region, we concluded that the male respondents are not more likely to set up their own business, contrary to the traditional viewpoint.

One possible explanation is that female undergraduates today have more role models who have done well as entrepreneurs and as such are less risk-averse to starting their own ventures. Examples of successful female entrepreneurs in Singapore include Jannie Tay who founded The Hour Glass, and Mrs Nanz Chong-Komo, founder of The 1.99 Shop.

Entrepreneurial Competencies of University and Polytechnic Students Compared

To examine differences in entrepreneurial competencies, we included a tongue-in-cheek question that asked what the university students thought about their polytechnic counterparts and vice-versa in terms of 19 factors broadly grouped into competencies of risk-taking, innovation, independence, perseverance, opportunity, inter-personal skills and leadership. Three statements (some positive and some negative to ensure consistent responses) are used for each competency, with the only exception being leadership skills, which has only a positive statement. Table 7 below illustrates the results based on responses from 372 university students and 388 polytechnic students.

Table 7 - Entrepreneurial Competencies - University versus Polytechnic Students.

Statistics/Competency		Risk-taking	Innovation	Independence	Perseverance	Opportunity	Inter-personal Skills	Leadership
Universities (Mean)		3.2769	3.5099	3.2554	3.5959	3.0367	3.4892	3.1237
Polytechnics (Mean)		3.2990	3.4691	3.1022	3.7053	3.1478	3.3092	3.0464
Equal variances assumed	T-value	-0.468	0.877	3.250	-2.060	-2.638	3.885	0.951
	Significance	0.64	0.381	0.001	0.040	0.008	0.000	0.342
Equal variances not assumed	T-value	-0.467	0.877	3.253	-2.067	-2.641	3.886	0.954
	Significance	0.64	0.381	0.001	0.039	0.008	0.000	0.340
Implication: Whether the competency significantly distinguish between polytechnic and university students		Not significant	Not significant	Significant	Significant	Significant	Significant	Not significant

The results showed that the two groups still regarded each other as quite different in terms of entrepreneurial competencies as there are four categories that they are significantly different. While there are similarities towards risk-taking, innovation and leadership, the university students were more independent and possessed better interpersonal skills than polytechnic students. This may be due to the age difference, as you get more independent when you grow older. More mature thinking and better handling of human relationships make university students possess better interpersonal skills while polytechnic students are more persevering and opportunistic. The educational system may provide an explanation for this finding. The

university system of teaching and learning has always more geared towards developing independent learners as opposed to 'receivers'. Although some of the independent learning features can also be found in polytechnics, they are less extensive. However, polytechnic education may reinforce tolerance for failure and opportunity recognition as it has a more practical and hands-on focus. As independence and interpersonal skills are more highly sought after characteristics among employers as opposed to tolerance of failure and opportunity recognition, entrepreneurship education may not actually have a desirable effect on encouraging university students to start their own ventures. Instead it may exacerbate the trend of them being absorbed into larger organisations that are willing to pay for graduates with these characteristics.

Opportunity recognition has been identified by researchers as the most important competency among entrepreneurs (Shane & Venkataraman, 2000) and it is worrying that this is not being developed sufficiently among undergraduates, despite the more experiential nature of the courses. It may be because these methods are new and need time for both students and lecturers to get used to and be proficient in. As Smith (2001) notes, "it is well known that experience itself is a very slippery teacher." (p. 36). However, as the entrepreneurship programmes are run mainly by academics that have come out of business schools, it could be a larger problem of being unable to break out of the dominant pedagogic paradigms in management education. As Kourilsky (1995) comments, "current entrepreneurship education tends to migrate towards its natural focus of 'least resistance' – the traditional business management process areas" but entrepreneurship education needs to break out of this and develop "without business management's seminal antecedents – opportunity recognition, marshalling of resources, and creation of the business venture." (p. 14)

Similarly, the ability to tolerate failure is a significant factor and may be even harder to achieve for entrepreneurship education courses run within universities. This is similar to the developing competencies in coping with ambiguity and constant change. As Gendron (2004) observes, "Almost anybody who has either been involved in start-ups or created one of their own often talks about some periods in those early days characterized by messiness, chaos, and constant ambiguity. Is there anything you can imagine doing in a university environment that would better prepare people

for the world of the start-up, which in many ways is completely contrary to the world of academia where you're constantly searching for clarity, for closure, for lack of ambiguity?" (p. 308).

