# Mathematical Problem Solving Capabilities: The Impact of Search Solve Create Share and Think Pair Share learning models on Logarithmic Lesson

**Syahfitri Purnama[1], Muawanah[2], Rika Septianingsih[3], Tista Maya Surati[4]**

[1] Indraprasta PGRI University, Jakarta, Indonesia

[2] Institut Agama Islam Negeri Kediri, Kediri, Indonesia

[3,4] Universitas Islam Negeri Raden Intan Lampung, Bandar Lampung, Indonesia

| Article Info | Abstract |
|---|---|
| | A learning can run well supported by an appropriate learning model. In this study the Search Solve Create Share (SSCS) and Think Pair Share (TPS) learning models are used. This research is a quantitative study using t test. The purpose of this study is to study whether there are differences between the SSCS learning model and the TPS learning model on students' mathematical problem solving abilities. This research is a quantitative study with a research design. Random Design Group Pretest-Posttest Group. The results of this study obtained a P-value smaller than the significance level. Hypothesis testing from this study provides conclusions about the TPS learning model better than the SSCS learning model in improving students' mathematical problem solving abilities.<br><br>Key Words : Mathematical Problem Solving Ability, SSCS, TPS |

## Introduction

Improving the quality of education in Indonesia is inseparable from the participation of the community and the school itself (Swandewi et al., 2019). One of the improvements in the quality of education is problem-solving ability (Siregar, 2019). The goal is that students are able to live a life full of complexity problems. This ability can be directly applied in life, so students can solve problems and this ability can reduce anxiety in dealing with problems(Akbar et al. 2018). Based on previous research, there are studies that discuss the ability to solve problems using several learning models such as Student Teams Achievement Division, Pair Check, TTW, Realistic Mathematics Education, Think Pair Share, Search Solve Create and Share (Husna, 2013; Nadhiroh, 2015; Oktaviani, 2016). These studies show that problem-solving abilities are a material for research that is often done and interesting to discuss.

Problem solving ability is the ability most frequently studied and paired with learning models, one of which is the Search Solve Create Share learning model. The Search Solve Create Share Model is a learning model that provides opportunities for students to be directly involved in the learning process including improving problem solving skills. In previous studies, the Search Solve Create Share model has been used to examine several abilities such as problem solving skills, reasoning abilities, learning motivation, mathematical reasoning (Fatiya, 2019; Johan, 2019; Raehanah, 2014; Samira, 2019; Satriawan, 2017; Hartanti 2018; Utami, 2011).

There are also several learning models that can also be applied to improve problem solving, including Think Pair Share learning models. Think Pair Share learning model directs students to think independently in solving a problem. Think Pair Share learning models are designed to influence student interaction patterns (Untary, 2017). In previous studies, several studies have been conducted on Think Pair Share models for some abilities such as problem solving,

mathematical abilities, learning outcomes, representation abilities and creative thinking abilities (Saragih, 2017; Sirait, 2017; Tristianti, 2013; Zulhanaya; 2019).
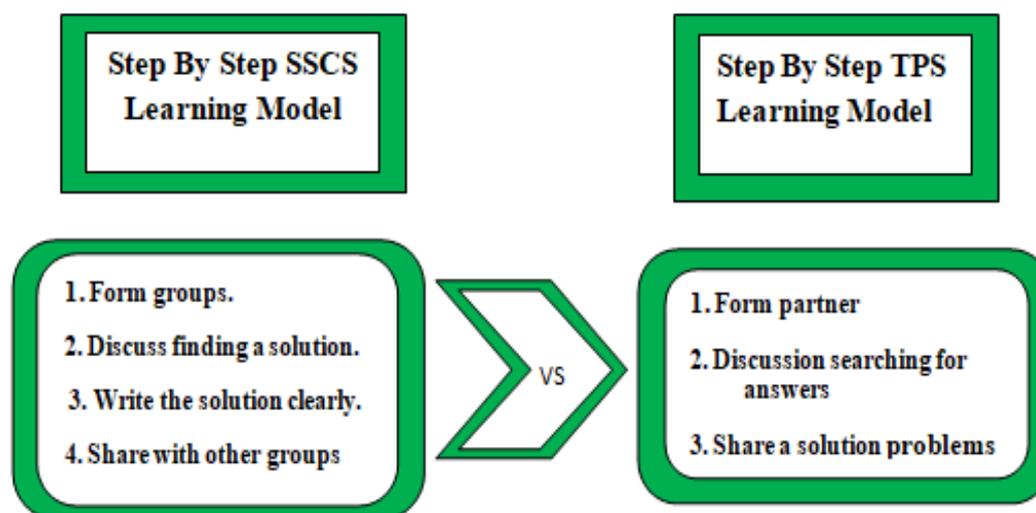


