

From School to Economy: Innovation and Enterprise in Singapore

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Abstract

This paper examines the recent efforts by the Singapore government to promote the spirit of Innovation and Enterprise (I&E) in all schools in Singapore. This paper begins by identifying the ideology of Realism-Pragmatism underpinning education in Singapore. The paper then discusses the motivation and some of the key changes and challenges in the drive towards innovation and enterprise in Singapore education. In particular, the policy is motivated by the need to prepare students to meet the demands of a competitive global economy. While the government has introduced many measures to provide more space in the system for experimentation and diverse approaches, this centralized approach towards innovation and enterprise in education still contains challenges and dilemmas for schools. The paper highlights the challenge for school leaders and teachers to be role models in innovation and enterprise. It also explains the challenge for innovation and enterprise to flourish in an examination-driven environment where academic results are still a priority.

Key Words: Education, Economy, Schools, Innovation, Enterprise, Singapore

Introduction

While the competitive strategy of many region-states and nation-states has been the provision of more and cheaper physical resources and labour, a powerful competitive strategy on the global economic arena is emerging. This strategy is about learning, innovation and enterprise. At the core of development of these cities and nations is an explicit commitment to learning and innovating to sustain economic enterprise through various combinations of lifelong learning, innovation and creative uses of information and communication technologies (Larsen, 1999).

But innovation is not just the business of multi-nationals and large companies. Increasingly, the drivers of growth in modern economies are new and small businesses (Drucker, 1985; Coulson-Thomas, 1999). Therefore, there is a shift of economic focus from traditional goods production and services to the concepts of innovation and enterprise. Unlike the traditional capitalist economies, in the modern sense, this economic strategy is about knowledge creation and exploitation, and an attitude shift from the dependence on a technological status quo to the pursuit of new opportunities to improve it, or to discover new and wider applications of it. This is the engine that drives the economy towards its new state in most nations (Keats & Abercrombie, 1991). The ability of a country's citizens to enhance their know-how and market it globally market has a direct impact on the survival and prosperity of the country (Drucker, 1993; Ohmae, 1990).

This paper examines the recent efforts by the Singapore government to promote the spirit of Innovation and Enterprise (I&E) in all schools in Singapore. This paper begins by identifying the ideology of Realism-Pragmatism underpinning the educational reforms in Singapore. The paper then discusses the motivation and some of the key changes and challenges in the drive towards innovation and enterprise in Singapore education.

The Ideology of Realism-Pragmatism

Singapore was a British colony in the 19th century, achieved self-government in 1959 and became an independent nation in 1965. The early days were difficult as Singapore struggled to survive. The ruling People's Action Party (PAP) government, under the leadership of Mr Lee Kuan Yew, put in place a series of pragmatic social and economic policies to attract industrial investments from the international community. Today, Singapore is a vibrant cosmopolitan city with one of the world's busiest ports and airports.

Education in Singapore is underpinned by an ideology best described as Realism-Pragmatism. This ideology is derived from the educational philosophies of Realism and Pragmatism. Realists generally see schools as academic institutions to develop the students' abilities in reasoning, observation and experimentation (Ozmon & Craver, 2003; Gutek, 2004). The function of schools is to train and prepare professionals and technicians for the economy, with systematic and highly structured curriculum and different subject-matter disciplines. All students should begin with the basic skills of reading, writing, arithmetic, and moral values, before proceeding to specialize in various areas of study. Academically inclined students should be given a liberal education in the arts and sciences, while weaker students should be channelled to vocational training. Quantifiable yardsticks in assessment, including various types of diagnostic, competency and achievement tests are used for both students and teachers. The Realist teacher is seen as an expert in the subject, skilful in explaining the content to the students and in assessing the students' understanding. Rather than teaching students what they are interested in, Realist teachers focus on what is essential to develop their reasoning powers so that they can gain knowledge of the world of nature.

On the other hand, Pragmatists generally see schools as more than academic institutions to develop the students' cognitive capabilities (Ozmon & Craver, 2003; Gutek, 2004). Schools should be miniature communities for teachers and students to engage in active learning, experiment with new ways of thinking and doing, solve problems, and build social consensus. They prefer content and activities that are relevant to the students' interests, needs and problems rather than focussing on traditions and cultural heritage. The curriculum should be interdisciplinary, integrated and action-oriented, and not divided into specialized and theoretical subjects. The Pragmatist teacher is one who helps the students to grow by empowering them with the knowledge, skills and dispositions to make intelligent decisions in life. He or she is a resource person and facilitator to guide the students in active learning.

