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THE EFFECT OF SEARCH SOLVE CREATE SHARE LEARNING (SSCS) ON UNDERSTANDING MATHEMATICAL CONCEPTS BY CONTROLLING STUDENT NUMERICAL ABILITY

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ABSTRACT

This research aims for knowing the effect of learning of search, solve, ceate, share (SSCS) toward the understanding of mathematical concept with control of grade 7th students' numeric ability of SMP (SLUB) Saraswati 1. This kind of research is quasi experiment. The population in this research is grade 7th students of SMP (SLUB) Saraswati 1 Denpasar Denpasar on 1st Semester in academic year 2019/2020. Sample selection in this research was conducted by using cluster random sampling technique. Cluster random sampling technique was done for selecting 2 classes that will be made as class control and experiment class. The data collection used students' mathematical concept understanding ability test for ability of students' mathematical concept understanding and numeric ability test for students' numeric ability. This research is using ANAKOVA analysis with single factor independent group design with use covariative. Based on the calculation result found that: 1) there is positive learning effect SSCS toward grade 7th mathematical concept understanding ability of SMP (SLUB) Saraswati 1 Denpasar, with significant score 0,018, (2) after controlling covariable of numerical ability there is learning positive effect SSCS there is positive learning effect SSCS toward grade 7th mathematical concept understanding ability of SMP (SLUB) Saraswati 1 Denpasar, with significant score 0,041 and (3) there is a contribution of students' numeric ability toward students mathematical concept understanding ability as much 15,21%

KEYWORDS: effect, SSCS, numerical, concepts and mathematics.

1. INTRODUCTION

Based on the aims of learning mathematics there are 5 stages of activities to meet meaningful learning, namely 5M (observing, asking, reasoning, presenting, and creating). Achievement of learning objectives is strongly influenced by obstacles that occur in the learning process. One obstacle that is seen is the low ability to understand students' mathematical concepts. According to NCTM (2000), to meet meaningful understanding, mathematics learning must be directed at developing the ability of mathematical connections between various ideas, understanding how mathematical ideas are related to each other so that a comprehensive understanding is built up, and using mathematics in contexts outside mathematics. Students are told to have understood the concept if they have been able to express the concept in their own words, able to express examples and not examples and be able to apply concepts in various situations.

Efforts are needed in the learning process to improve students' understanding of mathematical concepts that refer to the stages of the 5M activity. Another obstacle is the lack of interest and active students in following the learning process. A good learning process is to provide an active opportunity for all students to understand the material and solve problems independently so they are able to build their own knowledge. One learning that involves these things is the SSCS learning model. The term for learning SSCS is an abbreviation of its stages, namely the first stage of the search which aims to find out the problem, the second stage of the problem that aims to solve the problem, the third stage of the aim is to reclaim and write down the problem solution obtained, and the fourth is the stage share that aims to communicate the solution to the problem.

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Pizzini (1988) said the SSCS learning model was designed to broaden and apply concepts of science and critical thinking skills, as well as using model and holistic problem solving. This is supported by (Utami, 2011) that SSCS is a learning model that gives freedom and freedom to students to develop creativity and thinking skills to gain an understanding of science by conducting investigations and finding solutions to existing problems.

According to the Laboratory Network Program report (in Idaman, 2012) the National Council of Teachers of Mathematics (NCTM) standards say what can be achieved by the SSCS learning model, among others, (1) submitting mathematical problems / problems, building students' experience and knowledge, (2) develop mathematical thinking skills that are convincing about the validity of a particular representation, (3) make guesses, solve problems or make answers from students, (4) involve student intellectuals in the form of asking questions and assignments involving students, and challenging each student, (5) develop students' mathematical knowledge and skills, (6) stimulate students to make connections and develop a coherent framework for mathematical ideas, (7) useful for problem formulation, concept understanding, problem solving, and mathematical reasoning, and (8)) promote the development of all students' abilities to do mathematical work. Based on the eight things that can be achieved from the SSCS learning it can be said that SSCS learning can be applied in mathematics learning, especially in terms of understanding concepts, problem solving and reasoning.

