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Improving Students' Self-Efficacy in Studying Salt Hydrolysis using the SCCrT Model

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Abstract: Improving Students' Self-Efficacy in Studying Salt Hydrolysis Using the SCCrT Model. **Objectives:** This study aims to determine the differences in the Self-Efficacy of students who learn to use the SCCrT (Scientific Critical Creative Thinking) model with the DI (Direct Instruction) model. **Methods:** This research is an experimental study of quasi-experimental design with a sample of 69 people consisting of 2 classes with data collection techniques using a questionnaire consisting of 15 statements using four aspects of self-efficacy. Data analysis was descriptive quantitative, and quantitative inferential with SPSS version 25. **Findings:** The application of the SCCrT model affects students' self-efficacy acquisition, which is characterized by differences in the self-efficacy results with classes that apply the DI model with an average significance value of 0.00. **Conclusion:** There are differences in students' self-efficacy between classes that study with the SCCrT model and courses that use the DI model. The SCCrT model performed better than the DI model in the average category, and the DI model performed well in the salt hydrolysis material category.

Keywords: self-efficacy, salt hydrolysis, SCCrT model.

Abstrak: Meningkatkan Self-Efficacy Peserta Didik dalam Mempelajari Hidrolisis Garam dengan Model SCCrT. ***Tujuan:*** *Penelitian ini bertujuan untuk mengetahui perbedaan Self-Efficacy peserta didik yang belajar menggunakan model SCCrT (Scientific Critical Creative Thinking) dengan model DI (Direct Instruction.).* ***Metode:*** *Penelitian ini merupakan penelitian eksperimen jenis quasi experimental design dengan sampel sebanyak 69 orang yang terdiri atas 2 kelas dengan teknik pengambilan data menggunakan angket yang terdiri atas 15 pernyataan yang menggunakan 4 aspek self-efficacy. Analisis data secara deskriptif kuantitatif dan kuantitatif inferensial dengan SPSS versi 25.* ***Temuan:*** *Penerapan model SCCrT memberikan pengaruh terhadap perolehan self-efficacy peserta didik yang ditandai dengan perbedaan hasil self-efficacy dengan kelas yang menerapkan model DI dengan rerata nilai signifikasi 0,00.* ***Kesimpulan:*** *Terdapat perbedaan self-efficacy peserta didik antara kelas yang belajar dengan model SCCrT dengan kelas yang menggunakan model DI. Kelas dengan model SCCrT lebih baik dibandingkan kelas dengan model DI dengan kategori rerata sangat baik dan model DI dengan kategori baik pada materi hidrolisis garam.*

Kata kunci: *self-efficacy, hidrolisis garam, model SCCrT.*

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INTRODUCTION

Self-efficacy comes from a person's belief in balancing skills with the ability to achieve goals to obtain positive academic results and other areas of life. Self-efficacy is paramount today (Bulfone *et al*., 2021; Chuang *et al*., 2021). Self-efficacy can help someone in dealing with and overcoming any problems they experience. Self-confidence also influences a number of thoughts and anxiety experiences when individuals engage in an activity. Self-efficacy is closely related to motivation and action (Holzberger & Prestele, 2021), regardless of whether the belief is objectively true (Blaique & Pinnington, 2022).

Self-efficacy determines the activities, goals, and efforts they make in classroom activities (Akcaoglu & Akcaoglu, 2022). Self-efficacy can also determine whether the student is achieving or not. Students with high self-efficacy will face tasks with great desire (Handayani & Sholikhah, 2021), while students with low self-efficacy will avoid many jobs and incredibly challenging tasks (Fauziana, 2022). Self-efficacy produces different behaviors among individuals even though they have the same ability. This is because self-efficacy affects choices, goals, overcoming problems (Ahmad & Safaria, 2013), and persistence.

Self-efficacy is a person's evaluation of his ability or competence to perform a task, achieve goals, and overcome various obstacles (Naparin *et al*., 2020). Self-efficacy (self-ability) is a very important aspect in today's education world, where a student is required to have the competence that is in him in doing something, one of which is essential in learning today is the ability of a student to speak or speak. Appear in front of the class to present or explain what he has understood to produce a good presentation and succeed in explaining and getting good results (Kartikasari & Idayani, 2022).

