

# SINGAPORE'S ELEMENTARY SCHOOL MATHEMATICS TEXTS AND CURRENT RESEARCH ON WHOLE NUMBER OPERATIONS

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*Singapore's grade 1 and 2 mathematics texts were examined using Fuson's 2003 review of research findings on whole number operations as a framework. The texts were found to use a number of strategies that have been demonstrated to be effective by research. Several known effective strategies, notably the use of accessible algorithms, do not appear in the grades 1 and 2 texts used in Singapore.*

Fuson's 2003 chapter was used as a basis for analyzing the presentation of whole number arithmetic in the grades 1 and 2 texts used in Singapore. These texts present material in ways that have been shown to be effective by research, notably: 1) The texts introduce addition, subtraction, and multiplication by eliciting stories to go along with pictured situations. 2) The texts support a progression from "counting all" to "counting on" and using thinking strategies for single-digit addition. 3) The base-ten structure of decimal numbers is repeatedly emphasized with drawings of bundled objects. Multi-digit addition and subtraction is strongly supported with these visual aids. 4) The presentation is structured around big ideas, conspicuous strategies are shown clearly, often with the aid of simple diagrams, background knowledge is primed, there are many visual supports with cues for correct methods, material is integrated into complex applications to provide distributed practice, and opportunities for judicious review are provided.

The following items that have been shown by research to be effective are not used in the Singaporean texts: 1) Single-digit subtraction by counting up is not shown explicitly. Instead, subtraction problems are often accompanied by a simple "number bond diagram", showing a number broken into two parts. Counting up could easily be used with these diagrams. 2) Accessible multi-digit addition and subtraction algorithms are not presented in the texts. However, the standard addition and subtraction algorithms are strongly supported with visual aids.

## **References:**

- Curriculum Planning and Development Division, Ministry of Education, Singapore (1999). *Primary Mathematics, third edition, volumes 1A – 6B*. Singapore: Times Media Private Limited.
- Fuson, K. C. (2003). Developing Mathematical Power in Whole Number Operations. In J. Kilpatrick, W. G. Martin, and D. Schifter, (Eds.), *A Research Companion to Principles and Standards for School Mathematics*, (pp. 68 - 94), Reston, VA: National Council of Teachers of Mathematics.