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IMPLEMENTATION OF REALISTIC MATHEMATICS EDUCATION WITH FORMULATE-SHARE-LISTEN-CREATE (FSLC) STRATEGY ON THE MATERIAL OF PERMUTATION AND COMBINATION AT GRADE XI SMA NEGERI 4 SIDOARJO

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Abstract

Mathematics learning should be based on a scientific method, which requires students to be active in learning. In fact, there are many teacher-centered learning methods that do notpromote students to think about solving daily life problems. This research is a pre-experimentalstudy which aims to describe the management of learning, students' activities, students' learning outcomes, and students' responses. The data were collected using observation sheets, test, and questionnaire. The results of the data analysis show that: (1) the overall learning management can be categorized as good which is supported by the result of observation with an average score of 3.1; (2) the students' activities as a whole can be categorized as active thatis supported by the result of observations with the average percentage of 96,40%; (3) the average score of students' learning achievement is 79,86 which meets the minimum mastery standard, so the result of learning is said to be complete with an average percentage of classical completeness 77,50% ; and (4) the students' responses towardthe implementation of realistic mathematics education with formulate-share-listen-create strategy is positive, because the average score of students' positive responses is 91.56%.

Keywords: Mathematics Learning, Realistic Mathematics Education, Formulate-Share-Listen-Create Strategy.

INTRODUCTION

According to curriculum 2013, mathematics learning should be based on scientific methods, which require students to be active in learning. In learning process there are various components that affected the effort to achieve the learning objectives. These components include teachers, students, and learning approaches (Alipandie, 1984). In learning, teachers must be careful in choosing a learning approach which is used in learning that appropriate to the material and state of the student. Every teacher does not always have the same view in assessing students. It will affect the approach that teachers use in learning.

In fact, there are many teacher-centered learning methods conducted in mathematics classroom, in which the students only listen to the teacher's explanation, take notes, answer if being asked, and do the given problems in exactly the same way as the teacher explained. Students only work on the teacher's instructions, follow the way specified by the teacher, and think to follow the direction outlined by the teacher. Although students are not entirely passive, this learning doesn't encourage students to think and act on their own responsibilities so that one of the lesson objectives of the curriculum 2013 of forming a responsible attitude can't be achieved in learning.

Alipandiealso mentions that "virtually all education is personal education." A teacher cannot solve problems for his students, and so on. Therefore students must do themselves, think for themselves, prove themselves, and experience their own process of thinking. Students are no longer considered to have no knowledge whatsoever at the beginning of the lesson. The success of student learning can be seen from the achievement of learning objectives. Meanwhile, to achieve the purpose of learning, the learning must be done effectively (Djamarah, 2000).

In mathematics learning, teachers should be able to instill meaningful concepts, because in general, mathematics teaching is dominated by the introduction of formulas and concepts verbally, regardless of student understanding. Linking children's real-life experiences to mathematical ideas in important classroom lessons is taught to make learning meaningful (Anwar, 2012). The meaningful learning is intended to enable teaching and learning activities to be effectively achieved. Slavin (1997) said that learning will be effective if the teacher can facilitate the delivery of information, linking the initial knowledge of students, motivate and what the teacher planned on learning done as expected.

Panhuizen (2001) says that "when children learn mathematics apart from their daily experiences, the child will be eager to forget and cannot apply mathematics". Because of that, we need a learning innovation that relates real-life experiences of children with mathematics. Learning that treat students as active participants rather than as passive recipients. One of those innovations is Realistic Mathematics Education or RME.

Since 1971, The Freudenthal Institute has developed a theory of mathematical learning called Realistic Mathematics Education (RME). The approach was influenced by the thought of Hans Freudenthal, an educator and mathematician (Sadiq, 2010). In his view, mathematics must be related to reality, close to the child's experience and relevant to society. In other words, mathematics materials must be transmitted as human activities. Learning with RME emphasizes student activity, which is to seek, find, and build student's own necessary knowledge, which later becomes a learning experience for each individual. The term 'realistic' itself not only relates to the real world, but also emphasize is the realistic problem that can be imagined.

According to Gravemeijer (1994) Realistic Mathematics Education has three basic principles, namely guided reinvention and progressive mathematizing, didactical phenomenology and self-developed model. In addition, Treffers(1987) stated that RME has five characteristics, namely, the use of context, model, production and construction, iteration and braided mathematical unit. This is in line with the content standards for the secondary education unit that "to improve problem-solving skills need to be developed in understanding problem skills, modeling mathematics, solving problems, and interpreting solutions" (Depdiknas, 2006). With the development of this model, it is expected to help students in solving problems.

