

Mathematics Education in Singapore: An insider's perspective

Professor Berinderjeet Kaur
National Institute of Education
Singapore

Why does Singapore participate in International Studies?

- To benchmark outcomes of schooling against international standards.
- To learn from educational systems that are excelling.
- To update school curriculum and keep abreast of global advances.
- To contribute towards the development of excellence in education internationally.

Mathematics studies that Singapore participates in

- IEA's study – Trends in International Mathematics and Science Study (TIMSS)
 - conducted once in every four years
 - participated in 1995, 1999, 2003, 2007
- OECD's study – Programme for International Student Assessment (PISA)
 - conducted once in every three years
 - participated in 2009

OUR REPORT CARD

Mathematics performance of our students in TIMSS and PISA

TIMSS: Singapore students achievement in Mathematics

	Rank	Rank
TIMSS	Grade 4	Grade 8
1995	1	1
1999	-	1
2003	1	1
2007	2	3

PISA: Singapore students achievement in Mathematics

	Rank
PISA 2009	2

Factors that may explain Singapore's performance in TIMSS and PISA

- The Curriculum
- The Teacher
- The Learner
- The Learning Environment



THE CURRICULUM



The White Paper (1956)

- In 1959 when the People's Action Party (PAP) came to power it acted upon the White Paper of 1956 and put in place a Five-Year Plan in education. The main features of this Plan were:
- Equal treatment for the four language streams of education: Malay, Chinese, Tamil and English;
- The establishment of Malay as a national language of the new state;
- Emphasis on the study of **Mathematics, Science and Technical Subjects.**

Note: Stability of political system: The PAP has been in power from 1959 to date.

The New Education System

- Concern – high education wastage resulting in low literacy levels in the country.
- Goh's report 1979
- New Education System introduced streaming
- Streaming has served the system well as it is flexible
- Many pathways to cater to the diverse needs of students with varying academic abilities

Significant Initiatives in Education

- Three initiatives were launched in Singapore's education system in 1997:
 - National Education,
 - Information Technology (IT), and
 - Critical and Creative Thinking.

With the infusion of these initiatives in all curriculum subjects at schools, the teaching of mathematics and science have underwent significant changes compared to the time prior to 1997.

Thinking Schools, Learning Nation (TSLN) was adopted as the vision statement for MOE in 1997. It continues to be the over-arching descriptor of the transformation in the education system, comprising changes in all aspects of education.

