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USING FLIPPED CLASSROOM APPROACH TO PROMOTE CRITICAL THINKING SKILLS ON REACTION RATE TOPIC

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Abstract: The research aims to determine students' critical thinking skills through the implementation of the guided inquiry laboratory learning model on the reaction rate material, including the implementation of the syntax of the guided inquiry laboratory learning model, student activities, student cognitive learning outcomes, students' critical thinking skills, and student responses. This research was carried out using a pre-experimental one-group pretest-posttest design research model at a public high school (SMA Negeri 9 Surabaya) Indonesia. The instruments used in this research were the validity sheet of the learning set, research instruments, and learning set. The data obtained were analyzed using quantitative analysis methods. Students' critical thinking skills can be trained by implementing the guided inquiry laboratory learning model. Implementing the syntax of the guided inquiry learning model in 3 meetings shows the average percentage at meetings 1, 2, and 3 with very good criteria. Relevant student activities in the learning process at meetings 1, 2, and 3 of sessions A and B are most dominant. Students' cognitive learning outcomes are classically complete. Students' critical thinking skills increased with medium and high criteria (5) Student responses to learning using a guided inquiry laboratory and practicing essential thinking skills obtained a positive response.

Keywords: *Guided Inquiry Laboratory, Guided Inquiry, Reaction Rate, Critical Thinking Skills.*

INTRODUCTION

Chemistry learning teaches chemistry, which requires understanding skills and high-level thinking skills. The chemistry lessons taught are aimed at achieving standard graduate competencies. The standard graduate competencies are defined in Permendikbud Number 20 of 2016; students may use scientific approaches to thinking and act creatively, productively, critically, independently, and collaboratively [1].

The results of a pre-research conducted with 31 respondents at SMAN 9 Surabaya, the results show that 67.7% of respondents expressed interest in learning chemistry. Meanwhile, 61.3% stated that chemistry lessons were difficult to understand because they memorized too much material. It is not in line with Permendikbud Number 20 of 2016. Skills in Permendikbud Number 20 of 2016 refers to 21st-century learning. 21st-century learning emphasizes what are known as the (4C) skills of the 21st-century. The required skills that students should master are creativity, communication, cooperation, and critical thinking [2]. Critical thinking skills are classified into six components: interpretation, analysis, explanation, inference, evaluation, and self-regulation [3].

One strategy to train these skills is to connect the theory taught in school with real-life situations that students frequently meet. The related subject is chemistry. According to PISA results, Indonesian students achieved a score of 371 in a reading category, lower than the OECD average score of 487 in a reading category, a score of 379 in the mathematics' category, and a score of 396 in the science category, lower than the OECD average score of 489 in the mathematics' category and science's category [4]. Indonesia's low achievement can be caused by students not being used to solving PISA questions in the HOTS (Higher Order Thinking Skills) category. As a result, Indonesian students' achievement has retarded that students' critical thinking skills remain in the bottom group.

According to pre-research interviews with chemistry teachers, critical thinking skills haven't been trained or implemented. Students taking a critical thinking ability test show that 7.14% can interpret; the remaining 92.86% have not been able to interpret. 0% of students can infer, 3.57% of students can analyze the rest, 96.43% have not been able to analyze, and 17.85% can explain the remaining 82.15% have not been able to explain. These results revealed that students have difficulty applying critical thinking skills to analyze everyday events. It is not in line with the 21st-century skills that every student must possess to achieve standard graduate competencies in Permendikbud Number 20 of 2016; therefore, critical thinking skills need to be trained.

Permendikbud Number 22 of 2016 efforts to train thinking skills can be made by implementing supportive learning models such as discovery-based learning [5]. One type of discovery-based learning is Guided Inquiry Laboratory. According to Wenning, Guided Inquiry Laboratory is a self-contained activity that may gradually enable children to become more self-sufficient in designing experiments and data collection [6]. One of the Guided Inquiry

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Laboratory model's strengths is enabling students to construct and develop self-concepts, developing their grasp of ideas and concepts, and increasing their skill to integrate knowledge in daily life [7].

