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ADDITION AND SUBTRACTION WORD PROBLEM DISTRIBUTION IN YEARS 1 TO 4 MATHEMATICS TEXTS AND ITS RELATIONSHIP TO PUPILS' ACHIEVEMENT IN WORD PROBLEMS

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ABSTRACT

The content in Mathematics textbook is an important source for both teachers and pupils in teaching and learning of mathematics. Since 2011, all schools were provided new textbooks in mathematics since the implementation of the new curriculum known as the Primary School Curriculum Standards (KSSR). Thus, this study was conducted to analyse the content distribution of the types of word problems categories in addition and subtraction topics in these new KSSR Mathematics Text and its relationship with pupil's achievement. The types of errors made by pupils as they solve the problems were also investigated using Newman Error Analysis Guideline (NEAG). This three phase study involved both quantitative and qualitative approach. In the first phase, document analysis was utilized in analysing the distribution of the type of word problem categories involving addition and subtraction operations in Year 1, Year 2, Year 3 and Year 4 text (including the accompanying activity books for each Year) according to eleven types of categories as modelled by Van de Walle (1998). The second phase analyses 570 pupils' achievement in Word Problem Test (WPT) and its relationship with the distribution of the eleven categories in the math text. The final phase analyses the type of errors made by 48 pupils as they solve the word problems using Newman Error Analysis Guidelines (NEAG). The analysis of Primary Mathematic Texts indicates that the composition distributions of the types of word problem categories in addition and subtraction topics are not represented in a systematic manner. Some categories were over represented while some had no representation at all. For example, both SRU (Separate Result Unknown) and JRU (Join Result Unknown) categories which are considered as the easiest had the highest representation throughout the levels while the more difficult categories of JIU(Join Initial Unknown), SCU(Separate Change Unknown) and CSU(Compare Smaller Unknown) were underrepresented across levels. The study on the relationship between pupils' performances in WPT with the word problem distribution also suggested significant association for all grade levels. The findings also depict that pupils had most types of error in transformation and process skills across all grade levels. Taking into consideration, the importance of mathematics textbooks used in classroom, coupled with the difficulty pupils faced in solving word problems, thus the Ministry of Education need to ensure that the textbooks distributed to schools are regularly updated and monitored for quality assurance.

Keywords: textbooks, mathematics, errors, word problems, school, content

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CHAPTER 1
THE STUDY

1.1 Introduction

Recent trends in international studies have shown a downturn in Malaysian students' achievement in both Mathematics and Science at schools. The 2007's Trends in Mathematics and Science Study (TIMSS) results revealed that nearly 20 % of Malaysian students failed to meet the minimum requirement for both mathematics and science compared to only 7% in mathematics and 5% in science in 2003 (Ministry of Education, 2014). Malaysia scored 440 points in the 2011 results and 465 points in 2015 which were still below the international average benchmark of 500 points (TIMSS Scale Centre point, 500) and also below the previous 2007 TIMSS achievements (Ministry of Education, 2016). In the Programme for International Student Assessment (PISA) study, Malaysia was ranked 52 out of 65 countries for their achievement in mathematics (Ministry of Education, 2014). In PISA 2015, results were reported "below the line" to highlight the potential lack of comparability with previous waves and with other countries, due to a high level of non-response by the originally sampled schools (Francesco Avvisati, e-mail, December 21, 2016). These explained the absence of Malaysia's ranking among the other OECD countries in the 2015 PISA's report (OECD.org, 2016). From these results, it can be deduced that Malaysian students' academic achievement in mathematics has decreased significantly over the years and we are way behind the top five countries in Asia such as Singapore, Korea, China, Taipei, Hong Kong and Japan.

Realising this issue, the Ministry of Education in Malaysia (MOE) has, in recent years taken various measures and initiatives to improve pupils' achievement in mathematics. For example, in 1999, the Malaysian Ministry of Education introduced the abacus or "sempoa" as a tool to enhance pupils thinking and mental computation skills (Utusan online, 3 July,1999). The Chinese abacus was a tool used in Malaysian Chinese Primary Schools and has proven to be popular amongst the Chinese community (Kim, 2007). For this reason, it appeared feasible to employ instructors who had the ability to teach this subject in schools nationwide (Curriculum