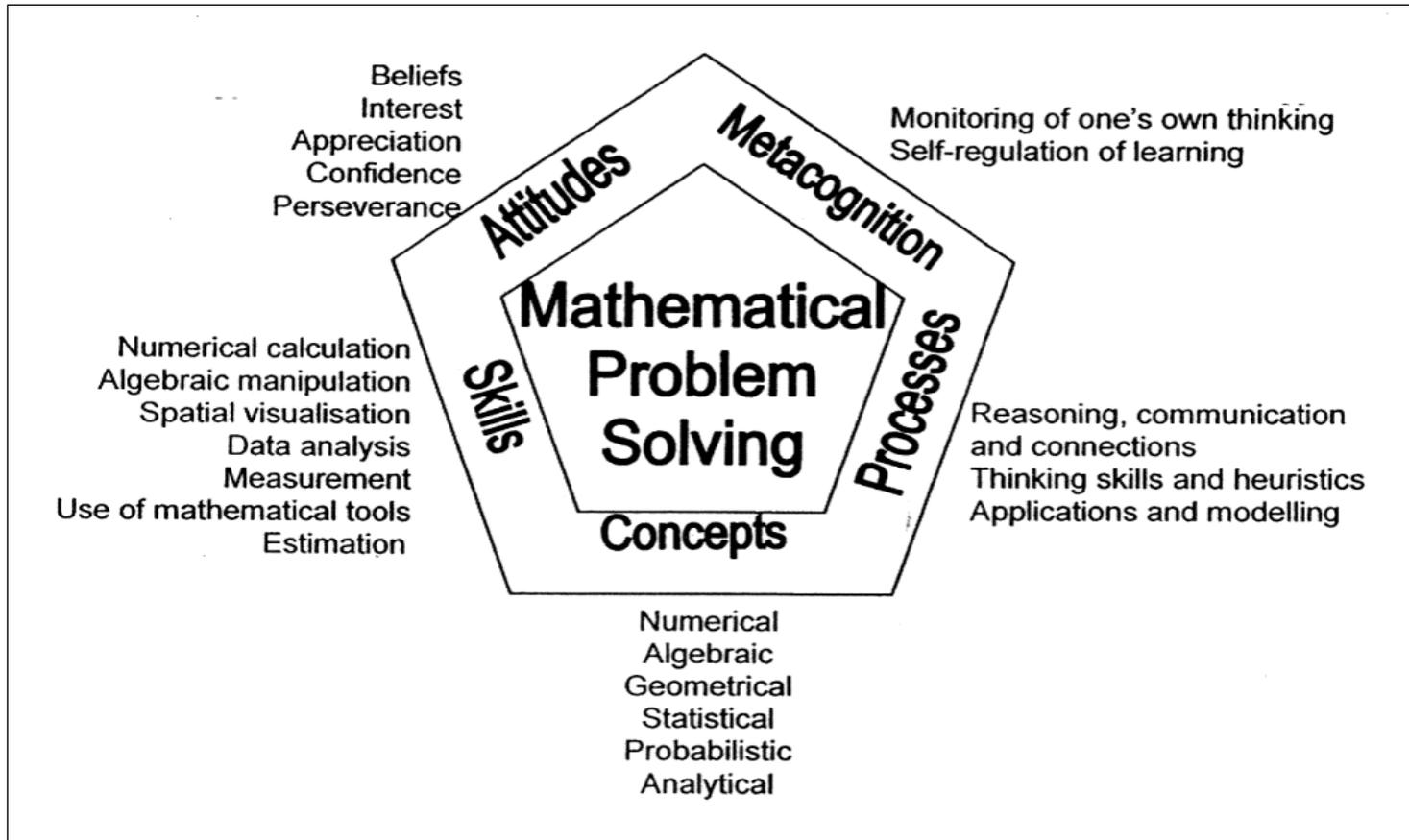
Initiatives in Education

- Teach Less, Learn More initiative was launched in the education system in 2003.
- TLLM **builds on the groundwork** laid in place by the systemic and structural improvements under TSLN, and the mindset changes encouraged in our schools under I&E. It continues the TSLN journey to improve the quality of interaction between teachers and learners, so that our learners can be more engaged in learning and better achieve the desired outcomes of education.

What is TLLM?

- TLLM aims to touch the hearts and engage the minds of our learners, to prepare them for life. It reaches into the core of education - why we teach, what we teach and how we teach.
- 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 and strategies. “Less quantity” in terms of rote-learning, repetitive tests, and following prescribed answers and set formulae.
- Teachers, school leaders and MOE all have important roles to play to make Teach Less, Learn More happen.

Framework of the school mathematics curriculum



Mathematics for all but more mathematics for some

- Mathematics is a compulsory school subject from grades 1 – 10.
- Mathematics courses are tailored to meet the needs of the students.
- Primary school
 - Mathematics
 - Foundation Mathematics
- Secondary School
 - Special course / Express course mathematics
 - Normal (Academic) course mathematics
 - Normal (Technical) course mathematics
 - Additional mathematics

Review and Revision of Mathematics & Science Curricula

- The mathematics syllabuses in Singapore, for schools, are issued by the Ministry of Education in collaboration with University of Cambridge Local Examinations Syndicate.
- Every six years or so, the syllabuses undergo a periodic review to ensure that they remain relevant so as to prepare pupils for the challenges and opportunities of the future and also to be in line with the national objectives.

The Intended Curriculum

- The syllabuses adopt a spiral approach.
- The syllabuses are a guide for teachers to plan their mathematics and science instructional programmes.
- Teachers are not bound by the sequence of topics but ensure that the hierarchy and linkage are maintained.
- Teachers are free to exercise flexibility and creativity when drawing up plans of work which serve as a blueprint for them to implement the instructional programme.

The Intended Curriculum

- Textbooks are an essential part of the intended curriculum.
- Produced by publishers with close guidance from Curriculum specialists of the Curriculum Planning and Development Division (CPDD) at the Ministry of Education.
- All textbooks used in schools must have the approval of the Ministry of Education.





THE TEACHER



Teacher is Key

- To forge the vision: THINKING SCHOOLS, LEARNING NATION (1997) ahead, teachers have been identified as the key and hence their development has been accorded due importance.