Chemistry learning involves thinking process skills and reasoning. Learning chemistry requires proving a concept through experiments. Experiments produce facts where the facts are generalized to produce a concept. According to Basic Competence, the reaction rate is one of the chemical materials that requires experimental proof. Basic Competence 3.6 Explaining the reaction rate factors using collision theory. Basic Competence 4.6 Presenting the results of searching for information on organizing and storing materials to avoid uncontrollable physical and chemical changes. Basic Competence 3.7 Determining the reaction order and the reaction rate constant based on experimental data. Basic competence 4.7 Designing, conducting, concluding, and presenting results of the experiment on factors affecting the reaction rate and order in Permendikbud Number 37 of 2018 [8].

According to results of pre-research with 31 respondents, the percentage of the results at most 41.90% of students stated that they prefer to study chemistry by experiment. Experimental-based learning is relevant to the guided inquiry laboratory learning model. It trains students to become more self-sufficient in designing experiments with the basic competence of reaction rate material. So, it is necessary to implement Guided Inquiry Laboratory learning to train critical thinking skills on reaction rate material.

According to Febri, using the guided inquiry lab model effectively increases students' critical thinking skills [9]. It is also in line with Seranica's statement that the guided inquiry learning model affects students' critical thinking skills [10]. Based on the background explained, the research proposed by the researcher is the Implementation Of Guided Inquiry Laboratory Learning Model Using Flipped Classroom to Train Critical Thinking Skills On Reaction Rate Topic.

RESEARCH METHOD

The study used a pre-experimental type, a quantitative descriptive type, and a sample of 34 students in class 11th Science 2 SMAN 9 Surabaya during the odd semester of 2021/2022. One-group pretest-posttest design was applied in this study. The following describes the research design.

$$O_1 \times O_2$$

Information: O_1 : Pretest (the initial ability of critical thinking skills); X : The implementation of a guided inquiry laboratory learning model on the reaction rate material; O_2 : Posttest (the final ability of critical thinking skills).

The instruments used are the validity sheet of the learning set, research instruments, and learning set. The research instruments include learning implementation sheets, student activity sheets, cognitive learning outcomes test sheets and critical thinking skills test sheets, and student response questionnaire sheets. The learning set includes student worksheets, lesson plans, and a syllabus.

The data collection method included the observation method, the test method, and the questionnaire method. The observation method is utilized to implement the learning model and student activities. The test method is utilized on critical thinking skills outcomes and learning outcomes. The questionnaire method is utilized on student response questionnaires.

The guided inquiry laboratory model was implemented through the observation sheet throughout the learning process, following the syntax of the guided inquiry learning model. The learning was carried out divided into two sessions, each session, there were 17 students. Two observers observed the learning process and scored the implementation of guided inquiry learning from phase 1 until phase 6. The scores given are presented in table 1 on the Likert scale.

Table 1. Likert Scale

Score	Criteria
4	Very Good
3	Good
2	Enough
1	Less
0	Not Doing

[11]

The obtained values were analyzed using the formula:

$$\%\ \text{Implementation} = \frac{\sum \text{score}}{\text{maximum score}} \times 100\%$$

The calculation results of the percentage of eligibility are then interpreted in the following table.

Table 2. Implementation Criteria

Percentage (%)	Criteria
0-20	Very Less
21-40	Less
41-60	Enough
61-80	Good
81-100	Very Good

[11]

The implementation of the learning model is carried out well if a percentage of the implementation criteria is 61%.

Student activities observation sheets were used to find out the activities of students.

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Observation of student activity was observed by two observers, where one observer observed 4 groups, each group containing 4-5 people with a frequency of observation every 3 minutes. The learning was carried out divided into 2 sessions, In each session, there were 17 students, so in each session, one observer observed 2 groups. The percentage of this observation data is obtained by using the following formula.

$$\%\text{Student Activities} = \frac{\sum \text{student activities that arise}}{\sum \text{overall activities}} \times 100\%$$

Students' learning activities support practicing critical thinking skills using the guided inquiry laboratory learning model if the relevant percentage of activities carried out by students is higher than irrelevant activities.

