IJEEPA

International Journal of Educational Evaluation and Policy Analysis

E-ISSN: 3048-0841
P-ISSN: 3048-0833

Research Article

Application of the *Search, Solve, Create, and Share* (SSCS) Learning Model to Improve Students' Understanding of Concepts in Class XI MIPA SMAN 7 Pekanbaru

Fitri Ramadani [1], Susilawati [2]*, Herdini [3]

[1] Program Studi Pendidikan Kimia, FKIP, Universitas Riau, Kampus Bina Widya KM. 12,5, Simpang Baru, Kec. Tampan, Kota Pekanbaru, Riau, 28293, Indonesia ; E-mail: fitri.ramadani3545@stundent.unri.ac.id
[2] Program Studi Pendidikan Kimia, FKIP, Universitas Riau, Kampus Bina Widya KM. 12,5, Simpang Baru, Kec. Tampan, Kota Pekanbaru, Riau, 28293, Indonesia; E-mail: susilawati@lecturer.unri.ac.id
[3] Program Studi Pendidikan Kimia, FKIP, Universitas Riau, Kampus Bina Widya KM. 12,5, Simpang Baru, Kec. Tampan, Kota Pekanbaru, Riau, 28293, Indonesia; E-mail: herdini@lecturer.unri.ac.id
* Corresponding Author : susilawati@lecturer.unri.ac.id

Abstract: This study aims to determine the improvement and category of improvement in students' understanding of the concept of buffer solutions by applying the Search, Solve, Create, and Share (SSCS) learning model. The form of this study is an experimental research with a Randomized Control Group Pretest-Posttest design. The population of this study is all students of class XI MIPA SMAN 7 Pekanbaru for the 2024/2025 school year. The research sample was students in class XI MIPA 1 as an experimental class and students in class XI MIPA 2 as a control class. The experimental class was given the treatment of the application of the SSCS learning model, while the control class was given learning without the SSCS model. The results of the data hypothesis test analysis technique used the right-hand t-test. Based on the analysis of research data, it was obtained that the tcount of 2.07 was greater than the ttable of 1.67 (dk = 67, α = 0.05) with the category of increasing students' understanding of concepts of 0.74 in the high category. The results of the study show that the Search, Solve, Create, and Share (SSCS) learning model can improve students' understanding of the concept of buffer solutions in class XI MIPA SMAN 7 Pekanbaru.

Keywords: Buffer Solutions; Concept Improvement; Experimental Research; SSCS; Student Understanding

Received: June 12, 2025
Revised: June 26, 2025
Accepted: July 23, 2025
Published: July 30, 2025
Curr. Ver.: July 30, 2025

1. Introduction

Learning plays a very important role in shaping the character and abilities of learners. With learning, students not only get the knowledge they need but also improve their abilities, skills and attitudes. Currently, learning refers to an independent curriculum that aims to provide more freedom in the learning process. This curriculum emphasizes learning that prioritizes students as the main focus or student center. One of the important materials in learning at school is Chemistry.

Chemistry encompasses various fields of study that are systematically arranged and interrelated between the competencies studied, in which there are concepts of knowledge from simple to complex. Chemistry learning is not only memorized, but also requires understanding, analysis and the ability of students to relate learning to daily life. In fact, learning chemistry is still seen as a difficult subject for students. One of the chemistry subject matter that is still seen as difficult by students is the buffer solution. The difficulty in understanding the concept of chemistry is closely related to the understanding of concepts owned by the students themselves.

Based on the results of interviews that have been carried out with chemistry teachers in class XI MIPA SMAN 7 Pekanbaru, it is known that students still have a relatively low understanding of concepts in buffer solution materials. This is because there are still many students who have difficulties in understanding the material of buffer solutions in the writing of chemical reactions and also in the concept of calculating buffer solutions. In addition, students' curiosity is still lacking, students are reluctant to express their opinions or ask questions about material that has not been understood, so that there are still many students who are not complete in learning. Students whose scores reach the criteria for achieving learning objectives set by the school are 80 by 45%. The non-achievement of the completeness of learning objectives shows that students still have difficulties in understanding the concept of buffer solution material.

