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the Effect of the Search, Solve, Create, and Share (Sscs) Learning Model on the Learning Outcomes of Students

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ABSTRACT

This research is motivated by the low learning outcomes from physics of students caused by the models of learning utilized by teachers in schools that are less varied in related to demands of Curriculum 2013. The research purpose is to analyze the model of SSCS learning impact on learning outcomes of students'. The model of SSCS learning is a variation of a methodology that emphasizes problem-solving and has the ability to raise student achievement levels. The Randomized Posttest Only Control Group Design is a quasi-experimental methodology utilized in this research. The sample in this study consisted of 68 students through two classes for sample, known as classes for experimental and control was got by technique of purposive sampling. The instruments used in this research were valid and reliable tests. Based on the research results obtained that the price of t is outside of H0's acceptance region, allowing H1 to be accepted at a real level of 0.05. This indicates that students receiving treatment have different learning results in physics. Thus the conclussion that there is an impact of SSCS learning model on physics learning outcomes of students who are given treatment.

Keywords: *SSCS, Learning Model, Curriculum 13, Learning Outcomes.*

I. INTRODUCTION

Physics learning is a learning that conveys concepts which are then described through systematic equations, where the systematic equations have a function to explain the natural phenomena studied in physics [1]. The skills to understand concepts, principles, and laws is important in learning physics. After that, students should be able to reorganize in their own language according to their level of maturity and intellectual development. In addition, physics is one of the subjects that is often considered difficult to learn. As a result, students become less interested in learning for has an effect on low outcomes of learning [2].

Many ways have been done by the government to increase the outcomes of learning quality to increase the quality of education including, implementing training and certification programs for teachers, building facilities and infrastructure in schools, maximizing the use of laboratories and school libraries, and developing textbooks that are expected to increase physics learning quality at the level of education. Another initiative taken by the government is to improve the previous curriculum. According to Kamiludin & Suryaman (2017) Curriculum 2013 is a replacement curriculum for the KTSP curriculum. Curriculum 2013 has several distinctive features, one of which is the teacher's commitment in applying the approach by scientific in the process of learning [3].

In the curriculum of 2013, teachers are required to use models of learning that are in related to the approach of scientific. The approach of scientific is a scientific approach in which learning involves steps consists of observing, questioning, trying, thinking, and communicating [4]. The model in scientific is a methodical process or framework that includes media, materials, strategies, procedures, methodologies, and learning evaluation instruments and is used as a guide to meet learning objectives [5]. There are four models in learning that are in related to the 2013 curriculum and can be linked to the scientific approach, namely (1) Inquiry Learning Model; (2) Discovery Learning Model; (3) Model of Problem-based Learning; (4) Model of Project Based Learning [6]. The method used in physics learning is the scientific method in problem solving so that it can train students to be honest, hard work, responsible, independent, and thorough. The physics learning process focuses on understanding concepts, mastering knowledge, developing skills and values that are useful for improving the quality of life.

The reality in the field today is that quality education is still not as expected even despite the fact that several attempts have been made to raise educational standards, one of which is in the subject of physics. The subject of physics is expected to be a subject that is favored by students can not actually be understood properly. This is in related to the observations results with the average value of students conducted at MAN 2 Padang City in class XI which is still using the 2013 Curriculum, it appears that student learning outcomes are still below the KKM value.

According on the above problems, having a learning model is essential that is in related to the demands of Curriculum 2013. Shifting the paradigm of learning from *teacher centered* to *student*. One of the models of learning that has the potential to improve student activeness is *Search, Solve, Create, And Share* (SSCS).

The model of SSCS learning refers to four problem-solving steps, namely the search (investigate), solve (plan the solution), create (construct the solution), and share (communicate) phases. The model of SSCS learning is a model of cooperative learning based on an approach by problem-solving. In each stage of the model of SSCS students are demand to actively participate in activities such as finding problems, finding and analyzing the right information to solve problems, and making creative products from the problem-solving process that will be communicated [7].

