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The Impact of Search, Solve, Create and Share Model on the Motivation and Mathematics' Achievement of the Students Grade Eight in Detukeli State JHS

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Abstract*—This study is aimed at: (1) evaluating the differences in students' motivation and achievement by implementation of search, solve, create, and share (SSCS) and conventional models. (2) Evaluating students' increasing motivation and achievement by using search, solve, create, and share (SSCS) model. This study employs quasi-experiment method. The research took place in Detukeli State JHS), Detukeli Subdistrict, Ende Regency, NTT. Sample of this research are the students of grade VIII-A as an experiment class, and students of grade VIII-C as a control class. The instruments in this study consist of test and non-test instruments. The data collected through test and motivation questionnaire. The data are analyzed using analytic description; employed to elaborate students' achievement data and learning motivation before and after the intervention. The result of the study suggests that; (1) there are developments in students' motivation and achievement when SSCS and conventional models are employed. (2) There are developments in students' motivation and achievement by using SSCS model*.

***Keywords*—** *Search, solve, create, share, model, motivation, learning, achievement.*

I. INTRODUCTION

Learning process in a class needs to be designed in a certain way that it encourages students to be engaged in the process. Students' motivation in learning process will lead to a better outcome. Learning motivation in this case shows when a student reflects determination, engagement, and learning effort (Brophy, 2010). Students who are less motivated in mathematics on the contrary are mostly ignorant, reluctant in asking questions, acting out in school, cheating, and sometimes skipping class. Students who are more motivated tend to review mathematic lessons at home (Satriawan, 2017)

Based on the interview with one of the school's mathematic teachers and one of the students, they admitted that comparison is a difficult subject. The data suggests that students' marks do not even meet the minimum requirement, and concepts of comparisons are not fully understood by the students. One of the students stated that the teacher tells too many stories instead of giving the students the necessary explanations. For this reason, the students find it difficult to be motivated.

In order to overcome the situation, *search, solve, create and share* (SSCS) model is the highly recommended, especially to increase students' achievement and to help students with their motivation. SSCS model was initiated by Edward L. Pizzini in 1985 in science teaching. According to Pazzini (1991), SSCS model is designed to expand and apply science concepts and the analytical thinking skill, and exploring more holistic problem solving models.

SSCS refers to four ways in problem solving, starting from investigating problems (*search*), drawing problem solving plans (*solve*), constructing the problem solver (*create*), and finally communicating the resolution (*share*). The National Council of Teachers of Mathematics (2000) also stated that through problem solver, students find the strength and purpose of mathematics.

In teaching and learning process, motivation is considered a student's driving force; it activates students' will, gives students direction, which will help them to achieve the expected goals. Sugihartono and friends (2007) stated that motivation is a condition that causes or generates certain behavior and helps one to direct and maintain the behavior. Oemar Hamalik (2008) stated that motivation is the change of energy in one's self indicated by an urge or reaction to reach the target. Dimyati and Mudjiono (2006) also defined motivation as a mental thrust that mobilizes and directs human's behavior, including learning behavior. Based on the definitions above, it can be concluded that fundamentally motivation in mathematics learning is any internal or external push that changes an individual's energy to behave and maintains it, and allows the change of behavior that leads to mathematics learning activity.

Learning achievement consists of two different words, the word 'achievement' and 'learning'. The word achievement refers to something that is gained through a series of process that causes an alteration of input functionally (Purwanto, 2009). Fundamentally, a learning process is a change in one's self at the end of a learning process (Djamarah and Zain, 2009). Hence, learning achievement is a change that occurs after someone engaged in teaching and learning process in accordance with the purpose of education (Purwanto, 2009). Sjukur (2012) stated that learning achievement is a final assessment in a process of understanding that happens constantly and will be in store for a long term or will not fade because the learning process also forms somebody's personality to always search for more and change the mindset and generates a better working behavior.

The elaborations above delivers an understanding that students' achievement in mathematic learning is a student's ability in mathematics gained through his/her experiences and

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evaluations during teaching and learning process that portrays students' understanding in mathematics which can be assessed through the scores and the ability in solving mathematics problems.