From these explanations, realistic mathematics education begins with raises realistic issues close to the child, so that learning becomes meaningful. Meanwhile, in solving problems, students do not have to use the formula that already exists but he/she may use his/her own models of the given problems.As a consequence, the students are not fixated on a single way of solving, but many ways of completion.

The Formulate-Share-Listen-Create (FSLC) strategy was first proposed by Johnson and Bartlett in 1990 (Kurtis, 2003). Basically, this strategy is a cooperative learning strategy in small groups. It is a modification of the Think-Pair-Share (TPS) of the cooperative learning model. In a study conducted by (Afrilianto, 2014), it is revealed that the use of the FSLC strategy can improve student activities.

The steps of instruction implementing realistic mathematics learning are as follows:(1) understanding contextual problems,(2) explaining contextual problems, solving contextual problems, comparing and discussing answers, and concluding. In the formulate-share-listen-create (FSLC) strategy, the first, second and third steps of realistic mathematics learning, that is understanding the contextual problem, explaining the contextual problem, solving the contextual problem are similar to or included in the formulate stage. Moreover, the fourth step of realistic mathematics learning that is comparing and discussing answers is the share and listen in the formulate-share-listen-create (FSLC) strategy where students explain and listen to their partner's opinions. Then, the fifth step of realistic mathematics learning, which is drawing conclusion is similar to the create stage in a formulate-share-listen-create (FSLC) strategy. In this case, students draw conclusions about concepts or procedures relating to realistic issues that are resolved.

METHOD

This research is a pre-experimental study, using the design of "One Shot Case Study".This research was conducted at SMA Negeri 4 Sidoarjo which is located on Jl. Raya Suko, Sidoarjo, JawaTimur. This study is conducted in 5 times meeting in the even semester of the academic year 2016-2017. The subjects in this study were 40 students of grade XI. The procedure of this research can be illustrated as in Figure 1.

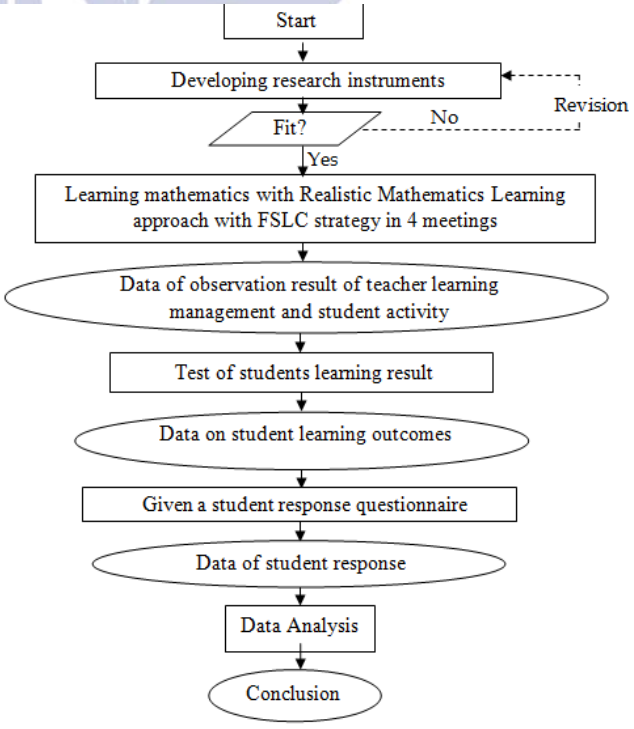

Figure 1. Stages of research

RESULT AND DISCUSSION

1. Learning Management

At the first meeting, the teacher did all activities well in accordance with the Lesson Plan. However, at the second meeting, the teacher did not give motivation. Besides, at the third meeting, the teachers almost did not motivatethe students to be active. But, in the fourth meeting, the teacher performed activities in accordance with the Lesson Plan. Overall, the teacher managedthe instruction well. The teacher are able to control the class well, so the class is not rowdy and remain conducive until the learning ends. The teacher also guided students to understand the problem well. This is supported by the result of analysis of observation sheet of teacher learning management that got a score of 3,1 which is categorized as "good".