When presenting a lesson, students must master the material delivered in front of the class. It is common for students to become nervous and anxious when they come forward in front of the class because they feel unsure of their abilities or competencies when presenting one of the class-Learning materials in front of the course. This is because the quality of self-efficacy also affects students' motivation to learn, confidence in doing assignments, and ability to focus on achieving something.

The problem of confidence in one's abilities plays a vital role (Amini & Samani, 2021) and even becomes one of the keys to student achievement. Self-efficacy helps strengthen learning activities in improving students' competence in the academic field (Ulfah *et al*., 2020). Students with high self-efficacy will generally be easier to accept and understand the learning delivered by the teacher.

Self-efficacy also makes it easier for students and feels able to work on the problems they face, even complex lessons (Sriwiyanti *et al.,* 2021). On the other hand, students with weak self-efficacy appear to lack self-confidence, doubt their academic abilities, do not try to achieve high scores, avoid difficult tasks, and have less than optimal efforts (Nisa *et al*., 2021; Soraya *et al*., 2018).). This is in accordance with the opinion that students with weak self-efficacy look inferior to smart achievers who need more confidence in their ability to achieve achievements (Gazo *et al.,* 2020).

This problem follows Midiana *et al*. (2022), who state that students easily misunderstand the salt hydrolysis material because it is an abstract and complex chemical material. The difficulty of salt hydrolysis material (Sugianingsih *et al*., 2022) makes educators have to find a way of learning (Andina *et al*., 2017; Priyasmika & Sholichah, 2022) that can increase understanding (Salmar Pepteti & Latisma DJ, 2022) as well as self-awareness student efficacy.

Based on the problems above, it is necessary to have learning that can increase

students' self-efficacy so that the classroom atmosphere takes place in two directions. So this research was carried out by implementing the SCCrT model to increase students' self-efficacy in salt hydrolysis material.

The SCCrT model is developed from the SCT model (Rusmansyah *et al*., 2019), which the SCT model has been widely used for research with self-efficacy variables. The SCCrT model consists of 5 learning syntaxes, namely: (1) student orientation; (2) scientific activities; (3) presentation of the results of scientific activities; (4) completion of critical thinking and creative thinking tasks; and (5) evaluation and reflection (Rusmansyah *et al*., 2018). To determine whether the SCCrT model is very good at increasing students' self-efficacy, the SCCrT model is compared with the DI model.

The DI model itself consists of 5 learning syntaxes, namely: (1) conveying learning objectives (Yaghmour & Obaidat, 2022); (2) demonstrating knowledge and skills (Wilujeng & Kusnowanto, 2019); (3) guiding training; (4) checking to understand and providing feedback (Maarif, 2020); and (5) implementation (Alqadri, 2018). The purpose of using these two models is to determine the difference between classes using the SCCrT model and the DI model.

METHODS

Participants

The population of this study was 69 people class XI MIPA students consisting of 2 classes. The variables used in this study consist of dependent variables and independent variables. The dependent variable is students' self-efficacy, and the independent variable is the SCCrT and DI models.

Research Design and Procedures

This research is a research experimental type Nonequivalent Control Group Design experimental that two classes are not selected randomly because, indeed, before determining which class was chosen, first observations by conducting interviews with teachers in schools. This study was conducted at SMA Negeri 10 Banjarmasin conducted in March-May 2022. The procedures/stages in this study were specifically divided into 3 stages as follows: 1. Preparation stage, namely a survey to SMAN 10 Banjarmasin, interviews with teachers, preparing research proposals, making research instruments, conducting validity and reliability, revising instruments, and research permits; 2. Implementation stage, namely distributing self-efficacy questionnaires, applying the SCCrT model and the DI model, and distributing self-efficacy questionnaires to the applied models; 3. The final stage analyzing the data and compiling a research report.

Research Instruments

The instrument in this study used non-test instruments in the form of questionnaires (Badrun *et al.,* 2022) which were distributed before and after the learning was carried out. The questionnaire was first tested for validity using Aiken's V validity assessment with an average validity for the questionnaire before learning of 0.9 in the valid category. The questionnaire after learning was applied at 0.93 in the valid category. The reliability value of the questionnaire before learning was 0.72, and after learning, with an average reliability of 0.75, which stated that the questionnaire was reliable and feasible to use in research. After being given treatment, a questionnaire was made by applying the model used in each class. Making a self-efficacy questionnaire was adapted from research by Uzuntiryaki & Aydin, 2009; Hanifah & Agustini, 2012. The questionnaire consists of 15 statement items containing positive and negative statements consisting of 4 aspects, more details as in Table 1 below.