Education in Singapore is both Realist and Pragmatist in its approach. The Realist aim of education is seen in the expressed objective of education in Singapore to prepare students to meet the challenges of a knowledge economy and to enhance the economic competitiveness of Singapore. Education in Singapore is the vehicle for nation-building by producing a competent, adaptive and productive workforce and promoting social cohesion among the various ethnic groups. From self-government in 1959 until the mid 1990s, the government has used Realist methods of education. The educational system was highly centralized and structured, and students were streamed into different tracks based on their academic performance. All the schools adopted a uniform curriculum where subjects such as the English language, indigenous languages such as Chinese, Malay and Tamil, and moral and civics education were compulsory for all students. The schools also used

standardized textbooks, and prepared students for centralized national level examinations. The pedagogy adopted was mainly teacher-centred and the role of the teacher was to teach essential skills for their students to find jobs later in life.

The Singapore government has, however, increasingly adopted Pragmatist methods of education since 1997 under the Thinking Schools, Learning Nation (TSLN) vision (more will be discussed later). The Pragmatist influence is seen in the move away from a unified, rigid and hierarchical educational system to one which offers different types of schools and programmes in Singapore. The curriculum has also been revised to promote customised and interdisciplinary study, rather than a curriculum that is common, standardized and classified under different subject-matter disciplines. The other Pragmatist element is the changing role of the teachers in Singapore. Teachers are no longer just experts and dispensers of content knowledge; they are expected to be resource persons to facilitate the students' learning through creative and student-centred activities.

The Singapore Economic Strategy

Like many other developing and advanced economies vying for global economic success, Singapore has to shift its economic focus from a strategy of industrial-age production to that of innovation and enterprise. The challenges for Singapore today are thus different from those faced by the old guard. Not only does Singapore need to transform the nature of its economy, its near-saturated domestic market means that Singapore has to create external economies with strong links with the domestic one. In other words, innovation and enterprise become the new buzzwords for the Singapore economy.

The Singapore government pursues this economic strategy intensely. Evidence of this economic approach abound. One example is its strategic investment in research and development (R&D). Minister of State for Trade and Industry, S. Iswaran, commented that the government was committed to invest in R&D as a driver for economic growth and as a foundation for our long-term competitiveness (Iswaran, 2006). In particular, the government is prepared to achieve national R&D spending of 3% of GDP by 2010. A council chaired by the Prime Minister aims to build core capabilities in three strategic areas, namely Biomedical Sciences, Environmental and Water Technologies, and Interactive and Digital Media. The target is to generate 86,000 jobs and S\$30 billion (approximately US\$20 billion) in value-add from the three sectors by 2015 (Iswaran, 2006).

But, this economic policy cannot stand alone. In a globalized and knowledge-driven world, education is seen as a prime source of economic competitive advantage (Porter, 1990). Indeed, innovation and enterprise will have to start in school. This position is articulated by former Minister for Education, Teo Chee Hean:

Innovation will be absolutely critical to the creation of wealth in the 21st century ... To develop an innovative work force, we will need to start in school by training our students to be enterprising and creative thinkers. The education system in Singapore has thus far emphasized the acquisition of factual knowledge. We will need to shift our focus to creative thinking skills. Instead of just being followers, our young must be prepared to experiment, to make mistakes, to learn and to innovate, in order to be leaders in their own fields (Teo, 1998).

Prime Minister Lee Hsien Loong further pointed out that a survey of Chief Executive Officers (CEOs) and employers in Singapore showed that young graduates in Singapore stick to tried and tested ways, and were reluctant to take risks and try new things (Lee, 2004). He added that there was a need for a mindset change for Singaporeans to be less conventional and more enterprising, as this was a major economic weakness, and this change among the young in Singapore had to start early while they were still in school. Therefore, in 2004, the Ministry of Education formally launched its “Innovation and Enterprise” initiative in Singapore schools.

Innovation and Enterprise (I&E) in Singapore Schools

As Singapore moves into the 21st century, young people have to be prepared to meet the challenges of tomorrow. The official umbrella vision is called Thinking Schools, Learning Nation (TSLN). Mr Goh Chok Tong, then Prime Minister, introduced this national strategy in 1997. In his speech, Goh (1997) looked to the United States as a good example of people who were able to produce highly creative and entrepreneurial individuals. He noted that the best schools in the United States produced innovative students through a diverse and challenging curriculum, their academic institutions and research laboratories were comprised of entrepreneurial individuals who contributed to scientific breakthroughs, and there were strong links between academia and industry, society and government (Goh, 1997).