**Figure 1.the steps of the SSCS and TPS learning model**

Based on previous research there are studies comparing Think Pair Share models with other models on mathematical problem solving abilities as well as Search Solve Create Share learning models with other learning models(Amalia and Surya 2017), but studies comparing Think Pair Share models with Search Solve Create Share to the ability to solve mathematical problems has never been done. This article aims to compare the learning model of Search Solve Create Share and Think Pair Share to the improvement of mathematical problem solving abilities, so that which model has the most impact in influencing the improvement of mathematical problem solving abilities.

## the Research Methods

This research is a quantitative study whose data analysis uses the t test. This research uses The Randomized Control Group Pretest-Posttest Design. The population of this study was all students of class X MIPA SMA and sampling techniques using cluster random sampling.

Figure 1 is the steps of the Search Solve Create Share (SSCS) and Think Pair Share(TPS) learning model. The first step is to form groups, meaning an educator directs students to form several large groups in the class to discuss a problem. The aim is to explore initial knowledge in groups. The second step in discussing finding solutions is to encourage students to solve the problems faced by the third step of students writing the solutions that the group found as evidence of finding a solution to a problem. The final step is presenting the results, meaning an educator guides students in presenting the results obtained to their friends and explains the ambiguous answers during the presentation (Ikhram, Djamas & Ramli, 2018; Parno, Mustofa, & Masjkur, 2015).

Forthe steps of the Think Pair Share learning model. the first is to form a pair of discussions, meaning that an educator directs students to pair up and then educators give questions to students. The next step, students discuss the questions that have been given with their partner friends. The discussion will produce an agreement of opinion on the right solution to the problem. The last step, students convey the results of the discussion to another pair so that the solution can be concluded as a whole (Rahmawati, Hanipah, 2018).

In order to see the extent of the impact of the model applied in this article, the effect size formula is used. According to Olejnik and Algin (Santoso, 2010), "effect size is a measure of the magnitude of the effect of a variable on another variable, the magnitude of the difference or relationship, which is free from the influence of the sample size". The formula used to calculate the effect size of the t-test uses the Cohen's d formula as follows:

$$d = \frac{\overline{x_1} - \overline{x_1}}{S_{gab}}$$

$$(S_{gab}) = \sqrt{\frac{(n_1 - 1)S_1^2 + (n_2 - 1)S_2^2}{n_1 + n_2 - 2}}$$

Where $\overline{X_1}$= the average of TPS model group, and $\overline{X_2}$ = the average of SSCS model group Effectsize calculation is interpreted based on classification according to Cohen in Becker (Aldila and Mukhaiyar 2020).

**Table 1. Classification ofeffect size**

| d | Interpretation |
|---|---|
| $0,8 < d < 2,0$ | Large |
| $0,5 < d < 0,8$ | Medium |
| $0,2 < d < 0,5$ | Small |

## the Results of the Research and the Discussion

The results on comparing the improvement of students' mathematical problem solving abilities for which data is obtained from pre-test and post-test of two classes, each of which has a different value where experimental class 1 with TPS model and experimental class 2 with SSCS model, summarized in the following table 2.

**Tabel 2. Descriptive Data**

| | Group | N | Mean | Median | Std. Deviation | Variance | Max | Min |
|---|---|---|---|---|---|---|---|---|
| Value_N | TPS | 30 | 54.29 | 52.00 | 19.2714 | 371.38 | 100 | 10 |
| _Gain % | SSCS | 30 | 44.124 | 36.00 | 13.4924 | 182.04 | 95 | 10 |

Based on Table 2, it can be seen that there are differences in the average value of students' problem solving abilities between the first experimental class with the TPS model and the second experimental class with the SSCS model. In the experimental class with the TPS model has a greater average than the experimental class SSCS model. The other values are also dominated by the TPS model with a considerable difference from the SSCS model. This can be seen indirectly that a better TPS model.

This study uses the t test to strengthen the results of the previous descriptive data. The results obtained can be confirmed by the results contained in Table 2 of the independent sample test. Based on the results of data processing, it can be concluded that the TPS learning model is better than the SSCS model in improving mathematical problem solving abilities. The independent sample test data are presented in Table 3.