Pizzini (1988) explains in more detail the activities at each stage of the Search, Solve, Create and Share (SSCS) learning model as follows.

1) The Search Stage of the teacher plays a role in conveying the learning objectives and guiding students in achieving problems. While students play a role in finding out the problem given, exploring initial knowledge, writing down information that is known and relating to the given situation, observing and analyzing information that is known, inferring the problem by making questions, and generalizing information so that ideas arise that might be used to solve the problem. Thus this activity can increase student motivation actively to construct their own knowledge.
2) The Solve Phase of the teacher will encourage students to carry out a problem-solving plan by identifying, gathering possible alternatives, and analyzing. While students find the criteria that will be used in choosing several alternative solutions, make guesses about some solutions that can be used, think of all the possibilities that occur when using these solutions, and make plans to solve problems that include determining the solution to be used. At this stage each student in the group tries to understand each other's problems and think about planning a solution. In addition, each student will later have the responsibility in presenting their group settlement solutions.
3) Create phase the teacher directs students in describing, designing or creating the best solution so that they can communicate the results and conclusions from the problems obtained. Meanwhile students convince themselves by re-testing the solutions that have been obtained, describing and describing the problem-solving process, and preparing what will be made to be presented. At this stage the ability to understand the concepts of students is needed because students must be able to create the best solution or the right conclusion. In addition, at this stage students also describe the results of their completion by using their own words in accordance with their respective ideas
4) The teacher share phase creates a situation of active and effective interaction between groups and guides students in presenting the results obtained to their peers and evaluating student presentations. At this stage each student will have the same opportunity in presenting problem-solving solutions to the teacher and other friends and receive feedback, put together ideas and evaluate solutions. From this activity it is expected that each student is able to be directly involved actively so that students' understanding of concepts increases.

The application of the learning process in improving students' understanding of mathematical concepts will be influenced by several factors, as expressed by (Sudjana, 2000) that the level of student learning success is more influenced by internal factors than students themselves than external factors. It was stated that 70% of student achievement is influenced by students themselves and 30% is influenced by the environment around students. The internal factors referred to include self ability, learning motivation, learing style, and students' interests themselves, while the external factors referred to include learning facilities, methods and learning strategies.

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One internal reason that refers to mathematics learning is the numerical ability possessed by each student. Numerical ability is the basic ability to count that is fundamental to use in mathematics learning activities. numerical ability becomes a very important initial foundation that students must be able to master. This ability is very important to be able to do calculations quickly and to solve arithmetic problems. Numerical abilities include standard abilities about numbers, numeracy abilities that contain reasoning and algebraic skills. In other words it can be said that numerical ability is an important and fundamental aspect in learning mathematics. According to Pica (2015) students who have high numerical ability will have problem solving abilities, classify, categorize information, work with abstract concepts to find out the quality of each, and can conduct controlled experiments, interest in natural events and be able to do mathematical calculations complex. Thus the level of numerical ability of students can affect students' understanding of mathematical concepts. So we need control over numerical abilities of students through the covariate analysis method when they want to apply a learning model in the learning process. Such as, controlling the numerical ability of students so that the effect of SSCS learning on understanding concepts is not biased towards numerical ability.

