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Implementation of Problem Based Learning to Develop Student's Character in Social Arithmetic Lesson

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ABSTRACT
This study aims to determine the effectiveness of the application of Problem-Based Learning in developing students character in social arithmetic material. The approach used in this research is a quantitative approach with a quasi-experimental type of research. This study used all students of class VII D SMP Negeri 1 Kudu which were divided into two groups, namely the control group and the experimental group. The instruments used in this study were tests, questionnaires. The test is used to determine the student's ability while the questionnaire is to determine the student's character in Problem-based Learning. The prerequisite test used in this study used the normality test and homogeneity test with a=0,05. Hypothesis testing in this study using independent sample t-test on IBM SPSS.21 for windows. The result showed that the Problem-based Learning model had a positive and significant effect on the development of students' character.

***Keywords**: Problem-based Learning; Student character; Social Arithmetic.*

INTRODUCTION
The function and purpose of education in Indonesia based on the law on the National Education System Number 20 of 2003 article 3 is to develop capabilities and shape the character and civilization of a dignified nation in the context of educating the nation's life, aiming top develop the potential of students to become human beings who believe and fear God. The Almighty, noble, healthy, knowledgeable, capable, creative, independent, and become a democratic and responsible citizen. Therefore, teacher and schools need to create learning that supports the formation of potential in accordance with the objectives and functions of the law. One of the main goals and functions of national education is to create students who have good character, are creative, independent, have noble character. This matter, because the formation of character is very important in building a better generation of the nation. Character formation from an early age is not only taught in the home environment, but in the school environment in various subjects the teacher emphasizes instilling good character in students. one of them, in mathematics.

Mathematics lessons are very important and very influential lessons in everyday life, both in the development of science and technology, as well as in the context of forming students' positive characters. The formation of students' positive character in mathematics can be applied in various kinds of subjects in mathematics, one of which is on the subject of social arithmetic. Social arithmetic is one of the learning materials for mathematics at the junior high school level. Social arithmetic studies the selling price, purchase price, profit and loss, gross, tare, net, interest and taxes. Social arithmetic material is taught in class VII even semester. Social arithmetic is a branch of mathematics that is closely related to the economy, and buying and selling transactions in everyday life. In everyday life, they often use mathematical calculations to carry out buying and selling activities, calculating taxes, calculating interest in banks and so on. However, in fact, students still often find it difficult to learn and apply social arithmetic material in real life.

Based on the results of interviews with mathematics teachers for class VII D at SMP Negeri 1 Kudu on Thursday, March 18, 2021, it was stated that many students still did not fully understand social arithmetic material in everyday life. This is evidenced on Monday, March 22, 2021 from the results of the pretest showing that many students do not understand and determine the purchase price if the selling price and profit percentage are known, regarding gross, net, and tare. In addition, learning is still glued to the

teacher. Even though the teacher has implemented various learning models. And the lack of positive student character in participating in mathematics learning because it is considered difficult. And do not understand the questions presented so that students find it difficult to solve a problem. Therefore,

The problem-based learning model Problem Based Learning according to Maryati (2018) is a learning model that presents contextual problems so as to stimulate students to learn. Problem-based learning model is student-centered where students are provided with a problem to be solved by students. So that students are expected to be able to play an active role in channeling knowledge, ideas and receiving ideas from others. According to Qomariyah et al (2020) *Problem based learning* closely related to the problems of everyday life. One of the mathematical materials that involve these activities is social arithmetic material. According to Nasrulloh et al (2020) The use of learning media in accordance with the material is a means to streamline the process of delivering material to students.