**Tabel 3. Independent Sample Test**

| | | Levene's Test for Equality of Variances | | t-test for aEquality of Means | | |
|---|---|---|---|---|---|---|
| | | F | Sig. | T | Df | Sig.(2-tailed) |
| N_Gain_% | Equal variances assumsed | 1,425 | ,237 | -2,368 | 58 | ,021 |
| | Equal variances not assumed | | | -2,368 | 51,923 | ,022 |

Based on Table 3 the independent sample test can be made that hypothesis:

H0: TPS model is the same as SSCS

H1: TPS model is better than SSCS

Based on the results of the t-test on SPSS contained in Table 3, the P-value is smaller than the significance level ($\alpha$ = 5%), which is 0,021 < 0,05 so H$_0$ in the hypothesis test is rejected. This results in a better TPS model than the SSCS model. Whether or not a learning model usually depends on the situation and condition of the place. In previous tests, the TPS learning model was better than the conventional model. It turns out that after further research this TPS model is better than the SSCS model.

Problem solving ability is a very important ability to have (Hidayati, 2015; Netri, 2016). That is because by mastering this ability students will more easily face all problems in the right way. Basically, one of the goals of learning mathematics for students is that they have the ability to solve problems as a means to hone their knowledge (Noviana, Fitriani, 2018;(Gafur, Sudia, and Hasnawati 2015). The more problems students can solve, the more abilities they can help in daily life (Tanjung, Nababan, 2019; Hidayat and Sariningsih 2018).

Problem solving skills can be supported by using appropriate learning models, including TPS and SSCS learning models. The TPS model itself is a model that uses pair discussion and that's where the ability to think in solving problems is considered. That is because it is not easy to bring together the thoughts of two people to get a conclusion. The steps in using the TPS model are Think Pair Share, where students form pairs and then students are given a problem and asked to think to find solutions to problems, and then students are asked to share conclusions with other pairs (Muffidah, Effendi, 2013). In this model it looks quite effective if applied in mathematics learning.

The next learning model is the SSCS model, in this model students think in larger groups (Rahayu, 2016; Peripres, 2014). The stages of the SSCS model are actually more detailed namely Search Solve Create Share. The application of this model is first by forming groups then discussing to solve problems and write down solutions. The final stage of this learning model is that each group presents and discusses it with other groups. Thepractice in the discussion stage is not very effective. This is because there are too many members in a group so that not all students can work together.

Based on the results of previous studies, it appears that the TPS model can influence and improve problem solving abilities, mathematical communication skills, learning outcomes and student representation abilities (Husna, 2013; Nadhiroh, 2015; Oktapiani, 2016). Other studies also say that the SSCS model is effective against learning motivation and learning outcomes but

is not effective against mathematical reasoning (Fatiya, Partaya, and Dewi, n.d. ; Johan, 2019; Raehanah, 2014; Samira, 2019; Satriawan, 2017; Hartanti, 2018; Utami , 2011).

Based on the previous description, it can be seen that the steps in the SSCS and TPS models have differences that make the TPS model more effective. In the first step it has been seen that the TPS model is more effective than the SSCS, because the TPS model students learn in pairs while the SSCS model students learn with large groups. The effectiveness of student learning is seen when discussing, because discussing with a small number of people will be more effective than discussing with a large group when determining a solution of a problem. So it can be concluded that the TPS learning model is better in improving students' mathematical problem solving abilities compared to the SSCS learning model.

In order to see the extent of the impact of the TPS model on the ability to solve mathematical problems, an effect size was applied and a result of 0.61 was obtained. This shows that the impact of the TPS model on improving students' mathematical problem solving abilities is included in the medium interpretation category.

## Conclusion and Suggestion

The TPS or SSCS learning model can be used as one of the learning models that can improve students' ability to solve problems, both problems in the classroom and in the surrounding environment. In this study, the TPS learning model is better than SSCS. The impact of using the TPS learning model on improving this problem solving ability is included in the medium interpretation category. So it is better if the teacher tries to apply the TPS model in the learning process to improve students' mathematical problem solving abilities.

Suggestions for future researchers are to be able to research TPS models with others or SSCS with others, or even be able to examine the effects of other learning models that can improve students' mathematical problem solving abilities. The research will help solve problems that occur when the teaching and learning process takes place.

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