Previous research conducted by Idaman (2012) concluded that there was an influence of the SSCS Learning Model on the ability to understand the mathematical concepts of eighth grade students of MTs Darel Pekanbaru on the subject of the Pythagorean Theorem. Furthermore, other relevant research is a study by Widiana and Jampel (2016) stating that after controlling numerical thinking skills, the results of this study show that: (1) the achievement of inferential statistics of the group of students who follow the SSCS learning model is higher than the group that follows the achievement of statistics conventional inferential graduates, (2) groups of students who get higher performance appraisals than conventional assessments, (3) there is an effect of the relationship between learning models and forms of assessment on student achievement statistics, (4) in the SSCS learning model, inferential statistical achievements of students who get performance appraisals are higher than groups that get conventional assessments, (5) in conventional learning models, inferential achievement statistics for students who get lower performance appraisals than groups that get conventional assessments, (6) in performance appraisals, achievement statistics inferential students who take studies with SSCS learning models are higher than those who follow conventional learning models, and (7) in conventional assessments, inferential statistical achievement of students who take SSCS learning models is lower than groups who follow conventional learning models. Furthermore Agustin's research results (2018) show that there are differences in the understanding of the concepts of students who take learning with the SSCS model with students who take conventional learning. However, these studies are limited to the effect of SSCS learning on the achievement of inferential statistics and understanding of concepts in certain subject matters. So that further study is needed, whether SSCS learning still has a positive effect on students' understanding of mathematical concepts in fraction material after controlling numerical abilities.

Based on this study, it is interesting and important to conduct research on SSCS learning towards students' understanding of mathematical concepts. This study will be limited to the problem of understanding the mathematical concepts of VII graders of SMP (SLUB) Saraswati 1 Denpasar by paying attention to students' numerical abilities. Therefore, the author is interested in conducting a study entitled "The Effect of Search Solve Learning Share Create (SSCS) on Understanding Mathematical Concepts by Controlling Student Numerical Abilities.

2. METHOD

This research uses quasi-experimental research (quasi-experimental). Darmadi (2011) states that Quasi experimentation is a type of experiment that is not possible to place research subjects randomly into groups, which means that in conducting research it is not possible to change classes that already exist at the study site. This research consists of several stages, namely the preparation phase of the experiment, the implementation of the experiment, and the end of the experiment. In the preparation phase begins with observation to the Saraswati 1 Junior High School (SLUB) Denpasar and the trial of the instrument. At the experimental stage of the learning process carried out in the control class and experimental class. Learning activities are carried out based on learning scenarios that have been discussed before with the teacher. In the last stage of the experiment the students' concept understanding tests were carried out in each group, namely the control group with conventional learning and the experimental group with SSCS learning. After conducting a concept

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understanding test, it is continued with data collection and processing. The population in this study were all students of class VII Junior High School (SLUB) Saraswati 1 Denpasar in the semester of academic year 2019/2020.

This research was conducted by cluster random sampling technique in which the sample was randomly selected as a group (class). The class in question is a class that has been previously formed in the school where the research without interference and without randomization people. Based on the results of the cluster random sampling technique, two classes are obtained which will be the experimental class and the control class. The following is a sample of students of class VII SMP (SLUB) Saraswati 1 Denpasar.

Table 1. Sample of Class VII Students of SMP (SLUB) Saraswati 1 Denpasar

No	Class Type	Class	Many Students
1	Experiment	Class VIIG	40 students
2	Control	Class VIIC	40 students

(Source: Vice Principal Curriculum SMP (SLUB) Saraswati 1 Denpasar)

In this study there are 3 variables, namely the independent variable, the dependent variable, and the control variable (covariable). The independent variable is the variable that influences or is the cause of the change or the occurrence of the dependent variable (Sugiyono, 2017). Based on this explanation, the independent variable in this study is SSCS learning. Dependent variable is a variable that is affected or which becomes a result, because of the independent variable (Sugiyono, 2017). The dependent variable in this study is the understanding of mathematical concepts of VII graders of SMP (SLUB) Saraswati 1 Denpasar. The control variable (covariate) is also called the control variable. Sugiyono (2017) said control variables are variables that are controlled or made constant so that the relationship of independent variables to the dependent variable is not influenced by outside factors studied. In this study the control variable is the numerical ability of students.

