

# Building Blocks for Education: Whole System Reform Toronto, September 2010

## Building a National Education System for the 21<sup>st</sup> century: *The Singapore Experience*

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# Building a National Education System for the 21<sup>st</sup> century: *The Singapore Experience*

## ABOUT SINGAPORE

1. Singapore is a multi-racial, independent city-state which has benefited from a forward-looking, stable government. A snapshot in numbers, is shown below in Table 1.

Table 1: Singapore Statistics (2010)

Population:	3.73 mil (resident), 4.99 mil (total)
Land Area:	710.3 sq km (274.2 sq miles) , smaller than New York City at 305 sq miles
Pop density:	6,814 per sq km
Ethnic diversity:	Chinese (74.2%), Malay (13.4%), Indian (9.2%), Other races (3.2%)
Official languages:	English (administration), Malay (national), Chinese (Mandarin), Tamil Languages most frequently spoken at home include: English (28.1%), Mandarin Chinese (36.0%), Other Chinese Languages (18.2%), Malay (13.2%), Tamil (3.1%) <i>*The working language of both government and the education system is English, as a common language for the different ethnic groups in Singapore.</i>
GDP:	S\$265bil (US\$182.2 bil) (2009, current market prices)
Per-Capita GDP:	S\$53,140 (US\$36,540) (2009, current market prices)
Education Budget:	S\$9.7 bil (US\$6.7 bil) approx 3.6% of GDP

2. The Ministry of Education, Singapore (MOE) is a national-level jurisdiction which operates most national schools<sup>1</sup>. Education is compulsory for the six years of primary education, but completion of 10 or 11 years of general education is virtually universal. Students progress to post-secondary education of two to three years along an academic, applied-oriented or vocational pathway, before one-quarter of each cohort go on to pursue university education. A growing continuing education system caters to the lifelong learning needs of the population. (Refer to Annex A for an overview of Singapore's education system). National examinations are held at the end of Grades 6, 10 (or 11) and 12.

3. We have half a million students enrolled in 356 public schools (173 primary, 155 secondary, 15 mixed-level, 13 junior colleges) and an education Service comprising 30,400 teachers, 1,600 allied educators and 5,600 executive and administrative staff. Schools are divided into four zones (North, South, East and West) with each zone divided into seven clusters. Each cluster is overseen by a superintendent (an experienced former principal).

4. There are 182,800 students enrolled across three universities, five polytechnics, the Institute of Technical Education and two tertiary arts institutions. A

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<sup>1</sup> In 2004 and 2008, Specialized Independent Schools such as the Singapore Sports School and School of the Arts were set up to nurture talents in those fields owned and are managed by other relevant Ministries. MOE provides funding and continues to have some oversight of those schools.

new publicly funded university, the Singapore University of Technology and Design has recently been established in collaboration with the USA's Massachusetts Institute of Technology and China's Zhejiang University, and will enrol its first cohort of students in April 2012.

5. The importance that Singaporeans attach to education reflects the larger role that education plays in Singapore's economic and social development. Education is not merely about allowing individuals to discover their strengths and realise their potential, but is also regarded as a critical pillar for supporting economic growth and building a nation. As a city-state plugged into a global economy, our imperative is to constantly innovate in order to stay competitive, while building a distinctive national identity.

## **BRIEF HISTORY OF SINGAPORE'S EDUCATION SYSTEM**

6. Singapore's education system has evolved considerably since the Ministry of Education was set up about five decades ago. These changes can be broadly characterized by three phases - "survival-driven" (1959-1978), "efficiency-driven" (1978-1997) and "ability-driven" (1997-present). Our focus shifted from raising participation and enrolment rate to raising the quality of teaching, and then to helping each child reach his/her fullest potential.

### **Survival-Driven Education (1959-1978): Building a National Education System**

7. After the laissez-faire education system of the colonial era, a key task when Singapore attained self-government in 1959 was in bringing the four different language streams into one national system and according them equal status<sup>2</sup>. The government also made it a priority to ensure that every child had a place in school. Schools were built at a rate of about one each month. The teaching force almost doubled from 10,590 to 19,216 between 1959 and 1968. To improve the quality of teaching in schools, measures were taken to upgrade both the faculty and facilities of the teacher training campus. Bilingualism was made compulsory from 1966, and all students had to study English (at first or second language level) and their mother tongue language (MTL) from Grade 1. Grade 7 students in 1966 were required to learn a second language which was offered as an examination subject at the Grade 10 level from 1969.

8. By the end of this period, Singapore had achieved virtual universal primary education. However, up to the late 1970s, almost 30 per cent of primary school pupils did not progress to secondary schools. Proficiency in the English language was low, and educational wastage (failure to achieve the expected standards and premature school leaving) was high.

### **Efficiency-Driven Education (1978-1997): Raising Educational Quality**

9. In 1978, a major review of the education system was undertaken with a view to reduce attrition rates (itself a sign of the failure of the system to meet the needs of

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<sup>2</sup> Instruction was carried in at least four different languages – English, Chinese (Mandarin), Malay and Tamil.

different learners) and to raise the quality of education to power future growth and social development. The review resulted in key structural changes. To address the diverse needs of different groups of learners, streaming (also known as tracking) was introduced – students were streamed into academic groups based on academic achievement. For each group, the curriculum was customized to the learning needs of the students so that each group could learn at a pace they were comfortable with, and stay in school for longer. The results were impressive. At the primary level, the dropout rate fell from 6 per cent in the late 1970s to 0.5 per cent in 1997. At the secondary level, the rate fell from 13 per cent to 3.3 per cent over the same period.

10. Greater emphasis was placed on language acquisition in lower primary to help students acquire a strong foundation in the language for the learning of content in the other subjects at the upper primary level. The Curriculum Development Institute of Singapore was set up in 1980 to develop all curriculum and teaching materials in order to improve the quality of teaching materials. School appraisals were implemented from 1980, focusing on school organization, instructional programs, extracurricular activities and pupil welfare. School appraisals were both an accountability exercise and a process to help schools evaluate their effectiveness and identify areas for improvement.

