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INCREASING STUDENTS' SELF-EFFICACY THROUGH A REALISTIC MATHEMATICAL EDUCATION

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ABSTRACT

This research is motivated by problems, the low level of students' self-efficacy abilities. One alternative learning that can be applied to improve students' self-efficacy abilities is a realistic mathematical education. The purpose of this study was to determine the increase in students self-efficacy abilities with a realistic mathematical education in mathematics learning, and to determine students' responses to mathematics learning by using a realistic mathematics education. The design used in this study was a pretest-posttest control group research design, with a quasi-experimental method. The population in this study were all class VII students of Al-Ulum Private Junior High School Medan, while the sample in this study were students of class VII 3 as the experimental class and class VII 5 as the control class who were randomly selected class. The instrument used is a self-efficacy questionnaire to see the ability of self-efficacy that has been tested and a questionnaire to see student responses. In this study, data was obtained to see the increase in students 'self-efficacy abilities with a realistic mathematics education in mathematics learning and to see students' responses to mathematics learning using a mathematical education which was analyzed using a Likert attitude scale. The conclusion obtained in this study is the increase in self-efficacy of students who receive learning using a realistic mathematics education is better than students who receive conventional learning, the average experimental class (93.68) is higher than the control class (90.20) and the attitude students towards learning with realistic mathematics education is positive and students' self-efficacy using learning with realistic mathematics education increases.

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INTRODUCTION

In general, the aim of providing education is to develop and foster the potential of human resources through various teaching activities held at all levels of education and the levels of primary, secondary, to tertiary institutions (Harlen & Qualter, 2018). In improving the quality of education in Indonesia, the government has made various efforts including completing various educational facilities and infrastructure, improving the quality of teachers, and

refining the curriculum to achieve the expected educational goals so as to become a generation with life skills in the future (Chang et al., 2014).

In improving the quality of education in addition to cognitive aspects, affective or psychological aspects are also needed, including student self-efficacy (Graham & Harris, 1989). Teachers are required to play a role in fostering student self-efficacy (Siregar, Karnasih, et al., 2020). In an activity the emotional state is one that will affect self-efficacy in that activity. As for these emotions such as anxiety, stress, fear can reduce one's self-efficacy (Arslan, 2017). However, if there is an increase in emotion (which is not excessive) it can increase self-efficacy (Lippke, 2020). The higher one's self-efficacy, according to, the better one's performance (De Clercq et al., 2018). People act on their self-efficacy and measure their self-assessment by performance (Gorson & O'rourke, 2019). In general, success in performance increases confidence in personal efficacy; repeated performance failures will decrease self-efficacy (Etherton et al., 2020).

In human endeavors there are often several challenges, obstacles, and difficulties which serve as teaching that achieving goals requires continuous effort and does not give up (Wood & Bandura, 1989). Once people are convinced that they have what it takes to succeed, they will be able to withstand unpleasant things and not give up easily and quickly bounce back when they experience failure (Bandura, 1978).

Someone who has self-efficacy usually determines when he feels, thinks, motivates himself and behaves. Initially, the action usually comes from within a person's mind (Bandura, 1994). Someone who understands himself to have high efficacy defines failure as less effort, so that they are more enthusiastic and motivated to try more optimally (Pajares, 2008). On the other hand, those who understand themselves as someone who lacks efficacy interpret their failure as a result of their lack of ability, so they usually tend to give up easily when faced with failure (Pajares, 2006). Based on this, a person usually acts on the decisions he has made. These decisions can affect motivation, results achieved and affective reactions primarily through beliefs of self-efficacy (Seo & Ilies, 2009). Self-efficacy plays a role in motivating in several ways (Bandura, 2013). They set goals that people have set for themselves; how much effort they have put in; how long do they persistently endure adversity; and the fortitude to overcome failure. When faced with obstacles and failures a person who has self-doubt about their abilities either lowers their efforts or gives up easily. Those who have a strong belief in their abilities show more effort when they fail to master a challenge (Bandura, 2010). So that a strong belief in a person is very important for the achievement of one's achievements and success.

The low ability of students to help students who are less able to deal with tasks that are non-routine in nature and students are still not developing their ideas and abilities (Siregar & Prabawanto, 2020). Through preliminary observations made, it can be seen that the self-efficacy or self-efficacy of students, especially in mathematics, is still not optimal (Ramlan, 2016). There are several reasons for the lack of self-efficacy, namely from within and from outside students, including the school environment, home environment, and the surrounding community (Öqvist & Malmström, 2017). So that in reality the students' self-efficacy ability is still low. This unsatisfactory reality is caused by many factors, including from within the student, family and environment. In the school environment, some teachers are still less creative and innovative in fostering student efficacy. This can be seen from the lack of meaning in the learning activities carried out by some teachers (Zeichner, 1994).