Data collection in this study using the test method. The test that will be used in this study is an objective test in the form of a multiple choice test and a description test. The description test is used to measure students' abilities in understanding mathematical concepts. The description test of students' mathematical concept comprehension ability consists of 5 items with a predetermined grid and scoring rubric. Each test item describing the ability to understand concepts gets a score of 1 to 4 so the maximum score is ideally 20. Multiple choice tests are used to measure students' numerical abilities. The numerical ability multiple choice test consists of 20 items with predetermined left-hand lattices. Each multiple choice test has a numerical ability score of 1 to answer correctly and 0 to answer incorrectly so that the maximum score is ideally 20.

This study uses ANAKOVA analysis with single factor independent groups design with use of covariate. Variables used in single factor independent groups design with use of covariates are continuous, such as intelligence (Dantes, 2012). These variables are said to be controlling or covariate variables.
The data analysis technique of this research was carried out with several tests namely content validity test by experts, empirical validity testing and reliability testing to conceptual ability comprehension test until continued with empirical validity testing, reliability test, different power test, difficulty level test, and test effectiveness of fraud. on numerical ability tests. After that, the hypothesis prerequisite test is the normality test, the homogeneity test, and the linearity and regression significance test. Furthermore, the hypothesis test in this study uses the F test, ANAKOVA analysis, and moment product correlation.

3. RESULTS AND DISCUSSION

The data obtained in this study are data on the ability to understand mathematical concepts and numerical abilities on groups of students who take the SSCS learning model and groups of students who take conventional learning.

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Table 3. Recapitulation of Calculation Results for Mathematical Understanding Ability Score (X) and Numerical Ability (Y) with SSCS Learning Model (A1) and Conventional Learning (A2)

Statistical Data	A1X	A1Y	A2X	A2Y
N	40	40	40	40
Mean	15,20	14,53	13,55	13,68
Median	15	15	13	14
Mode	11	10	12	11
Standard Deviation	2,98	3,15	3,10	3,00
Variance (SD^2)	8,88	9,90	9,64	8,99
Maximum score	20	20	19	19
Minimum Score	11	10	9	9
Range	9	10	10	10
Many Interval Classes (K)	6	6	6	6
Length of Interval Class (I)	2	2	2	2

Information:
A1X: The ability to understand mathematical concepts of students who follow the SSCS learning model
A1Y:The numerical ability of students who follow the SSCS learning model
A2X: Ability to understand mathematical concepts of students who follow conventional learning models
A2Y: Numerical ability of students who follow conventional learning

Before conducting a hypothesis test, it is necessary to first test the analysis of covariance (ANAKOVA), which consists of normality test of data distribution, test of homogeneity of variance, and linearity and significance of regression. Data normality test is used to determine whether the data used is normally distributed or not. Covariance analysis (ANAKOVA) can be done if the data used are normally distributed. To test the normality of data distribution using Kolmogorov-Smirnov. Here are the results of the calculation of normality test data distribution more clearly.

Table 4. Data Distribution Normality Test Results

Group	**(sig.)** Kolmogorov-Smirnov calculation	Information
A1X	0,103	Normal
A1Y	0,200	Normal
A2X	0,188	Normal
A2Y	0,057	Normal

Based on the results of the normality test data distribution in Table 4 shows that all data have a significance value of more than 0.05. So that the data on understanding mathematical concepts and numerical ability data of students who follow the SSCS learning model and conventional learning come from populations that are normally distributed.

Homogeneity variance test is used to ensure that the differences obtained from the ANACOVA test really originate from differences between groups, not based on differences within groups. Testing of homogeneity of variance is carried out using the Levene's Test. The following is a clearer recapitulation of the variance homogeneity test results.

Table 5. Homogeneity Test Results Variance Ability Understanding Students' Mathematical Concepts

F	df1	df2	Sig.
0,039	1	78	0,845

Table 6. Homogeneity Test Results for Student Numerical Ability Variance

F	df1	df2	Sig.
0,060	1	78	0,807

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Based on the results of the variance homogeneity test using Levene's Test calculations in Table 5 and Table 6 it was found that all data have a significance value of more than 0.05. So that the data on understanding mathematical concepts and numerical ability data of students who take the SSCS learning model and conventional learning come from homogeneous populations.

