Reading Comprehension

Ability to Understand Text Mathematics to Solve Basic Mathematical Questions

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Abstract: This study aims to determine the relationship between the ability to understand mathematical text and the ability to solve basic math problems. Mathematical problems can be presented in two forms, namely in the form of verbal and in the form of numbers. The verbal question is packed through a narrative text stimulus. Failure to understand the contents of narrative texts causes chaos in understanding the essence of basic mathematical concepts. Basic mathematical concepts include addition, subtraction, multiplication, and division. The interpretation of what basic mathematical concepts should be used is determined by the students' ability to understand the content of the text. In this case, students' reasoning ability plays a very important role. The ability to reason can be trained through reading learning. The data of this study were taken from the second graders of elementary school in Bandung. Using correlational method, there is evidence that both variables have positive correlation. This implies the importance of integrative learning implementation between reading and learning of mathematics in low grade elementary school.

1 INTRODUCTION

Students reading and reading competencies in Indonesia are still low. Based on the results of PISA tests and evaluations in 2015 the performance of Indonesian students in a row showed average scores for science, reading, and maths ranked 62, 61, and 63 of 69 countries evaluated. The rating and average score of Indonesia does not differ greatly from previous PISA test results and surveys in 2012 which are also in the low material mastery group (Wuttke, 2007; Grek, 2009; OECD (Organisation for Economic Co-operation and Development), 2013). The Progress in International Reading Literacy Study (PIRLS) study of fourth grade students showed that the reading and counting achievement of Indonesian students was very low. Indonesian students' reading ability in 45th out of the 49 countries studied. The Indonesian score (405) is above Katar (353), Morocco (323), and South Africa (302) (Mullis et al., 2012).

Based on these data, reading ability and numeracy ability of students seem not far adrift. Counting instruments in PISA and PIRLS research are essentially presented in the form of narrative texts. That is, both reading and numeracy tests, both using verbal text stimulus. To understand the intended verbal text required reading ability and high-order thinking skills (Bell, 1995; Aitchison and Lewis, 2004; Myles, 2010). A person's thinking ability is influenced by language skills (Waters, 2006; Rezaei, Derakhshan and Bagherkazemi, 2011; DePoy and Gitlin, 2016). The development of language competence is an indicator of cognitive development (Carruthers, 2002; Clark, 2006). A person's language skills reflect his or her thinking skills (Piaget, 1964; Albert, Albert and Radsma, 2002). To communicate a concept is necessary means of language that is understood together between communicator and communicant. Language is needed to communicate a concept to others (Bell, 1995)

Mathematical problems can be presented in two ways, namely by using mathematical symbols and verbal symbols. Understanding of the two symbols will facilitate a person in solving mathematical problems (Lin, et. al., 2013; Björn, Aunola and Nurmi, 2016). From both ways of presenting the counting problem, the questions presented through verbal symbols tend to show worse results than the results presented through mathematical symbols (Vilenius-Tuohimaa, Aunola and Nurmi, 2008; Ozuru, Dempsey and McNamara, 2009). Why does

this happen? Could these two have a positive correlation?

Several related studies have been done before, such as "Supporting the Formal Verification of Mathematical Text" by Claus Zinn in 2005. This study proves that the organizing of math problems can be traced and determined by an application. What operation should be used in solving math problems can be determined by the truth of the language in its mathematical text (Zinn, 2006). Another study of "Covariation between Reading and Arithmetic Skills from Grade 1 to Grade 7" by Heidi Korpipa 2017 proves that low grade students rely heavily on phonological awareness while high-class students rely on nonverbal reasoning (Korpipää, et. al., 2017). Anna Teledah's research in 2015 on "Different modes in teachers' discussions of students' mathematical texts" proves that students' understanding of the type of counting operation depends on the style of the teacher in explaining the mathematical text (Teledahl, 2015). These three research results indicate the important role of language competence in understanding the text, both verbal and nonverbal texts. The possession of adequate language competence is the main ingredient in reading activities (Vilenius-Tuohimaa, Aunola and Nurmi, 2008; Ozuru, Dempsey and McNamara, 2009; Lin, et. al., 2013). The difference of this study with previous studies lies in the focus of research which is focused on the amount of correlation between the ability to understand the text and the ability to count. The results of this study can be used as a basis for determining and considering the strategies of learning to read and count / math in low grade primary schools appropriately.

2 RESEARCH METHODS

This research uses correlational method. The correlated research variables are the ability to understand mathematical text with the ability to solve basic mathematics problems (numeracy). The data source is the result of the reading ability test of mathematics text and numeracy ability of the 2nd graders of elementary school in West Bandung regency as much as 71 people. The school sample represents three categories, namely schools with less accreditation (C), good (B), and excellent (A).