Cognitive learning outcomes of knowledge obtained from multiple-choice tests formulas calculate 12 questions.

$$\text{Cognitive learning results} = \frac{\sum \text{earned score}}{\sum \text{maximum score}} \times 100\%$$

The analysis of each student's learning outcomes is considered complete if the learning outcomes score ≥ 75 and incomplete if the learning outcomes score < 75, the percentage of classical completeness is determined using the formula.

$$\%\text{ Classical} = \frac{\sum \text{Students who reach KKM}}{\sum \text{Students taking the test}} \times 100\%$$

Analysis of class completeness is said to be "classically complete" if the minimum classical completeness in a class is 80% of the number of students in the class.

Critical thinking skills were analyzed using Paired sample t-test and N-Gain on SPSS. This type of t-test has the hypothesis H0 and the hypothesis H1. No difference in learning outcomes was found between the pre-and post-tests, according to hypothesis H0. There is a difference in learning outcomes between pre-and post-test, according to H1.

The SPSS output data significance value determines the paired sample t-test decision criteria. If the Sig. (2-tailed) < 0.05, H1 is accepted, while H0 is rejected. If Sig. (2-tailed) > 0.05, H0 is accepted, whereas H1 is rejected [12].

As long as the paired sample T-test results show that students' critical thinking skills learning outcomes have Sig. (2-tailed) < 0.05, the Guided Inquiry Laboratory model has an average difference between pre-and post-test learning outcomes. If there is a difference average between the pretest and postest learning outcomes. Calculating <g> value to analyze data.

$$\langle g \rangle = \frac{\text{score posttest} - \text{score pretest}}{\text{score maksimal} - \text{score pretest}}$$

[13]

<g> values are interpreted into categories in the following table.

Table 3. N-Gain Criteria

Score	Criteria
$\langle g \rangle \geq 0.7$	High
$0.7 > \langle g \rangle \geq 0.3$	Medium
$\langle g \rangle \leq 0.3$	Low

[13]

The Guided Inquiry Laboratory model is considered successful if the learning outcomes of students' critical thinking skills are measured with N-Gain in the medium and high criteria.

Students' responses to the guided inquiry laboratory carry out using a questionnaire method. Student responses were collected using a questionnaire response sheet in which there were ten positive questions and two negative questions. Each answer to positive and negative questions is given a value, as shown in Table 4.

Table 4. Guttman Scale Score

Answer	The score for a positive statement	The score for a negative statement
Yes	1	0
No	0	1

[11]

To analyze the student response data quantitatively and descriptively, calculate the percentage and then describe the percentage. Each category is calculated with the following percentage:

$$\%\text{ Answer} = \frac{\sum \text{Respondents answered}}{\sum \text{Respondent}} \times 100\%$$

The percentage results are then interpreted into the criteria's scores in the following table.

Table 5. Student Response Criteria

Percentage (%)	Criteria
0 - 20	Very less
21 - 40	Less
41 – 60	Enough
61 – 80	Good
81 - 100	Very Good

[11]

Based on the interpretation of student responses, positive results were obtained if the percentage obtained was 61%.

RESULT AND DISCUSSION

Implementation Learning Models

Learning in class 11 Science 2 is divided into two sessions, namely session A and session B. Session A and Session B consist of the same number of students. This activity was held because

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in the pandemic era, the number of students attending the offline class is only 50% of the whole number of students in class. Each session is held three times so that students are more active in discovering the concept of factors that affect the rate of reaction. The results of the Implementation of the Guided Inquiry Laboratory Model in 3 meetings in each session. Session A is shown in figure 1. Session B is presented in figure 2.