Based on the theoretical evaluations and the result of other relevant studies, the study's objectives are: (1) evaluating differences in students' motivation by implementation of two different teaching models, the *search, solve, create and share (SSCS)* and conventional; (2) evaluating developments in students' learning achievement by implementation of two different teaching models, *search, solve, create and share (SSCS)* and conventional; (3) evaluating if a development of motivation took place using *search, solve, create, and share (SSCS*) model, and (4) evaluating development in learning achievement using *search, solve, create, and share (SSCS)* model.

II. Literature Review

2.1 Definition of Mathematics Learning Achievement

Learning achievement consists of two different words, the word 'achievement' and 'learning'. The word achievement refers to something that is gained through a series of process that causes an alteration of input functionally (Purwanto, 2009). Fundamentally, a learning process is a change in one's self at the end of a learning process (Djamarah and Zain, 2009). Hence, learning achievement is a change that occurs after someone engaged in teaching and learning process in accordance with the purpose of education (Purwanto, 2009). Sjukur (2012) stated that learning achievement is a final assessment in a process of understanding that happens constantly and will be in store for a long term or will not fade because the learning process also forms somebody's personality to always search for more and change the mindset and generates a better working behavior. John M. Keller (in Abdurrahman, 2003:38) sees learning achievement as an output of a processing system in which the inputs consist of information.

The elaborations above delivers an understanding that students' achievement in mathematic learning is a student's ability in mathematics gained through his/her experiences and evaluations during teaching and learning process that portrays students' understanding in mathematics which can be assessed through the scores and the ability in solving mathematics problems.

2.2 The Essence of Learning Motivation

In teaching and learning process, motivation is considered a student's driving force; it activates students' will, gives students direction, which will help them to achieve the expected goals. Sugihartono and friends (2007) stated that motivation is a condition that causes or generates certain behavior and helps one to direct and maintain the behavior. Oemar Hamalik (2008) stated that motivation is the change of energy in one's self indicated by an urge or reaction to reach the target.

Mc. Donald (in Sardiman, 2012:73), motivation is an alteration of energy in one's self, indicated by the existence of feeling, preceded by a respond toward an expected target. Oemar Hamalik (2008: 158), stated that motivation is the change of energy in one's self indicated by an urge or reaction to reach the target. Dimyati and Mudjiono (2006) also defined motivation as a mental thrust that mobilizes and directs human's behavior, including learning behavior.

The definition of motivation by the experts above suggests a definition of motivation, which is an urge in every individual that emerges certain behavior and maintains it, and gives energy and directions to reach learners target in mathematic learning.

There are a number of indicators in student's motivation, namely: 1) passion and will to success, 2) an urge and need to learn, 3) hope and ambition for the future, 4) problem solving skills, 5) shows engagement in facing problems, 6) prefers to work alone, 7) soon gets tired of regular activities, 8) capable of maintaining the stand, 9) self learning ability, 10) interested in learning process, 11) determination in learning and working mathematics assignments.

2.3 SSCS Learning Model (Search, Solve, Create, and Share)

Pizzini introduced SSCS (*search*, *solve*, *create*, and *share*) learning model while developing science teaching method, designed to expand students' understanding in science concept and application in everyday life, and to stimulate students' ability in critical thinking. The implementation of SSCS model encourages the students to be more active in applying concept and to expose them to analytical thinking (Pizzini, 1991: 3).

North Central Regional Education Laboratory (Laboratory Network Program, 1994) explained that there are eight standard of National Council of Teacher of Mathematic (NCTM) that can be achieved by implementing the SSCC:

1. Posing mathematics test/problems
2. Building students' experience and knowledge
3. Developing learners' mathematical thinking and ensure students of validity of a stance, solution, presumption, and answer
4. Growing learners' intellectuality: giving questions and assignments that involve students, and challenge students' mindset.
5. Developing students' knowledge and skill in mathematics.
6. Stimulate learners to connect frameworks related to mathematical ideas.
7. Impose the ability to formulate problems, solve problems, mathematical reasoning, and
8. Utilize students' disposition to finish mathematics assignments.