Table 1. Aspect self-efficacy according to Hanifah & Agustini (2012)

No.	Aspect	Statement item	
		Positive	Negative
1	Confidence in facing uncertain situations	2 and 9	10 and 12
2	Confidence in moving motivation	5; 7 and 14	6
3	Confidence in achieving a predetermined target	3 and 15	-
4	Confidence to overcome the problems that arise	8 and 11	1; 4 and 13

The form of statements from these aspects is in the form of a questionnaire with answer choices that are given a score of strongly disagree (STS) = 1, disagree (TS) = 2, undecided (RR) = 3, agree (S) = 4, and strongly agree (SS) = 5 for positive statements, the opposite score for negative statements is the score strongly disagree (STS) = 5, disagree (TS) = 4, undecided (RR) = 3, agree (S) = 2, and strongly agree (SS) = 1. Positive statements contain sentences of motivation and optimism (Agbaria & Mokh, 2022), while negative statements contain pessimism and uncertainty about something.

Data analysis

Data analysis is carried out in two ways: descriptive quantitative and inferential quantitative. Quantitative descriptive analysis is carried out to determine students' self-efficacy with the value category based on Table 2.

Table 2. Category of self-efficacy level

Percentage of self-efficacy	Category
81 – 100	Very good
61 – 80	Good
41 – 60	Pretty good
21 – 40	Low
0,0 – 20	Not good

After the category of values based on the category above, the value is analyzed quantitatively inferentially by using SPSS software to test the hypothesis, whether there is a difference between the experimental class and the control class after being treated with the Mann-Whitney test.

■ RESULTS AND DISCUSSION

The data analysis results obtained after conducting research at SMAN 10 Banjarmasin to increase students' self-efficacy in studying salt hydrolysis using the SCCrT model in the experimental class and the DI model in the control class are as shown in Figure 1 below.

Based on Figure 1, it can be seen from the average pretest and posttest scores for each class. The experimental class had a higher average self-efficacy score of 80.78 in the very good category, and the average control class self-efficacy score was 70.06 in the good category. The difference in value when the pretest-posttest of the experimental class is greater than the control class. The N-gain of the experimental class is in the medium category with a value of 0.56, and the control class is in the low category with a value of 0.28.

This shows the self-efficacy of students at the pretest for both classes. There is a difference in the variance of self-efficacy between the

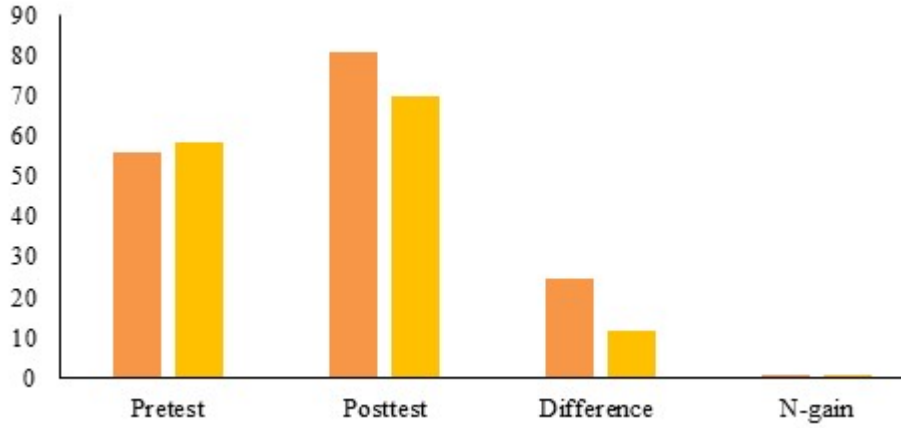

Figure 1. Pretest posttest results

experimental class and control classes. The average pretest score for students in the experimental class was 56.08%, and in the control class was 58.48%. All students are categorized as having fairly good self-efficacy. Hence, students in the two classes have the same skills because they are at the same category interval for the fairly good category. The average value of students' self-efficacy at the time of the posttest for the experimental class was higher than for the control class. The average self-efficacy score of students at the posttest for the experimental class was 80.78%, while for the control class was 70.06%.