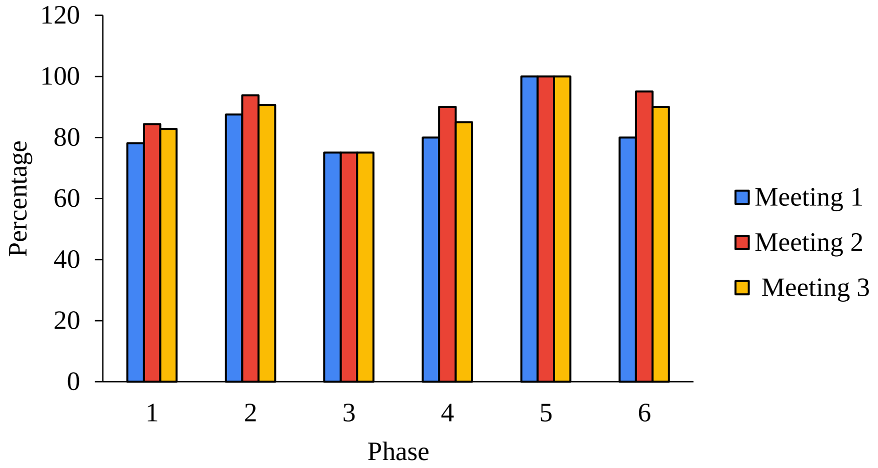

Figure 1. Percentage of Implementation of Guided Inquiry Laboratory Model Graph in Session A

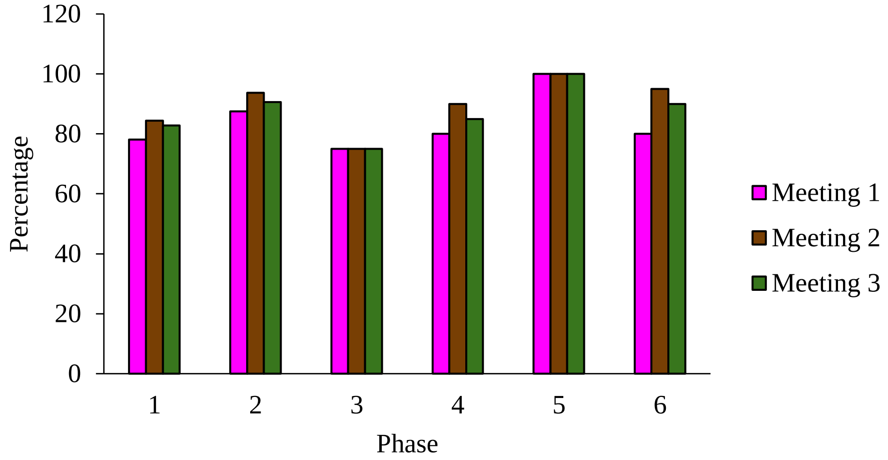

Figure 2. Percentage of Implementation of Guided Inquiry Laboratory Model Graph in Session B

Phase 1 is to focus students' attention and explain the inquiry process [14]. The teacher prepares students to learn and explains the learning process starting with giving apperception, providing motivation, and conveying learning objectives to students. Apperception aims to remind students of the knowledge obtained by students and is continued by presenting examples from daily events related to the subject as motivation. Learning objectives are delivered with the aim that students know what students will achieve after the learning process. The average results of Phase 1 implementation in each session at the first, second, and third meetings were 78.12%, 84.37%, and 82.81%.

Phase 2 presents the inquiry problem [14]. The teacher presents problem situations or events in the form of phenomena that can raise questions. The phenomena presented in the student worksheet are related to the factors that affect the reaction rate. The teacher divides students in each session into eight groups where each group consisting of 2-3 students so that students can have discussions about the phenomenon. The average results of Phase 2 implementation in each session at the first, second, and third meetings were 87.5%, 93.75 %, and 90.62 %.