The research instrument consists of two sets of tests, namely the ability to read mathematical text and numeracy tests. Both of these test devices use the same text stimulus, i.e. the mathematical text presented verbally. The reading test is focused on

questions of understanding and interpretation of reading content related to basic mathematical operations (addition, subtraction, multiplication, and division); while the numeracy skills test is focused on completion of numeracy problems presented in the form of numbers.

3 RESULTS AND DISCUSSION

The ability to read comprehension of mathematical text of low grade students in Bandung, West Java region is low, with average value of 44.3 from standard 100. To reach the average value of reading ability of mathematics text based on school category with accreditation of C, B, and A, respectively - shows the average value achievement as follows. Schools with category C earn an average of 37.5; schools with category B earn an average of 45.8; and schools with category A earned an average of 49.6. The average reading ability of mathematical text based on the category of school shows a grade gradation that corresponds to the school category. Schools that have category A get the average value of reading ability is relatively better than schools that are categorized B and C. Similarly, with school categories B better than schools that categorize C. Reading activities that not only recognize the print symbols but meaning and interpretation of the printed symbols. The interpretation of the code / symbol refers to the split of the code symbol, while understanding refers to the meaning of the message (Cain, Oakhill and Bryant, 2004; Koponen, et. al., 2013; Liu, Lin and Zhang, 2016).

The essence of reading is the understanding of the content and the reading message. The failure to reap the meaning of the print emblem in understanding mathematical texts leads to a failure to interpret the operating procedures of basic mathematical computations. When a basic mathematical process of operation must be accomplished through numeracy, such as summed, subtracted, multiplied, or divided, will be largely determined by one's understanding of his verbal text. It is evident that students who are well versed in reading comprehension (mathematical text) show good ability in solving their math problems (Kirby, et. al., 2012; Koponen, et. al., 2016). Reading activities allow people to gain meaning from the text (Vellutino, et. al., 2007; Afflerbach, Pearson and Paris, 2008; Compton-Lilly, 2011).

Achievements that are not too different from the ability to read mathematical text is also indicated by the average ability to count. In general, the average numeracy ability of low grade students in Bandung area is also low, that is 43.93 from the standard 100.

The achievement of the mean value of numeracy ability based on the category of schools that accredited C, B and A respectively shows the average value of numeracy ability 40, 40.5. and 51.3. The gap between the mean value of reading ability of mathematics text and the mean of numeracy ability for each school category is as follows. For categorized schools C is 2.5 (40 - 37.5). In schools with category C, the mean value of numeracy skills is better than the ability to read mathematical text. Gap at school with category B of 5.3. (45.8 - 40.5). In the B categorized schools, the mean value of reading ability of mathematics text is better than the mean of numeracy ability. Gap at school with category A equal to 1.7. (51.3 - 49.6). At school A category, show the opposite. The mean value of numeracy ability is better than the mean value of reading ability of mathematics text.

The data value of both variables in this study then performed by correlational testing with correlational statistical techniques. Correlation test results indicate a positive correlation between the ability to read mathematical text and the ability to count for 0676 (high). Significant correlations are shown by schools categorized C (0.756) and category B (0.787); whereas schools with category A show correlation results that are not high (0.473 = enough). The average value of reading ability of mathematics text, the mean of numeracy ability, and correlation, both per school category and overall can be seen in table 1 below.

Table 1: Average value of reading and counting competency and its correlation.

School's categories	Reading Competencies			Counting Competence			Correlation Value
	Mean	Mode	Median	Mean	Mode	Median	
C	37.5	30	30	40	60	40	0.756
B	45.8	30	50	40.5	40	40	0.787
A	49.6	50	50	51.3	50	50	0.473

The correlation of mathematics text and numeracy skills for each school category can be seen in figures 1, 2, and 3. The graph shows evidence of a strong relationship between the two variables studied.

Graphic that proves a strong relationship between the ability to read mathematical text and numeracy skills in C school can be seen in Figure 1. Reading competence is parallel to the scores obtained by students on numeracy competence. This is reinforced by the value of r or the correlation

between reading competence and arithmetic at school categorized C is at 0.756.
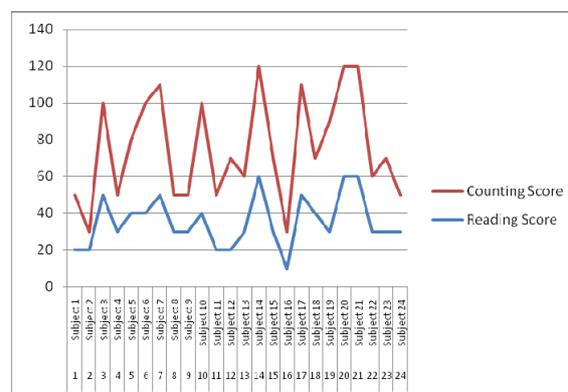
Figure 1: Values of reading ability and counting ability of low grade students in categorized schools C.