Difficulty in understanding one concept can result in difficulty in understanding other concepts that are interconnected. Complex chemical concepts can only be mastered if the underlying basic concepts have been fully understood and mastered (Rosawati & Dwiningsih, 2016). This requires students to have an understanding of the concepts in chemistry as a whole in order to be able to learn chemistry without experiencing difficulties (Widarti et al., 2018). Understanding concepts is an aspect of the human cognitive realm and one of the factors necessary for the learning process of students, so that students are able to solve problems that arise during learning activities (Subagiyo, 2019). Comprehension is not only remembering facts, but also includes the ability to explain, explain, interpret or understand a concept (Danial et al., 2017). According to Zuhroti et al. (2018) The indicators of concept understanding are as follows; 1) Repeating concepts, 2) Categorizing objects based on characteristics according to existing concepts, 3) Providing examples and not examples of a concept 4) Presenting concepts in various forms of representation, 5) Developing necessary conditions or sufficient conditions for a concept, 6) Using and selecting specific procedures or operations, and 7) Applying concepts or problem-solving algorithms.

The difficulty of students in understanding the concept of buffer solution material results in low students' understanding of the concept. Therefore, alternative solutions are needed that are expected to create learning that makes students' understanding of concepts increase in chemistry lessons. In connection with this, a learning model is needed that is able to make students' activeness and independence in the learning process increase, so that it can affect the understanding of concepts possessed by students. The Search, Solve, Create, and Share learning model can be applied to improve students' understanding of concepts. According to Pizzini in (Noviyanti et al., 2020) who stated that the SSCS model focuses on the problem-solving process, by making learning more meaningful for students which can be seen from the activities of identifying and finding problem solutions.

The SSCS learning model uses a problem-solving approach designed to strengthen understanding of science concepts. The SSCS model consists of four stages that include stages Search (looking for or investigating a problem), level Solve (plan problem-solving), stage create (solve the problem), and the stage Share (communicate the results of the settlement)(Susilawati & Rosidah, 2020). At the stage Search encourage students to look for information that from a given problem or situation, stage Solve is a stage that focuses students on active participation in finding the right alternatives to solve problems, the stage create is the stage where learners present their data by preparing ways to communicate the problem as well as conclusions and stages Share where students are encouraged to be active in presentations and exchange ideas and opinions (Jiltasari et al., 2020). Each stage in the model involves students to actively participate during discussions and exchange ideas in solving problems related to each stage of learning that takes place (Trisnawati et al., 2016).

The SSCS learning model provides opportunities to gain hands-on experience in the process of solving problems, processing information, providing opportunities to learn and reinforce concepts in a more meaningful way, collaborate with others, and convey ideas with good language and other skills (Pichi et al., 2020). Teachers can take advantage of this model in the hope that students will be able to actively participate during the learning process, be able to understand ideas related to concepts and train students in critical thinking to deal with various problems (Munawaroh) et al., 2022). The SSCS model has one of the advantages, which is that it can provide a meaningful concept to be learned and mastered by students through problem-solving activities, and students are involved in a new situation when solving a problem so that they are expected to be able to solve a problem according to the abilities that have been trained to students (Lele & Widyaningrum, 2022).

Research on the Search, Solve, Create, and Share (SSCS) learning model has also been carried out by a number of researchers, including research conducted by Rosawati & Dwiningsih (2016) stating that students' understanding of concepts has increased using the SSCS model on chemical bond materials with results of 53.34% of high-category interpretations, 43.33% of medium interpretations, and 3.33% of low-category interpretations. The same research was also conducted by Dewi et al. (2017) concluded that the implementation of the SSCS learning model was going well and there was an influence on the science process skills of students, the results of the significance test with the t-test showed a percentage of 79.49% of the good category, the percentage of models by students of 73.77% of the good category, and the percentage of science process skills of 60.56% of the category was quite good. The research of Yuanita et al. (2024) shows that the SSCS learning model applied has an effect on students' understanding of concepts, which is proven through hypothesis testing with a Sig. (2-tailed) value of 0.000. Based on the background of the problem that has been described above, the researcher needs to conduct research with the title "The Application of the Search, Solve, Create, and Share (SSCS) Learning Model to Improve Students' Understanding of Concepts in the Buffer Solution Material for Class XI MIPA SMAN 7 Pekanbaru".

2. Research Method

The research conducted was an experimental research using a Randomized Control Group Pretest-Posttest research design which was carried out in two classes as samples, namely the experimental class and the control class. The design is as follows:

Table 1. Research Design.