Phase 3 is asking students to formulate hypotheses to explain the problem [14]. The teacher urges students to ask questions about questionable issues and formulate hypotheses to explain the events. The teacher accommodates all student opinions to formulate problems in the phenomenon and agree on the right problem formulation. Based on the mutually agreed-upon problem formulation, then the teacher guides

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students to formulate the correct hypothesis after students read from various literature. Students' critical thinking skills of interpretation and inference have been trained during this phase. The average results of Phase 3 implementation in each session at the first, second, and third meetings were 75%; 75%; 75%.

Phase 4 is to encourage students to collect data to test hypotheses [14]. The teacher asks students what their plans are to get data to test their hypotheses. In this case, experiments in the classroom can be carried out. Before the experiment was conducted, the teacher asked students to determine the tools, materials, and procedures based on the phenomenon. The guided inquiry laboratory learning model emphasizes that students can actively construct knowledge through scientific investigation. Students are given an ill-structured problem. The problem will lead students to determine the experimental design to be carried out, which will lead to the ultimate goal of the desired learning process [15]. Then the teacher held a pre-lab activity that was in line with the special characteristics of the guided inquiry laboratory. Pre-lab aims to activate students' prior knowledge, help students understand learning objectives, and help students understand the process of conducting investigations. These are the special characteristics of guided inquiry laboratories [6]. The teacher guides the students in conducting experiments. The teacher also guides students to write down the observations in the observation table and make graphs. This activity trains the critical thinking skills of the interpretation component. The teacher guides students to analyze. This activity trains the critical thinking skills of the analytical component. The average results of Phase 4 implementation in each session at the first, second, and third meetings were 80%, 90%, and 85%.

Phase 5 is to formulate explanations and conclusions [14]. The teacher closes the investigation by asking students to formulate conclusions and generalizations. The teacher guides students in remembering and collecting information gathered from the start to conclude by paying attention to hypotheses and answering problem formulations. This stage trains the critical thinking skills of the inference component. The average results of Phase 5 implementation in each session at the first, second, and third meetings were 100%.

Phase 6 reflects on the problems and thought processes used during the investigation [14]. The teacher makes students think about their thinking process and reflect on the inquiry process. The teacher guides the discussion process between students who present their findings with students who will later ask questions. Besides that, the teacher also straightens out if there is a wrong explanation from the students. Activities reflecting problems are also applied to application questions and knowledge application in real situations. One of the Guided Inquiry Laboratory model's strengths is enabling students to construct and develop self-concepts, developing their grasp of ideas and concepts, and increasing their skill to integrate knowledge in daily life [7]. Applying knowledge in real situations requires critical thinking skills, so in this activity, critical thinking skills are trained in the explanation component. The average results of Phase 6 implementation in each session at the first, second, and third meetings are 80%; 95%; 90 %.

Guided inquiry laboratory model learning has been carried out using Arrends' syntax in 3 meetings showing the average percentage at meetings 1, 2, and 3 of 84.43%; 89.68%; 87.23% are very good criteria. Students can find the concept of the influence of concentration factors, surface area, temperature, and catalysts or new information through the information that has been given to the phenomena around them by applying critical thinking skills so that learning becomes meaningful. It is in line with Ausubel's theory. Meaningful learning means that the material being studied is potentially meaningful for students. The acquisition of a new concept becomes meaningful if the material being studied relates to things that students already know [16]. Learning activities can be carried out well, as evidenced by the criteria for implementing the inquiry learning model in 2 meetings [17]. The implementation of learning using Guided Inquiry obtained very good criteria on the reaction rate material [18].

Student Activities

The observed learning activities of students included classroom activities and group activities. The number of observers was two people. One observer observed four groups in each session with an observation frequency of once every 3 minutes. Observers tick on the observation sheet of the most dominant activity that appears in the 3-minute interval. The observations obtained in session A are shown in Table 6, and session B is shown in Table 7.