Limitations

There are three limitations in the research for this paper. Firstly, respondent error is of a concern. The tendency to endorse favourable statements and not endorse negative statements is reduced in this research by introducing positive and negative statements to ensure consistency in response. Unless respondents conscientiously 'fake' responses, the results are considerably reliable. The perception of social desirability of the respondent vis-à-vis the question may also be problematic. However, this may be resolved by ensuring confidentiality (since no sensitive data information was asked in our survey) so that respondents are more likely to provide truthful responses. Secondly, a limitation concerning the instrumentation is response sets, which involves a host of biases such as acquiescence, evasiveness, tendency to guess and working for speed instead of accuracy. In addition, the survey design suffers from the potential bias that the researcher introduces. Systematic forms of bias may be incorporated by the definition of the questions, response sets and conditions for participation. Moreover, there may also be problems associated with respondents. No other control over respondent conditions could be achieved. The use of students as surrogates for entrepreneurs is also an issue.

Thirdly, the sample includes students who were doing entrepreneurship courses as a compulsory subject and those who were doing it as an elective. Given that the motivation of the students could be quite different depending on their ability to choose to go on these programmes, this could have an impact on the results. However, as the policies of the different tertiary education institutions were in constant flux during this period, we could not effectively control for this and hence the results may lead to methodological problems of aggregation (During, Oakey, & Kipling, 2000; Gartner & Birley, 2002).

Conclusion

The Singapore government has invested significantly in entrepreneurship education in the hope that some of the more talented Singaporeans would take on the challenge to start their own high-technology or knowledge-

intensive ventures. The Singapore universities adopted various experiential learning techniques in their entrepreneurial education programmes. Although the common perception and past research in Singapore has been that polytechnic diploma holders are more entrepreneurial than graduates, in this paper, we find that the initial introduction of entrepreneurship education into the undergraduate syllabus in Singaporean universities has had a positive effect on changing entrepreneurial perceptions and intentions among Singapore undergraduates. It also appears that the long-standing entrepreneurial gap between graduates and polytechnic diploma holders may be narrowing.

However, this trend may be short-lived as entrepreneurship education does not seem to be improving the persistence and opportunity recognition competencies of the graduates. Moreover, in the spirit of competition and meeting national education strategic targets, the success of the entrepreneurship education efforts in the universities has also led to the polytechnics introducing formal entrepreneurship education programmes into their syllabi. For example, Singapore's newest polytechnic, Republic Polytechnic, has adopted the more specific Problem-Based Learning method for its curriculum whereby learning is achieved via students tackling a set of problems that reflect the real-work situation as closely as possible (Tan & Ng, 2006; Wee, 2004). This may result in current diploma students who are undergoing entrepreneurship education having higher entrepreneurial intention and perceptions thereby re-establishing any gap that was initially created between university graduates and diploma holders. But from the educators and policy-makers perspective, this can only be a good outcome as entrepreneurship education is changing mindsets among both undergraduates and polytechnic students.

However, the trend in entrepreneurial competencies is worrying. The study finds that entrepreneurship courses have not had as much of a significant impact with the key entrepreneurial competencies of opportunity recognition and tolerance of failure still more prevalent among undergraduates than polytechnic students. Whether the causes are institutional or transient is debateable but it may point to what Hampden-Turner & Tan (2002) identified, using Kolb's model, as a larger problem in Singapore's highly meritocratic educational system, namely the cultural impediments to facilitate reconciliation of abstract thought with concrete actions:

“There is also a marked reluctance by abstract thinkers to come down to earth and consider the impact of their ideas and strategies on real people in the world of objects. To descend to the concrete world is risky. You may discover that your thoughts are insignificant in their repercussions or plain wrong ... One constant feature of the entrepreneur is that he/she must command all levels of thought from the most abstract thoughts to the most concrete instances and details. The Big Idea either works “on the ground” in shops and offices, in orders and deliveries or it fails. Nor can you leave out any of the details. One glitch on day one with customer one and it may all be over ... So how readily do Singaporeans take to the kind of person who is effective at all levels and not afraid to get his hands dirty? Our preliminary investigation suggests that the higher reaches of the abstraction ladder is indeed a privileged place and a relatively safe perch above the fray.” (pp. 84-85) (emphasis in original).