Class	Pretest	Treatment	Posttest
Experimental Classes	T_0	X	T_1
Control Class	T_0	-	T_1

Information:
T_0 = Results Pretest
X = Treatment of experimental classes with the application of the model SSCS Learning
T_1 = Results Posttest

The research was carried out at SMAN 7 Pekanbaru, class XI MIPA even semester of the 2024/2025 school year. The data collection time will be in May 2025. The students who became the population in the study were students of class XI MIPA SMAN 7 Pekanbaru which consisted of four classes, namely, class XI MIPA 1, class XI MIPA 2, class XI MIPA 3, and class XI MIPA 4. The research sample consisted of two classes, namely the experimental class and the control class. The instrument used for data collection was a concept comprehension test for students in the experimental class and the control class. The data from the concept understanding was taken from the pretest and posttest test scores. Before treatment, both classes were given a pretest regarding the buffer solution material which consisted of objective questions. After being given treatment, the posttest is given with the same amount and time as the pretest.

The data analysis technique uses the analysis prerequisite test, namely the normality test and the normality test using the data of the salt hydrolysis material, the pretest-posttest normality test, the pretest-posttest difference test, the hypothesis test (t-test) using the right-hand t-test. The formula used for the right-side t-test is as follows:

$$t = \frac{\bar{x}_1 - \bar{x}_2}{S_g\sqrt{\frac{1}{n_1}+\frac{1}{n_2}}}$$

With the Combined standard deviation (Sg) can be calculated by the formula:

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

$$S_1^2 = \frac{n_1\sum x_1^2 - (\sum x_1)^2}{n_1(n_1-1)} \qquad S_2^2 = \frac{n_2\sum x_2^2 - (\sum x_2)^2}{n_2(n_2-1)}$$

Information:
t = Statistical symbol to test hypotheses
Sg = Combined standard deviation
S_1^2 = Sample variance 1
S_2^2 = Sample variance 2
x_1 = Experimental class posttest and pretest values
x_2 = The value of the control class posttest and pretest
$\bar{x}_1$ = Average value of difference Post test and Prestest Sample 1

$\bar{x}_2$ = Average value of difference Posttest and Pretest Sample 2
n_1 = Many students sample 1
n_2 = Many students sample 2

The test criteria, the hypothesis is accepted if the tcal value is > ttable with the probability criteria of 1-α (α=0.05) and dk = $n_1 + n_2 - 2$. Conversely, for other t price degrees the hypothesis is rejected (Sudjana, 2016). Then the test was carried out N-gain to show the category of improving concept understanding by applying the SSCS learning model. Formula (N–Gain) as follows:

$$\text{N-gain} = \frac{\text{Skor posttest} - \text{skor pretest}}{\text{Skor maksimum} - \text{skor pretest}}$$

N-gain is the normalized gain of both classes. The classification of normalized N-Gain values is presented in the following table:

Table 2. Ternomalization and Classification gain values.

Average ternomalization gain	Classification
N-gain ≥ 0.70	Tall
0.30 ≤ N-gain < 0.70	Keep
N-gain < 0.30	Low

3. Results and Discussion

3.1. Results

The testing of the research data results was reviewed from three aspects of testing, namely homogeneity test, hypothesis test, and category of improving students' concept understanding. Testing of research data can be carried out if the prerequisite test of analysis has been carried out through a normality test.

3.1.1 Analysis Prerequisites

a. Normality Test

The results of the normality test of the students' test scores on the subject matter of salt hydrolysis are presented in table 3.

Table 3. Results of Normality Test Analysis of Salt Hydrolysis Subject Matter.

Class	N	$\bar{X}$	SD	L_{max}	L_{table}	Information
XI MIPA 1	32	71,72	11,40	0,1234	0,1566	Normal distribution
XI MIPA 2	35	72,29	11,84	0,1024	0,1498	Normal distribution
XI MIPA 3	35	70,14	12,86	0,1563	0,1498	Not Distributed normally
XI MIPA 4	36	70,42	12,44	0,1044	0,1477	Normal distribution

Table 3. shows the results of the normality test that class XI MIPA 3 is not normally distributed while class XI MIPA 1, class XI MIPA 2 and class XI MIPA 4 are normally distributed.

b. Homogeneity Test

Homogeneity tests can be carried out if the data have the same variance. Therefore, a variance test was first carried out on all normally distributed samples. Next, test the average similarity (two-party test) to determine the homogeneity of the two classes. The results of the homogeneity test analysis from the test score data of salt hydrolysis material students are presented in Table 4.

Table 4. Results of Homogeneity Test Analysis of Salt Hydrolysis Material.