According to the Singapore Ministry of Education (MOE), “Innovation and Enterprise” (I&E) is not new in the system, but a strategic part of TSLN. Then Acting Education Minister, Tharman Shanmugaratnam (2004a) said:

But we need to give [I&E] more emphasis, and more focus. It is part and parcel of what we all know as Thinking Schools, Learning Nation. It is not a new programme; it doesn't replace existing programmes. It is the way we will take Thinking Schools, Learning Nation forward in the new era (Tharman, 2004a).

The term “innovation and enterprise” is of course highly related to commercial businesses and entrepreneurs. However, the MOE is clear that I&E is not centred around creating entrepreneurs or letting them run businesses, at least not in school. What, then, is Innovation and Enterprise in a school context? Minister Tharman (2004b) clarified:

At the heart of what we are trying to achieve in I&E is not a new set of activities or programmes, but a set of mental attitudes amongst our young, a new culture or outlook on life. We want to nurture in them the mental traits that will serve them well in a future full of challenge and opportunity – a robust spirit of inquiry, a willingness to take untried paths, and a certain ruggedness of character. These are the intangible factors that will make the difference for Singapore in the future (Tharman, 2004b).

Therefore, teachers and students with a strong spirit of I&E possess a mindset and outlook of creativity, initiative and self-reliance. They possess the following core attributes:

- Intellectual curiosity (e.g. to question assumptions, explore and experiment) and ability to see things in new ways (e.g. to recognize patterns and make connections);
- Passion, strength of character, persistence, resilience and ruggedness;
- Courage to live with ambiguity (e.g. to seek alternative pathways) and to take calculated risks;
- Sense of teamwork and ‘giving back’ to the community;
- Grounded in a set of time-honoured values that serve as guiding principles to navigate choices in life, e.g. integrity, social responsibility and respect for others.

The I&E initiative has spurred schools in Singapore to experiment with new types of learning for their students and to get their students to try something innovative and enterprising. Good I&E projects are show-cased among schools and members of the public through an annual MOE festival, both as a form of professional sharing as well as encouragement to the students.

For example, at Ghim Moh Primary School, some pupils were given the opportunity to be involved in Orchid hybridization, which was integrated into their curriculum when they learned the life cycle of flowering plants. Pupils in the programme learned the biology of artificial pollination, fertilization, genetic traits of flowers, media preparation and tissue culture techniques. Besides acquiring the scientific thinking and process skills, such a project fostered creativity through experiential learning. It actively engaged pupils in creating their own hybrid. Under the guidance of a university professor, the pupils managed to create a few new hybrids and one was named after the school (Dendrobium Royal Ghim Moh Primary). It was hoped that some pupils would be inspired in life sciences and maybe even become entrepreneurs in orchid cultivation.

At Pei Tong Primary School, pupils from the IT club embarked on an “e-journalism” project. Their first episode entitled ‘Life of a P1’ looked into the fears and anxiety of a Primary 1 pupil in Term 1 (first 10 weeks of the school term). There were interviews with a senior Primary 1 teacher and a new Primary 1 teacher and they talked about their personal experiences teaching the Primary 1 pupils. The pupils not only learned how to interview people but also the science behind video production. Their video was presented during the assembly to the school. This was learning beyond the usual primary school syllabus.

At Maris Stella High School, the school introduced an initiative to expose their students to the concept of financial planning with the following objectives:

- learn about the importance of money and how to manage it wisely;
- learn to be financially street-smart;
- learn the financial responsibility that comes with the buying of some items; and
- get a head start by learning different financial instruments and the importance of early financial planning.

Using a board game as a teaching tool, the students made calculations on budgeting and cash flows based on a typical financial life of a Singaporean. The students learned to manage money in a fun and relaxed manner. They also learned how they could address some of the financial issues they would be likely to face in the future. This was learning beyond the usual secondary school syllabus.

Key Changes and Challenges in the Pursuit of I&E

The Singapore government has introduced a number of key changes in the education system, both in the spirit of I&E and as supporting structures for I&E in schools. We discuss a few key changes and challenges here.

National System level

Firstly, the Ministry of Education aims to encourage more local initiative with greater decentralisation of authority and accountability to schools. Principals are encouraged to think of themselves as Chief Executive Officers (CEOs) of their schools, and to manage their schools like companies—articulating vision statements, producing results, answering to “shareholders” and “customers”, talking about service, marketing, getting results, and watching the bottom-line. MOE, as the headquarters, is given the role of the guardian of standards to ensure that overall curriculum needs are met and professional training is given to staff. Senior ministry officials make visits regularly to schools island-wide, explaining policies and gathering feedback from school staff.