11. Enabling these changes was the emphasis placed on the status of and recognition for teachers and school leaders. In line with the overall philosophy to pay competitive salaries in the public sector, educators saw two major rounds of revisions in salaries and career prospects. The first was in 1982 and the second round in 1996, arising from the recommendations of the Education Service Review Committee. More competitive salaries and faster promotions were introduced, together with strong emphasis on continual upgrading and professional development. By the mid-1990s, efficiency-driven education was receiving positive affirmation, with Singapore students doing well in both mathematics and science for the Third International Mathematics and Science Study (TIMSS) in 1995.

### **Ability-driven Education (1997-present): Developing Every Child to His/Her Fullest Potential**

12. In 1997, then-Prime Minister Goh Chok Tong unveiled the vision of “Thinking Schools Learning Nation” (TSLN). TSLN describes a nation of thinking and committed citizens capable of meeting the challenges of the future, and an education system geared to the needs of the 21st century. It continues to be the over-arching descriptor of the transformation in the education system, comprising changes in all aspects of education.

13. Our Desired Outcomes of Education (DOE) were formulated in 1997, which articulated the end-objectives of formal education and described the skills and values deemed important for our young to possess in an increasingly globalized world. To ensure continued relevance, these desired outcomes were reviewed and refreshed in 2009. Please refer to [Annex B](#) for the DOE.

14. In the late 1990s, TSLN provided the context for curriculum reviews that aimed to develop creativity and habits of independent learning among our students. Content was judiciously trimmed to make room for development of thinking skills,

15. Systems and structures were developed to support these strategies. School management structures were strengthened – schools were organized into geographical clusters, where each cluster was overseen by a superintendent who provided mentorship for the principals. The School Excellence Model was introduced in 2000 to provide schools with a framework and holistic approach for self-assessment, and guide schools on self-improvement.

16. Teacher quality was again affirmed as a key determinant of quality education. The National Institute of Education was restructured and its nexus with schools and MOE was strengthened to facilitate close alignment between overall educational policy and teacher training. Career development and compensation for teachers were continually being improved, with significant enhancements being made in 2001, 2006 and 2007.

17. In 2003, MOE focused more on one aspect of our Desired Outcomes of Education, i.e. nurturing a spirit of Innovation and Enterprise (I&E). I&E can be described as a spirit that will build up a core set of life skills and attitudes that we want in our students. It promotes the mindsets that we want to see in our students, teachers, school leaders and beyond.

18. From 2005, MOE took the transformation one step further, from structure and systems into the heart of the education endeavour – the quality of interaction between teacher and students, and the teacher, school leader and school factors that would support this. This is the “Teach Less, Learn More” movement.

19. In 2008, MOE placed the spotlight on what our learners would need for the future, and sharpened its focus on the need to develop 21<sup>st</sup> century competencies among our young. The changes are being introduced, starting from the early years in primary schools, under the aegis of the Primary Education Review and Implementation Committee, before extending into the secondary and post-secondary years.

20. As teachers are critical to this effort, capacity building is a key priority for MOE. The Academy of Singapore Teachers (the academy), to be established in late 2010, aims to be the leading academy for professional excellence in education. Its mission is to build a teacher-led culture of professional excellence centred on the holistic development of the child. The academy, together with other specialized centres for English language, physical education and sports and the arts will serve as catalysts and enablers for teachers’ professional development. These complement existing centres that cater to the professional development of Malay, Chinese and Tamil language teachers. Together, the academy and the specialized teacher centres will provide a central focus and driving force for professional development, and enable teachers to move our education system to a higher plane for the next decade.

### **Box 1: Theory of Action - Thinking Schools, Learning Nation**

In 1997, MOE set out the vision of *Thinking Schools Learning Nation* (TSLN), a key milestone in Singapore's journey to bring about improvements in the education landscape on a larger scale. The term TSLN was first introduced by then-Prime Minister Mr. Goh Chok Tong in 1997, when he called for all Singaporeans to embrace a "total learning environment."

Within the MOE, TSLN was a clarion call to examine current practices with the view to meet the challenges of the future. The willingness to make fundamental changes just at a time when our school system was performing well was a reflection that our education system believed in preparing well for the future.

To prepare for the future, education must impart process skills and not centre solely on knowledge acquisition. The phrase "Thinking Schools" was coined, indicating the need for schools to strive for continuous self-improvement, and not be mere implementers of education policies. Encapsulated in the TSLN vision was also the importance placed on "brainware" and to fire a passion for learning so that the next generation could think for themselves confidently and deal with challenges different from those faced by the present generation.

To further support the achievement of the TSLN vision, MOE re-examined our goals and purpose in education. It was an important exercise especially as Singapore found herself at the threshold of a new knowledge-based economy that necessitated a re-examination of our education system. The re-examination culminated in the birth of the Desired Outcomes of Education (DOE), marking a strong restatement of the need to develop the child holistically.

The DOE aimed to set people thinking about the fundamental outcomes that our education system should aim to achieve, beyond the pursuit of academic standards. Guided by the TSLN vision and the DOE, numerous initiatives were broached at the systemic level to massively re-orientate the education system to meet the needs of the future. Then-Permanent Secretary Mr. Lim Siong Guan summed up the hive of activity in an apt metaphor - "I remember we talked about this 32-legged (caterpillar) and we had to move together."

The TSLN movement reviewed the entire education system from pre-school education to the formal and informal curricula and university admission criteria. University academics and other education personnel, especially principals, were extensively involved in the process. The reviews also sought the views of other ministries, statutory boards and industry leaders.

Reviews were made in areas including curriculum and assessment to develop creativity and habits of independent learning among our students. MOE embarked on the implementation of a masterplan for ICT in education, the development of a comprehensive strategy for national education, and moves to strengthen school management structures. These are explained in subsequent sections of the case study.

Given the slew of radical initiatives injected into the education landscape, it was very important for educators to make sense of the rapid changes so as to manage the changing expectations of their roles positively. All teachers were encouraged to take the opportunity to share their professional views regarding the policy changes with their school leaders. This would form part of an envisioning exercise for all members of the school community to ease them into the evolving education landscape.