Class	N	$\sum X$	$\bar{x}$	F_{count}	F_{table}	T_{count}	T_{table}	Information
XI MIA 1 XI MIA 2	32 35	2295 2530	71,72 72,29	1,08	3,989	-0,2	1,997	Homogeneous
XI MIA 1 XI MIA 4	32 36	2295 2535	71,72 70,42	1,19	3,986	0,447	1,997	Homogeneous
XI MIA 2 XI MIA 4	35 36	2530 2535	72,29 70,42	1,10	3,980	0,649	1,995	Homogeneous

Table 4. shows the results of the homogeneity test that the three sample groups can be said to be homogeneous, so the selection of samples is carried out randomly. The research sample was obtained, namely class XI MIPA 1 (32 students) and class XI MIPA 2 (35 students).

3.1.2 Pretest-Posttest Normality Test

The results of the normality test analysis of the pretest-posttest values of the experimental class and the control class are presented in table 5.

Table 5. Results of Normality Test Analysis of Pretest-Posttest Data.

Data	Class	N	$\bar{x}$	S	L_{max}	L_{table}	Information
Pretest	Experiment	32	23,88	8,41	0,1465	0,1566	Normally Distributed
	Control	35	22,51	7,46	0,1463	0,1498	
Posttest	Experiment	32	80,5	7,12	0,1353	0,1566	
	Control	35	67,2	9,33	0,1410	0,1498	

Table 5. The test results showed that the experimental and control class pretest-posttest data had a value of $L_{max} \leq L_{table}$ which showed normal distributed data.

3.1.3 Pretest-Posttest Difference Data Normality Test

The results of the analysis of the normality test of the difference in pretest-posttest scores of the two classes are presented in table 6.

Table 6. Results of Normality Test Analysis of Pretest-Posttest Differences.

Data	Class	N	$\bar{x}$	S	L_{max}	L_{table}	Information
Pretest-Posttest Score Difference	Experiment	32	56,63	5,48	0,1446	0,1566	Normally Distributed
	Control	35	50,63	5,40	0,1440	0,1498	

Table 6. The test results showed that the $L_{max} \leq L_{table}$ for the data was the difference between the pretest-posttest values of the experimental class and the control class, which means that the data was normally distributed.

3.1.4 Research Hypothesis Test

The hypothesis test uses statistical testing, namely the right-hand t-test. The difference between posttest and pretest scores was used as data for hypothesis tests in this study, because the difference in pretest-posttest scores showed that the amount of students' understanding of concepts increased before and after learning the buffer solution with or without the application of the SSCS learning model. The results of the analysis of the research hypothesis test are presented in table 7.

Table 7. Results of Hypothesis Test Analysis.

Class	N	∑X	S_{gab}	T_{count}	T_{table}	Information
Experiment	32	1812	5,44	4,47	1,67	Accepted hypotheses
Control	35	1772				

Table 7. The results of the hypothesis test presented showed that the data on the difference between posttest and pretest scores from the calculation results were obtained tcount = 4.47 and ttable = 1.67 at dk = 32 + 35 – 2 = 65 and the $t_{count} > t_{table}$ so that the hypothesis was accepted that "the Search, Solve, Create, and Share (SSCS) learning modelcan improve students' understanding of the concept of buffer solutions in class XI of MIPA SMA Negeri 7 Pekanbaru".

3.1.5 Category of Improving Understanding of Students' Buffer Solution Concepts

The category of improving students' understanding of the concept of buffer solution material based on the normalized N-gain test is presented in table 8.

Table 8. Categories of Improving Students' Concept Understanding.

Class	N	Pretest (X1)	Posttest (X2)	N-gain	Category
Experiment	32	23,88	80,50	0,74	Tall
Control	35	22,51	73,14	0,65	Keep

Table 8. shows that the experimental class was in the high category for the category of improving students' conceptual understanding with a value of N-gain = 0.74 while the control class of the medium category with a value of N-gain = 0.65.

3.2. Discussion

The SSCS learning model includes four learning stages, namely the first Search second Solve, third Create, and fourth Share. Each stage has an important role in improving students' understanding of concepts, because the learning process from beginning to end involves students to actively participate so that they can train memory and provide a more meaningful learning experience to students. This is in agreement with Rismayati & Pujiastuti (2020) that SSCS learning is designed in a simple and practical way, so that it can be applied in the learning process that actively involves students in every step or stage. In addition, it is also supported by Pichi et al. (2020) that students gain hands-on experience in the problem-solving process, get the opportunity to learn and reinforce concepts in a more meaningful way by applying the SSCS learning model.

