The potential effects on junior high school mathematics learning: The reading texts for learning stage of the school literacy movement

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The potential effects on junior high school mathematics learning: The reading texts for learning stage of the school literacy movement

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Abstract. This study discusses the result of the field test stage of reading texts development for reading activities in School Literacy Movement in mathematics learning with futsal context. This study is development research with design research method and development studies as its type. The evaluations at the prototyping stage use the formative study with self-evaluation, expert review, one-to-one, small group, and field test as its phases. The subjects were 7th-grade students at a junior high school in Karawang. The data were collected using documentation, questionnaires, tests, and interviews. The calculation of the effect size is 2,895 and categorized as high. Based on this result, it shows that the reading texts for the learning stage of the School Literacy Movement have potential effect for students in mathematics learning.

1. Introduction

The Government of Indonesia launched a movement to help students in developing their habit of reading and writing at school, namely the School Literacy Movement. The unsatisfactory achievement of literacy from the results of Indonesian students who were representing Indonesia in several international comparative studies became the background of the School Literacy Movement. The School Literacy Movement is a movement to develop students' character through acculturation of school literacy ecosystems so that they become lifelong learners [1]. The school literacy movement consists of three stages, namely, the habituation stage, the development stage, and the learning stage. The activities at each stage use 15 minutes to read in accordance with Permendikbud No. 23 year 2015. Reading is a necessary effort in daily life, especially in teaching and learning activities. Reading activities mean we translate the writing in the reading text so we can understand it. The more often someone reads a book, the more knowledge they have, on the other hand, the more rarely they read the book, the fewer knowledge they have [2]. Reading provides an influence on student literacy activities. The existence of the School Literacy Movement that focuses on reading and writing habits is expected to play a role in increasing students' interest in reading and writing. Also, students can be able to use what they read for their life skills. Therefore, literacy is one of the needs that must be fulfilled in daily life.

The three stages of the School Literacy Movement have not done as a whole because their implementation is still in the habituation stage. The stage that has done aims to improve the love to read outside school hours, improve the ability to understand reading text, improve self-confidence as a good reader, and develop the use of various reading sources [3]. The development and learning stages have

not done because of a lack of reading texts relating to mathematical material. Meanwhile, these two stages need to implement so that students can be able to understand the context relating to mathematics, even at the learning stage, the reading texts in a certain context can be a starting point for students to learn mathematical material. Cockroft argued that mathematics needs to be taught to students because it always used in various daily activities [4]. One of the students' daily activities is exercising, such as playing futsal. This activity is one of the calming activities for students.

Futsal is a ball game playing by two teams with five people in every team that aim to put the ball as much as possible into the opponent's goal [5]. Futsal has become one of the most popular sports in Indonesia. Based on Google Trends, Indonesia is in 3rd rank in fond of futsal game after Portugal and Brazil. Futsal game that is played by two teams consisting of team A and team B is a mathematical application in sports because the groups of futsal players are people who have futsal skill and represent their respective teams. In mathematics, a collection of distinct objects with clear definitions is referred to set. Besides that, we can calculate the score and speed in playing futsal with the basic mathematical formula. It shows that between the mathematics and futsal games, there is a connection in the implementation. Things related to sports have become the context used as the starting point in mathematics learning, one of it is the sprint context in ASEAN Games that can help students understand fraction materials [6]. In everyday life, people tend to choose various sports, but nowadays, one of the popular sports is futsal.

2. Method

This study is design research with development studies [7, 8]. The stages in the study are the preliminary stage, the prototyping stage, and the assessment stage [8]. In the prototyping stage, the evaluations use formative evaluation with self-evaluation, expert review and one-to-one, small group, and the field test as it phases. While to analyze the two previous stages, it uses the assessment stage [9, 10]. In this article, the research discussion is about the field test phase of the learning stage. In the field test phase, the third prototype as a result of revision from the small group phase was used. In this field test, a third prototype trial was conducted on a 7th-grade class in one of the junior high schools in Karawang. The data were collected using documentation, questionnaires, tests, and interviews.

Documentation was done to collect the students' answers and photographs of the implementation of this study. Interviews were conducted to explore information about the potential effects of reading texts on students' mathematical abilities. The questionnaire used Likert scales that are SS (strongly agree), S (agree), N (neutral), TS (disagree), or STS (strongly disagree), and also contains several statements that require students to state the practicality of the text.

The given tests were essay tests that consisted of contextual questions related to set materials. The results of documentation, questionnaires, and interviews were analyzed qualitatively. Meanwhile, tests are conducted to see the potential effects of the prototypes produced on learning outcomes. The potential effects of this study shown by the percentage of the questionnaire and the effect size of the students' test results. The formulas for calculating effect sizes [11]:

$$d = \frac{\bar{X}_t - \bar{X}_c}{S_{Pooled}}$$

The calculation results are then interpreted using classifications as in the Table 1.