There are many things that teachers can do to make maths more attractive to students. Among them, through various learning approaches that can be used, namely the realistic mathematics education (Sumirattana et al., 2017).

Learning is said to be interesting and effective if students are interested in paying attention and follow the given material well and can produce something appropriate with what is expected or with words other learning objectives can be achieved perfect (Siregar, Mujib, et al., 2020).

One of the goals of the realistic education is to encourage students to understand the subject matter from abstract to more real, because the teacher uses various examples or props of objects around them so that they are easy to understand (Gainsburg, 2008). In addition, students' interest in mathematics is increasing because the realistic mathematical education is very close to the problems that occur in everyday life, in contrast to the mathematical concepts that students consider to be monotonous and abstract. Therefore, the existence of a realistic education can make mathematics learning more concrete (real) and can help most students understand the material that has been taught by the teacher in a fun way and does not seem abstract anymore (Papadakis et al., 2017).

The Realistic Education is an approach that is adapted from Realistic Mathematical Educations (RME), so that the principles of the Realistic approach are the same as RME but in some ways different from RME. The differences are due to differences in context, culture, social system and nature (Sembiring et al., 2008).

The realistic approach is a learning approach that starts from contextual problems to direct students to understand a mathematical concept in accordance with the material being studied. He also said that the Realistic Approach is a mathematics learning approach that is oriented in everyday life (Gee et al., 2018). In accordance with the concept, the realistic approach emphasizes that in mathematics learning students are required to be active and an idea is carried out by the students themselves, while the teacher is only a facilitator. As for the realistic approach, students are usually led to learn mathematical concepts starting with real things before entering abstract things (Wubbels et al., 1997).

Freudhental that "Mathematics is a form of human activity" is the basis for the development of Realistic Mathematics Education (RME). The purpose of mathematics is human activity, namely mathematics is formed from human activities and is applied in human activities (Rowland, 2003). According to realistic mathematics has characteristics, namely: (1) students think actively, (2) context and teaching materials are directly related to the school environment and students, (3) the role of teachers is active in designing teaching materials and class activities (Van Den Heuvel-Panhuizen, 2003).

Van de Walle added that the most basic thing in mathematics is that mathematics can be understood and it makes sense:

1. Every day students should experience that mathematics makes sense.

2. Students must believe that they are able to understand mathematics.

3. Teachers must stop teaching by telling students everything and must start giving students opportunities to understand the mathematics they are learning.

4. Finally, teachers must believe in students' abilities (Linder et al., 2011).

Therefore, changes should be made in the process of learning mathematics so that the objectives of learning mathematics can be achieved. Mathematical concepts must be built with the students' own understanding. Teachers should try to emphasize various ways to encourage students to think, ask questions, solve problems, put forward ideas, and discuss ideas and even find something new so that students' enthusiasm for learning increases (Brophy, 1986). Furthermore, Van de Walle argues that teachers should change their learning approach from teacher-centered to student-centered teaching. In this case, learning should

further increase student creativity, stimulate interest and distance the authority of truth. Learning mathematics is more concerned with understanding than just remembering procedures, concerned with making guesses, finding and solving problems and keeping away from the stress on finding answers mechanically (Durowoju et al., 2020). As well as avoiding mathematics as a collection of isolated concepts, procedures, but linking mathematics, ideas and applications.

Currently, most teachers still apply teacher-centered learning in accordance with conventional learning that is applied in schools. The teacher begins the lesson by providing explanations or examples of material without combining it with the environment (real life context), then continues by giving assignments. Interaction between students and teachers is rare (Candela et al., 2006). Furthermore, the teacher in fact also controls the teaching and learning process and does not involve the activeness of students, resulting in fewer opportunities for students to develop their abilities (Carpenter et al., 2016). This problem shows that teachers do not have knowledge of the concept of learning that learning should be student-centered.

Preliminary studies conducted by some students were not much involved in constructing the knowledge they had, students tended to only accept the information conveyed in line with the teacher (Scardamalia & Bereiter, 2009). This fact can be a trigger for the low self-efficacy of students because the challenges given to students in learning are still lacking so that students' interest in mathematics will also decrease. This is an evaluation for teachers to continuously create a better quality learning atmosphere so that the objectives of learning mathematics can be achieved (Meyer et al., 2015).