First stage Search The SSCS learning model is a very important first step because it is the basis for students to understand and formulate problems to be solved. At this stage, students are directed to explore the topic or problem given through the student's worksheet with the aim of gathering initial information and building a deeper understanding of the problem. The main activities carried out by students in the Search Includes reading and understanding the problems presented in the student's worksheets, identifying the important points of the problem, and formulating questions that reflect the core of the problem. Students are given issues or problems in the form of discourses or videos according to the material taught. The role of the teacher in this stage is as a facilitator who guides students in observing, asking questions, and directing the information search process independently and in a structured manner. For example, at the first meeting of the stage Search, students are asked to observe problems related to changes in pH in the buffer solution and those that are not buffer solutions when a little acid or a little alkaline is added, then students are directed to formulate questions or learning problems based on these observations. By composing their own questions, learners begin to realize that there is information or concepts that they are not yet masterful of, and this becomes the basis for building a deeper understanding in the next stage. In addition, students are also encouraged to conduct group discussions to exchange opinions and expand their understanding of the problems being discussed. This is in agreement with Andayu et al. (2018) that stage Search help students in building their knowledge, this is because at the stage Search Learners are trained to investigate phenomena and look for existing problems. Thus, the stage Search It not only serves as a stage of information search, but also as a basis for students in developing problem-solving strategies at the next stage.

The second stage of Solve is the stage where students begin to look for answers or solutions based on questions that have been formulated beforehand. This stage trains students to solve problems systematically in order to get the right solution (Mulfi et al., 2020). In this stage, learners conduct analysis, propose hypotheses, and apply the concepts they learn to solve problems, which ultimately strengthens their understanding of the material. At the solve stage , students are given the opportunity to formulate several conjectures (hypotheses) to solve the problem and then plan to solve the problem. Activities at this stage can be in the form of conducting experiments, investigating literature from various learning sources, practicing questions or discussing in groups to find answers. Students receive guidance from teachers in finding solutions and solving problems by working on student worksheets to find answers to problems that have been identified through group discussions. For example, at the first meeting, students conducted an experiment to observe changes in pH when a small amount of acid or alkaline was added to the buffer solution. Through this process, students begin to relate new information with knowledge they already have, and gradually build a more complete and easy-to-apply understanding of concepts.

The third stage of Create, is a stage where students and their group mates discuss the best way to solve the problem presented in the student's worksheet, provide answers to questions or problems by combining the best ideas from the discussion and formulating a conclusion. The Create stage provides students with the opportunity to create a product in the form of a problem solution according to predetermined assumptions at the solve stage. At this stage, students test the hypotheses (conjectures) that have been made to determine the truth and display the results or solutions of the problem as creatively as possible to be displayed during the presentation at the share stage.

The last stage is Share, this stage encourages active participation of students in making presentations and exchanging ideas and opinions with teachers and classmates. In the Share stage, students play a role in communicating the answers to problems made in the previous stage. The Share stage provides an opportunity to interact, express opinions, and receive feedback from friends or other groups in class discussions. This is in agreement with Astuti et al. (2018) This stage provides opportunities for students to interact, express opinions, ask for opinions, and receive feedback from friends or other groups in class discussions. Students communicate with each other to find the whole material concept with teacher facilities that stimulate them to deepen the learning material independently. The sharing stage can increase students' understanding of concepts, because students can share new knowledge with friends through discussions, questions and answers, and others. The next activity is to provide an evaluation to measure the ability of students at each meeting. After all meetings are completed, a posttest is given. The purpose of giving a posttest is to measure the level of knowledge of students after getting the material taught.

Based on the hypothesis test that has been carried out, the tcal value of the ttable > is 2.07 > 1.67 (dk = 67, α = 0.05) so that the hypothesis is accepted. This shows that the learning model Search, Solve, Create, and Share (SSCS) which is applied can improve students' understanding of the concept of buffer solution material for Class XI MIPA SMA Negeri 7 Pekanbaru. In line with Rosawati & Dwiningsih's research (2016) which concluded that the understanding of concepts through the SSCS model of chemical bonding materials increased, judging from the index value Gain With a result of 53.34%, the interpretation of the high category was obtained. In addition, the results of student worksheets and evaluations are also used to see students' understanding of the concept of buffer solution material at each meeting. The results of the students' worksheet average scores and evaluations showed that the experimental class was higher than the control class. The student's worksheet can be seen in Figure 1.