Under the TSLN vision, school autonomy continued to be an important pillar. Thinking Schools required that decisions be made at the lowest possible level, and to do that, schools had to be provided with additional support structures. For example, additional Heads of Department posts were created in each school to coordinate the provision of a broad range of non-academic programs and to set in place monitoring mechanisms to ensure that each student participated in a breadth of activities.

Even as our education system continues to evolve, the TSLN spirit has continued to undergird enhancements and refinements to the system. School leaders and teachers have autonomy to introduce school-based innovations, with support from the Ministry of Education Headquarters (HQ).

## **IMPLEMENTATION – AREAS OF FOCUS, STRATEGIES & CHALLENGES**

### **(A) Standards and Targets**

21. MOE's goal is to put the child at the centre of all that we do. Reforms that have been put in place since the 1990s have aimed not only at achieving high averages but also peaks of excellence in the system.

22. Our goals are for all our students to complete at least 10 years of basic education, and for at least nine in 10 to progress into a post-secondary education institution to build strong foundations for employability and civic participation. Today, 93 per cent of each Grade 1 cohort progresses to post-secondary education, an increase from 78 per cent in 1999. Around 25 per cent progress to the publicly funded universities, and we target to increase this proportion to 30 per cent by 2015. Attrition rates in the schools have been reduced - from about 5 per cent in 1997 to about 1 per cent today, through programs and pathways to help at-risk students.

#### *National examinations and international benchmarking*

23. Singapore's national curriculum and national examinations play critical roles in safeguarding the foundations of learning and the standard of attainment across the entire system. Core learning outcomes in knowledge, skills and values are outlined in the subject syllabuses and assessed in key stage national examinations. This sets clearly defined benchmarks for students, parents and teachers to work towards, and helps to ensure that our students meet minimum standards at each of the key stage levels. Singapore's participation in international benchmarking studies also serves as a useful external validation of our strengths and areas that we need to improve in. In TIMSS 2007, we were ranked 2<sup>nd</sup> and 3<sup>rd</sup> respectively in Grade 4 and

### *Diversifying the education landscape*

24. The focus in recent years has been to help every child achieve his/her aspirations through multiple pathways, by recognising a broader range of talents and abilities. Reforms have been put in place to inject greater diversity, flexibility and choice into the system. Beyond the customization by streams, schools are provided some “white space” in the curriculum to develop innovative and relevant school-based curricula and programs that are more finely tailored to the needs of their students.

25. Concurrently, streaming in primary schools evolved to a system of subject-based banding (an approach whereby students take a combination of “standard” and “foundation” level subjects) to cater to students with uneven strengths. At the secondary level, students from the normal (academic) stream and normal (technical) stream have benefited from more customized options such as applied elective modules, offered in collaboration with Polytechnics and Institute of Technical Education (ITE). There is also greater opportunity for lateral transfer between streams at the Secondary level. The Integrated Program was developed for students who are clearly university-bound to proceed to Grades 11 and 12 without taking the National Examinations at the end of Grade 10 (GCE O-levels). This frees up time and space for broader learning experiences. This structural change was of great significance as our education system has always placed great value on these almost “sacred” national benchmarking examinations.

26. Specialized schools in sports, mathematics and science; science and technology; and the arts were established. Three privately funded secondary schools offering different curricula and qualifications (e.g. International Baccalaureate) have also been set up to introduce greater diversity in the education landscape and greater choice for our students.

27. To cater to the needs of the very small proportion of students (about 0.5 per cent of each cohort) who are unable to access mainstream secondary education, MOE set up Northlight School in 2007 and Assumption Pathway School in 2009 to provide a more customized curriculum suited to their learning styles. Data from the first cohort of students from Northlight School show gratifying outcomes – more confident individuals, significantly reduced attrition rates, as well as higher progression into vocational and skills training or employment.

28. In addition, there are 20 special education schools run by Voluntary Welfare Organizations, serving about 5,000 students with moderate to severe or multiple special needs. These schools cater to different disabilities including sensory impairment, intellectual disability, autism and multiple handicaps. The majority of the students in these schools undergo a modified and customized curriculum focusing on functional and vocational skills, leading to a wide range of outcomes from independent living to supported or open employment. A small number of students in these schools access mainstream curriculum and are being prepared for national examinations.



29. Among mainstream schools, niches of school-based excellence were encouraged and nurtured. Around 47 per cent of all schools today have niches of excellence in different areas such as sports and the performing arts.

30. The Direct School Admissions framework has also widened the scope for students to be selected into secondary schools and post-secondary institutions through school-specific and merit-based criteria that go beyond just examination results (e.g. strengths in sports, performing arts, leadership or specific subject areas). This has allowed us to combine the rigour and transparency of a national examinations-based selection system with the flexibility of school-based selection criteria that can recognize and pick out unusual talents or uneven strengths.

### *Teach Less, Learn More*

31. Apart from structural changes to the education system, the “Thinking Schools, Learning Nation” vision also required MOE and schools to sharpen our focus on developing the important but less tangible qualities like character and values, and pay more attention to catering to diverse learner needs. In particular, there was a need for more emphasis on “softer” factors, like learner motivation, teacher competency in guiding learning for life, and leader capacity to manage change.

32. The “Teach Less, Learn More” (TLLM) movement launched in 2005 best sums up our strategy in the area of curricular reforms. TLLM comprised a set of strategies to transform learning, and helped to realise the full potential of TSLN. The key approach which MOE adopted under TLLM was to allow more differentiated approaches and innovation from schools, and for MOE HQ to provide top-down support for ground-up initiatives.

33. TLLM is about teaching better, so as to engage our learners and prepare them for life, rather than teaching more for tests and examinations. It is about shifting the focus from “quantity” to “quality” in education. “More quality” in terms of classroom interaction, opportunities for expression, the learning of life-long skills and the building of character through innovative and effective teaching approaches. “Less quantity” in terms of rote-learning, repetitive tests, and following prescribed answers and set formulae.

34. To provide greater space for school-based flexibility in the curriculum, there was judicious content reduction across subjects so that 10 to 20 per cent of curriculum time could be freed up as ‘white space’. Teachers have the autonomy to use the ‘white space’ to customize lessons, using a variety of teaching and assessment methods to better meet the needs of their students.