The model of SSCS learning is anticipated to contribute to raising student participation in the learning process and enhancing learning outcomes of student. Thus, students not only receive learning, but also can explore and show the advantages possessed in each student [8]. According to Pizzini, "The Model of SSCS Problem Solving is intended to broaden and implement scientific ideas and critical thinking abilities" [9]. According to Pizzini, The goal of the problem-solving-focused SSCS learning approach is to enhance students' comprehension of science ideas and foster critical thinking abilities in order to increase learning outcomes of physics [10].

II. METHOD

The research method used is *quasi experiment.* The design utilized in this research used *Randomized Control Posttest Only Control Group Design.* Researchers conducted research using a two-group design, where one class, namely the group for experimental, was treated with learning using the model of SSCS learning. While the controlled group without being treated. In simple terms, the design for research shown in Table 1.

Table 1. Research Design

Group	Treatment	Posttest
Experiment	X	T
Control	-	T

Description

T : The final test (posttest) was given after the treatment for the group for experimental and the controlled group.

X: Treatment given SSCS model learning in the experimental class.

The research population were all grade XI students of MAN 2 Padang City who were enrolled in the odd semester of the 2023/2024 academic year and which shown in Table 2.

Table 2. The Population in this Research from Class X Students of MAN 2 Padang City in the 2022/2023 Academic Year

Class	Number of Students	Average Value

X IPA 1	36	63,56
X IPA 2	36	61,33
X IPA 3	33	58,47
X IPA 4	34	57,42
X IPA 5	35	48,82
X IPA 6	35	44,34
X IPA 7	34	59,91

Source: Physics Teacher Grade XI MAN 2 Padang City

The group for experimental and control were determined using technique of purposive sampling. The sample for research consists of two classes, namely, class XI IPA 4 as a controlled group totaling 34 students and class XI IPA 7 as a group for experimental totaling 34 students. One way to model a class is to look at previous student learning outcomes and the entire population. Taking the group for experimental and control refers to the average value of student learning outcomes that are almost the same and the same number of students. Previously, the analysis of the two classes was also carried out by conducting a test of normality, homogeneity and hypothesis test on the two sample classes and it was found that the two classes had the same average outcomes of learning from students in the cognitive aspect.

The control variable in this study is the model of SSCS learning and the dependent variable in this study is the outcomes of learning in physics of grade XI students. The data used is primary data, namely data collected directly from the sample in the form of outcomes of learning in physics after using the SSCS learning model. The instrument in for this research was a test consisting of multiple choice physics questions with cognitive levels C2 to C6 to measure the learning outcomes of students' knowledge aspects. The 20 questions given in the form of posttest were conducted after the treatment was applied. Before data collection, the questions were first tested for validity, reliability, power of distinguishing and difficulty level on other objects outside the predetermined population. The instrument has a valid t> t table, sufficient differentiating power, medium difficulty index, and reliability level of 0.60-1.00 (medium to very high criteria).

III. RESULTS AND DISCUSSION

a. Description of Data on Student Learning Outcomes on Knowledge Competencies

Data on the assessment of outcomes of learning from student in knowledge competencies are obtained from a written post-test in the shape of objective questions totaling 20 items. From the statistical calculations results, the mean score (X), the highest score, the lowest score, the standard deviation (S), and the variance (S^2) are obtained in Table 3 below.

Table 3. Student Learning Outcomes on Knowledge Competencies

Class	**N**	**Value**		$\bar{X}$	S^2	**S**
		Highest	Lowest			
Experiment	34	96	48	83	134.74	11.608
Control	34	88	44	74	153.85	12.404

Table 3 shown the mean score of students' outcomes of learning in physics for the knowledge aspect of the experimental class is higher than the controlled group. The standard deviation value of the group for experimental is smaller when compared to the standard deviation value of the controlled group, meaning that the outcomes of learning in physics of the group for experimental from students are more evenly distributed than the controlled group. To find out whether the difference in the results from final test of the two classes for sample is significant or not, an equality and average test was conducted. As a condition, first the tests of normality and homogeneity were conducted.