2. Students Activities

Overall, students are active in learning. Students are enthusiastic during the lesson because they have never learned mathematics using realistic mathematics education before. Students appeared more relaxed during learning. Students were also eager to work and discuss in groups. This conclusion is supported by the result of observation analysis of student activity which states that the student activity in reading and comprehending the given contextual problem getsan average score of 6.32%, mention or write the related information about 4.63% ,ask the teacher of the less understood materials of 5.66%, submitting or writing a completion plan of 15.35%, explaining the settlement plan to the partner of 13.26%, listening to the partner's explanation of the settlement plan it has 11.68%, discuss and concludes with partner of 16.58%, submits completion of 6.68%, listens and responds to other group answers of 9.09%, draws a final conclusion of 7.15%, and conducts activities that are not relevant to learning, such as sleeping, making noise in the classroom, not listening to a friend or teacher explanation in front of the class etc. of 3.60%.

Based on the data obtained, the average score of the students' total activity during two meetings except the score of irrelevant activities in the learning is 96.40%; So it can be said that the students of grade XI MIA-4 SMAN 4 Sidoarjocan be classified in active criteria during a mathematics instruction using realistic mathematics education with formulate-share-listen-create strategy on the materials of permutation and combination.

3. Students Learning Outcome

Based on students' test results, it can be seen that the average score of class learning outcomes for permutation materials and combination after the implementation of realistic mathematics learning with formulate-share-listen-create strategy is 79.86. The highest learning result obtained by the students is 100 and the lowest student learning result obtained by the students is 52 with the total number of students who do not complete as many as 9 students. Based on the value of learning outcomes in the cognitive domain, it is found that students can understand and mastered the permutation and combinationmaterial with realistic mathematics learning with formulate-share-listen-create strategy, and the percentage of learning result of classicalcompleteness in grade XI MIA-4 SMAN 4 Sidoarjo is 77.50%. Thus it can be said that class XI MIA-4 mastered or thoroughly learn about the permutation and combination material because the percentage of mastery learning result class more than 75%.

4. Students responses

Student responses to learning are the students' responses to realistic mathematics learning with a formulate-share-listen-create strategy on permutation and combination materials that have been applied. The student response questionnaire contains about the favorable (+) statements on the statements 1, 4, 7, and 8 and unfavorable statements (-) in statements 2, 3, 5 and 6. Questionnaire responses are filled out by students at the fifth meeting after the learning result test done. Overall, 91.56 responded to grade XI MIA-4 SMAN 4 Sidoarjo students had positive response to realistic mathematics learning with formulate-share-listen-create strategy on permutation and combination materials.

CONCLUSION

Based on the research data about the application of realistic mathematics learning with formulate share listen create strategy on permutation and combination material on the students of grade XI MIA-4 SMAN 4 Sidoarjo which has been processed and analyzed, obtained the following conclusion.

1. Overall, the learning management done by the teacher by applying realistic mathematics learning with formulate share listen create strategy on permutation and combination material on the students of grade XI MIA-4 SMAN 4 Sidoarjo categorized good. Teachers conduct lessons according to Lesson Plan and only some of the activities in Lesson Plan are not performed by the teacher. This is supported by the results of the observation sheet of teacher learning management that get an average score of 3.1 and included in the category of good learning management.
2. Overall, the students of grade XI MIA-4 SMAN 4 Sidoarjo can be said to be active during the learning process, and only a few students who do actions irrelevant to the learning. This is supported by the result of student activity observation sheet that stated that the total percentage of student

activities during four times meetings(besides behavior score which is not relevant to learning activity) is equal to 96,40%. So, it can be said that students of grade XI MIA-4 SMAN 4 Sidoarjo included in active criteria during mathematics instruction using realistic mathematics education with formulate share-listen-create strategy on the materials of permutation and combination.

3. The result of students' learning outcome of grade XI MIA-4 SMAN 4 Sidoarjo after mathematics instruction using realistic mathematics education with formulate-share-listen-create strategy on the materials of permutation and combination is said to be complete learning. The average score of the entire students' learning outcome is 79.86 (above the Minimum Mastery Standard), while the classical completeness is achieved with a percentage of 77.50%.
4. Overall, the students of grade XI MIA-4 SMAN 4 Sidoarjo have positive responses to realistic mathematics learning with positive student responses of 91.56% .

SUGGESTIONS

Some suggestions that can be given by researchers related to the results of this study can be described as follows.

1. We need to do further research for realistic mathematics learning with formulate-share-listen-create strategy as the follow up of this research, teachers should provide greater motivationbe more to the students to argue in realistic mathematics learning. Besides, the teacher should guide and motivate students to share answers they owned and discussed the final answer with their partners.
2. In creating Student Worksheet and Test Sheet, the teacher should use more familiar words, so that students can understand the problem easier, because when students do not understand the purpose of the problem it will also affect the learning outcomes obtained by the students.
3. Before conducting a research, a university student needs further discussion with teacher about Lesson Plan and Worksheet so that there will no miscommunication.

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