35. The TLLM movement catalysed the transformation of teaching and learning in our schools by providing schools with the opportunity and resources to develop School-based Curriculum Innovations (SCI) for their students. Our strategy was to prototype the changes with 29 schools in 2006, and scale up progressively. Schools received consultancy support from curriculum experts, and teachers were trained in

36. The success stories of the prototype schools were shared with the rest of the schools and the program expanded to another 100 schools in 2008. By 2011, we expect all schools to come on board the TLLM movement.

37. Teacher professional development was given a boost under TLLM when “time-tabled time for professional development” was introduced, to provide teachers a clearly delineated time-slot to engage in professional discourse and sharing with colleagues.

*Future challenges – balancing knowledge with skills and values*

38. Following the TLLM movement, our challenge today is to rebalance the emphasis on knowledge acquisition with development of skills and inculcation of values. While Singapore has strong academic standards in math, science and literacy, we could do better in developing soft skills and competencies such as critical thinking and creativity among our students.

39. A recent review of primary education was completed in 2009 and saw the charting of a road map for the next 10 years. The recommendations were in two broad areas. First, to balance the acquisition of knowledge with the development of skills and values through increased use of engaging and effective teaching methods, more holistic assessment, and a stronger emphasis on non-academic aspects within the curriculum. Second, MOE would invest more resources in the areas of manpower, funding and infrastructure.

40. A conceptual framework was developed to guide teachers and schools leaders in developing 21<sup>st</sup> century competencies among our young at all levels. Diagram 1 illustrates the desired student outcomes and 21<sup>st</sup> century competencies. We want our children to be confident, retain a sense of curiosity and the desire to learn, be able to communicate clearly and work well in teams and across cultures. We also want them to be contributing citizens and individuals of good character.

**Diagram 1: Desired Student Outcomes and 21<sup>st</sup> Century Competencies**



41. Many of the competencies and values depicted above (e.g. civic literacy, critical thinking, cross-cultural and communication skills) are being taught in schools today. What schools will aim for however, is to strike a better balance between students' learning of content knowledge and their acquisition of these necessary competencies and values to thrive in the future.

42. As part of efforts to strengthen holistic education, curriculum, pedagogy and assessment are being refined to make explicit the teaching and learning of 21<sup>st</sup> century competencies through all academic subjects. The quality of physical education, music and art education will also be strengthened. More art and music teachers will be recruited, while the existing ones will move towards single-subject specialisation. There will be more explicit emphasis on the development of 21<sup>st</sup> century competencies during co-curricular activities as they serve as natural platforms for the development of skills and values.

### **(B) Assessments and Use of Data**

43. Policy-making and program development are informed by the extensive use of data and evidence-based research. MOE developed a comprehensive suite of databases in the early 1980s, and these have been used in turn to build applications that directly help school leaders and teachers to monitor school and student outcomes. For example, the School Cockpit System, first commissioned in 2001, serves as a web-based school administration system that provides a rich source of

44. The results of student achievement in the national examinations provide annual data to analyze trends in student achievements and are also used to guide policy formulation as it identifies areas where intervention is needed and the type of intervention needed.

45. At the school level, teachers and school leaders are provided with a single point of access to all student data and resources for management planning and decision making within schools and school clusters. At the systems level, the database facilitates research and analysis, where data is used to inform policy-making. For example, data on home language trends collected from parents of Grade 1 students have been used to inform major reviews on the teaching and learning of mother tongue languages (MTLs). The growing trend of a rising proportion of students coming from predominantly English-speaking households provided the impetus for us to further customize teaching methods, to make the MTLs more accessible for those who might have very limited exposure to the language prior to entry into Grade 1.

46. An example of data-driven program development was how MOE leveraged on student assessment data for its review and enhancement of the Learning Support Program (LSP). The LSP supports Grade 1 and 2 students who enter Grade 1 with very weak oral language and literacy skills and aims to level them up through an intensive literacy intervention program. To help schools monitor students in the LSP, the School Cockpit contains an LSP module, which captures the screening test results at the beginning of Grade 1 which are used to identify students for the LSP. Students' reading age and English-language assessment results are also captured in the LSP module. At the systems level, these data informed MOE's review of the LSP, leading to its enhancement in 2005 and the piloting of the enhanced LSP in 2006-07. Students' performance data during the pilot revealed the positive impact of the enhanced LSP on pupils' learning outcomes.<sup>3</sup> This led to the decision to roll out the enhanced LSP to all primary schools in 2007 and 2008. Beyond the LSP years, student performance data in the School Cockpit facilitates longitudinal tracking, to inform schools and MOE if further action needs to be planned and taken to continue to support students.

47. Mining the data captured in international benchmarking studies also helps to inform our policies and practices. For example, the Centre for International Comparative Studies at the National Institute of Education has embarked on a secondary analysis of TIMSS 2007, to answer a set of research questions that would help MOE identify specific strengths and weaknesses in various domains of learning for different groups of students and the possible factors that contribute to variations in student performance. These include how students fared in specific released

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<sup>3</sup> A research study showed that 65 percent of students who participated in the study were found to be able to read at their age level and pass their school English Language examinations by the end of Grade 2. This is significantly higher than the previous LSP discharge rate of 40 percent.

TIMSS items, as well as common mistakes and difficulties faced by students, so as to help teachers better understand students' areas of strengths and weaknesses.

48. In terms of modes of student assessment, one of our aims is to strike a better balance between “assessment of learning” and “assessment for learning”. While assessment of learning in the form of national and semestral examinations are important measures in our system to ascertain how much students have learnt and for merit-based placement, assessment for learning will increasingly play an important role in improving students' learning and for teachers to improve their teaching. As paper-and-pencil tests are limited in assessing certain skills, school-based assessment e.g. coursework in some subjects, school-based science practical assessment (at Grades 7-12) and project work (at Grades 11-12) have been introduced to more comprehensively assess students' development of skills and understanding of certain core concepts.

