Mathematics Education in the New Zealand Setting

Presentation for Representatives from SEAMEO QITEP in Mathematics, Yogyakarta

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Governing Bodies

- **Ministry of Education**
- **Committee on University Academic Programmes** (CUAP) considers academic matters across the university system. These include inter-university course approval and moderation procedures, advice and comment on academic developments, the encouragement of the coherent and balanced development of curricula and the facilitation of cross-crediting between qualifications.
- **New Zealand Qualifications Framework** (NZQF), is a comprehensive list of all quality assured qualifications in NZ. All qualifications offered by NZ universities are included. The NZQF enables people to find qualifications, and obtain information about them and their providers.

Governing Bodies

- **Tertiary Education Commission** (TEC) is responsible for funding tertiary education in New Zealand, assisting our people to reach their full potential and contributing to the social and economic well-being of the country.
- **The New Zealand Teachers Council** has the responsibility to approve Initial Teacher Education (ITE) programmes and to set standards for graduates from the programmes.
- **The University of Waikato**

Mathematics Education

- The New Zealand Curriculum states succinctly what each learning area is about and how its learning is structured.
- Mathematics and Statistics is one of the learning areas. Students explore relationships in quantities, space, and data and learn to express these relationships in ways that help them to make sense of the world around them.

Structure of Mathematics & Statistics

The achievement objectives are presented in three strands. It is important that students can see and make sense of the many connections within and across these strands.

- **Number and algebra** – Number involves calculating and estimating, using appropriate mental, written, or machine calculation methods in flexible ways. It also involves knowing when it is appropriate to use estimation and being able to discern whether results are reasonable. Algebra involves generalising and representing the patterns and relationships found in numbers, shapes, and measures.
- **Geometry and measurement** – Geometry involves recognising and using the properties and symmetries of shapes and describing position and movement. Measurement involves quantifying the attributes of objects, using appropriate units and instruments. It also involves predicting and calculating rates of change.
- **Statistics** involves identifying problems that can be explored by the use of appropriate data, designing investigations, collecting data, exploring and using patterns and relationships in data, solving problems, and communicating findings. Statistics also involves interpreting statistical information, evaluating data-based arguments, and dealing with uncertainty and variation.

National Standards

The National Standards are based on the premise that they will lead to improved student achievements in mathematics and reading and writing. These standards have been aligned with the *New Zealand Curriculum*

It is therefore mandatory for schools to report student achievement using the National Standards.

The Standards are presented for Years 1 to 8 and provide examples of problems and descriptions of students' thinking that illustrate and clarify each of the Standards.

Set expectations in reading, writing and mathematics

Give teachers benchmarks against which they can judge the progress of their students.

The Numeracy Development Projects

- The focus of the Numeracy Development Projects is to *improve student performance in mathematics* through improving the professional capability of teachers.
- *Teachers* are key figures in changing the way in which mathematics is taught and learned in schools.
- The *Number Framework* embodies most of the achievement aims and objectives in levels 1-4 from the New Zealand Curriculum *Mathematics and Statistics*.
- A series of 10 resource books has been produced to support the teaching of mathematics.
- *The National Standards* are linked to the Number Framework.

Creates new knowledge through use

Strategy ⟷ **Knowledge**

Provides foundation for strategies

Strategy is about how children solve number problems, in particular the mental processes they use.

Knowledge considers the key items of knowledge that children need to know.

Numeracy Stages

0 Emergent
1 One to One Counting
2 Count from one on Materials
3 Count from one by Imaging
4 Advanced Counting

Counting Strategies

5 Early Additive Part-Whole
6 Advanced Additive Part-Whole
7 Advanced Multiplicative
8 Advanced Proportional

Part-Whole Strategies

Best Evidence Synthesis

This best evidence synthesis plays a key role in knowledge building for NZ education. As a capability tool, it identifies, evaluates, analyses, and synthesises what the NZ evidence and international research tell us about quality mathematics teaching.

Pedagogical approaches and learner outcomes

Making a difference for all

Mathematical proficiency

- Social, affective, and participatory outcomes
- Diversity
- Equity

In-service Education

Professional Learning and Development (PLD)

Is centrally- funded. The aim is to provide high-quality, evidence-based PLD that is directly targeted at raising student achievement.

A fully-contestable model.

The Ministry is providing a

Tertiary Fees Subsidy as an incentive for teachers to up-skill in mathematics education.

Mathematics Associations

There is one national teachers' association (NZAMT) and then regions have associations that cater for primary and/or secondary teachers.

Most mathematics education researchers belong to MERGA.