Figure 1. Student Worksheets 1, 2, and 3

The improvement in concept understanding that occurred was then looked at again in the category using the N-gain test. The results of the N-gain test showed an increase in understanding of concepts in the experimental class students in the high category with an N-gain value of 0.74 and the control class in the medium category with an N-gain value of 0.65. The difference in the category of improving students' concept understanding in general can be seen in the graph presented in Figure 2.

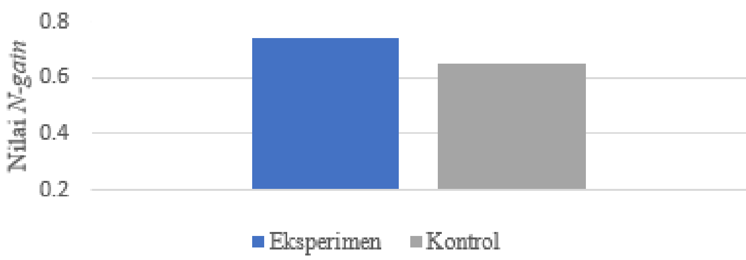

Figure 2. Graph of Difference Categories Improvement in Concept Understanding of Experimental Classes and Control Classes

An increase in conceptual understanding also occurred in each indicator. In the experimental class, 6 indicators of understanding the concept of the high category and 1 indicator of the medium category were obtained. Meanwhile, in the control class, 2 indicators of understanding the concept of the high category and 5 indicators of the medium category were obtained. This is because at each stage the SSCS model supports the improvement of concept understanding, namely students are actively involved in the process of building their knowledge and discovering new concepts in lessons. The difference in the category of improving students' understanding of concepts for each indicator in general can be seen in the graph presented in Figure 3.

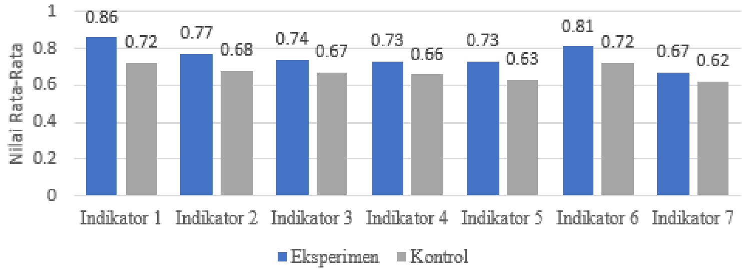

Figure 3. Differences in Categories of Improvement Each Indicator of Students' Concept Understanding

Based on the graph of the N-gain value increase category, each concept understanding indicator on the buffer solution material, the experimental class and the control class showed different results. Indicator 1 (repeating the concept) and indicator 6 (using and selecting a specific procedure or operation,), showed that both classes were in the high category with a higher N-gain value of the experimental class than the N-gain value of the control class. Indicator 2 (categorizing objects based on characteristics according to existing concepts), indicator 3 (providing examples and not examples of a concept), indicator 4 (presenting concepts in various forms of representation), indicator 5 (developing the necessary conditions or sufficient conditions of a concept), and indicator 7 (applying a concept or problem-solving algorithm), showed that the experimental class obtained a high category and the control class obtained a keep. The N-gain results showed that the experimental class was higher than the control class, that is, there was a higher increase in students' understanding of concepts in the experimental class using the SSCS learning model compared to the control class without the SSCS learning model. This is because at each stage it supports the improvement of concept understanding, namely students actively build their own knowledge and discover new lesson concepts.

The increase in students' understanding of concepts in experimental classes is due to the application of the SSCS learning model. The SSCS learning model allows students to search for ideas independently, requiring students to be able to formulate problems, write solutions, and structured resolution stages and actively participate in discussions during learning. The SSCS learning model encourages the active involvement of students, thus enabling an optimal knowledge formation process which will ultimately deepen the understanding of the material being taught. The SSCS model can facilitate students to search, find and build their knowledge to overcome problems, providing opportunities for students to explore information. Students play an active role in building knowledge and discovering new concepts in lessons, thus making the knowledge they gain more meaningful and can last for a long time. This model provides students with the opportunity to explore sources of information in order to construct new concepts that make students enthusiastic and active so that learning can be more meaningful (Mursyidah et al., 2019). Thus, this learning model can be used as an effective alternative to improve students' ability to understand concepts.