49. Going forward, MOE will be working with schools to balance the use of written examinations and alternative modes of assessment in primary schools, so as to support the holistic development of pupils. This will help schools to track the learning progress of pupils, and provide richer feedback to parents and pupils. MOE will provide schools with training and resources for developing expertise in new teaching and assessment methods. At the student level, tools to evaluate students' level of acquisition of skills and competencies are also being developed, including rubrics for teacher-evaluation and students' self-assessment. We anticipate that schools will take the next few years to build capacity in using a wider range of assessment modes.

### **(C) Developing Quality Teachers**

50. Our strategy over the years has been to attract good teachers, give them the right training, and provide career opportunities and support so that we retain good people within the profession.

#### ***Box 2: How Singapore Develops its Teachers***

##### **Recruitment**

MOE aims to recruit teachers from the top one-third of each cohort. University graduate teachers deployed to secondary schools (Grades 7-10) and junior colleges (Grades 11-12) must have a degree in the subject that they are to teach. In primary schools, we also plan to recruit only those who have graduated from degree programs by 2015. About 10-15 per cent of each intake of teachers each year are holders of MOE scholarships and teaching awards; the scholarships and awards serve to attract a fair share of the most talented in each cohort to a career in education. Teaching applicants are interviewed and selected carefully by a panel comprising experienced principals. During their training at the National Institute of Education (NIE), teachers are paid salaries so that they can fully concentrate on their learning. This has been a key enabler for attracting mid-career entrants to the teaching profession. The loss of income during teacher training could otherwise be a major impediment to recruiting former accountants, bankers, engineers, executives and lawyers into teaching.

### Training

Like the rest of the civil service, teachers are entitled to 100 hours of training each year. They have access to a plethora of training, professional development and academic upgrading opportunities. After graduating from NIE, beginning teachers go through a customized induction program and are put on a Structured Mentoring Program in their schools to ease them into the school environment. Professional networks and communities facilitate sharing of knowledge and best practices. Education officers are encouraged to attend in-service courses tailored to the teaching profession and sent on milestone programs at key stages in their career. They benefit from fully paid professional development leave while outstanding officers are given postgraduate scholarships to pursue studies either locally or overseas at prestigious universities.

Principals who have completed six years of service can also take advantage of a sabbatical scheme on full-pay for up to two months, starting from 2003.

### Career Development

To strengthen the attractiveness of the teaching profession, the career development and compensation for teachers was significantly boosted with the introduction of the Education Service Professional Development and Career Plan (EduPac) in 2001. EduPac helped to attract a larger pool of people to join teaching, including mid-career professionals who offer a good balance to the teaching service with their prior experience in other sectors of the economy.

Within the education service, different career paths are available to cater to the different talents and aspirations of education officers. There are the leadership, teaching and senior specialist tracks. Officers have the flexibility to make lateral movements across the different tracks based on their interests and organizational needs. To support career development, MOE has an open posting framework to allow officers to apply for teaching positions which they have interest in rather than having them centrally posted as before. They may move to schools within or across different levels of the education system and overseas campuses, work at MOE's headquarters or even external organizations such as NIE.

Singapore is one of the few education systems that has implemented a performance-based compensation structure for our teachers, instead of following a seniority-based pay scale. This ensures that our teachers are duly recognized for their contributions, are motivated towards excellence, and those with stronger potential can progress to higher appointments.

A further boost to teachers' career and professional development came in 2006 and 2007, in the form of new packages called GROW and GROW 2.0 which aimed to maximize the growth of our education officers through better recognition, opportunities (e.g. support for post-graduate studies) and seeing to their Well-being.

51. Over the past 10 years, the size of the teaching force has increased by 30 per cent from 23,500 teachers to over 30,000 currently. In terms of quality, the proportion of graduates in the teaching force has also increased from 67 per cent to 79 per cent

### *Future challenges*

52. In the next phase of education, the capacity of our educators to prepare students for the 21<sup>st</sup> century will be even more critical. Teachers will be required to deliver holistic education that is increasingly flexible, customized, collaborative, and grounded by sound moral and social values. They must be able to respond to students who question more, and who may learn better through self-discovery and an exchange of views.

53. MOE will continue to invest in the professional development of teachers, strengthen professionalism and build capacity within the profession. Our approach is to strengthen the network of professional learning communities (PLCs) in schools, so that teachers come together regularly to share and learn from one another. PLCs will provide teachers with the platform for continuous dialogue to lead and drive improvements, hone their own classroom practice and maintain their professional currency.

54. To consolidate expertise and resources at the national level, MOE will establish the Academy of Singapore Teachers (the academy) which will be the home of the teaching profession and help catalyse the building of teacher capacity. Working closely with the academy, teacher academies in key learning areas will also be set up under the aegis of the academy as focal points for teachers to gather and work collectively towards a higher level of professional competence. By end 2010, we will be establishing a Physical Education and Sports Teacher Academy (PESTA), and a Singapore Teachers' Academy for the aRts (STAR). An English Language Institute of Singapore (ELIS) will be set up by mid-2011 to complement similar centres catering to the professional development of Malay, Chinese and Tamil Language teachers.

55. The academies will help build instructional capacity, draw out pedagogical leadership from the fraternity, as well as advance continuous learning and improvement. At the same time, our teacher academies will continue to study models of excellence in various parts of the world and network with other centres of expertise in the world. By championing professional values and the core of practice underpinning the teaching profession, we envisage that the academies will help build a deep sense of pride, identity, ownership and collaborative professionalism among teachers. We hope to groom a core group of master teachers and senior teachers who will lead and guide the teacher fraternity in the latest pedagogical developments in their respective subject areas.

### **(D) Leadership Development**

56. Emphasis is placed on the identification and development of leaders in education. High-potential officers are placed on a mentorship scheme, given various

57. Teachers with the potential to become principals are appointed to middle-management positions in schools, like subject or level heads, and as heads of department. Some have stints in MOE to expose them to broader policy issues. To better prepare them for their management responsibilities, they attend a full-time four-month milestone program at the National Institute of Education – Management and Leadership in Schools (MLS) for middle managers. During their vice-principal posting, officers identified for principalship are put through an assessment centre to assess how they demonstrate the full range of leadership competencies needed for school leadership. The assessments gathered as a result of this program are integrated with other input for the selection of Principals. Principalship candidates attend a six-month preparatory program called the Leaders in Education Program.