Secondly, schools are now placed in clusters in a spirit of collaboration and given the authority and resources to spot and solve common problems, or reap the benefits of economies of scale. Each cluster comes under the leadership and supervision of a superintendent who has a good track record as a school principal. The MOE’s position is that to be creative and responsive, schools can no longer be managed by a centralized top-down approach in problem solving and in implementing change. Then-Education Minister Teo Chee Hean gave the following arguments for decentralization through the school clusters:

The devolution of decision making to the cluster level has allowed resources and expertise to be used according to the needs of schools in the clusters and there is greater responsiveness to the needs of individual schools. Principals and teachers in the clusters have reported that they have been enriched by the high level of collaboration among schools and benefited from shared experiences. This has improved the ability of the schools to meet the needs of their pupils. ... The aim of school clusters and devolution is not just to achieve administrative excellence. More importantly, it is a way to provide schools with the ability to be more innovative and creative in providing education to their students (Teo, 1997).

One other innovation in the school system is the introduction of the School Excellence Model (SEM) in 2000. The SEM is a comprehensive quality management system and is a significant part of the move to embrace a broader notion of success. Schools are now required to do self-appraisal using the new model; this is a break from the traditional school inspections when school inspectors swoop upon schools to vet their operations using measures that are not entirely clear to the schools. More emphasis now is devoted to value-addedness, leadership, staff management and strategic planning, rather than just on academic results (Ng, 2003).

The SEM basically describes an excellent school as one in which the leaders lead staff, devise strategies and deploy resources, all of which are systematically fed into clearly identified student-focused processes for which targets are set and performance monitored and managed. These “enablers” then produce results in staff and stakeholder satisfaction, as well as impact on society, all contributing to the achievement of school results and excellence. In the SEM, results go beyond academic achievements—while a school’s academic performance continues to be important, an excellent school is one that provides a quality and holistic education. Excellent results are defined as results which meet the target, are sustained over a number of years and show positive trends (Ng, 2003).

An external team from MOE validates the self-assessment results using the same criteria approximately once in five years. The assessment process is explicit in requiring evidence to justify a certain score. This means that even when a school is thought to perform well against a particular criterion, the model permits no score without any evidence of this. In addition to having explicit evidence relating to a criterion, a school must also have evidence of continuous improvement through trend analysis (Ng, 2003).

There is also a greater flexibility and choice in the educational programmes, and greater autonomy at the school level. To encourage more diversity and innovation, a variety of different types of schools and programmes are now available in Singapore. There are schools which offer the Integrated Programme (IP) where students skip O levels and head straight for the A levels or the International Baccalaureate (IB) diploma, specialized schools in sports, the arts, and science and mathematics schools. Syllabi, examinations and university admission criteria were changed to encourage thinking out of the box and risk-taking. Students are now more engaged in project work and higher-order thinking questions. The MOE has also adopted a more flexible and differentiated approach to school and university admissions. From a centrally controlled admission system, schools are given more leeway in admitting their own students and the universities will take steps toward greater ownership of their admission criteria, leading eventually to full autonomy in admissions. The government’s reasoning is that the increased flexibility will enable the schools and universities to be more responsive to their strategic objectives and changes in market demand, as well as to compete for the best students. It will also signal a shift away from a fixed formula of success.

Students are now given great support in doing things that are different from the usual examination curriculum. An example on how much the government is willing to invest to support the all round development of students is in the emphasis on cultural interactions between Singapore students and those from other countries. According to Education Minister Tharman Shanmugaratnam, schools in Singapore are sending more of their students abroad with the aim of developing the cultural flexibility of their students. A quarter of the university students spend some time overseas as part of their study and the government hopes to increase this to 50% in 2 years’ time (Tharman, 2006).

While the government has made significant changes to the system, there are still many challenges to overcome. Firstly, while there is decentralization of power to the schools to encourage innovation and enterprise, this is actually initiated by a strong centralized government in Singapore. Students can choose different types of schools, programmes and subjects, but the syllabi and national examinations are still set by the government. While the schools are asked to innovate, the government still exerts quality control through the SEM. Therein lies a tension between lofty goals and hard reality: the government still

carries a great responsibility for achieving national outcomes and providing high value for public money. Given the national economic strategies, the functioning of the schools must be correlated with the goals of national, social and economic development in Singapore. On one hand, the government attempts to decentralize power, give autonomy and devolve responsibilities to the schools. On the other hand, there is a risk of declining educational standards once government controls are lessened. With a robust quality assurance system to insure against the loss of control and facilitate authoritative communication and managerial scrutiny (Watkins, 1993; Ng, 2003), I&E will be more a diversity of means rather than ends.