This study uses a probem based learning model as an intermediary to develop students' character. According to Sunardi & Nelfiyanti (2017) PBL is related to learning about the wider life (life wide learning), skills to interpret information, collaboration and team learning and reflective and evaluative thinking skills. According to research Nasrulloh & Umardiyah (2020) Problem-based learning model has a positive impact on students' academic achievement and students' attitudes towards science. Therefore, With the implementation of this learning model, students are expected to be able to develop students' character in applying mathematics learning so that students are able to present the results of their completion in accordance with the stages and the concept of completion. The syntax or steps in the PBL learning model Rezky et al (2016) in general are as follows:

Table 1. Syntax Problem Based Learning

phases	Teacher Behavior
Phase 1	- Informing learning objective
Orienting the students on issues	- Creating a classroom environment that allows an exchange of ideas that is open.
	- Directing a question or problem.
	- Encouraging children to express ideas openly
Phase 2	- Help students find the concept-based problem
Organising students to learn	- Encouraging openness of the democratic process of learning
	- Test the students' understanding of the concept finds
Phase 3	- Provide ease of students in problem solving.
Help investigate independently or group	- Encouraging cooperation and task completion.
	- Encouraging dialogue, discussion with friends
	- Helps define and organize tasks
	- Helps formulate hypotheses
	- Assist in providing solutions
Phase 4	- Guiding students work on student activity sheet
Develop and present work	- Guiding students present the results of work.
Phase 5	- To help students review the results of problem-solving.
Analyze and evaluate the results of problem solving	- To motivate students to engage in problem solving
	- Evaluate the material

Problem-based learning is a learning approach model on authentic problems (Sunardi & Nelfiyanti, 2017). So that students can organize their own knowledge, develop higher skills, make students independent and increase student confidence. Based on this description, the problem in this study is how the application of problem-based learning models can develop students' character in social arithmetic material for class VII D SMP Negeri 1 Kudu.

METHOD

The approach used in this study is a quantitative approach with experimental methods, namely, quasi-experiments using the Nonequivalent Control Group Design. This research was conducted at SMP Negeri 1 Kudu. This research was carried out in mathematics learning in the even semester of the 2020/2021 academic year adjusted to the subject matter chosen in this study, namely social arithmetic material.

The population in this study used all students of class VII D SMP Negeri 1 Kudu. The samples used were all students of class VII D SMP Negeri 1 Kudu which were divided into two groups, namely,

class A as the experimental group and class B as the control group. Data collection techniques used, namely tests, questionnaires, and observations. The instruments used include: tests to determine students' abilities, questionnaires to determine student character in mathematics learning activities, observations for syntax implementation. The instruments that have been compiled are then tested for validity and instrument reliability tests. Validity testing in this study was carried out by 2 validators, namely lecturers as material experts and mathematics teachers as media experts. Reliability test is used to measure the level of determination of an instrument. Technical analysis of the data used in this study is the normality test using the Kolmogorov-Smirnov test, homogeneity test using Levene's test, hypothesis testing using the Independent Sample t-Test. The questionnaire will be tested for validity and reliability to determine the level of validity of the items in the questionnaire statement. Test the validity of the questionnaire using a correlation test while the reliability test using Cronbach's Alpha with a 95% confidence interval with the help of IBM SPSS.21 for Windows.

RESULT AND DISCUSSION

Result

Based on the research that has been done, the data obtained from the pretest and posttest results of the two groups, namely the experimental group and the control group. The data obtained from the two groups are:

- Pretest and Posttest Results of Experimental Group and Control Group

Before being given different treatment between the experimental group and the control group, the results of the pretest data calculation from the two groups were obtained. In general, it can be seen in table 2.

Table 2. Pretest results of the experimental group and the control group

Statistics	Experimental Group	Control Group
Average	62.25	61.75
variance	49,000	73.267
The highest score	70	77
Lowest Value	47	47
Amount of data	16	16

After being given different treatment between the experimental group and the control group, the results of the posttest data calculation from the two groups were obtained. In general, it can be seen in table 3.

Table 3. Posttest results of the experimental group and the control group

Statistics	Experimental Group	Control Group
Average	77.13	66.50
variance	37,583	56,400
The highest score	88	83
Lowest Value	69	53
Amount of data	16	16

Based on Table 2 shows that the posttest results in the experimental group were higher than the posttest results in the control group. This can be interpreted that there is an increase in student abilities due to the application of problem-based learning in developing student character in social arithmetic material.

- Sample Prerequisite Test

The sample prerequisite test is carried out using the data *pretest* and posttest which includes normality test and homogeneity test. The normality test in this study used the Kolmogorov Smirnov test, while the homogeneity test used the Levene Statistic test. The results are table 3 and table 4.