***Box 3: Leaders in Education Program***

Vice-principals and equivalent officers found to have potential for Principalship undergo a six-month Leaders in Education Program (LEP), where they are given opportunities to network, visit overseas education systems, engage in innovation projects, and learn about leadership in external and overseas organizations. The program has an executive orientation - similar in scope and intensity to an executive course in business schools, but with a focus on education.

Authentic engagement in a school community is intended as a key learning opportunity for leadership development. One example is the Creative Action project, where groups of three to four LEP participants are attached to a school for a minimum period of two months, and tasked with developing a concept plan to guide the transformation of the school in the immediate future. They also have to implement one aspect of the transformation plan, and prototype the innovation in the school. This could be in the area of teaching and learning, ICT, social-emotional learning and so forth. In doing so, they need to consider all aspects of the school and the schooling experience, including leadership and organizational needs, teacher development, pedagogy, curriculum and relationships with stakeholders.

58. To further strengthen school leadership, newly appointed principals are paired with more experienced ones under a mentoring scheme started in 2007, so that mentors can pass on tacit knowledge especially in the running of schools and people management. Emphasis on skills development and values education will subsequently be incorporated into these leadership milestone programs.



## **(E) Sustainability - Enhancing School Management and Excellence**

59. The TSLN movement necessitated a focus on an ability-based education, where schools had to customize solutions to meet the distinctive needs of their students. This meant that centralized management was no longer effective, and MOE had to empower schools to chart their own progress journey, customized to each school's unique level of development. It made good sense to give school leaders more responsibility and autonomy to manage their schools.

60. At the same time, MOE recognized the need to balance autonomy with accountability. School appraisal is a key aspect of creating a feedback loop that helps drive school improvements and ensures sustainability in good practices.

61. The key insight in the new school performance management and accountability system was the need for *schools to be engaged in a process of continuous improvement, across all domains that had an impact on school effectiveness*. MOE thus adopted a quality-assurance approach to school improvement, where schools were responsible for their own progress, while MOE took on the role of validating schools' progress. This led to the development of the School Excellence Model (SEM) in 1998, drawing from the European Foundation of Quality Management model. The system of having MOE officers inspect schools was thus replaced by a self-assessment approach, complemented by five-yearly external validations (recently revised to six-yearly cycles) undertaken centrally by MOE. The external validation process provides schools with an external perspective, and ensures a consistent view across the system.

62. To complement the use of the SEM as an accountability tool for schools to chart their own improvement, the Masterplan of Awards (MoA) was launched in 1998. The MoA functions as a useful milestone check for schools in their journey towards excellence, and seeks to encourage and recognize sustained good practices and achievements.

63. In addition, a school cluster system was introduced, under which selected experienced school leaders were appointed as Cluster Superintendents to oversee 12-14 schools each. The school cluster system provides a useful platform for leadership development, sharing of best practices, and local-level resource allocation — which in turn supports the drive towards continuous improvement. The school cluster system acts as a *multiplier of good practices*. It helps to level up schools through:

- a. *Sharing platforms.* Schools in the cluster share their best practices during cluster board meetings which are held monthly and attended by school leaders. Many clusters have support groups or communities of practice where key personnel from the various schools in the cluster come together to share and learn from one another. Clusters also organize workshops and seminars to focus on specific areas for improvement, e.g. strategic planning, resource management, curriculum design.

- b. *Support from cluster superintendents.* Cluster superintendents work very closely with school leaders to provide guidance and advice as well as support with additional funding through the use of cluster funds to enable school leaders to improve their schools' processes and programs.

64. Taken together with the improved quality of educators and school leaders, this systemic approach to school improvement ensures that schools take ownership of their own improvement process and that no school falls below or off the radar screen. It has helped to bring about a virtuous cycle in raising school performance across the board. The upward trend in the average External Validation (EV) score of schools in the last decade indicates an overall systemic improvement in school performance. For example, schools which had undergone EV in 2009 achieved an average score that was on average 40 per cent higher as compared to their last EV five years ago in 2004. The data suggests that the SEM has helped all schools to make constant, consistent and sustainable improvements, regardless of their starting points.

## **(F) Investing in Learning Resources & Infrastructure**

65. Significant investments in school infrastructure were necessary to strengthen our reforms and prepare our students for the future. They included the following:

### *Enhancements to school facilities to support a learner-centred school environment*

66. To equip schools with facilities that can support a wide range of educational programs, MOE launched the Program for Rebuilding and IMproving Existing Schools (PRIME) in 1999 in phases to upgrade all schools to the latest standards. Under PRIME, schools have more classrooms and are fitted with new or upgraded facilities which include media resource libraries, IT learning resource rooms and pastoral care rooms.

67. To provide a wider range of programs for the holistic development of our students, we had to overcome space constraints in our schools which catered to two sessions of students each day (a school session each in the morning and afternoon). To free up space for our students' holistic development, all secondary schools were converted to single session schools by the year 2000. We are currently facilitating the transition of our primary schools from double-session to single-session schools so that more time and space is available for them to use more engaging pedagogies, or to implement non-academic programs.

68. Since 2005, schools were also given greater flexibility and resources to design and optimize the use of existing school areas, under the Flexible School Infrastructure (FlexSI) scheme. Under FlexSI, each school was given a budget [\$350,000 (US\$240,600) for primary schools and \$400,000 (US\$275,000) for secondary schools] which they could use to transform their outside-classroom areas into useful learning spaces. For example, schools may decide, based on their own specific needs, to build an outdoor amphitheatre or eco-pond to facilitate experiential learning for students outside of the classroom.

69. Currently, primary schools are being resourced with enhanced, new-generation facilities to better support holistic education. This includes redesigned classrooms, outdoor learning spaces, and specialized rooms such as a band room, dance studio or performing arts studio and an outdoor running track. A number of primary and secondary schools have also been equipped with indoor sports halls and synthetic turf fields, and we plan to provide schools with more of such facilities in future.

