

Utilization of Search, Solve, Create Share Learning Model on Students's Test Performance in Static Fluids Material

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Abstrak. A student-centered learning model facilitates student's engagement in class, positively impacting learning outcomes. The search, solve, create and share learning model is one approach that effectively involves student's engagement in learning process. This model consists of four phases: identifying problems, planning problem-solving strategies, writing solutions and communicating the solutions. This study aims to examine the application of search, solve, create and share model on student's learning outcome in static fluids topic at 11th grade of SMA Negeri 14 Jakarta. The research design used is a pretest-posttest control group design. Data collection was conducted through a written test consisting of 15 multiple choice questions. The data analysis results indicate that implementing of search solve, create and share model in static fluids topic led to an increase in the average test score, from 48,50 to 70,24. The improvement in student's test performance is also reflected in the n-gain test result of 0,352, which in moderate category.

Keywords: Search solve create share, Learning outcome, Static fluid, n-gain, physics learning

I. Introduction

In 2021, the Ministry of Education and Culture (Kemendikbud) officially abolished the National Examination, as stated in Ministerial Circular No. 01 of 2021. Graduation is now determined by student learning outcomes rather than exam results. Consequently, student performance has become the primary measure of education quality and effectiveness. According to a survey by the World Population Review (2021), Indonesia ranked 54th out of 78 countries in global education performance. This indicates that Indonesia's education system and quality still lag behind many other countries. Improving learning outcomes requires conceptual reform in education to enhance graduate quality and also Indonesia's global ranking [1]. Learning achievement can be viewed from both student and teacher perspectives. The effectiveness of learning process is reflected in both the learning process and student outcomes. Active learning and creativity encourage better academic

performance, with teachers acting as facilitators who guide students in exploring their potential, interests and talents [2].

The observation data at SMA Negeri 14 Jakarta revealed that 80% of students scored below the passing grade of 75 in physics. Recognizing the link between learning quality and students outcomes, this study explores search, solve, create, share (SSCS) learning model as an innovate approach to enhance student engagement. The SSCS model encourages critical thinking, creativity, and independence in problem-solving [3]. It also fosters collaboration, acceptance, respect and critical reasoning, leading to improved student outcomes and a more engaging learning proces [4].

The Search, Solve, Create, and Share (SSCS) model has been shown to enhance various aspects of student learning across different subjects. It significantly improves mathematical concept understanding, fostering independence, engagement, and focus [5]. In biology learning, SSCS increases student achievement in cognitive, affective, and psychomotor domains, with $\geq 75\%$ of students meeting the KKM [6]. Additionally, SSCS positively influences scientific generic skills in environmental pollution topics, with students achieving an average score of 75.45, classified as high [7]. The use of SSCS-based worksheets (LKPD) also yields a 96.95% positive student response, followed by a 96.66% improvement in learning outcomes [8]. Furthermore, SSCS provides 85.04% relative efficiency in cognitive learning outcomes and 20.3% improvement in scientific generic skills, making it highly effective for practical-based subjects [9].

Based on these considerations, this study examines the utilization of search, solve, create, and share (SSCS) on students test performance in static fluids for 11th grade at SMA Negeri 14 Jakarta. The study aims to improve concept mastery and problem-solving abilities while helping teachers develop better instructional strategies. Findings will support more effective learning methods and contribute to higher student achievement in physics.