Table 4. Normality test using Kolmogorov-Smirnov test using SPSS.21 windows

Class		Kolmogorov-Smirnova		
		Statistics	df	Sig.
Results	pre_experiment	.169	16	.200*

post_experiment	.133	16	.200*
pre_control	-124	16	.200*
post_control	.143	16	.200*

Based on Table 4 shows that the results of the pretest and posttest data of the control group and the experimental group have a significance value > 0.05, meaning that the data is normally distributed.

Table 5. Homogeneity test using Levene Statistic test using SPSS.21 windows

		Levene Statistics	df1	df2	Sig.
Results	Based on Mean	.421	3	60	.739
	Based on Median	.330	3	60	.803
	Based on Median and with adjusted df	.330	3	54,388	.803
	Based on trimmed mean	.434	3	60	.730

Based on Table 4, the sig Based of Mean value is $0.739 > 0.05$ so it can be concluded that the data variance is homogeneous

- Hypothesis testing

Hypothesis testing in this study uses the independent sample T-test. This test was conducted to determine whether there was a significant difference between the pretest scores of the two groups.

Table 6. Results of independent Sample t-Test

Data Type	Group	df	mean	t	Sig.(2-tailed)
Posttest	Experiment	30	77.13	4,384	0.000
	Control	28.844	66.50	4,384	0.000

Based on Table 6, the results of the t-test in the posttest obtained a sig. (2-tailed) value of $0.00 < 0.05$. It can be concluded that there is a significant difference between the posttest results of the experimental class and the control class

Table 7. Questionnaire Reliability Test

Cronbach's Alpha	N of Items
.988	25

Based on Table 7, the results of Cronbach's Alpha of 0.988 mean that the questionnaire is reliable because 0.988 is greater than 0.6. Meanwhile, based on the results of the validation analysis of the statement items using the correlation test, the questionnaire was declared valid because of the significance value 0.00 < 0.05 with the corrected item total correlation price harga ≥ 0.66. The results of student character development which include honest, disciplined, confident, thorough, religious, polite, tolerance in the application of Problem Based Learning can be seen in Figure 1.

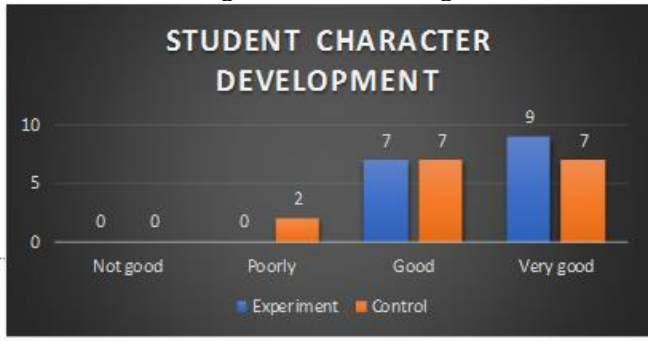

Figure 1. Histogram of student character development in learning

Figure 1 shows the significant development of student character in learning that can be seen in the experimental group. There are no unfavorable criteria in the experimental group in learning using problem based learning. While there are poor criteria in the control group which uses the control class learning model. Based on the description, it shows that the application of problem based learning is able to develop students' character.

Discussion

This study aims to determine how the effect of the application of problem-based learning models in developing students' character in social arithmetic material. In the experimental group, a problem-based learning model was applied, while in the control group, conventional learning was applied. The research activity was carried out on March 18, 2021 at SMP Negeri 1 Kudu, to be precise, for class VII D students on Social Arithmetic material. This research was conducted in 4 meetings, the first meeting of the control group and experimental group students before being given treatment was given a test to determine the students' abilities and students' character in solving a problem. The next meeting the experimental group was given treatment. While the control group still uses the conventional learning model. In the learning process students are required to get used to praying before starting learning, then students are required to be active, fill in attendance, students are emphasized to be active in asking, students are emphasized to solve a problem carefully, honestly, and responsibly. The data described is the data of students' mathematical test results obtained from the experimental group and the control group. The students' mathematical ability test data was carried out before and after being given treatment both in the control group and the experimental group. In the experimental group there was an increase in the average value before and after being given treatment, from 62.25 to 77.13. However, the control group also experienced an increase in the average score from 61.75 to 66.50. So the increase value between the experimental group and the control group is very different. The description above provides information that students' abilities can be increased by applying the problem-based learning model.