Graphic that proves a strong relationship between reading ability of mathematics text and numeracy ability at school B can be seen in Figure 2. Read competence in the same direction as the score obtained by students on the numeracy competence. This is reinforced by the value of r or the correlation between reading competence and numeracy at school B is at 0.787.
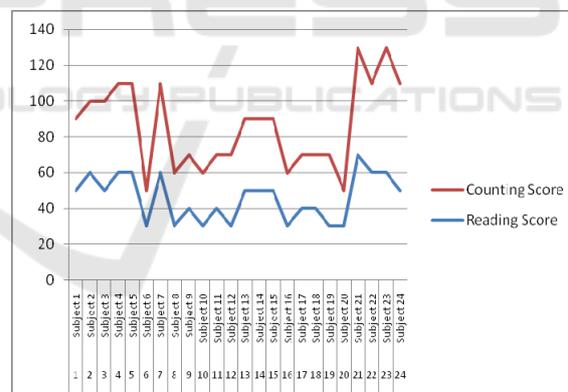
Figure 2: Correlation of ability to read mathematics text and counting students at school categorized B.

The opposite evidence occurs in schools categorized A. The mean value of numeracy ability of students in school categorized A is better than the average value of reading ability of mathematics text. Meanwhile, the correlation numbers are not too strong (0.473). Children who have relatively high intelligence tend to be more talented in the exact field, including counting affairs. The numerical questions presented in the form of numbers will be more interesting to them, rather than presented in verbal text form. The reluctance to read verbal texts

that are influenced by interest will impact on the inaccurate interpretation of content and text messages (Piaget, 1920, 1964; Barrouillet, 2015).

Some respondents show a parallel between the reading test results of mathematical text and numeracy skills. However, several other respondents pointed out the opposite. The value of good or bad numeracy skills is not followed by good or bad text reading skills. The full picture can be seen in Figure 3 below.
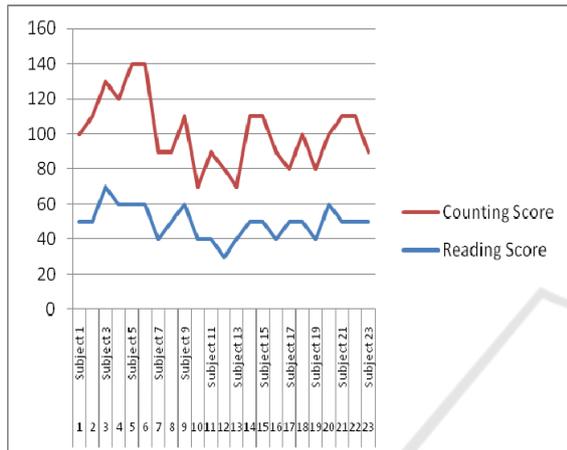
Figure 3: Values of student reading and counting skills at school a category.

From the three data, the researcher can conclude that the competence of reading and counting does have a positive correlation or correlation. The interpretation of the code refers to the breaking of code symbols, whereas comprehension refers to the notion of message (Koponen, et. al., 2013). It should be realized that the most important in the process of reading is understanding. However, understanding will not happen if the reader does not recognize the symbol (letter) code. It is evident that students who have a good ability to understand reading or text on math problems better in solving math problems compared with students who have less ability to understand the text. This is proven by students whose high reading ability has implications for high numeracy skills (Kirby, et. al., 2012; Koponen, et. al., 2016).

4 CONCLUSIONS

Competence of reading and computing competence are two competencies that have a strong relationship. Students can solve basic mathematics problems (arithmetic) based on mathematics text stimulus

(verbal and narrative) if the student has good reading competence. Thus, reading competence will be the main foundation in educational construction and teaching in schools. Reading activity is part of the literacy activity. In micro, literacy activity is only interpreted as activity of reading and writing. In its development, literacy activities related to various abilities related to life skill for the benefit of life and life. Therefore, literacy education becomes an urgent thing to be implanted in schools, either through the learning process or the process of habituation. Learning to read and study mathematics in lower classes should be done in an integrative, not disaggregated. Separation of self-discipline can be done in high school or next level.

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