2.4 Implementation of SSCS in Mathematics Learning

Implementation of SSCS in mathematics learning means teaching mathematics use SSCS model. An example of implementing SSCS model in mathematics learning is presented by Irwan (2001) through this writing:

a. *Search* (investigating problem). In this process, student tries to understand the given problems or conditions by digging for known and unknown information, and get familiar with the questions, and then create simple questions until the focus emerges.
b. *Solve* (planning to solve the problem). From the data found in *search* process the students will be given an opportunity

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to create alternative hypothesis to solve the problem and finally design a plan to solve the problem using a prepared method.

c. *Create* (problem solving). Student invents a product or create a formula as a means of solving the problem based on the drawn hypothesis, recheck the findings and prepare to present the report on how to solve the problem in front of his/her colleagues.

d. *Share* (communicating the result). After finishing the report on how to solve the problem, the student will be asked to present their result to the teacher and his/her colleagues. Ask the other students to give feedback and evaluations.

Using the previous theories, learning process with SSCS model can be designed as follows:

a. Preliminary Activities

1. Teacher greets the students and invites the students for opening prayer
2. Teacher makes sure that the students are ready for the lesson
3. Teacher prepares the subject and student's worksheet
4. Teacher creates apperception
5. Teacher elaborates the process of learning using SSCS model
6. Teacher elaborates the learning objectives
7. Teacher gives motivations

b. Main Activities

1) Teacher divides the students into groups. Each group consists of 3 – 4 students.
2) Teacher provides the students with problems or situations related to the lesson in the worksheet
3) Students pay attention and engage in teacher's explanation and instruction.

Search

4) Students will be asked to search and write down information related to the given problem or situation.
5) Student analyze the information and find conclusion related to the given situation or problem.

Solve

6) Students look for and choose the information related to the given problem or stuation.
7) Find the resolution for the situation or problem.

Create

8) Students will be asked to create a formula related to the problem or situation, and students' worksheet will be distributed.
9) Students will create the best report.

Share

10) Students will present the report in front of the class.
11) Other groups will be given an opportunity to give questions or to express their opinion on their friend's report.

(SSCS completed)

12) Teacher and students draw a conclusion on the solution of the problem and today's lesson.
13) Students will be given an opportunity to improve the report after drawing the conclusion.
14)

c. Closing

1) Teacher assists the students to make a summary on important information and on the subject
2) Teacher gives the students individual assignment.
3) Teacher provides information on upcoming meeting and subject.

Teacher ends the meeting by saying goodbye.

III. Research Method

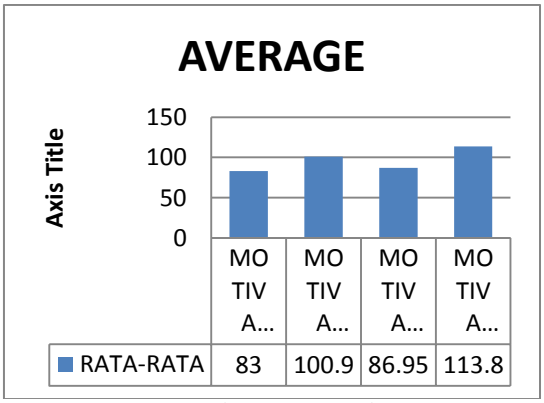
This is a quasi-experiment research. The study implemented the "*Pretest-Posttest Non Equivalent Control Group Desain"*. Population of this study consists of the students grade VIII of Detukeli State JHS. Sample for this research are randomly chosen, consists of two out of three classes of eighth grade (using SSCS); grade VIII-A consists of 20 students, acted as the experiment group, and grade VIII-C consists of 18 students, acted as the control group. (Using conventional model)

The data is collected using questionnaire and written test for students before and after the intervention. Data are analyzed using the following method: (1) evaluating analytical requirements with normality test using *kolmogorov-Smirnov* method. *One way anova test* is chosen for test of homogeneity (2) *independent samples test* is used for hypothesis 1 and 2, while *paired samples t test* is chosen for hypothesis 3 and 4.

IV. Results and Discussion

With significance level 0,05, hypothesis 1 resulted in $t_{hit} \geq t_{tab}$ in which $7.07 \geq 2.02$. With significant value of $0{,}00) \leq 0{,}05$ which means H_0 is rejected. Therefore, a difference occurs in the implementation of *search, solve, create and share* (SSCS) model, and in conventional model.