The SSCS learning model teaches students collaboration and collaboration. Through the cooperation of students in groups, it can be easier to understand existing concepts or problems. Cooperation is characterized by students solving problems in groups and solving LKPD problems. Each stage of the SSCS model requires students to discuss and cooperate with each other. In addition, the SSCS learning model increases students' curiosity. Students in the experimental class had activities to make problem formulations and make temporary answers (hypotheses) from the problem formulations they made. This will arouse students' curiosity and encourage students to prove their hypotheses and be serious in collecting data and conducting experiments. Student assessment is not only assessed from the cognitive aspect but also based on the affective aspect and psychomotor aspects of students in the learning process. The affective aspect is related to the attitude of students during the learning process. The aspects of attitude assessment assessed include curiosity, cooperation, and discipline. The experimental class has a higher average attitude score than the control class, it is characterized by the activeness of students asking questions to the teacher or group, students actively discussing or expressing opinions in groups and helping to explain to friends if there is something they don't understand, completing assignments well and characterized by the attitude of students in the experimental class in doing evaluation questions better than the control class without asking friends and not commit cheating.

Psychomotic assessments are carried out when students make presentations and practicums. The results of the presentation assessment were higher in the experimental class than in the control class. Presentation assessment has 3 aspects, namely delivery methods, content, and communicative. The average presentation performance score of students in the experimental class was higher in each aspect characterized by better presentation and presentation of the results of the discussion and the content of the presentation of the discussion results during the presentation in accordance with the concept. Students' communication skills during presentations, where the experimental class has a higher performance value supported by the application of the SSCS learning model, especially the solve and share stage. The results of the practicum performance assessment analysis showed that the experimental class was higher than the control class. Practicum assessment has 3 aspects, the first aspect is using tools, the second aspect is observing changes, and the third aspect is presenting results. The average practicum performance score of students was higher in the experimental class than the control class in each aspect, characterized by better use of tools in the experimental class during the practicum, as well as the process of student observation during the practicum and the delivery or presentation of practicum results by students in the experimental class was better than the control class. In the application of the SSCS learning model, there are challenges that arise during the learning process. Although teachers have tried to provide time limits for discussions at each stage, students often take longer than set. To overcome this, the solution taken is to manage the time more efficiently and remind students when the discussion time has ended. In addition, teachers also need to have the ability to facilitate and manage discussions so that each one runs smoothly.

4. Conclusions and Recommendations

Based on the results of the analysis and discussion, it can be concluded that: (1) The application of the Search, Solve, Create, and Share (SSCS) learning model can improve students' understanding of the concept of the buffer solution material for class XI MIPA SMAN 7 Pekanbaru with a calculation of 2.07 greater than the table of 1.67 (dk = 67, α = 0.05). (2) The category of improving students' understanding of concepts by using the Search, Solve, Create, and Share (SSCS) learning model in the buffer solution material for class XI MIPA SMA Negeri 7 Pekanbaru of 0.74 is in the high category.

Based on the results obtained, the researcher recommends the use of the Search, Solve, Create, and Share (SSCS) learning model as one of the options that can be applied to improve students' understanding of concepts. For researchers who wish to follow up on this research, they can apply the Search, Solve, Create, and Share (SSCS) learning model to other chemical subjects.

References

Andayu, S., Susilawati, & Haryati, S. (2018). Application of the Search, Solve, Create and Share (SSCS) learning model to improve student learning achievement on the subject of solubility equilibrium in class XI MIA SMAN 2 Pekanbaru. *Jom Fkip, 5*(2), 3.

Astuti, N. P. E. F., Suweken, G., & Waluyo, D. (2018). The effect of the Search, Solve, Create and Share (SSCS) learning model on the understanding of mathematics concepts of grade VIII students of SMP Negeri 1 Banjar. *Journal of Mathematics Education Undiksha, 9*(2), 84-95. https://doi.org/10.23887/jjpm.v9i2.19901

Danial, M., Gani, T., & Husnaeni, H. (2017). The influence of learning models and early abilities on students' critical thinking skills and concept understanding. *Journal of Educational Science and Technology (EST), 3*(1), 18. https://doi.org/10.26858/est.v3i1.3509

Dewi, Afrida, & Triwahyudi, S. (2017). Analysis of the implementation of the Search, Solve, Create, and Share (SSCS) learning model and its effect on students' science process skills on the molecular form material of class X MIA SMA Negeri 11 Jambi City. *Journal of The Indonesian Society of Integrated Chemistry, 9*(1), 1-9. https://doi.org/10.22437/jisic.v9i1.5073

Jiltasari, J., As, H., & Amaliah, N. W. (2020). The application of the Search Solve Create Share (SSCS) learning model through a problem-solving approach to improve the learning outcomes of biology science class VIII SMPN 007 Bambang Mamasa. *Journal of Marine Ecology, 3*(2), 276-293.