Table 6. Percentage of Student Activity in session A

Meeting	Relevant	Irrelevant
First	94.87%	5.12%
Second	95.76%	4.23%
Third	96.80%	3.20%

Table 7. Percentage of Student Activity in session B

Meeting	Relevant	Irrelevant
First	90.84%	9.17%
Second	92.37%	7.62%
Third	93.00%	6.99%

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Table 6 is the result of the activities of 17 students in session A and Table 7 is the result of the activities of 17 students in session B. The percentage of relevant activities of students in session A is higher than in session B. In comparison, students' percentage of irrelevant activities in session A is lower than in session B. The difference in the percentage of student activity in session A and session B is due to the different characteristics of students. It shows that session A students do more activities related to learning and do fewer activities than students in session B.

The percentage of relevant activities from student activities consists of class activities (listening to the teacher's explanation, answering teacher questions, expressing opinions, conveying experimental results, reflecting on problem situations and thinking processes) and group activities (reading phenomena, conducting group discussions, identifying problems, determining experimental variables, formulating problems, formulating hypotheses, designing experimental steps, collecting data, experimental recording results, analyzing experimental data, and concluding) is greater than irrelevant activities (playing cellphone, disturbing, busy, and perform other activities that can interfere with teaching and learning activities). This research suggests that students are active in the learning process is coherent with Bruner's learning theory, which states that students will be productive, participate actively, and have activities in learning in class when facing new material [19]. Bruner also stated that if students participate actively, they will get various experiences and do various experiments that will help them discover the concepts for themselves [20]. Throughout the guided inquiry learning process, student activities show a high percentage of related activities: listening, giving attention to the teacher's explanation, conducting experiments/observations, and asking questions or opinions [21]. Meanwhile, irrelevant activities have a low percentage [21]. Increasing students' understanding of concepts cannot be separated from activities, observations, and experiments. Students discover their new knowledge using the teacher's guidance [21]. Throughout the guided inquiry model's learning, relevant student activities obtained a more significant percentage than irrelevant student activities [22]. Guided inquiry learning activities are carried out through real experimental activities. Virtual experiments can develop student activities such as formulating problems, making hypotheses, designing and conducting experiments, collecting data, analyzing data, drawing conclusions, and communicating results in writing [23].

Cognitive Learning Outcomes

Students' cognitive post-test results can be seen in Table 8. The post-test questions are multiple-choice as many as 12 questions regarding concentration factors, surface area factors, temperature factors, and catalyst factors that affect reaction rates. This post-test score is used to determine students' conceptual understanding after being treated using the guided inquiry laboratory model. Students' learning outcome is completed when they get a score ≥ 75. Based on Table 8, 4 students are included in the incomplete category because the value obtained is less than the minimum criterion of 75.

Based on Table 8, 4 students, including student 16, student 23, student 24, and student 33, are included in the incomplete category because the score obtained is less than the minimum criterion of 75. One of the factors for the incompleteness of the four students' cognitive post-test results is that their skills in the analysis and inference components received a less than satisfactory score, namely 8.33; 65.62; 0; 11.45. Components of analysis, namely identifying the intended and actual inferential link between concepts, statements, questions, descriptions, or other forms meant to express opinions, which are proven by submitting opinions and Inferences, namely identifying and retaining the components needed to draw reasonable conclusions [3]. Components of analysis and inference affect students' ability to relate phenomena to concepts obtained and draw conclusions to obtain concepts. Students will be asked to answer questions based on the concepts of factors that affect the rate of reaction they already have. Based on the incompleteness results, students can relate what they have learned in phenomena when practicing critical thinking skills and are less able to conclude to obtain concepts from factors that affect reaction rates with the questions given in the cognitive postest. Another factor is the incompleteness of the cognitive post-test results. The teacher does not provide training to students because the teacher only focuses on training components of critical thinking skills so that students have difficulty answering cognitive learning outcomes tests.

The guided inquiry laboratory learning model achieved classical mastery of student learning outcomes, with an average post-test score of 75.98. 88.23 % of students achieved classical mastery, and 11.76 % achieved classical incompleteness of learning outcomes. The class is classically complete with minimum classical completeness in the class is 88.23% of the total number of students. Implementing the inquiry learning model can increase cognitive learning outcomes in reaction rate material [24]. There is an increase in the number of students who achieve better learning outcomes in classes that use the guided inquiry model instead of classes that use the conventional model [25-27].