Furthermore, mathematics subjects at school are still impressed as difficult, abstract, and unpleasant subjects by some students. This is in accordance with the assumption of some students that mathematics memorizes a lot of formulas (Kol, 2014). In addition, teachers still dominate the class and are too monotonous in explaining mathematics material, making students think that mathematics is the most boring subject (Ensor, 2001). Teachers also still tend to explain abstract mathematical concepts based on book methods and are less varied in learning which is one of the reasons that mathematics material is difficult for students to understand.

The function of a teacher is to help students understand mathematical concepts in textbooks. If in fact the teacher in question explains the existing concepts based on the language of the book without using their ability to make the delivery lighter, of course this does not help students understand the concept, but helps students read books (Caine, 1991). As a result, some students felt that mathematics was still confusing and in the end they stated that mathematics was a difficult subject. Meanwhile, there are many things that teachers can do to attract students 'interest and develop their abilities and foster students' enthusiasm and potential, one of which is through the application of various approaches including the realistic mathematics education.

In a realistic approach students are encouraged to be able to understand the subject matter more concretely / real or not abstractly, because of the use of various examples, media and props around objects so that mathematics material is easier for students to understand (Kaiser, 2020). This can also stimulate students' interest in learning mathematical concepts that seem monotonous and abstract because the realistic mathematics education is very close to the problems that occur in everyday life. This makes mathematics more concrete / real and does not seem abstract anymore. So that a realistic mathematics education can help most students understand the material, foster self-efficacy and be more motivated in learning mathematics in a fun way.

The purpose of this study is to determine the increase in student self-efficacy with a realistic mathematics education.

METHOD

This study used a pretest-posttest control group design experimental research design. Posttest control group design is a research design where two groups are randomly selected, initially having been given a pretest to determine the initial ability between the experimental group and the control group (Morris, 2007). Furthermore, after the results of the two groups' pretest are known, the experimental class will be given treatment (X), while the control class will not get treatment (X).

Table 1.Pretest-Posttest Control Group Design Research Design

R	**01**	**X**	**02**
R	03		04

Notes :

R = group selected randomly

X = treatment or something tested

O1 = the pretest results of the experimental class

O3 = control class pretest results

O2 = posttest results of the experimental class

O4 = control class posttest results (Zientek et al., 2016).

The population in this study were all eighth grade students of Al-Ulum Medan Private Middle School. While the sample in this study were students of class VII 3 as the experimental class who received learning using a realistic mathematics education, and class VII 5 students who received conventional learning as the control class.

This research data is quantitative data which consists of: 1) The initial data is in the form of a self-efficacy questionnaire score obtained through a pretest before starting learning. 2) The final data is in the form of a self-efficacy questionnaire score obtained through posttest conducted at the end of learning or after treatment, and 3) the last is data on the achievement (gain) of self-efficacy through a realistic education.

The data collection technique of this research uses four data collection techniques, namely the distribution of self-efficacy questionnaires, observation, documentation, and literature. Next, this research consists of several research steps, namely: 1) Initial observation to see the conditions of the location or place of research such as: the number of classes, the number of students, and the way the seventh grade mathematics teacher teaches. 2) Determine the population and sample. 3) compilation and determination of mathematical material to be used in research. 4) Furthermore, the preparation of the syllabus and lesson plan (RPP) is in accordance with the realistic mathematics education. 5) Creating a research self-efficacy questionnaire instrument. 6) Perform instrument validation. 7) Testing the instrument. 8) Repairing the questionnaire instrument. 9) Conducting the initial self-efficacy questionnaire (pretest) in both classes, the experimental class and the control class. 10) In both classes, teaching and learning activities were carried out by giving treatment. 11) Completing the final self-efficacy questionnaire (posttest) in both classes. 12) Analyze data. 13) Finally, make a conclusion.

Thus, this study aims to increase the self-efficacy of junior high school students through a realistic mathematics education. So that the hypothesis of this study is the increase in self-efficacy of students who get learning with a realistic mathematics education is better than those who get conventional learning.

RESULTS AND DISCUSSION

Results

The results of this study are described descriptively with regard to increasing students' self-efficacy abilities through a realistic mathematics education. Increasing students' self-efficacy abilities through a realistic mathematical education can be seen in the table of test results for the difference in the average self-efficacy ability which is shown in Table 1.