While this may be a pessimistic view, it is important that the continued progress of these trends be monitored and investigated and points towards further research needed to track whether some of the more encouraging findings actually lead to higher new venture creation and better entrepreneurial performance.

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References

Argyris, C., & Schon, D. A. (1978). *Organizational learning : A Theory of Action Perspective*. London: Addison-Wesley.

Aronsson, M. (2004). Education Matters--But Does Entrepreneurship Education? An interview with David Birch. *Academy of Management Learning & Education*, 3(3), 289-292.

Bandura, A. (1977). Self-efficacy: toward a unifying theory of behavioral change. *Psychological Review*, 84, 191-215.

Bandura, A. (1991). Human agency: The rhetoric and the reality. *American Psychologist*, 46(2).

Birley, S. (1989). Female Entrepreneurs: Are They Really Any Different? *Journal of Small Business Management*, 27(1), 32-37.

Burgoyne, J. G. (1993). The Competence Movement: Issues, Stakeholders and Prospects. *Personnel Review*, 22(6), 6-13.

Bygrave, W. D. (1997). *The portable MBA in entrepreneurship* (2nd ed.). New York: J. Wiley & Sons.

Chandler, G. N., & Jansen, E. (1992). The Founder's Self-Assessed Competence and Venture Performance. *Journal of Business Venturing*, 7(3), 223-236.

Chandrashekar, M., McNeilly, K., Russ, F. A., & Marinova, D. (2000). From Uncertain Intentions to Actual Behavior: A Threshold Model of Whether and When Salespeople Quit. *Journal of Marketing Research*, 37(4), 463-479.

Churchill, G. A., Jr. (1986). Teaching Introductory Marketing Research. In J. Guiltinan & D. Achabal (Eds.), *Proceedings, AMA Winter Educators' Conference B2 - Proceedings, AMA Winter Educators' Conference* (pp. 53). Chicago, IL: American Marketing Association.

Donckels, R., & Miettinen, A. (1997). *Entrepreneurship and SME research : on its way to the next millenium*. Aldershot: Ashgate.

Douglas, E. J., & Shepherd, D. A. (2000). Entrepreneurship as a Utility Maximising Response. *Journal of Business Venturing*, 15(3), 231-251.

Douglas, E. J., & Shepherd, D. A. (2002). Self-Employment as a Career Choice: Attitudes, Entrepreneurial Intentions, and Utility Maximization. *Entrepreneurship: Theory & Practice*, 26(3), 81-90

Drucker, P. F. (1985). *Innovation and Entrepreneurship: Practice and Principles*. London: Heinemann.

During, W. E., Oakey, R. P., & Kipling, M. (2000). *New Technology-Based Firms at the Turn of the Century*. Oxford: Pergamon.

Feldman, J. M. (2001). Towards the post-university: Centres of higher learning and creative spaces as economic development and social change agents. *Economic and industrial Democracy*, 22(1), 99-143.

Fiet, J. O. (2001). The Theoretical Side of Teaching Entrepreneurship. *Journal of Business Venturing*, 16(1), 1-24.

Gaidis, W. C., Andrews, J. C., & summer. (1991). An experiential approach for integrating ethical analysis into marketing coursework. *Journal of Marketing Education*, 13(2), 3-9.

Gartner, W. B., & Birley, S. (2002). Introduction to the Special Issue on Qualitative Methods in Entrepreneurship Research. *Journal of Business Venturing*, 17(5), 387-395.