The instrument in this research is a test. Where the test is used as a means of measuring the level of students' mathematical ability, the instrument in this study was validated by one mathematics teacher and one lecturer. From the validation results, the experts stated that the instrument was feasible to use without revision. Furthermore, this research was conducted at SMP Negeri 1 Kudu in class VII D students. This study used two groups, where class VII D was divided into two namely the experimental group and the control group. Attendance with odd numbers as the experimental group and attendance with even numbers as the control group. The control group uses a learning model that is usually applied by mathematics teachers.

The experimental group uses a Problem-based Learning model. At the time of pretest, the experimental group got the same minimum score as the minimum score in the control group, namely 47. Meanwhile, at the posttest the experimental group got a minimum score of 69, while the control group got a score of 53. So it can be seen from the difference in the maximum value between the two groups, that the experimental group has a score of 69. greater maximum than the control group. Based on the observations, the two groups both displayed coherent completion steps. However, the control group had a lower level of accuracy than the experimental group. The data collection process is carried out when students still do not understand how to solve problems using the correct concepts in the process. It is said to use the correct concept if students solve problems can be seen from how to solve problems using coherent concepts, as well as being thorough in presenting solutions. For example, students have not included things that can help solve the problems they face, for example being known, asked, and answered.

This is able to increase student knowledge, and can grow the character of students who are initially not careful, eventually become more thorough in solving the problems given. And after being treated by both the experimental group and the control group, when doing the posttest the experimental group students showed an increase in solving the problems given by using the appropriate settlement steps. and meticulous in presenting solutions. For example, students have not included things that can help solve the problems they face, for example being known, asked, and answered. This is able to increase student knowledge, and can grow the character of students who are initially not careful, eventually become more thorough in solving the problems given. And after being treated by both the experimental group and the control group, when doing the posttest the experimental group students showed an increase in solving the problems given by using the appropriate settlement steps. and meticulous in presenting solutions. For example, students have not included things that can help solve the problems they face, for example being

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Based on the hypothesis test using the independent sample t-Test test on the posttest data of the experimental group and the control group, the results showed that there were significant differences in students' knowledge and abilities. It can be seen that the significance value 0.00 > 0.05. Until H_0 rejected and H_a accepted means that the knowledge and abilities of the experimental group students are higher than the control group. This is due to the application of problem-based learning models in the experimental group. In line with research Indriawati et al (2016) which proves that the problem-based learning model shows that the knowledge of the experimental group students is higher than the control group with an average post test result of the experimental group 78.49 while the control group is 74.91.

The results of the descriptive analysis show that learning mathematics with social arithmetic material with a problem-based learning model has a positive effect on the development of students' character and abilities in learning mathematics. This can be seen from the initial conditions of students before and after being given treatment. Based on the average of students before and after being given treatment, it increased. Research of Cahyaningsih & Ghufron (2016) explained that the problem-based learning model affects the creative character of students and the problem-based learning model affects the students' critical thinking character. Based on the pretest, posttest and data analysis results from students' statements, it was shown that students' abilities, student learning outcomes, and student character in the experimental group were higher than the control group. Where the control group uses a conventional learning model while the experimental group uses a problem-based learning model. This result is also relevant to the statement Djuandi (2016) that the problem-based learning model in the experimental group has an effect on students' attitudes. The attitude of students in the experimental group increased significantly after obtaining learning with a problem-based learning model. In addition, these results are relevant to research research (Nasrulloh, 2019) which states that problem-based learning model can increase student learning activity.

CONCLUSIONS

Based on data analysis and discussion, it can be concluded that the application of problem-based learning models (Problem Based Learning) in class VII D students effectively supports learning and can develop students' character towards learning materials. The results of calculations using the Independent Sample t-Test show that sig.(2-tailed) is $0.00 \leq 0.05$. Thus, it can be concluded that Ho is rejected and Ha is accepted, that is, there is a difference between the results of the pretest and the results of the posttest so that the problem-based learning model has a positive influence in developing students' character in social arithmetic material in class VII D SMP Negeri 1 Kudu.

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