Table 2. Two-Mean Difference Test Self-Efficacy

Class	N	Mean	Std. Dev	t-hit	Sig. (2-tailed)
Experiment	33	93,68	7,44	2,183	0,034
Control	33	90,20	5,88	2,183	0,034

Based on table 1 above, it can be seen that the Equal variances assumed that the sig. (2-tailed) value is 0.034 <0.05, so that H_0 is rejected, this shows that the self-efficacy of students who use a realistic mathematical education is better than those using conventional learning . The mean mean of the experimental class (93.68) was higher than the control class (90.20), meaning that the increase in the efficacy of the experimental class was better than the control class.

Discussion

Based on the results of data analysis, it was found that the student's response to the realistic mathematics approach was positive. In line with the results of this study, learning based on a realistic approach based on the premise of problematic situations adapted to the context of real life or everyday life will arouse students' interest and curiosity in solving problems because they are related to real life. In other words, learning using a realistic approach can generate student interest in learning, causing learning activities to be effective.

Learning is a process of change, namely a business process carried out by a person to obtain a new behavior change as a whole as a result of interaction with the environment (Melão & Pidd, 2000). This is because the learning process is a complex thing, where students determine whether they will learn or not.

Thus, the action/response to the stimulus in the form of teaching as an activity can be categorized into two things, namely a positive response to learning (listening, reading, writing, discussing/asking) or a negative response (other irrelevant actions). A positive response indicates that students are willing to participate in the learning process.

Furthermore, the positive response given by the students was caused because the teacher had provided a stimulus in the form of feedback and reinforcement that was in accordance with the characteristics of the students after studying the class situation. In other words, the teacher is a very decisive component in the implementation of a learning strategy. A teacher must prepare a mature and accurate learning planning process because with learning planning the teacher will be able to predict how much success will be achieved.

Based on the results of data analysis, it shows that learning with a realistic mathematical education to learning mathematics encourages students to have confidence in their ability to produce high levels of performance such as completing tasks maximally. Learning mathematics with a realistic mathematical education takes place actively and interactively, students do their own LAS given in their group and explain and provide reasons for the answers they make then the other groups respond. Such activities raise confidence in one's own abilities and have a strong commitment, see difficulties as challenges and think of strategies in experiencing difficulties, like new situations, set yourself challenging goals, persevere and try to the maximum, try to face failure, focus with tasks, and not easily give up on failure.

Overall, the increase in the self-efficacy of the experimental class students (students who received learning with a realistic mathematics education) was better than the control class students (students who received conventional learning). The ability of student self-efficacy can be developed with a realistic mathematical education because of the principles and characteristics of a realistic mathematical education that is applied in learning.

Based on the explanation above, the learning approach factor is one of the most influential factors in increasing student self-efficacy. The application of the right approach such as a realistic mathematics education in the learning process will make students more interested in mathematics and will be more responsible in solving mathematical problems. This is in accordance with the observations of researchers when the learning process takes place with a realistic mathematical education, most students look brave, enthusiastic, active, and enthusiastic when designing answers from the LAS given even though there are some students who are less enthusiastic like resigning to waiting for friends to answer the LAS given. This is caused by several factors, including physiological, emotional, social and experiential conditions.

In general, students who get learning with a realistic mathematics education have a positive tendency towards self-efficacy. For example, having confidence or confidence in the abilities they have in carrying out and completing the tasks at hand so that they are able to overcome obstacles and achieve expected goals, so it can be concluded that students who have high efficacy abilities will have an impact on their learning achievement and can improve mathematical abilities. students.

Based on the results of observations made, it shows that the attitudes of students respond positively to learning with a realistic mathematics education. Students' enthusiasm can be seen when faced with concrete / real world problems, because perhaps all this time learning has always been faced with problems in mathematical and abstract concepts. With the application of learning with a realistic mathematics education, it is seen that students respond positively, courageously, actively, enthusiastically, and enthusiastically. So it can be concluded that students 'attitudes towards learning with a realistic mathematics education are positive and students' self-efficacy using learning with a realistic mathematics education increases.

CONCLUSION

Based on the analysis of the research results, it can be concluded that the increase in the self-efficacy ability of students who get learning with a realistic mathematics education is better than students who receive conventional learning, the mean mean of the experimental class (93.68) is higher than the control class (90 , 20). Schools and teachers are expected to be able to create creative and innovative learning, including using a realistic mathematical approach to attract interest and increase student learning motivation and increase student self-efficacy

for all materials. Furthermore, it is also recommended to use other learning models so that they are varied and can increase students' learning motivation.

The researcher suggests to the next researcher to be able to conduct similar research that is deeper, broader, and adds other mathematical abilities by using a realistic mathematical approach.

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