Based on the results of the pretest normality test in the experimental class, a Sig value of 0.200 was obtained with a price of á = 0.05 so that it can be seen that Sig > á (0.200 > 0.05). This means the distribution of student self-efficacy pretest data in the experimental class is normally distributed. Whereas in the control class, a Sig value of 0.029 was obtained with a price of á = 0.05 so that it can be seen that Sig < á (0.029 < 0.05). This means that the pretest self-efficacy data of students in the control class is not normally distributed.

The results of the posttest normality test in the experimental class obtained a Sig value of 0.016 with a price of á = 0.05 so that it can be seen that Sig <á (0.016 <0.05). This means that the posttest self-efficacy data distribution of students in the experimental class is not normally distributed. In contrast, in the control class, a Sig value of 0.200 is obtained with a price of á = 0.05 so that it can be seen that Sig > á (0.200 > 0.05). Based on this, the distribution of posttest self-efficacy data of students in the control class is normally distributed.

Based on the results of the student self-efficacy pretest data homogeneity test, it can be seen that 0.05 > 0.000 proves á > Sig; this means that the experimental and control classes have unequal initial skills. In addition, based on the posttest self-efficacy homogeneity test results obtained 0.05 < 0.573, which proves á < Sig, which means that the price variance in each group is homogeneous.

The results of the inferential analysis test using the Mann-Whitney test show that the sig posttest self-efficacy of students with a sig value of 0.000 with á = 0.05 where Sig <á (0.000 > 0.05) means that H0 is rejected so that it is said that there is a difference between the average self-efficacy scores of students in the experimental class and the control class after learning that applies the SCCrT learning model in the

experimental class and the direct instruction model in the control class in increasing student self-efficacy. The self-efficacy category after learning is in the very good category for the experimental class and the good category for the control class.

The difference in the achievement of these results is due to the application of the SCCrT learning model because the syntax of scientific activity (identifying problems) is related to aspects of self-efficacy, namely confidence in skills in dealing with uncertain situations. The syntax of scientific activity (collecting data) is related to aspects of self-efficacy, namely belief in the skills of driving motivation. The syntax of scientific activity (data processing) is related to self-efficacy aspects of belief in problem solving skills that arise. The syntax of scientific activity (prove) is related to aspects of self-efficacy, namely the belief in achieving predetermined targets.

Students become more active in discussing and solving problems, especially in the experimental class, because SCCrT learning emphasizes students being active in discovering their concepts. The SCCrT model involves a lot of students in the process of understanding concepts (Pradhan *et al.,* 2020) and applying them in experimental activities to prove the truth of the concepts learned so that they can generate self-confidence in students. Self-efficacy can develop better in the learning process.

Febriana & Putri (2020) stated that students with high self-efficacy are more likely to exert effort and can last longer in difficult tasks than students with low self-efficacy. Self-efficacy is very important for students because this underlies the emergence of curiosity in learning. This is because students with good self-efficacy are self-confident in learning and try to think to find a learning concept. This is to research conducted by Sariningsih & Purwasih (2017) that someone with high self-efficacy will find it easier to do difficult tasks better as something that must be mastered, not avoided.

The self-efficacy level of students regarding salt hydrolysis material can be seen from the graph of the average percentage results for each aspect during the pretest and posttest for the experimental class and control class presented in Figure 2 and Figure 3.