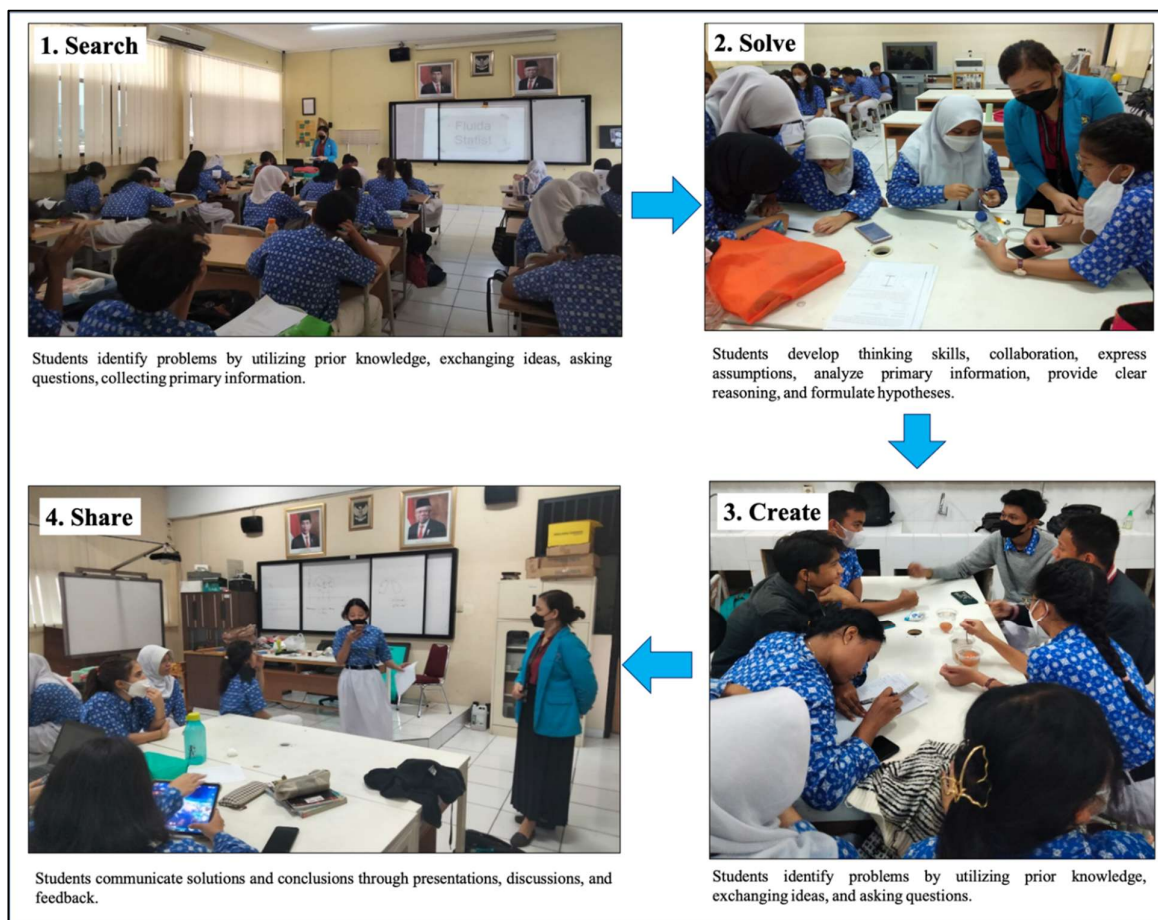
II. Method

The method used in this study is a quasi-experimental design of pretest-posttest control group design, which involves twogroups: a control group and an experimental group. A control group, which uses teacher-based learning model, meanwhile an experimental group is taught using search, solve, create and share (SSCS) learning model. This study consists of two independent variable, the teacher-based learning and SSCS learning model. The dependent variable of this study is student's test performance in static fluid material. This study was conducted as SMA Negeri 14 Jakarta during the odd semester of 2022/2023 academic year. This study population consits of all 11th grade science student, totaling 170 students. The sample was selected using purposive sampling, based on its relevance to the research material. Total of 68 students from class XI MIPA 4 and XI MIPA 5 were

chosen as they were about to study static fluids. The data collection technique in this study used a test instrument to measure the improvement in student learning outcomes. A pre-test was conducted before learning, and a post-test was given afterward. Both tests consisted of 15 multiple-choice questions.

III. Result and Discussion

The Search, Solve, Create, and Share (SSCS) model consists of four phases. In the Search phase, students observe and understand problems, identify known information, ask questions, connect concepts, analyze data, and draw conclusions. The Solve phase encourages critical thinking, where students develop ideas and formulate solutions based on their analysis. In the Create phase, students generate solutions, evaluate their analysis, and refine their reasoning. Finally, in the Share phase, students present their findings, receive feedback, and improve their understanding through discussion. This model enhances concept development and promotes two-way communication between students and teachers.



The collected data includes pretest and post test results on static fluids to asses student performance in cognitif aspect. The normality test results for both the experimental and control classes showed a significance value > 0.05 , indicating that the data is normally distributed. The Levene's test showed a homogeneity significance value of 0.115, indicating that the variance in this study is homogeneous. Both of control and experimental group are presented in Table 1.