Gendron, G. (2004). Practitioners' Perspectives on Entrepreneurship Education: An Interview With Steve Case, Matt Goldman, Tom Golisano, Geraldine Laybourne, Jeff Taylor, and Alan Webber. *Academy of Management Learning & Education*, 3(3), 302-314.

Ghazali, A., Chew, S. B., Ghosh, B. C., & Tay, R. S. T. (1994). Tertiary education, gender and entrepreneurship: An empirical analysis. *Journal of Enterprising Culture*, 1(3&4), 473-495.

Gorman, G., & Hanlon, D. (1997). Some research perspectives on entrepreneurship education, enterprise education and education for small business management: A ten-year literature review. *International Small Business Journal*, 15(3), 56-77.

Greene, P., Hart, M., Gatewood, E., Brush, C., & Carter, N. (2003). Women Entrepreneurs: Moving Front and Center: An Overview of Research and Theory. *Coleman White Paper Series*, 3, 1-47.

Greene, P. G., Katz, J. A., & Johannisson, B. (2004). From the Guest Co-Editors. *Academy of Management Learning & Education*, 3(3), 241-242.

Hamer, L. O. (2000). The Additive Effects of Semistructured Classroom Activities on Student Learning: An Application of Classroom-Based Experiential Learning Techniques. *Journal of Marketing Education*, 22(1), 25-34.

Hampden-Turner, C. (1999). Control, Chaos, Control: A Cybernetic View of Creativity. In R. E. Purser & A. Montuori (Eds.), *Social creativity 2* (pp. 17-31). Cresskill, N.J.: Hampton Press.

Hampden-Turner, C. (2002). *Learning in the Connected Economy*. Cambridge: University of Cambridge Programme for Industry; Open University.

Hampden-Turner, C., & Tan, T.-K. (2002). Six Dilemmas of Entrepreneurship: Can Singapore Transform itself to Become an Innovative Economy. *Nanyang Business Review*, 1(2), 79-97.

Heinonen, J., & Poikkijoki, S.-A. (2006). An entrepreneurial-directed approach to entrepreneurship education: mission impossible? *Journal of Management Development*, 25(1), 80-94.

Hickcox, L. K. (1991). An historical review of Kolb's formulation of experiential learning theory. University of Oregon, Corvallis.

Hostager, T. J., & Decker, R. L. (1999). The effects of an entrepreneurship program on achievement motivation: A preliminary study. San Francisco: SBIDA.

Hynes, B. (1996). Entrepreneurship education and training -- Introducing entrepreneurship into non-business disciplines. *Journal of European Industrial Training*, 20(8), 10-17.

Iliff, C. H. (1994). *Kolb's Learning Style Inventory: A meta-analysis*. Boston University, Boston, MA.

Katz, J., & Gartner, W. B. (1988). Properties of Emerging Organizations. *Academy of Management Review*, 13(3), 429-441.

Kolb, A. Y., & Kolb, D. A. (2005). Learning Styles and Learning Spaces: Enhancing Experiential Learning in Higher Education. *Academy of Management Learning & Education*, 4(2), 193-212.

Kolb, D. A. (1971). Individual Learning Styles and the Learning Process. Sloan School of Management Working Paper, 535(71).

Kolb, D. A. (1984). *Experiential Learning: Experience as the Source of Learning and Development*. Englewood Cliffs, N.J.: Prentice-Hall.

Kolb, D. A., Boyatzis, R., & Mainemelis, C. (2001). Experiential Learning Theory: Previous Research and New Directions. In R. J. Sternberg & L.-f. Zhang (Eds.), *Perspectives on thinking, learning, and cognitive styles* (pp. 227-247). Mahwah, NJ: L. Erlbaum Associates.

Kolvereid, L. (1996). Prediction of employment status choice intentions. *Entrepreneurship: Theory & Practice*, 21(1), 47-57.

Kourilsky, M. L. (1995). Entrepreneurship education: Opportunity in search of curriculum. *Business Education Forum*, 50(1), 11-15.

