APEC - Tsukuba International Conference: Innovation of Mathematics Education through Lesson Study: Challenges to Emergency Preparedness for Mathematics February 14-18, Tokyo, Japan.

### Preparing primary pupils for emergency education through mathematical modeling and teachers through Lesson Study

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# Overview

- Importance of Emergency Preparedness Education in Malaysia
- How to integrate Emergency Preparedness Education through mathematical modeling?
- An example of mathematical modeling task
- Lesson Study in Malaysia latest development

# Importance of Emergency Preparedness Education in Malaysia

- Malaysia is blessed with no major natural disasters:
  - Tsunami in Penang, Malaysia 26 Dec 2004, 68 dead, 6 missing, and 300 injured.
  - Property damage was reported as 1535 homes and 1332 boats damaged.
  - No infrastructure was reported destroyed or damaged (POHD, 2005)
- Malaysians are not prepared for major disasters
- Both teachers and pupils do not have much awareness towards emergency and disaster
- No school curriculum address this issue yet

# Mathematical Modelling

- Mathematics can be used to "model", or represent, how the real world works.
- Mathematical modelling is the process of formulating and improving a mathematical model to represent and solve real-world problems.
- Through mathematical modelling, students learn to use a variety of representations of data and to select and apply appropriate mathematical methods and tools in solving real-world problems.
- The opportunity to deal with empirical data and use mathematical tools for data analysis should be part of learning at all levels. (Singapore Ministry of Education, 2006a, p. 8; 2006b, p. 4)
- MATHEMATICAL APPLICATIONS AND MODELLING Yearbook 2010, Association of Mathematics Educators © World Scientific Publishing Co. Pte. Ltd. <a href="http://www.worldscibooks.com/mathematics/7798.html">http://www.worldscibooks.com/mathematics/7798.html</a>

# Difference between mathematical applications and modelling

- In mathematical applications the task setter starts with mathematics and reaches out to reality. A teacher designing such a task is effectively asking: Where can I use this particular piece of mathematical knowledge? This leads to tasks that illustrate the use of particular mathematics content. They are a useful bridge into modelling but are not modelling in themselves.
- With mathematical modelling on the other hand, the task setter starts with reality and looks to mathematics before finally returning to reality to judge the usefulness and desirability of the mathematical model for description or analysis of a real situation.

(p.7)

<sup>•</sup> KAUR, B. & DINDYAL, J. (2010). A Prelude to Mathematical Applications and Modelling in Singapore Schools MATHEMATICAL APPLICATIONS AND MODELLING - Yearbook 2010, Association of Mathematics Educators © World Scientific Publishing Co. Pte. Ltd.

### An example of mathematical modeling task – related to tsunami

- Target group of pupils: Primary Year 5
- Related mathematical topics: percentage, decimal, four basic operations; time and distance
- Task description:
- To create awareness about natural disaster happen locally, pupils will be shown a video clip of the Tsunami in Penang in 2004 (obtained from Youtube), and newspaper cutting on the incident.
- Pupils are then asked to consider a variety of facts and then use various problem solving strategies to establish how many people may be affected by the disaster, what food, water and shelter are needed and how it could all be transported.

Lesson Study in Malaysia: latest development

- Mar 2011- Feb 2014: USM Research University Grant
- **Title:** Improving Mathematics And Science Teachers'Teaching Quality And Student Learning Performance In Low- Performing Primary Schools Through Lesson Study Collaboration

### Participants:

- 9 Primary schools 3 SK, 3 SJKC and 3 SJKT
- 54 Mathematics and science teachers

## 20 : a great leap for Lesson Study

- Lesson Study was officially introduced as an innovation to schools.
- Under the National Key Result Area [NKRA] project,
  - 289 schools low-performing schools and
  - 20 high performing schools were exposed to Lesson Study as an initiative to further enhance teachers' teaching practices.
  - A <u>four day introductory workshop</u> on Lesson Study was organised by the Teacher Education Division and carried out in six zones.
  - A comprehensive <u>monitoring system</u> was also set up to ensure all Lesson Study groups will be implemented accordingly and
  - with <u>full continuous support from the MOE</u>, the state and district education officers as well as facilitators that made up of university educators, teacher training institute lecturers and "excellent teachers".
  - began to disseminate and popularize the concept of lesson study to other schools as one of the key ideas in Professional Learning Communities (PLC).

**2012:** National Key Result Area [NKRA] Lesson Study project -expanded

- 289 schools low-performing (Band 6 and 7 schools) Continue – monitor by District and State Education Department
- Expanded to 106 average performing (band 5) schools – by Teacher Education Division, Ministry of Education
- Major aim and focus: to promote teacher collaboration and professional development community (PLC) such as Learning Walk, peer teaching and Lesson Study