The data obtained in the research that has been conducted is data on the achievement outcomes of learning in grade XI students of MAN 2 Padang City on attitude competencies, knowledge competencies, and skills. The research was conducted by researchers from January 8, 2024 to April 29, 2024 at MAN 2 Padang City. This researcher used two samples from classes, namely class XI IPA 7 as the group for experimental which was given treatment using the model of SSCS while class XI IPA 4 as the controlled group was given treatment using the model of learning utilized by teachers at school.

1) Final Test Normality Test

The test of Liliefors is done to look whether the sample comes from a distributed in normal from population or not. The test of normality results was conducted obtained the price of Lh and Lt at the real level (α) 0.05 for N = 34 as present in Table 4.

Table 4. The Results form Calculation of the Normality Test of the Final Test of the Sample Class Knowledge Aspects

Class	A	N	L_h	L_t	Description
Experiment	0.05	34	0.0897	0.159	Normal
Control		34	0.0945	0.159	Normal

Table 3 shows that all sample classes have a score of Lh < Lt at a real level of 0.05, meaning that the final test data of the two sample classes are normally distributed.

2) Final Test Homogeneity Test

The test of homogeneity was done to look whether the sample class learning outcomes data had a homogeneous variance or not. In the test of homogeneity, the F test was utilized. After process the two samples, the results are shown in Table 5.

Table 5. The Test of Homogeneity Calculation results of Final Test of Sample Classes in Knowledge Aspect

Class	A	N	S^2	F_h	F_t	Description
Experiment	0.05	34	134.74	1.1418	1.3199	Homogeneous
Control		34	153.85			

Table 14 shows that the variance homogeneity test findings, which were performed on the final test data of the two sample classes, were Fhitung = 1.1418 and Ftabel, at dk numerator 34 and dk denominator 34, respectively, with a real level of 0.05. The findings indicate that Fh < Ft, indicating a homogenous variance in the data for the two sample groups.

3) Final Test Hypothesis Test

The final test data from both sample classes were subjected to homogeneity and normality tests, and it was discovered that the data in both sample classes had homogeneous variances and were normally distributed. The t-test was employed to examine the research hypothesis. The t-test results of the two sample classes shown in Table 6.

Table 6: The Results of Calculation from the Hypothesis Test of the Final Test of the Sample Class Knowledge Aspect

Class	1-α	N	$\bar{X}$	S^2	th	tt
Experiment	0.95	34	83	134.74	3.336	1.667
Control		34	74	153.85		

Table 6 shows that th = 3.336 and tt = 1.667, according to the testing criterion where th < tt indicates that H0 is approved and if another price with degrees of freedom dk = (n1 + n2) - 2 is found, H0 is rejected. It is determined that H1 is accepted at a real level of 0.05 since the price of t is outside of the H0 acceptance region.

Attitude competency learning outcomes data were obtained from during the learning process through observation sheets. Data on student learning outcomes on knowledge competencies are obtained through written test instruments at the end of the material (post-test). Data on learning outcomes of skill competencies were obtained during the process of practicum activities through an observation sheet instrument with a scoring rubric. Data on student learning outcomes in physics subjects on each competency will be explained as follows [11]:

b. Description of Data on Student Learning Outcomes on Attitude Competencies

Data from outcomes of learning from student on attitudinal competencies were obtained during learning activities. This data was taken using an observation sheet and assisted by two observers. Attitude competency assessment is carried out on seven assessment indicators containing character values, namely religion, discipline, independence, curiosity, creativity, cooperation, and hard work which are adjusted to the material and students' abilities, then added to self-assessment and learning journals conducted by students themselves. The data description on outcomes of learning from student in attitude competency is shown by the total score obtained by each student after 7 weeks of face-to-face meetings in class, which shown in table 7 below.