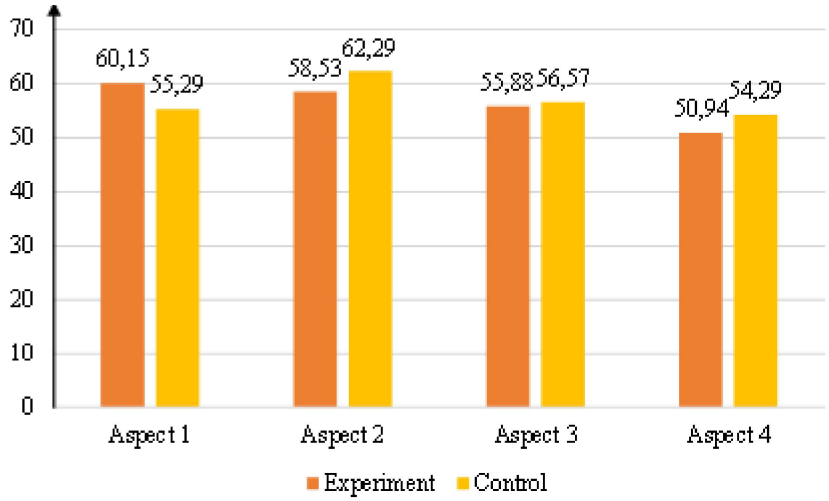

Figure 2. Pretest each aspect of self-efficacy

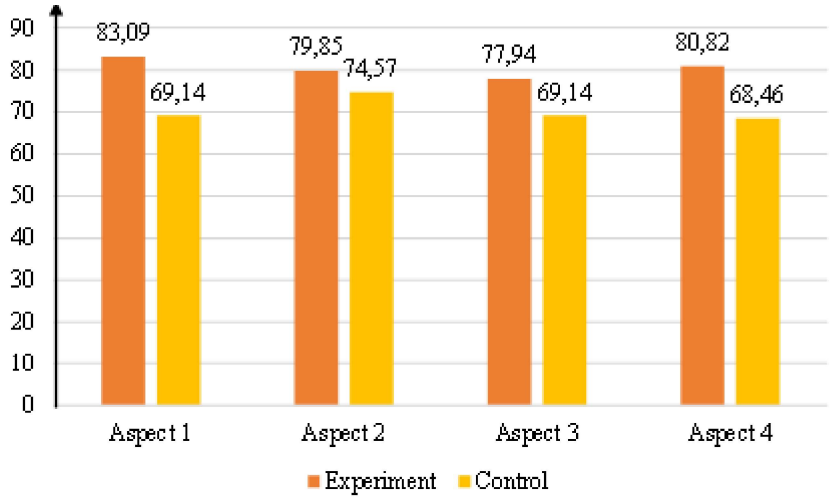

Figure 3. Posttest each aspect of self-efficacy

The level of achievement of each aspect of self-efficacy in the experimental and control class is different in Figure 2 and Figure 3. For more details, the following will discuss the details of each aspect.

Aspect 1

The first aspect of self-efficacy is the belief in skills in uncertain situations. The statement in this first aspect consists of 4 statements: two positive statements in numbers 2 and 9 and 2 negative statements in numbers 10 and 12. The first statement used to measure aspect 1 of self-efficacy in this study is statement number 2, which describes the confidence students have to understand the learning material that is considered difficult. Students with low self-efficacy tend to be pessimistic in dealing with stressful situations, in this case, facing learning materials that are difficult to understand.

Statement number 9 describes students' attitudes when they find interesting chemistry questions, especially questions that require a good understanding of mathematical concepts and skills. There are two possibilities in this case; students with high self-efficacy will tend to feel challenged and uneasy if they cannot solve the problem. On the other hand, students with low self-efficacy will feel normal in a similar situation.

Statement number 10 describes how the resilience of students in dealing with learning materials. Students with high self-efficsacy will exert maximum effort in dealing with the educator's tasks, and these students will not give up easily. Conversely, low self-efficacy students will tend to give up more quickly in dealing with these situations.

The last statement used to measure self-efficacy aspect 1 in this study is statement number 12. Statement 12 describes how students will get part of a difficult task in group work. Students with low self-efficacy tend to object and refuse to do it, while students with high self-efficacy will try to do it first.

Figure 3 shows that the self-efficacy value in aspect 1 of the experimental class students is better than the control class, namely 83.09% for the experimental class and 69.14% for the control class. The difference in the average value of the two classes is 13.95%; this shows that the two classes already have confidence in this aspect.

Self-efficacy aspect 1 of students in the experimental and control classes is in a good category. This is because, in every learning,

students face a problem with several stages in the LKPD. In the LKPD, students must be more active in asking questions and expressing opinions to raise their confidence to solve problems. Especially for the experimental class that uses the SCCrT model in the syntax of scientific activities, students are required to work together and discuss the syntax of completing critical thinking tasks, and creative thinking can train self-confidence in working on questions so that self-efficacy in the experimental class is better than the control class. This is in accordance with the research of Ulfah *et al*. (2020), which states that the learning model is SCT, one of the learning models that can increase the self-efficacy of the experimental class by 84.09% and the control class by 74.00%.