Table 1. Pretest and Post test Result Description

	N	Minimum	Maximum	Mean	Std. Deviation
Control Group Pretest	34	0,00	73,00	40,76	19,04
Control Group Post test	34	33,00	87,00	62,62	13,97
Experiment Group Pretest	34	10,00	73,00	48,50	19,47
Experiment Group Post test	34	60,00	100,0	70,24	9,814

Based on Table 1, the experiment group showed an increasedly average score from 48,50 to 70,24, by range 10-100, meanwhile the control group also tend to increasedly from 40,76 to 62,62 by score range 0-87. This data indicated that both experiment and control group started with similar initial abilities in cognitive test performance. Experiment group demonstrated greater ini average score test improvement.

The hypothesis test was conducted using a t-test, as the data was normally distributed and homogeneous. The t-test results showed a significance value of 0.011 (< 0.05), leading to the rejection of H_0 and acceptance of H_a . This indicates that the Search, Solve, Create, and Share (SSCS) learning model resulted in a significant improvement in students' pre-test and post-test scores, demonstrating an increase in learning outcomes. The N-gain test was conducted to measure the improvement in student learning outcomes. The N-gain results from the pre-test and post-test for both the experimental and control classes are presented in the Table 2

Table 2. N-Gain graph for the Experimental and Control classes

Group	N-gain
Experiment Group	0,47
Control Group	0,28

The N-gain test results show that the experimental class (SSCS model) achieved a moderate improvement (0.47), while the control class showed a low improvement (0.28). This indicates that the SSCS model is more effective in enhancing students' learning outcomes compared to conventional methods. To breakdown the student test performance gainig, we describe the Student Answer Scores for Test Instruments by Indicator in Table 3.

Table 3. Student Answer Scores for Test Instruments by Indicator

Bloom's Taxonomy	Indikator	Correct Answer Score	Correct Answer Percentage
C1	Students can recall the concept of Pascal's Law.	26	76,47%
C2	Students can understand the principle of hydrostatic pressure in everyday life.	6	17%
	Students can identify the factors that affect hydrostatic pressure in everyday life.	22	64,70%
C3	Students can apply the pressure equation when given experimental data.	29	85,29%
C3	Students can calculate the magnitude of force on small and large surfaces using Pascal's law.	21	61,76%
C4	Students can analyze the fluid mass value accurately using a graph of density versus volume.	26	76,47%
	Students can analyze the relationship between hydrostatic pressure and depth when given relevant data.	2	5,88%
	Students can analyze hydrostatic pressure in daily life when provided with an illustration.	25	73,52%
	Students can evaluate Archimedes' Principle when presented with real-life fluid phenomena.	28	82,35%
	Students can determine the conditions of three types of liquids in a U-tube by applying the hydrostatic pressure concept.	21	61,76%

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	Given data on the submerged volume of an object in a liquid with known density, students can organize the data in a table accordingly.	28	82,35%
	Students can categorize objects that can be lifted by the large piston when provided with a hydraulic jack diagram, experimental data, and the minimum applied force on the small piston.	22	64,70%
C6	Students can calculate the required force to lift a car using the hydraulic jack principle.	18	52,94%

Table 3 shows that the lowest percentage of correct answers is in the indicator of linking experimental data with theoretical concepts. This contributes to the SSCS learning model being classified as moderate in improving learning outcomes. Field observations indicate that students are unfamiliar with interactive learning models that require active participation. Previously, they primarily acted as passive recipients of information. Additionally, they need more time to process information and independently connect it to real-world applications.

The SSCS learning model achieved a moderate category due to its emphasis on independent learning and knowledge construction. However, students faced challenges in practical activities, requiring more intensive guidance from teachers. Their ability to conduct experiments and explore concepts independently was not yet optimal. Similar findings were reported before, where students struggled with practical work due to a lack of prior experience. The difficulties in supervising students during simultaneous classroom experiments, emphasizing the need for better preparation and coordination among groups and teachers to ensure effective implementation [6].

IV. Conclusion

It can be concluded that the SSCS learning model led to a moderate improvement in student learning outcomes. The experimental class had a higher average score than the control class. The control class had a pretest score of 0 and a posttest score of 38.00, while the experimental class had a pretest score of 10.00 and a posttest score of 62.00. However, the implementation of SSCS was not optimal, leading to less-than-expected results. Insufficient preparation affected the learning process, with more time spent on experiments, leaving limited time for the sharing phase. As a result, students rushed through conclusions, preventing in-depth exploration of the material.

Based on the findings of this study, the SSCS learning model is best suited for physics topics that involve simple experiments. For future implementations, teachers should actively monitor student discussions to facilitate better material exploration and enhance student engagement in the learning process.

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