Linearity test and significance test were conducted to determine the relationship between numerical ability and understanding of mathematical concepts of students for the experimental group and the control group. The following is a recapitulation of linearity test results and the significance of the regression direction more clearly.

Table 7 Linearity Test Results and Meaning of Regression Direction

	F	**Sig.**	Information
Significance of Regression Direction	15,219	0,000	Significant
Linearity	1,678	0,104	Linear

Based on Table 7, the linearity test results show that the significance value is greater than 0.05, that is 0.104. So that data on understanding mathematical concepts and numerical ability data of students who take the SSCS learning model and conventional learning have a linear relationship. Furthermore, based on Table 7, the results of the significance of the regression direction show that the significance value is smaller than 0.05, which is 0.000. So it can be concluded that the coefficient of the regression direction is meaningful or significant.

This research has three hypotheses, namely: (1) there is a positive influence of SSCS learning on the understanding of mathematical concepts of VII graders of SMP (SLUB) Saraswati 1 Denpasar (2) there is a positive influence of SSCS learning on understanding of mathematical concepts of VII graders of SMP (SLUB) Saraswati 1 Denpasar after controlling its numerical ability, and (3) there is a significant contribution of numerical ability to the understanding of mathematical concepts of Grade VII students of Denpasar (SLUB) Saraswati 1 Denpasar.

The analysis used to test the first hypothesis is using the F test. Following is the recapitulation of the results of the calculation of the first hypothesis test.

Table 8. Results of Calculation of the First Hypothesis Test

Source of Variation	JK	Df	RJK	F	Sig.
Intergroup (A)	54,450	1	54,450	5,880	0,018
In Groups (dal)	722,300	78	9,260		
Total	776,750	79			

Based on the results of the calculation of the first hypothesis test in Table 8, it was found that the significance value is smaller than the 0.05 significance level of 0.018 so that Ho is rejected and H1 is accepted. With H1 accepted, it shows that SSCS learning has a positive effect on the understanding of the mathematical concepts of Grade VII students of Saraswati 1 Denpasar.

The analysis used to test the second hypothesis is analysis of covariance (ANAKOVA). The recapitulation of the results of covariance analysis can be seen in the following Table 9.

Table 9 Results of Calculation of Second Hypothesis Tests

Source of Variation	**JK**	**df**	**RJK**	**F***	**Sig.**
Y	98,911	1	98,911	12,217	0,001
Group	35,145	1	35,145	4,341	0,041
In	623,389	77	8,096		
Total	17308,000	80			

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Based on the results of the covariance analysis in Table 9, it was found that the significance value is smaller than the significance level of 0.05 which is 0.041, so that H0 is rejected and H1 is accepted. Thus, it can be concluded that after controlling for numerical abilities, SSCS learning has a positive effect on the understanding of mathematical concepts of VII graders of SMP (SLUB) Saraswati 1 Denpasar.

To test the third hypothesis, the moment product correlation formula is used. Following is the recapitulation of the results of the calculation of the third hypothesis test.

Table 10 Third Hypothesis Test Calculation Results

R	r^2	Contribution
0,390	0,1521	15,21%

Based on the results of the calculation of the third hypothesis test in Table 10 it was found that the contribution of numerical abilities to the ability to understand students' mathematical concepts reached 15.21%.

Based on the results of the calculation of the first hypothesis test using the F test it can be concluded that SSCS learning has a positive effect on the understanding of the mathematical concepts of VII graders of SMP (SLUB) Saraswati 1 Denpasar with a value of Fhit> Ftab which is 5.880 and the significance level is smaller than 0.05 which is 0.018 <0 .5. Based on these results it can be said that the application of the SSCS learning model has an effect and a positive contribution to the ability to understand mathematical concepts of students compared to students who take conventional learning. These results are also supported by the results of a study conducted by Idaman (2012). The results showed that there were differences in understanding of mathematical concepts between students who took the SSCS learning model and students who took conventional learning as seen from the average score of students' understanding of mathematical concepts who took lessons with the SSCS learning model and the average scores of understanding mathematical concepts students who follow learning with conventional learning models, so it can be concluded the ability to understand mathematical concepts of students who follow the SSCS learning model is better than conventional learning models.