Aspect 2

The second aspect is the aspect of confidence in skills, mobilizing motivation and cognitive skills, and performing actions needed to achieve a result. Statements on this aspect consist of 3 positive statements and one negative statement, positive statements on numbers 5, 7, and 14, while negative statements on numbers 6. For more details, the following will discuss the details of each statement.

The first statement used to measure self-efficacy aspect 2 in this study is statement number 5, which describes how students believe in their skills in completing learning materials. Students with high self-efficacy tend to have self-confidence that they will be able to solve more problems than those they cannot solve. Conversely, students with low self-efficacy tend to feel unsure they can solve these questions. In this case, students must be sure of their cognitive skills so that it affects the effort to be made (Loeb *et al.,* 2016).

Statement number 7 describes how students respond to the effect of giving learning material assignments by educators. Students with high self-efficacy will use these tasks as motivation and boosters to be more active in learning. On the other hand, students with low self-efficacy tend to behave otherwise, feeling burdened by the educator's tasks.

Statement number 14 describes how students perceive learning materials as easy or difficult. This is important because self-perception of something will affect a person's behavior towards something. This follows Sudwiarrum and Puspitasari (2021), who state that compared to someone with doubts about their skills, someone with high self-efficacy in learning or doing tasks will participate further, work harder, last longer when encountering difficulties and will achieve success at a higher level of achievement.

The last statement used to measure the self-efficacy of aspect 2 in this study is statement number 6. Statement number 6 describes how confident students feel when they come to the front of the class to work on questions. Students with low self-efficacy tend to object and refuse to do this part of the task, while students with high self-efficacy will try to do it first. Another factor that might influence this situation is the innate nature of shy students.

Figure 3 shows that the self-efficacy of the experimental class students is 79.85% for the experimental class and 74.57% for the control class. The difference in the average value of the two classes is 5.28%; this shows that the two classes already have confidence in this aspect 2. The experimental class is better than the control class.

The self-efficacy aspect of 2 students in the experimental and control classes is in a good category. In the learning process, students do practicum to collect data on LKPD so that students' self-confidence in moving motivation and taking action to solve problems becomes good. This shows that both classes already have good self-efficacy in solving the questions. Especially

for the experimental class that uses the SCCrT model in the syntax of scientific activities, students are required to work together and discuss the syntax of completing critical thinking tasks, which can train self-confidence in working on questions so that the self-efficacy in the experimental class is better than the control class. This follows the research of Ulfah *et al*. (2020), which states that the learning model is SCT, one of the learning models that can increase students' self-efficacy with the experimental class self-efficacy of 84.09% and the control class of 74.00%.

Aspect 3

The third aspect is the aspect of confidence in achieving the predetermined target. Statements on this aspect consist of 2 positive statements in numbers 3 and 15. The first statement used to measure the self-efficacy of aspect 3 in this study is statement number 3, which describes how students believe that they will get satisfactory test scores in the class. Students with high self-efficacy will certainly be confident that they will get satisfactory results because they have tried their best during the learning process (Dan *et al.,* 2022). On the other hand, students with low self-efficacy will have low confidence that they will get good results.

Statement number 15 describes how students believe in the answers that come from their efforts during the test. Students who have low self-efficacy will tend to feel unsure of the answers they give. On the other hand, students with high self-efficacy will believe in their answers more than the results of a cheat sheet. Confidence in his answer because he feels proud of his confidence in understanding difficult issues and will not easily waver in his confidence.

Figure 3 shows that the self-efficacy of the three aspects of the students at the time of the posttest is 77.94% for the experimental class and 69.14% for the control class. The difference in the average value of the two classes is 8.8%; this shows that the two classes already have confidence in these three aspects. Based on the percentage value in aspect 3, it shows that both the experimental and control classes have confidence in achieving a better target. This follows Sariningsih & Purwasih (2017), who states that self-confidence will strengthen the motivation to achieve success because the higher the confidence in one's skills, the stronger the enthusiasm to complete the work.