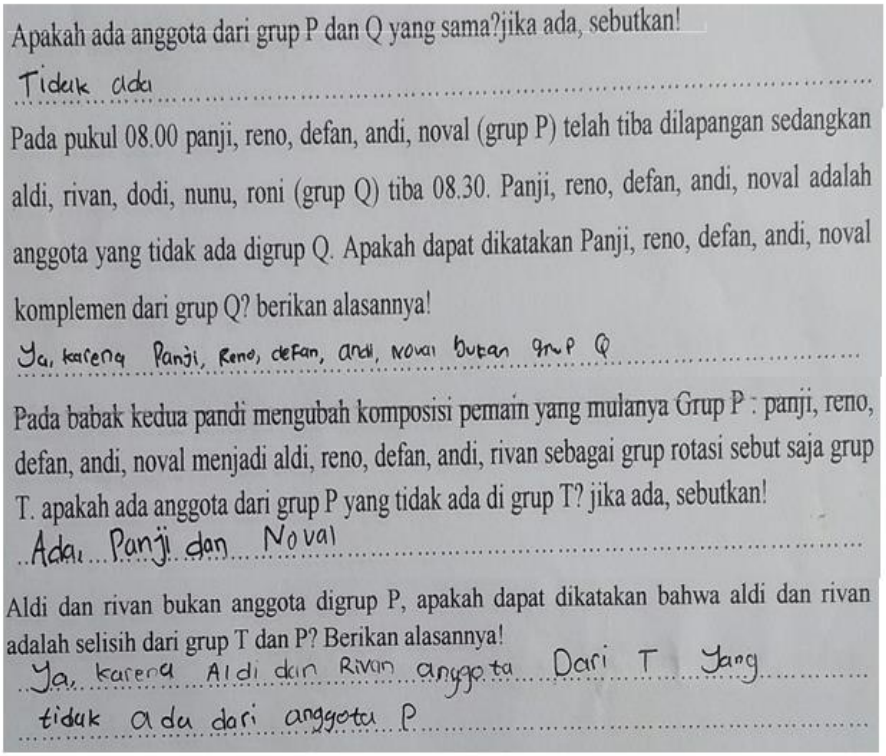
Table 1. Interpretation of Effect Size (d)

d	Interpretation
$d \leq 0{,}2$	Low
$0{,}2 < d \leq 0{,}8$	Middle
$g > 8$	High

3. Result and Discussion

In the field test phase, the researchers tested the third prototype of the reading texts with futsal context for the School Literacy Movement on mathematics learning in 7th-grade students of a junior high school in Karawang. The school literacy movement in the learning phase is carried out on all subjects by reading non-learning books related to the subject matter. The principles at this stage are (1) Books that are read in the form of books on general knowledge, hobbies, special interests, or multi-modal texts, and can also be associated with certain subjects (not only languages), (2) There are bills that are academic in nature (related to subjects) [3]. This school literacy movement activity is carried out to foster interest in reading students and improve reading skills so that knowledge can be mastered better. The School Literacy Movement is a participatory business or activity involving school members and the collaborative support of various elements.

This reading texts have valid based on the results of the one-to-one phase and expert review [12]. Furthermore, this reading texts also have practicality based on the results of the small group phase [13]. Before the learning stage of the School Literacy Movement begins, students are given tests with contextual questions related to set materials because the reading texts presented at the learning stage is related to set materials. The title of the presented text is "Harumkan Nama Kampus dengan Modal Kebersamaan". This text consists of five parts and questions adjusted to the sub-materials of set, namely the concept of set and universal set, empty set and subset, presentation of sets with Venn diagrams, intersection and union of sets, also difference and complement of sets. Questions in the texts are arranged based on the objectives at the learning stage. The purpose is to develop the ability to understand the text and relate it to personal experience so that they will become lifelong learners, develop critical thinking skill, also process and manage communication skills creatively through responding to reading textbooks and learning textbooks [3].


Apakah ada anggota dari grup P dan Q yang sama?jika ada, sebutkan!

Tidak ada

Pada pukul 08.00 panji, reno, defan, andi, noval (grup P) telah tiba dilapangan sedangkan aldi, rivan, dodi, nunu, roni (grup Q) tiba 08.30. Panji, reno, defan, andi, noval adalah anggota yang tidak ada digrup Q. Apakah dapat dikatakan Panji, reno, defan, andi, noval komplemen dari grup Q? berikan alasannya!