Table 7. Student Learning Outcomes on Attitude Competency

Attitude	M1	M2	M3	M4	M5	M6	M7
Religious	72,14	78,65	80,47	81,51	83,07	85,94	88
Hard Work	67,81	72,03	76,09	79,22	81,88	83,44	85
Creative	75,39	78,13	80,27	82,03	83,2	85,16	86,33
Discipline	74,41	76,14	79,1	80,66	83,01	84,08	86,13
Curiosity	73,44	76,82	79,95	81,51	82,03	84,11	86,2
Cooperation	75,59	77,54	80,08	81,25	81,01	84,77	87,11
Independent	73,44	75,26	77,34	78,65	80,47	82,03	83,33
Average	**73,174**	**76,367**	**79,034**	**80,69**	**82,381**	**84,219**	**86,014**

Table 7 shows that the total score results obtained from students in each aspect of the attitude assessed show that the acquisition of scores at each meeting has increased, which means that student learning outcomes in attitudinal competence have increased for each meeting.

c. Description of Data on Student Learning Outcomes on Skills Competencies

Research data on outcomes of learning from student in skill competencies were obtained through observations during practicum activities. Similar to learning outcomes in the knowledge domain, from the data on outcomes of learning in skill competencies, statistical tests can be carried out to obtain the average, highest value and lowest value in Table 8 below.

Table 8. Student Learning Outcomes on Skills Competencies

Material	N	Lowest Score	Highest Score	X	S^2	S
Waves	34	71,15	88,64	77,58	23,05	40,80
Sound Wave	34	73,08	90,39	79,8	26,49	51,16

Table 8 shown that the score of learning outcomes of student skill competencies has increased for each material. Research conducted at MAN 2 Padang City class XI IPA 4 and XI MIPA 7. In the group for experimental using the SSCS model.

Discussion

In the experimental class, the learning process using the SSCS model was given LKPD at each meeting. When filling in the LKPD, students seemed confused because they had never been given LKPDs using the SSCS model before. So that it causes many students to ask questions, this makes researchers feel overwhelmed in dealing with the situation. However, this can be overcome by providing further instructions or explanations on how the steps in filling out the LKPD, then the researcher gives time for them to conduct discussions with their respective group friends. If there are still questions, the researcher will investigate each group and help direct so that slowly students can understand it well. The LKPD helps students to find a new concept to solve a problem. Where in LKPD there are stages that help students to solve a problem for it can increase outcomes of learning from student.

When students conducted group discussions then continued with presentations in front of the class, at first it seemed that students were shy and not used to it because usually the teacher directly informed or explained the material for learning in front of the class, so this caused students to be less active in conducting group discussions. The researcher in this case tried to make all students actively involved in group discussions by providing opportunities for each student in turn to express their respective opinions from the results of the previous group discussion. Then the researcher will give a reward by adding 1 point for students who are involved in the discussion, so with this students become motivated to be more involved in the implementation of the discussion. Over time there was an increase at each meeting. The next meeting students are getting used to the SSCS model application where this model requires students to participate fully in the educational process. Students have begun to be able to discuss in their respective groups and begin to respond and give conclusions on learning at each meeting. So that learning becomes more meaningful.

This assessment includes outcomes of learning in physics for the knowledge aspect. For the assessment of outcomes of learning in physics in the knowledge aspect is done by holding a posttest. Before conducting the posttest, the questions given were tested first in a class that was not a sample class and normality test, reliability test, differentiability and difficulty level were obtained 20 questions that would be used for posttest questions of both sample classes.

The results stated that the analysis of the posttest results showed a difference. The analysis's findings indicate that the group for experimental average score was greater than that of the controlled group. when the SSCS model is applied by the experimental class itself in order that students' interest in learning increases and has an impact on learning outcomes of student and fosters critical ideas to solve problems during learning. If we review the student scores on the diagnostic test scores at the beginning of learning, there is an improve in the average in both sample classes when compared to the initial data of the sample, indicating that the growth of learning motivation for students. This is in accordance with the research of M. R. Fatiya, who stated in her research that there is an effect of learning using the model of SSCS on student learning outcomes in physics [11].

This is because after being given treatment with the model of SSCS learning makes students understand the subject matter and Other than that, students actively participate in the process of learning it can foster student curiosity about physics lessons with the subject matter of Waves and Sound Waves. This is in related to Budi Wibowo's research which said that learning with the SSCS model can increase outcomes in learning, learning motivation, and student learning activities [12]. According to Nia et al. when applying the SSCS learning model, students are faced with problems that commonly occur in life that must be solved by discussing in groups consisting of four to five members [13]. Then to make the conclusions from the results of the discussion each group summarizes the discussion results and is presented in front of the class.