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Table 8. Pretest and Posttest Cognitive Outcomes

Student	Pretest	C/NC	Posttest	C/NC
1	33.34	NC	75	C
2	58.34	NC	100	C
3	58.34	NC	75	C
4	58.34	NC	75	C
5	0	NC	83.34	C
6	0	NC	83.34	C
7	50	NC	75	C
8	50	NC	75	C
9	50	NC	75	C
10	50	NC	75	C
11	58.34	NC	83.34	C
12	50	NC	75	C
13	50	NC	75	C
14	50	NC	75	C
15	50	NC	83.34	C
16	25	NC	50	NC
17	50	NC	83.34	C
18	41.67	NC	83.34	C
19	50	NC	75	C
20	58.34	NC	75	C
21	33.34	NC	75	C
22	58.34	NC	75	C
23	58.34	NC	66.67	NC
24	58.34	NC	66.67	NC
25	33.34	NC	75	C
26	50	NC	83.34	C
27	25	NC	83.34	C
28	58.34	NC	75	C
29	66.67	NC	75	C
30	50	NC	75	C
31	50	NC	75	C
32	66.67	NC	83.34	C
33	33.34	NC	50	NC
34	66.67	NC	75	C

Critical Thinking Skills

Facione formulated critical thinking as having six components: interpretation, analysis, evaluation, inference, explanation, and self-regulation [3]. This study trains the critical thinking skills of interpretation, inference, analysis, and explanation. The student's initial skills are assessed before receiving critical thinking training in a pretest. After receiving critical thinking training, the student's final skills are evaluated in a post-test.

Table 9 presents the pretest and post-test results. All students' pretest scores were < 75. Students were unable to interpret, infer, analyze, or explain the material, and they are still confused and do not understand the material. The teacher trains students' critical thinking skills during teaching. After learning, all students had a post-test score of > 75, indicating that they were able to interpret, infer, analyze, and explain.

Paired sample t-tests were used to compare the pretest and post-test results. The results are shown in Figure 3, which reveals a Sig. (2-tailed) of 0.000. It was determined that there was a difference between the pre-and post-test learning outcomes for students' critical thinking skills when the results of a paired-sample t-test with a significance level of Sig. (2-tailed) < 0.05. A Sig indicated a significant difference between pre- and post-test results. (2-tailed) 0.000 < 0.05 in the post-test result.

To determine the difference between the pretest results and the postest results, 34 students took the N-Gain test, and they achieved the average and high criteria; none of the students had low criteria. So it can be concluded that there were increasing critical thinking skills. Using a guided inquiry learning model can improve students' critical thinking skills on sub matter factors that affect reaction rate [28]. Students' critical thinking skills were successfully improved by using the guided inquiry learning model in a reaction rate material [29].

Table 9. Pretest and Posttest Results of Critical Thinking Skills

Student	Pretest	Posttest	Gain Score	Criteria
1	19.53	81.25	0.77	High
2	50.78	86.71	0.73	High
3	27.34	89.84	0.86	High
4	53.90	84.37	0.66	Average
5	0	82.81	0.83	High
6	0	89.84	0.90	High
7	60.15	88.28	0.71	High
8	53.90	82.03	0.61	High
9	55.46	87.50	0.72	High
10	50	89.06	0.78	High
11	55.46	86.71	0.70	High
12	54.68	86.71	0.71	High
13	53.12	85.93	0.70	High
14	49.21	81.25	0.63	Average
15	52.34	82.03	0.62	Average
16	8.59	90.62	0.90	High
17	0	85.15	0.85	High
18	23.43	85.15	0.81	High
19	35.15	83.59	0.75	High
20	9.37	85.93	0.84	High
21	4.68	89.06	0.89	High
22	62.50	88.28	0.69	Average
23	63.28	83.59	0.55	Average
24	0.78	83.59	0.83	High
25	10.93	83.59	0.82	High
26	48.43	87.50	0.76	High
27	3.90	82.03	0.81	High
28	59.37	85.15	0.63	Average
29	14.84	88.28	0.86	High
30	42.96	82.03	0.68	Average
31	57.81	90.60	0.78	High
32	47.65	79.68	0.61	Average
33	14.06	82.81	0.80	High
34	36.71	87.50	0.80	High