Ya, karena Panji, Reno, defan, andi, noval bukan grup Q

Pada babak kedua pandi mengubah komposisi pemain yang mulanya Grup P : panji, reno, defan, andi, noval menjadi aldi, reno, defan, andi, rivan sebagai grup rotasi sebut saja grup T. apakah ada anggota dari grup P yang tidak ada di grup T? jika ada, sebutkan!

Ada, Panji dan Noval

Aldi dan rivan bukan anggota digrup P, apakah dapat dikatakan bahwa aldi dan rivan adalah selisih dari grup T dan P? Berikan alasannya!

Ya, karena Aldi dan Rivan anggota Dari T yang tidak ada dari anggota P

Figure 1. Students' Answer

Figure 1 show that the first is the answer to the question in the text relating to difference and complement of sets. It shows that students can mention that there are no same members of group P and

group Q, students also mention the names of members in group P as the complement members of group Q because these names are not in group Q. Furthermore, the students able to provide reasons why Aldi and Rivan are the differences between T and P. Although they have not included the difference and complements of sets notations, they know the purpose of difference and complements of sets. The missing notation presented in this reading text is because of this text given at the beginning of learning as a starting point for studying the difference and complements of sets. Thus, it can be said that they were able to see the connection of the text they read with mathematical materials so that the text can develop students' understanding into formal concepts regarding the difference and complements of sets. The reading text in the learning stage of the School Literacy Movement can construct students' knowledge in mathematics learning because the context used is close to students so students easily understand the material being studied and the learning outcomes obtained will be appropriate with the learning objectives. Students' understanding that is built through things based on the context that is close to students is very strong in relation to the knowledge that students have, so the process of receiving knowledge through the real context will be faster and more lasting. RME has characteristics and principles that enable students to develop optimally, such as the freedom of students to express their opinions, the existence of contextual problems that can connect the mathematical concepts with real life, and model making that can facilitate students in solving problems [14].

The calculation of effect size aims to find out how much the effect of the reading text with futsal context for the School Literacy Movement in mathematics learning. The calculation of the effect size is 2,895 and categorized as high. The existence of highly interpreted effects shows the importance of mathematical literacy in mathematics learning. Through reading activities in the context of the daily lives of students, students are able to attract the attention of the material learned so that students easily understand the material. Mathematical literacy specifically introduced as an intervention to improve the ability of students in mathematics learning [15]. Mathematical literacy is strongly influenced by realistic mathematics education (RME) because it emphasizes the importance of solving mathematical problems in real-world settings, this is also can be used as a basic theory to develop mathematics-based literacy learning [16].

The results of the potential effect questionnaire at the learning stage contains various opinions. The statement "mathematics learning which begins with reading the text of a school literacy movement in the context of futsal games can help me to understand the mathematical material being studied" dominated by students who agree. The statement "the text of the school literacy movement with the context of futsal games does not need to be used to start learning mathematics because it has no effect on my understanding in mathematics learning" dominated by students who disagree. The statement "I have difficulty answering questions because the text presented is unclear and incomprehensible" dominated by students who strongly disagree. Based on that results, it shows that start the learning with the activity of reading texts related to mathematical material makes students more interested in learning and students' literacy skills also improved because the context presented is interesting to them and learning becomes more varied. Interviews were conducted to find out the students' opinions about the potential effect of reading texts they had read. The following is an excerpt from the interview with a student:

Researcher	: After you read this text as the beginning of mathematics learning activities, do you feel that mathematics learning becomes more meaningful?
Student	: Yes, because it makes me understand the set material easily.
Researcher	: Does mathematics learning starting with this reading text help you to understand the mathematical material that being studied?
Student	: Yes

Based on the above description, it shows that the reading texts with futsal context for the School Literacy Movement have a potential effect on the mathematics learning of 7th-grade students. An important aspect of effectiveness (potential effects) of an instrument, theory, or model is knowing the level / degree of application of the theory, or model in a particular situation [17]. The effectiveness of

developing instruments, models, theories in the world of education refers to experience and the results of interventions are consistent with the intended purpose [18]. Potential effects are shown by the relationship between results and objectives. In this case, the potential effects of the use of reading texts for the school literacy movement can be seen from the results obtained from the application of the answers to questions in the habituation, development and learning text especially in learning material sets that are in accordance with the expected goals based on the Literacy Movement program School.

4. Conclusion

The products of this study are five reading texts with questions that are appropriate with the learning stage of the School Literacy Movement. The reading texts for the School Literacy Movement have a potential effect on the mathematics learning of 7th-grade students in one of the junior high schools in Karawang.

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