Learning Journey of Teachers

- Pre-service education of teachers
 - recruitment is based on aptitude and qualifications
 - rigorous pre-service education programmes
- Professional development of teachers
 - life long learners
 - entitled to 100 hours of PD per year
 - Enhanced performance management system (EPMS)
 - Beginning Teacher
 - General Education Officer (GEO) 1 / 2
 - General Education Officer (GEO) 1A1 / 2A1
 - General Education Officer (GEO) 1A2 / 2A2
 - Senior Teacher
 - Master Teacher

EPMS helps teachers develop themselves

The EPMS clearly articulates the expectations of teachers in their chosen fields of excellence. For the field, ***excellence in teaching*** teachers must slowly but surely develop themselves in the ***core competency*** (nurturing the whole child) which comprises of 4 main areas:

- ***cultivating knowledge*** (subject mastery, analytical thinking, initiative and teaching creatively),
- ***winning hearts and minds*** (understanding the environment, developing others),
- ***working with others*** (partnering parents, working in teams) and
- ***knowing self and others*** (turning into self, personal integrity, understanding others and respecting others).



THE LEARNER



Every child is precious

- The CHILD is the focus of the school system
- No child is deprived of opportunities or resources
- Rewards are based on merits
- Parents are key stakeholders of schools

Expectations

- Teachers have high expectations of their students
- Parents also have high expectations of their children
- Society values education as it allows people to improve their social status.



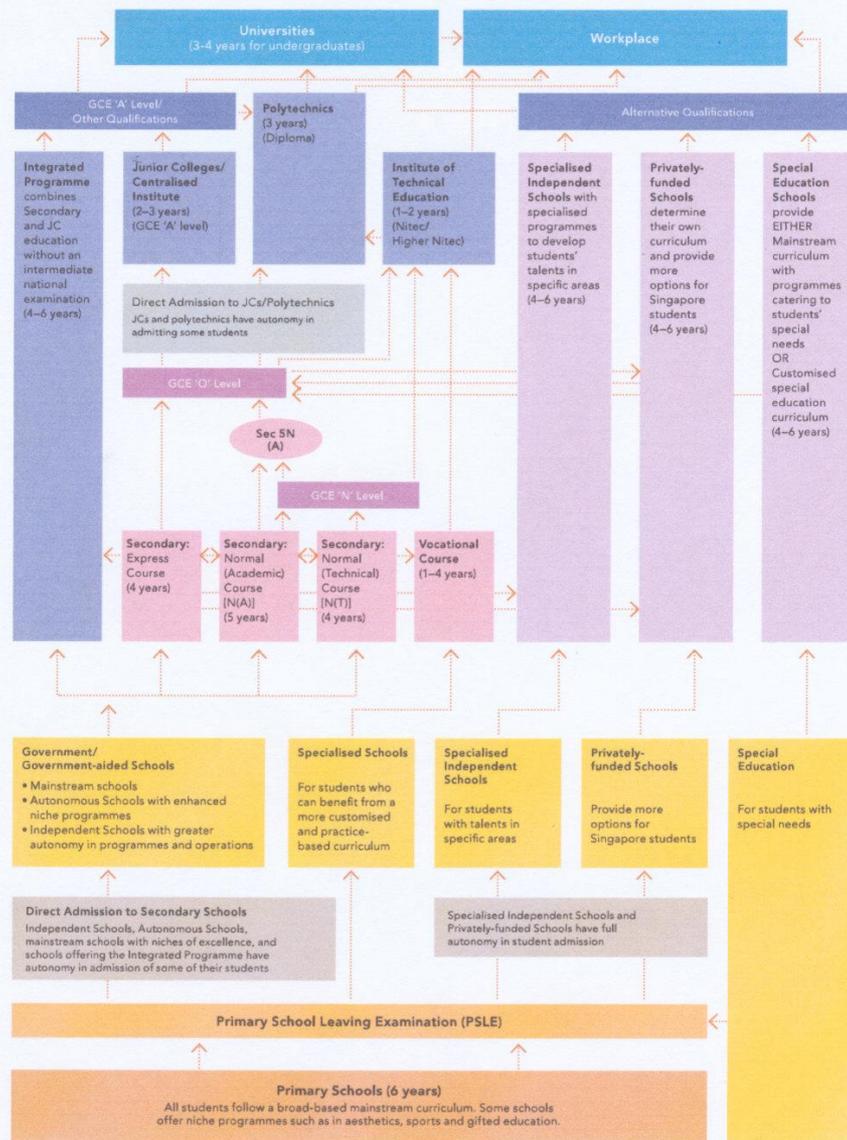
THE LEARNING ENVIRONMENT



Schools

- Schools have state of the art facilities
 - learning spaces
 - ICT facilities
 - sporting facilities
- Schools are safe
- There is a fair and just system of assessment and certification
 - benchmarks exist
 - standards are maintained

The Singapore education journey





THANK YOU