Table 10. Paired Sample T-Test Results

		t	df	Sig. (2- tailed)
Pair 1	Pre-test-Post test	-13.019	33	.000

Student Responses

Response questionnaires were used to obtain data on student responses to the implementation of a guided inquiry laboratory learning to train students' critical thinking skills. There were ten positive questions and two negative questions on the questionnaire. Student responses are positive if the percentage of students who responded is 61% or higher. The statement questionnaire is presented in table 11.

The results of student responses are presented in Figure 3.

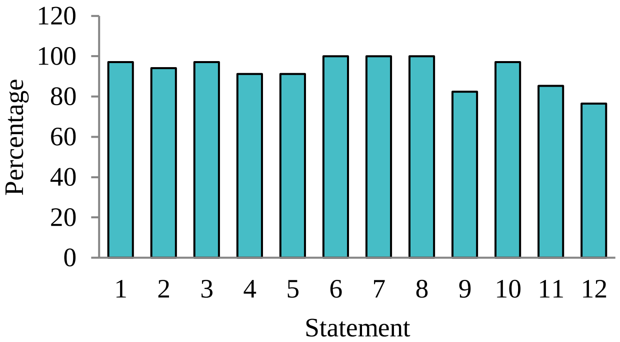

Figure 3. Graph Of Student Response Results

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Based on Figure 4, each statement has reached a percentage of ≥ 61%, which means that students give positive responses. Students feel happy and easily understand the reaction rate using Guided Inquiry Laboratory with teacher guidance and student worksheets. Students also feel more active, critical in thinking, and skilled at using laboratory equipment. Students' positive responses are more than positive responses to negative students. Students are motivated, and easier to understand science material with practicum activities. Guided inquiry learning is suitable for carrying out activities practice [30]. Students respond positively to guided inquiry learning-oriented on green chemistry because they understand the concept of buffer solution and feel more engaged in their learning [31].

Table 11. The Statement on Response Questionnaire

Number	Statement
1	Learning chemistry is fun using the Guided Inquiry Laboratory
2	I became more critical in thinking after learning using the Guided Inquiry Laboratory learning model
3	Experiments help me more easily understand the material of reaction rates.
4	I am more active in learning
5	I am more skilled at using laboratory equipment
6	Learning with practicum on the reaction rate material is more fun than learning with the lecture method
7	The teacher guides the practical activities
8	I feel helped by the teacher's guidance
9	I am more critical of the surrounding phenomena
10	Student Worksheets are systematic and help in learning
11	I have difficulty understanding the reaction rate material with the experiment
12	I am more passive in learning

CONCLUSION

Implementation of the guided inquiry laboratory learning model to practice critical thinking skills students at meeting 1, meeting 2, and meeting 3 are more than 81%, with very good criteria. Student activities support the guided inquiry laboratory learning model's implementation process. The average percentage of relevant activity in each meeting in sessions A and B is 93.94%, greater than the irrelevant activity in sessions A and B, which is 6.06%. Students' cognitive learning outcomes classically complete more than 80% of 34 students. Critical thinking ability increased, getting N Gain score ≥ 7.0 respectively with medium criteria and 0.7 > <g> ≥ 0.3 respectively with high criteria. Student gives positive responses in the implementation of Guided Inquiry Laboratory to train student critical thinking skills are shown in the results of each statement has reached a percentage ≥ 61%. Critical thinking component value analysis and inference on students who do not complete their cognitive learning outcomes get a lower average score than other components.

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