



Artificial Intelligence (AI) and Data Science in Education

Presentation from Singapore by

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Teacher Education in Singapore



General Direction:



SoLEC (Science of Learning in Education Centre) was set up

Studying the micro-level cognitive aspect of learning (in addition to socio-cultural aspects of learning)



Through collecting and analysing big data, AI in education focuses on three aspects : teachers, students and the processes of learning.



Research projects on AI have received much attention and potentially funding in the years to come.

Mathematics Teacher Education in Singapore

In preparation for AI and Data Science, statistics courses at the graduate level has been slanted with the flavor of Data Science.

Computational thinking has increasingly received attention by the Singapore Ministry of Education and the Singapore National Institute of Education (NIE).

In particular, computational thinking is best contextualized in the mathematics curriculum of the Singapore teacher education programme.

In NIE, our mathematics programme has been re-named as Mathematics & Computational Thinking.

- Not a drastic change in content but with a new focus.

Mathematics Teacher Education in Singapore

“In Singapore, mathematics education plays an important role in equipping every citizen with the necessary knowledge and skills and the capacities to think logically, critically and analytically to participate and strive in the future economy and society. In particular, for future engineers and scientists who are pushing the frontier of technologies, a strong foundation in mathematics is necessary as many of the Smart Nation initiatives that will impact the quality of lives in the future will depend heavily on computational power and mathematical insights.”

Mathematics Teacher Education in Singapore

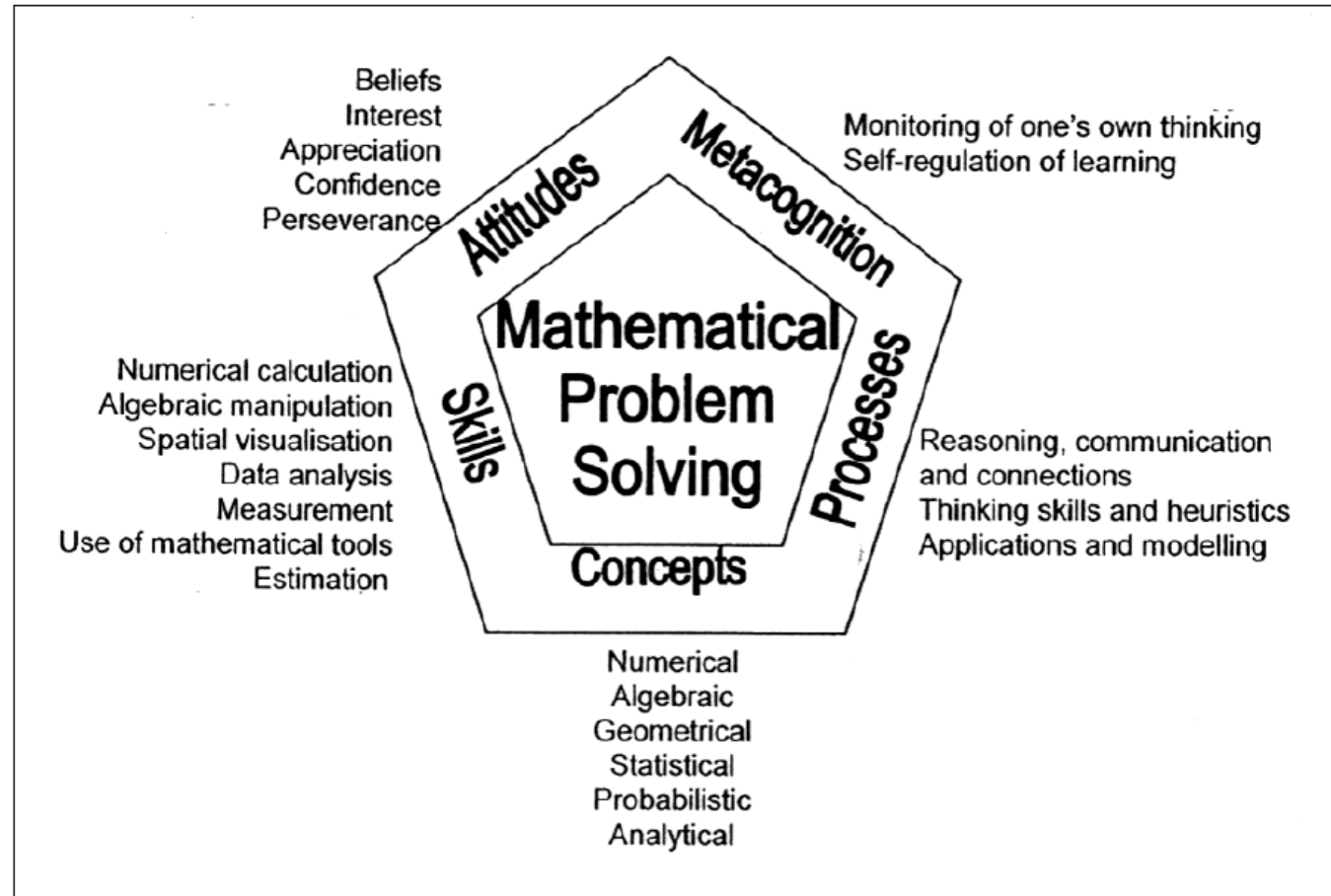


Figure 1. Framework of the Singapore school mathematics curriculum

Mathematics Teacher Education in Singapore

Computational Thinking in Mathematics

- **Student teachers are provided the opportunity to pursue a wide range of courses in pure and applied mathematics and statistics.** The core courses include Calculus, Linear Algebra, Discrete Mathematics, Number Theory, Computational Mathematics, Statistics, Differential Equations and Complex Analysis. Prescribed electives that allow students to study mathematics in depth include Real Analysis, Modern Algebra, Galois Theory, Modelling with Differential Equations, Graph Theory, Operations Research and Applied Statistics. On the basis of perceiving Computational Thinking as the conceptual foundation required to solve problems effectively and efficiently, **the curriculum should have a balanced emphasis on computability, constructive proofs, computer-based modelling and exploration.** Students are exposed to coding and the use of mathematical software commonly used by many research mathematicians.