Based on the results of the second hypothesis test, it has been proven that after controlling for numerical ability covariables, SSCS learning has a positive effect on the understanding of mathematical concepts of Grade VII SMP (SLUB) Saraswati 1 students with a value of Fhit> Ftab of 4.341 and a significance level of less than 0.05 i.e. 0.041 <0.05. To improve students 'understanding of concepts by paying attention to students' internal abilities. One of the abilities possessed by students in learning mathematics is students' numerical ability. Thus the SSCS learning applied to improve students' understanding of mathematical concepts needs to be purified by controlling their numerical abilities through covariate analysis so that the influence of SSCS learning is not biased by numerical abilities. This is in line with the results of research conducted by I Wayan Pica (2014). The results of the study stated that: (1) there were differences in student mathematics learning outcomes between students who took learning with realistic mathematics and students who took learning with conventional learning approaches (2) after the numerical ability covariables were controlled, there were differences in mathematics learning outcomes between students who took realistic mathematics approach with students who follow conventional learning models. With the high numerical ability, it allows students to excel in mathematics. While students who have low numerical ability will have low self-confidence in their ability to complete their assignments. Thus, in answering the second hypothesis, controlling the numerical ability of students is needed, so that a complete difference between the ability to understand the mathematical concepts of students who follow the SSCS learning model with students who follow conventional learning models.

The third hypothesis testing results, namely there is a contribution of students 'numerical ability to the ability to understand students' mathematical concepts by 15.21%. There is a high numerical ability of students and some are low. Wibowo in Darmayanti (2016) states that "Numerical ability is the ability to work in numbers to understand concepts related to numbers (numeric), so that numerical ability influences students' ability to understand and solve mathematical problems". So it can be said that the level of numerical ability can affect students in understanding and solving math problems. The results obtained are in line with the results of research conducted by I Wayan Pica (2014), it was found that there is a contribution of numerical ability to

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student mathematics learning outcomes. So, it can be concluded that numerical ability has a significant contribution to the ability to understand students' mathematical concepts.

4. CONCLUSION

Based on the results of research and discussion, the conclusions of this study are as follows.

1) There is a positive influence of SSCS learning on the understanding of mathematical concepts of VII grade students of SMP (SLUB) Saraswati 1 Denpasar, with a significance value of 0.018 less than the significance level of 0.05 ($p < 0.05$), so that Ho is rejected and H1 is accepted.
2) After controlling for numerical ability covariables, there is a positive influence of SSCS learning on the understanding of mathematical concepts of VII graders of SMP (SLUB) Saraswati 1 Denpasar, with a significance value of 0.041 less than the significance level of 0.05 ($p < 0.05$), so Ho refused and H1 accepted.
3) There is a contribution of students' numerical ability to the ability to understand mathematical concepts of students by 15.21%.

Based on the conclusion above, the following recommendations are:

1) It is expected that students can be active in following the learning process by using the SSCS learning model, so that they are able to build their own knowledge through discussion. SSCS learning model is expected to be able to optimize student mathematics learning outcomes, especially in the ability to understand mathematical concepts.
2) The results of this study are expected to be applied by teachers to increase insight into cooperative learning models especially SSCS learning models to maximize coaching of students to improve student mathematics learning outcomes, especially in the ability to understand mathematical concepts.
3) The results of this study are expected to be used as a means to support the learning process when applying the SSCS learning model, so students can increase their interest and motivation to learn. This motivation is believed to have an impact on student learning outcomes mathematics learning outcomes, especially on the ability to understand mathematical concepts.
4) It is hoped that other researchers who wish to conduct similar research on the SSCS learning model should pay attention to the constraints experienced in this study as consideration for improving and refining the research implementation.

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