School Level

School leaders will have to take the lead in I&E in schools. They have to be role models of I&E for teachers and students. In theory, I&E needs a culture of risk-taking and experimentation, rather than risk-avoidance and rule compliance. However, there is a tension because such a new mindset has not completely replaced the old one. The Singapore brand of leadership has been described as “too data-driven, too cautious, too little gut feel, fairly risk-averse” (Long, 2004). School leaders therefore play a key role in creating a culture of risk-taking and experimentation, rather than risk-avoidance and rule compliance in the school. In this area, some progress has been made in school leadership preparation. Instead of imparting administrative skills, the new focus is the inculcation of an innovative mindset. At the National Institute of Education (NIE), which is the only teacher and school leader training institute in Singapore, the Leaders in Education Programme (LEP), which started in 2001, aims to develop programme participants into innovative school leaders. The LEP is a 6-month full-time programme for specially selected vice-principals and MOE officers to prepare them for school leadership with the capability to transform schools into innovative learning communities. Such schools are incubators that nurture innovative students and teachers in a rapidly changing and complex economy, one that is driven essentially by knowledge and learning and pays a premium for innovation and enterprise.

But the challenge is that if I&E is to happen, the school leaders must be role models of I&E. Only then will staff members of the school believe in the initiative and be galvanized into action. If there is incongruence of word and deed, cynicism will set in and teachers will believe that I&E is yet another fad, an exercise to satisfy the headquarters or to pursue awards. Realistically, notwithstanding the provision of training, leadership in I&E demands human qualities that are not found in abundance, whether in the education, industrial or commercial sector.

For the teachers, the acute task is to be innovative in the teaching and learning process itself. Innovative teachers can discover new ways of getting an idea across to the students more effectively, or to excite students to explore or think through issues for themselves. To nurture innovative teachers, one of the programmes the MOE has introduced in 2003 to spur the teachers on and give them exposure to experiences outside the school is the Teacher Work Attachment Programme. The idea is to give those who participate in the attachment the opportunity to learn about new work environments in the commercial world, thus leaving their comfort zones and plunging into unfamiliar environments. The aim is to give teachers first-hand experience of the flexibility and adaptability that their students will need in the changing workplace. The stints can vary from a week to several months and teachers can also get to work overseas with foreign schools and companies.

MOE hopes to enable at least two teachers per school from 2006 to go on work attachments, and a total of about 1000 to 1200 teachers a year going on work attachments. (Tharman, 2004b).

But the challenge that both school leaders and teachers need to face up to is the need to promote I&E in schools and yet produce good academic results in an examination-driven environment. Some school leaders and teachers are concerned that there is no direct link between I&E and academic results. Investing in I&E appears to be a “luxury” to some schools that are struggling to get results in the national examinations. Schools in Singapore still rely on academic performance as a measure of success. This is in spite of the shift from ranking schools based on exact academic scores to banding schools with similar academic performance. Although the exact positions of the schools are no longer revealed under the banding system, schools are still assessed based on how high a band they are placed in. Schools still need to compete with one another to get into or remain in the desired band. While academic performance is no longer the main determinant of a school’s ranking, it remains a significant indicator for a school to be favourably banded.

Past successes in the examinations can sometimes be the worst enemy of I&E. The national curricula requirements and the pressures of national examinations pose a challenge to school leaders to innovate in their “core businesses”. Why change a strategy when it brings so much examination success? Principals and teachers cannot afford to stray too far, so long as they are held accountable for their schools’ performance in the national examinations (Tan, 2006). Students, their parents and other key stakeholders in education may also not favour a school that is innovative but does not help their students to get to the university. To many students, regardless what the rhetoric may be about creativity, in the mean time, mugging for examinations will still bear more material fruits than spending time in exploratory work, since at the end of the day, it is the examination that counts. More efforts and attention will still be channelled in that direction, instead of exploration and experimentation (Ng, 2005). Therefore, the issue is not whether these I&E initiatives are implemented. The challenge is whether the initiatives delve deep beyond the surface level to change the basic philosophy and approach to education.

Conclusion

This paper discussed the recent efforts by the Singapore government to introduce I&E in schools. Driven by a pragmatic need to align the educational system in Singapore to a national economic strategy in response to global economic realities, schools are expected to be innovative and enterprising, spearheading their own education or reform initiatives within the broad policy parameters defined by the MOE. The Singapore experience provides a useful case study of the measures that a government can use to promote innovation and enterprise in education and the challenges faced in the process. Given the ongoing quest of the governments in many countries to enhance on their human capital through education, it is likely for the Singapore government to keep up with measures to promote innovation and enterprise in schools. Whatever new initiatives the government may introduce in the years to come, education in Singapore will continue to be influenced by global market forces, and the government will continue to play a pivotal role in educational reforms.

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