Students find the tasks assigned throughout the learning process engaging, and they are challenged to find solutions to the difficulties the instructor poses [14]. Because they desire to properly tackle the challenges, students work hard in groups to find solutions to the problems the teacher presents. Chess claims that in order to make learning student-centered, actual problems are presented to pupils to address through group collaboration. In order to enhance student learning outcomes regarding the material covered, this type of learning process necessitates that students actively participate in learning activities that are not just focused on the teacher [15].

The explanation above can be seen that the SSCS model provides a better influence in developing student learning outcomes on wave and sound wave material than using the learning model used at school. Because there

is group work and exploration included in the curriculum, learning in the experimental class using the SSCS learning paradigm is more enjoyable. The treatment of the control class and the experimental class differs, which leads to variations in the learning outcomes of students in Physics classes.

Researchers in this project have encountered a number of challenges, one of which is that managing student activities and time during experiments is challenging due to students' natural curiosity and interest in the characteristics of the PhEt simulations that will be employed. To combat this, we made an effort to closely monitor students during the experiment activities so that the time allotted for the experiment may be spent successfully and efficiently.

The second barrier is that some students continue to struggle to read and comprehend the learning objectives and activities in the SSCS model-based LKPD, which prevents them from understanding the curriculum and learning activities. In order to get around this, the instructor made an effort to mentor the class and remind them to read the LKPD accurately.

The third obstacle is that when conducting the experiment, it is carried out in the classroom so that it takes time to prepare the infocus screen and distribute LKPD paper, learning also takes quite a long time, when group learning has not been maximized because there are still students who do not participate in the group, To overcome this, Try to keep a tight eye on students during experimental activities so that experimentation time can be utilized efficiently.

Student learning outcomes on attitude competence are obtained from the average attitude assessment during the learning process through observation sheets assisted by two observers. The increase in the value of students' attitudinal competence shown that the physics learning outcomes of students in attitudinal competence have increased for each meeting. At the beginning of the meeting, students' attitudes did not look good, then during the process of learning from students' attitudes began to look better, and at the end of the process of learning from students were getting used to it. Based on the hypothesis test was done, it can be accepted at the real level of 0.05 for learning outcomes in attitude competence. This is in related to research conducted by Rhozy, with the SSCS model assisted by character-loaded teaching materials experiencing attitude competence every week, which means that the model of SSCS plays a role in building strong character in students [16].

The results showed that the application of the Search, Solve, Create and Share (SSCS) learning model can improve student learning outcomes in all three competencies. The process of learning using the SSCS learning model is carried out in accordance with the steps. This learning model makes students have good motivation and enthusiasm for learning, more active in the process of learning and behave better. In group discussions, many students are active both in providing answers, questions, opinions and always try to solve a problem together so that cooperation between students in the group goes well [17]. Students also have enthusiasm in working on the questions given and scramble to come forward [18]. In conducting experiments / practicums, students look so enthusiastic to take part in practicums and cooperate with their groupmates, and the level of student discipline has begun to increase, this can be seen from the fewer students who arrive late and do not comply with school rules.

The model of Search, Solve, Create and Share (SSCS) learning application in addition to having an influence on the learning process, namely increasing student physics learning outcomes, for teachers can also be used as a guide on how to create a learning atmosphere where students are more excited and fun in participating in learning, so that students become more active, work hard in solving problems in learning, have high curiosity, and dare to appear both in asking questions, giving answers and giving good suggestions in front of the class.

IV. CONCLUSION

Based on the research results that has been done, there are differences in physics learning outcomes of students in class XI IPA 7 who are treated with the *Search, Solve, Create, And Share* (SSCS) learning model and XI IPA 4 who are not treated. This is indicated by the value of tcount = 3.589 while t_{tabel} = 1.667, it is known that tcount> t_{tabel} which is 4.506> 1.667 which means H_1 is accepted and H_0 is rejected at a real level of 0.05. This shows that there is an impact of using the SSCS model on the physics learning outcomes of students who are treated in class XI IPA 7 at MAN 2 Padang City in the 2023/2024 academic year.

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