The average of students' learning motivation in experiment group is 26,85. The average of learning motivation in control group is 17,9. The average of learning motivation after learning process is relatively higher than before the class begins. The average number of learning motivation development is 8,95 for experiment group and control group. The description on learning motivation development between experiment class and control class is presented in the chart below.



Picture 4.1 the average number of developments of learning motivation before and after both classes.

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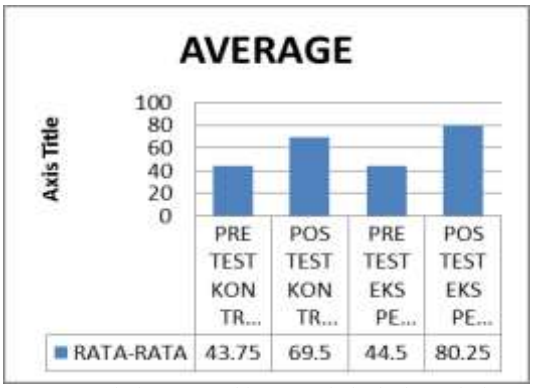
Hypothesis 2 uses significance level of 0,05, the result showed $t_{hit} \geq t_{tab}$ in which $5.77 \geq 2.02$ with significant value of $(0{,}00) \leq 0{,}05$ which means H_0 is rejected. The result indicates that an increasing of students' achievement took place if *search, solve, create and share* (SSCS) model dan conventional model are implemented.

The average rate of students' achievement in experiment group developed after class. The development goes as high as 35,75, while in control class, the development grows a little modest, 25,75. The difference between the development of learners' achievements in experiment group and control group is 10,00. The description on learners' achievement development between experiment class and control class is presented in the chart below.



Picture 4.2 progress in learners' achievement in both classes before and after class.

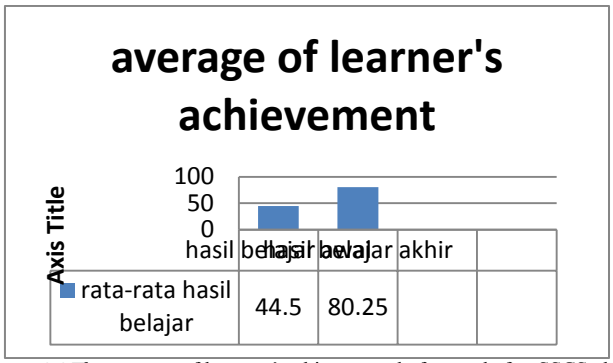
With significance level 0,05, hypothesis 3 resulted in $t_{hit} \geq t_{tab}$ in which $18.18 \geq 2.09$ With significant value of $(0{,}00) \leq 0{,}05$ which means H_0 is rejected. Therefore, a progress occurs in learners' motivation with the implementation of *search, solve, create and share* (SSCS) model.

The average score of students' motivation before intervention with SSCS is 86,95. Then, after being treated with SSCS, students' motivation is evaluated and the number becomes 113,8, which means the number increases as high as 26,85. The description on learners' progress in learning motivation is presented in the chart below:

Picture 4.3 The average of learners' motivation before and after SSCS class.

With significance level 0,05, hypothesis 4 resulted in $t_{hit} \geq t_{tab}$ in which $17{,}348 \geq 2.09$. With significant value of $(0{,}00) \leq 0{,}05$ which means H_0 is rejected. Therefore, a progress occurs in learners' achievement with the implementation of *search, solve, create and share* (SSCS) model.

The average score of students' motivation before intervention with SSCS is 44,5. After treatment with SSCS, students' motivation is once again evaluated and the number becomes 80,25 which means the number increases as high as 35,75. The description on learners' progress in learning motivation is presented in the chart below:



Picture 4.4 The average of learners' achievement before and after SSCS class.

V. Conclusion

The result of research in the previous chapter suggested that progress in students' motivation occurred by implementing *search, solve, create and share* (SSCS) and conventional models. Progress in both learners' motivation and achievement also took place along with the implementation of *search, solve, create and share* (SSCS) model.

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