Lele, D. R. U., & Widyaningrum, D. A. (2022). Development of student worksheets (LKS) based on the Search, Solve, Create and Share (SSCS) learning model on food digestive system materials. *Journal of Bioeduin: Biology Education Study Program, 12*(1), 24-33. https://doi.org/10.15575/bioeduin.v12i1.22254

Mulfi, W. O. D., Rasmuin, R., & Lestari, D. (2025). The effect of the Search Solve Create Share (SSCS) learning model on the ability to understand mathematical concepts in students at SMA Negeri 1 Batauga. *Academic Journal of Mathematics Education, 47-54*.

Munawaroh, K., Nabhar, N., & Auliya, F. (2022). Experimentation of SSCS (Search, Solve, Create and Share) learning model on students' critical thinking skills in comparison materials at MTS Al-Hikmah Pati. *Journal of Innovative Mathematical Learning, 5*(4), 1161-1170.

Mursyidah, R., Muharrami, L. K., Rosidi, I., & Hadi, W. P. (2019). The influence of the Search, Solve, Create and Share (SSCS) learning model on students' generic science skills. *Natural Science Education Research, 2*(1), 85-96. https://doi.org/10.21107/nser.v2i1.5569

Noviyanti, N., Haryati, S., & Herdini. (2020). Development of Search, Solve, Create and Share (SSCS) based student worksheets (LKPD) on the subject of ion balance and pH of buffer solutions. *Journal of Chemistry Learning, 5*(1), 8-16. https://doi.org/10.17977/um026v5i12020p008

Pichi, S. O., Erviyenni, E., & Holiwarni, B. (2020). Development of Search, Solve, Create and Share based student activity sheets (LKPD) on the subject of ion balance and pH of salt solution. *Journal of Mathematics and Natural Sciences, 15*(5), 505-508. https://doi.org/10.29303/jpm.v15i5.1608

Rismayanti, T. A., & Pujiastuti, H. (2020). The effect of the Search Solve Create Share (SSCS) model on the ability to understand mathematical concepts. *JKPM (Journal of Mathematics Education Studies), 5*(2), 183. https://doi.org/10.30998/jkpm.v5i2.6345

Rosawati, E. E., & Dwiningsih, K. (2016). Improving students' understanding of concepts through the Search, Solve, Create, and Share (SSCS) model on chemical bonding materials. *Unesa Journal of Chemical Education, 5*(2), 494-502.

Subagiyo, S. (2019). Application of the Blended Learning Model to improve students' understanding of thermochemical concepts. *Journal of Educational Chemistry (JEC), 1*(1), 1. https://doi.org/10.21580/jec.2019.1.1.3830

Susilawati, & Rosidah, A. (2020). SSCS (Search Solve, Create and Share) learning model for elementary school students' understanding of concepts. *Proceedings of the National Seminar on Education FKIP UNMA 2020*, 17-25.

Sutresna, N., Sholehudin, D., & Herlina, T. (2016). *Chemistry Active and Creative Student Book: For the Upper Middle Class/Madrasah Aliyah Class XI.* Bandung: Grafindo Media Pratama.

Trisnawati, Haryono, & Susanti. (2016). The application of the Search, Solve, Create, and Share (SSCS) learning model to improve analytical skills and learning achievement in the subject matter of solubility and solubility results of students of class XI MIA 3 even semester SMA Batik 2 Surakarta. *Journal of Chemical Education, 4*, 1-7.

Widarti, H. R., Safitri, A. F., & Sukarianingsih, D. (2018). Identify the understanding of the concept of chemical bonds. *J-PEK (Journal of Chemistry Learning), 3*(1), 41-50. https://doi.org/10.17977/um026v3i12018p041

Yuanita, D., Syafrizal, Widya, Ginting, F. W., & Sari, A. M. S. (2024). The influence of the Search, Solve, Create, and Share (SSCS) learning model on concept understanding in thermodynamics materials. *Relativity: Journal of Physics Learning Innovation Research, 7*(2), 86-93. https://doi.org/10.29103/relativitas.v7i2.16524

Zuhroti, B., Marfu'ah, S., & Ibnu, M. S. (2018). Identify the concept understanding of the level of macroscopic, microscopic and symbolic representation of students in acid-base materials. *J-PEK (Journal of Chemistry Learning), 3*(2), 44-49. https://doi.org/10.17977/um026v3i22018p044