Krueger, J., Norris F. (2000). The Cognitive Infrastructure of Opportunity Emergence. *Entrepreneurship: Theory & Practice*, 24(3), 5-23.

Kuratko, D. F. (2005). The Emergence of Entrepreneurship Education: Development, Trends, and Challenges. *Entrepreneurship: Theory & Practice*, 29(5), 577-597.

Larsen, H. H. (2004). Experiential Learning as Management Development: Theoretical Perspectives and Empirical Illustrations. *Advances in Developing Human Resources*, 6(4), 486-503.

Lee, L., & Wong, P.-K. (2003). Attitude towards Entrepreneurship Education and New Venture Creation. *Journal of Enterprising Culture*, 11(4), 339-357.

McCarthy, P. R., & McCarthy, H. M. (2006). When Case Studies Are Not Enough: Integrating Experiential Learning Into Business Curricula. *Journal of Education for Business*, 81(4), 201-204.

McMullan, W. E., & Gillin, L. M. (1998). Industrial viewpoint--entrepreneurship education. *Technovation*, 18(4), 275-286.

Muzychenko, O., & Saeed, J. (2004). Cross cultural professional competence in higher education. *Journal of Management Systems*, 16(4), 1-19.

Parry, S. B. (1998). Just what is a competency? (And why should you care). *Training*, 35(4), 58-64.

Phan, P. H., Wong, P. K., & Wang, C. K. (2002). Antecedents To Entrepreneurship Among University Students In Singapore: Beliefs, Attitudes And Background. *Journal of Enterprising Culture*, 10(2), 151-174.

Raichaudhuri, A. (2005). Issues in Entrepreneurship Education. *Decision*, 32(2), 73-84.

Reynolds, P. D., Bygrave, W. D., Autio, E., Cox, L. W., & Hay, M. (2003). *Global Entrepreneurship Monitor - 2003 Executive Report*. London: Babson College, Ewing Marion Kauffman Foundation, London Business School.

Rosenberg, D. (2002). *Cloning Silicon Valley : the next generation high-tech hotspots*. London: Pearson Education.

Shane, S., & Venkataraman, S. (2000). The Promise of Entrepreneurship As a Field of Research. *Academy of Management Review*, 25(1), 217-226.

Sheppard, B. H., Hartwick, J., & Warshaw, P. R. (1988). The Theory of Reasoned Action: A Meta-Analysis of Past Research with Recommendations for Modifications and Future Research. *Journal of Consumer Research*, 15(3).

Smith, P. A. C. (2001). Action Learning and Reflective Practice in Project Environments that are Related to Leadership Development. *Management Learning*, 32(1).

Solomon, G. T., & Fernald Jr, L. W. (1991). Trends in Small Business Management and Entrepreneurship Education in the United States. *Entrepreneurship: Theory & Practice*, 15(3), 25-39.

Tan, S.-S., & Ng, C. K. F. (2006). A problem-based learning approach to entrepreneurship education. *Education + Training*, 48(6).

Timmons, J. A., & Spinelli, S. (2004). *New Venture Creation: Entrepreneurship for the 21st century* (6th ed.). Boston: McGraw-Hill.
Vesper, K. H. (1994). Experiments in Entrepreneurship Education: Successes and Failures. *Journal of Business Venturing*, 9(3), 179-187.

Wallace, J. (1998). The impact of small business course on competencies. Paper presented at the 22nd National Small Business Consulting Conference, Santa Fe, New Mexico, US.

Wang, C. K., & Wong, P.-K. (2004). Entrepreneurial interest of university students in Singapore. *Technovation*, 24(2), 163-172.

Wee, K. N. L. (2004). A problem-based learning approach in entrepreneurship education: promoting authentic entrepreneurial learning. *International Journal of Technology Management*, 28(7/8), 685-701.

Young, J. E. (1997). Entrepreneurship Education and Leading for University Students and Practicing Entrepreneurs. In D. L. Sexton & R. W. Smilor (Eds.), *Entrepreneurship 2000*. Chicago: Upstart Pub. Co.