Aspect 4

The fourth aspect is the aspect of confidence in the skills to overcome problems that arise. Statements in this aspect consist of 5 statements, namely two positive statements at numbers 8 and 11 and 3 negative statements at numbers 1, 4, and 13. The first statement used to measure self-efficacy aspect 4 in this study is statement number 8, describing how you feel students when they can solve problems in more difficult learning. Students with high self-efficacy will feel proud when they succeed in solving more difficult questions.

Statement number 11 describes how students understand the learning material being taught. Students with high self-efficacy tend to find understanding each material being taught easier. Statement number 1 describes how students believe in completing tasks in learning. Students with low self-efficacy tend to feel unsure they can complete the task.

Statement number 4 describes how students deal with and overcome problems that arise when students are given group assignments. Students with low self-efficacy tend to have less initiative, so in completing these tasks, they will leave it to other friends. On the other hand, students with high self-efficacy will first try to overcome the problems that arise as best as possible.

The last statement used to measure self-efficacy aspect 4 in this study is statement number 13, which describes how students behave when

they encounter difficult tasks. Students with low self-efficacy tend to think about stopping working on the problem, while students with high self-efficacy will not behave that way. This proves how important it is for someone to have confidence in skills in overcoming problems that arise, in this case, in the learning process at home and at school.

Figure 3 shows that the self-efficacy aspects of the experimental class students are better than the control class; it can be seen from the percentage of students' average self-efficacy scores at the posttest, which is 80.82% for the experimental class and 68.46% for the control class with a difference in the percentage of self-efficacy values of 12.36%. These differences indicate that the experimental class has better confidence in achieving the target than the control class. This is because experimental class students applying the SCCrT model play an active role in expressing opinions (Sokmen, 2019), discussing with their group friends, and asking questions to solve problems so that students have better confidence in overcoming these problems.

Students' self-efficacy in the experimental class is also better due to the average value of critical thinking skills assessment in the experimental class being better than in the control class. This follows the research of Rusmansyah *et al*. (2019) state that the SCT learning model is one of the learning models that can increase the self-efficacy of prospective chemistry teacher students with an N-gain average of 0.78 in the high category.

Based on the discussion above, the SCCrT model applied to salt hydrolysis material can increase self-efficacy in the learning process. This can be seen from the results of the students' self-efficacy at the posttest for the experimental and control classes. In addition, this can also be illustrated by the average self-efficacy results of students in the learning process, where the average self-efficacy results in the experimental class are 80.78% better than the average self-efficacy results in the experimental class. Control that is equal to 70.06%. The experimental class has an average self-efficacy result in the very good category, while the control class is in a good category with a difference of 10.72% for the posttest.

Salt hydrolysis has conceptual and algorithmic characteristics, requiring a good understanding of concepts and mathematical skills. The results of the study, according to Salmar and Latisma (Salmar Pepteti & Latisma DJ, 2022), that salt hydrolysis is a chemistry subject matter, one of the concepts that are relatively difficult and confusing for students. Understanding the material well, students must have high self-efficacy in chemistry subjects. Students with strong confidence in themselves will try harder to achieve learning goals. Students with high self-efficacy tend never to give up and try their best to understand learning, as evidenced by their active learning in class (Wahyuni & Juwida, 2020).

Students who have high self-efficacy, namely by believing that they can do something according to the demands of the situation and with the hope that the results will be good, then someone will work hard and persist in doing the task until it is completed. This is supported by the fact that self-efficacy (Febriana & Putri, 2020) is a person's belief in skills to learn or display behavior at a certain stage.

Rusmansyah *et al*. (2019) state that increasing self-efficacy is inseparable from the design of each phase of the SCT model, which always trains four aspects of self-efficacy in learning activities so that students have increased confidence in completing the tasks given during the learning process.

■ CONCLUSIONS

Based on the research that has been done, it can be concluded that there are differences in

the self-efficacy of students treated with the SCCrT model and the DI model, with a mean significance of 0.00. The students in the experimental class who applied the SCCrT model were in the very good self-efficacy category with an average of 80.74, while the control class applied to the DI model was in the good self-efficacy category with an average of 70.06. This shows that the SCCrT model increases students' self-efficacy in learning chemistry on salt hydrolysis.

Suggestions for further research are to deepen other learning models that can be compared with the SCCrT model and to test other dependent variables to increase studies on the effectiveness of various models and topics of science learning.

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