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Students' Ability in Solving Higher Order Thinking Skills (HOTS) Fraction Word Problems

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Abstract

The study aims to identify the level of students' higher order thinking skills (HOTS) in solving HOTS fraction word problems. A sample of 48 Year 5 students from two schools participated in this research. The instrument of the study consisted of a set of test questions that contains 12 Fraction HOTS questions. Descriptive statistical analysis was used to assess the students' existing capabilities. The findings revealed that the current ability of Year 5 pupils in answering HOTS fraction word problems are at poor level which is 75 % followed by 20.84 % at satisfactory level and 2.08 % are respectively at good and excellent levels.

Keywords: Thinking levels, Higher Order Thinking Skills (HOTS), Fraction, Word Problems, Problem Solving

Introduction

Word problems are known as mathematical problems presented in a context of a story. In order to interpret the given information in mathematical symbols, learners need to possess some skills. Learners are expected to understand the language and factual information given in the problem, to translate the problem into a numeric equation, and devise a plan that can be used to solve the problem (Leh et al., 2009).

Therefore, solving mathematical word problems is a process requiring multistep skills and strategies to translate the problem into mathematics equation. Although by definition to solve word problem seems to be easy, Sepeng and Sigola (2013) supposed learners seem to view word problem solving as a difficult task. Likewise, Gooding (2009) added that children's poor performance with mathematical word problems is a trend that researcher became aware of very early in her teaching career.

In Malaysia, Polya's problem solving strategy is emphasizes in the Mathematics Curriculum (Kementerian Pelajaran Malaysia, 2016). There are four steps according to Polya; understand the

problem, devise a plan, carry out the plan and look back. In the first step, students are required to separate various parts of condition and identify the unknown in the problem. In the second step, Polya suggests that students choose an appropriate strategy to devise a plan. The third step is carrying out the plan. Students use their plan to solve the problem. The final step requires the students to recheck the answer using other method such as work backwards.

Research Background

Thinking is always associated with problem solving in mathematics (Mazlini et al., 2017). Therefore, problem solving is a grounding area for students to acquire HOTS. A student is considered to have HOTS if managed to solve problems involving four of the top level of Bloom's taxonomy (Abu Bakar, 2013). This study referred HOTS to the higher division of Revised Bloom Taxonomy (RBT) which includes creating, evaluating, analyzing and applying (Kementerian Pelajaran Malaysia, 2016).

In the Primary School Achievement Test 2016 or also known as UPSR, 20% of HOTS questions were included in the examination (Ministry of Education Malaysia, 2017). However, Year 6 pupils seem not to be ready to answer HOTS questions in the UPSR leading to a decrease in average grade of 0.02 point (Marzita et al., 2017). HOTS of students in Malaysia are still low based on the performance of Malaysian students in TIMSS and PISA (TIMSS, 2015).

Fraction is one of the earliest topics introduced in mathematics primary education. Students performed poorly in solving mathematics word problems compared to computational problems involving Fractions (Azlina et al., 2004). Hence, this research we will be well informed on the students' HOTS ability and thus, pedagogical steps can easily be taken by teachers to help them.

Research Methodology

This study aims (1) to determine the level of students' higher order thinking skills in answering HOTS fraction word problem questions. A total of 48 Year 5 students from two schools in Batang Padang District, Perak were involved in this study. Purposive sampling was used to select the schools based on the homogeneity score in the year end examination. The Year End Examination marks for mathematics were analyzed to examine the equality of achievements between the respondents in the two groups.

The test consist 12 HOTS word problem questions. It covers Mathematics Fraction Year 4 curriculum. Pupils are allocated one hour to answer the questions which are aligned with the time allocated in Mathematics Paper 2, UPSR.

The students' achievement scores from the pre-test are categorised based on their thinking ability. The guidelines are adapted from (Kusuma et. al., 2017).

Table 1. Level of higher order thinking skills

Student's mark	Level of higher order thinking skills
100-76	Excellent
75-51	Good
50-26	Satisfactory
25 - 0	Poor

Through this, the researcher could identify students' ability in answering fraction word problems in the form of HOTS.

Findings and Discussion

There are 48 students involved in this study. The findings revealed that the current ability of Year 5 pupils in answering HOTS fraction word problems are at poor level which is 75 % followed by 20.84 % at satisfactory level and 2.08 % are respectively at good and excellent levels.

Table 2. Students' Level of Higher order thinking skills

Level of students' higher order thinking skills	Students' Mark	Number of students	Percentage
Excellent	100-76	1	2.08 %
Good	75-51	1	2.08 %
Satisfactory	50-26	10	20.84 %
Poor	25-0	36	75 %

Conclusion

The ability of the students in answering HOTS fraction word problem questions is very poor. This is because 75% are in the poor level followed by 20.84 % at satisfactory level. These findings reveal that students are weak in answering fraction HOTS questions. Hence, students' higher order thinking skills can be improved by a method of teaching which support higher order thinking skills.

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