*Purposeful use of Information and Communication Technologies (ICT) to achieve more customized teaching and learning*

70. Masterplans for the incorporation of ICT in education were introduced in a staged manner to tap its capabilities to promote life skills and mindsets, such as risk-taking, innovation and problem solving. Usage of ICT became pervasive throughout the system in teaching and learning as a result.

71. The first ICT masterplan, launched in 1997, laid a strong foundation for schools to harness ICT by providing all schools with basic infrastructure. Teachers were equipped with basic skills in the use of word processing and presentation software to begin the process of integrating ICT into their lesson plans. A centralized approach was adopted in the early years as a significant proportion of teachers were still not comfortable using ICT. Each teacher received at least 30 hours of training and targets were set for each school to have ICT-enabled lessons for up to 30 per cent of curriculum time. By 2002, we achieved a widespread acceptance of its use in Education.

72. The second masterplan for ICT in Education (2003-2008) built on this foundation to strive for an effective and pervasive use of ICT in education by strengthening the integration of ICT into the curriculum to bring about greater interactivity and engagement in the learning process. With basic infrastructure in place, we provided greater autonomy for school leaders to decide how best to integrate ICT into teaching and learning based on the specific needs of their students. Baseline ICT standards were introduced to spell out the competencies that students should achieve at certain milestones.

73. The third masterplan (from 2008) places emphasis on capacity building to increase the integration of ICT into curriculum, pedagogy and assessment, e.g. use of ICT for school and national assessments. Ultimately we want to be able to use ICT to tailor learning experiences according to the way that each student learns best and encourage students to go deeper and advance their learning. In terms of infrastructure, we are exploring more flexible and mobile infrastructural provisions e.g. one-to-one computing such that students are able to learn anywhere, anytime.

74. Six schools have also been identified as “FutureSchools@Singapore”. These “trailblazers” have been set up to provide models for seamless and pervasive integration of ICT into the curriculum, and the experiences can then be scaled up to other schools across the system. Examples include digital modelling and games during maths and science lessons, use of 3D virtual worlds to teach abstract concepts, and leverage on animation/video-casts to produce high-quality multimedia products to develop language abilities and aesthetic appreciation. In Canberra

## OUTCOMES AND LESSONS LEARNT

75. To date, Singapore has achieved a system of high averages. From a Grade 1 cohort, 99 per cent complete secondary education and 93 per cent progress to post-secondary education. We have more pathways to cater to students of different abilities and talents, and our students have also performed well in international benchmarking studies (e.g. TIMSS, PIRLS).

76. The critical success factor for our education system is a quality teaching force supported by strong school leaders and administrators, working within an integrated MOE family. The sustainability of Singapore's reforms must also be seen in the broader societal context of a strong culture of respect for learning and hard work, which provides strong support for what we seek to do in schools.

77. Singapore's experience in building a national education system to prepare students for a more globalized world has surfaced several lessons, and we highlight a few below, including areas where we seek further improvement:

78. First, policy reforms must be clear in purpose and accompanied by the capacity for realization. It is the ability to communicate purpose and intent, translate plans to implementation, and generate feedback for policy reviews and improvement, that combine to become Singapore's key strength. In the case of education, this execution capacity extends across the system and into all the schools. Reforms must be prioritized, and supported by corresponding investments in resources and system-level platforms to spread best practices across the board. As we implement the reforms, public communication and consistent messaging have become increasingly important especially when implementation cycles may span a longer period than the term of government.

79. Second, a successful system needs to be open to new ideas, and constant adaptation. Education is a constant work in progress, as we evolve the system to prepare students for a globalized world. The constant refreshing of ideas within the system comes in part from the cross-fertilization of perspectives among the political leadership, professional educators and senior administrators who come from outside the education fraternity. An openness to new ideas has been helpful, as well as the availability of avenues to share best practices, for instance through our cluster system and online platforms. Beyond Singapore, we also look to other education systems to see what and how we can adapt to further improve our own.

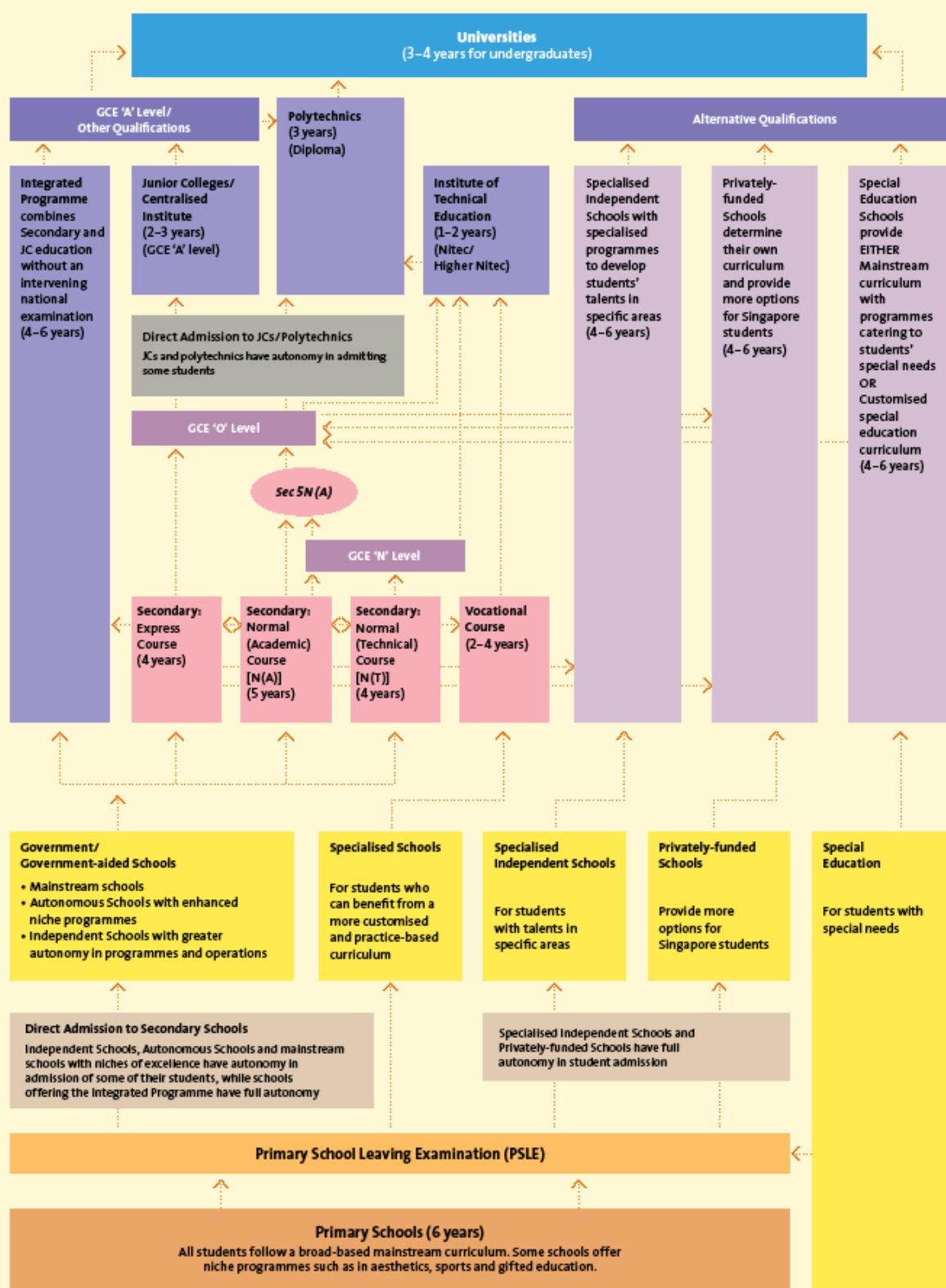
80. Third, empower teachers and school leaders. Quality teachers are the *sine qua non* for any education system. In the efficiency-driven phase of education, a teacher's main role was defined largely by her ability to transmit knowledge and impart values to every student through a centralized curriculum. While this core mission remains unchanged, the shift towards a more ability-based education system has given teachers more autonomy to co-design the curriculum and

81. Fourth, structures must be in place for school-based improvements and to systematize the sharing of good practices, in order to move an entire school system forward. Continuous improvement using the School Excellence Model is accelerated and multiplied by the sharing of good practices at the cluster, zonal and national level.

82. In conclusion, there is a fine balance to be struck between centralization and autonomy, policy and practitioner considerations, top-down and ground-up initiatives. Our quest is to continue to preserve strong fundamentals, while evolving our approach to respond to global and domestic trends, so as to prepare young Singaporeans for the future.

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# The Singapore education journey



## The Desired Outcomes of Education

The Desired Outcomes of Education (DOE) are attributes that educators aspire for every Singaporean to have by the completion of his or her formal education. These outcomes establish a common purpose for educators, drive our policies and programs, and allow us to determine how well our education system is doing.

The person who is schooled in the Singapore education system embodies the Desired Outcomes of Education. He/she has a good sense of self-awareness, a sound moral compass, and the necessary skills and knowledge to take on challenges of the future. He/she is responsible to family, community and nation. He/she appreciates the beauty of the world around him/her, possesses a healthy mind and body, and has a zest for life. In sum, he/she is

- a **confident person** who has a strong sense of right and wrong, is adaptable and resilient, knows himself/herself, is discerning in judgment, thinks independently and critically, and communicates effectively;
- a **self-directed learner** who takes responsibility for his/her own learning, who questions, reflects and perseveres in the pursuit of learning;
- an **active contributor** who is able to work effectively in teams, exercises initiative, takes calculated risks, is innovative and strives for excellence; and,
- a **concerned citizen** who is rooted to Singapore, has a strong civic consciousness, is informed, and takes an active role in bettering the lives of others around him/her.

### The Key Stage Outcomes

The DOE are translated into a set of developmental outcomes for each key stage of our education system. The Key Stage Outcomes spell out what the Education Service aspires to develop in our students through primary, secondary, and post-secondary education. Each educational level builds upon the previous stages and lays the foundation for subsequent ones. For example, primary school students start by learning to know and love Singapore. In doing so, their belief in Singapore will be strengthened and they will understand what matters to Singapore by secondary school. They will grow to be proud of Singapore and understand our country within the global context at the post-secondary level.

There are eight outcomes at each key stage. Taken together, the Key Stage Outcomes make explicit what we aspire to develop in our young so as to lay the strong foundations for them to thrive and achieve success in life as contributing members of society.

## The Key Stage Outcomes of Education

<b>At the end of <u>Primary</u> school, students should:</b>	<b>At the end of <u>Secondary</u> school, students should:</b>	<b>At the end of <u>Post-Secondary</u> education, students should:</b>
<b>be able to distinguish right from wrong</b>	<b>have moral integrity</b>	<b>have moral courage to stand up for what is right</b>
<b>know their strengths and areas for growth</b>	<b>believe in their abilities and be able to adapt to change</b>	<b>be resilient in the face of adversity</b>
<b>be able to cooperate, share and care for others</b>	<b>be able to work in teams and show empathy for others</b>	<b>be able to collaborate across cultures and be socially responsible</b>
<b>have a lively curiosity about things</b>	<b>be creative and have an inquiring mind</b>	<b>be innovative and enterprising</b>
<b>be able to think for and express themselves confidently</b>	<b>be able to appreciate diverse views and communicate effectively</b>	<b>be able to think critically and communicate persuasively</b>
<b>take pride in their work</b>	<b>take responsibility for own learning</b>	<b>be purposeful in pursuit of excellence</b>
<b>have healthy habits and an awareness of the arts</b>	<b>enjoy physical activities and appreciate the arts</b>	<b>pursue a healthy lifestyle and have an appreciation for aesthetics</b>
<b>know and love Singapore</b>	<b>believe in Singapore and understand what matters to Singapore</b>	<b>be proud to be Singaporeans and understand Singapore in relation to the world</b>

*The original DOE were first formulated in 1997. This revision was published on 1 Dec 2009.*