

**IMPLEMENTATION HANDS-ON AND MINDS-ON ACTIVITY APPROACH  
THROUGH GUIDED INQUIRY ON THE SUBJECT MATTERS OF THE FACTORS  
THAT AFFECT THE REACTION RATE IN THE CLASS OF XI IPA SMAN 1  
SOOKO MOJOKERTO**

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**Abstrak**

Tujuan dari penelitian ini adalah untuk mengetahui keterlaksanaan, aktivitas siswa dan ketuntasan hasil belajar siswa dengan pendekatan *hands on minds on activity* melalui *guided inquiry* pada materi pokok faktor-faktor yang mempengaruhi laju reaksi dikelas XI IPA SMAN 1 Sooko Mojokerto. Penelitian ini merupakan penelitian pre-eksperimen dengan metode “*One shot case study*” dengan jenis penelitian deskriptif kualitatif. Instrumen yang digunakan dalam penelitian ini adalah lembar pengamatan keterlaksanaan pembelajaran, lembar observasi aktivitas siswa dan tes ketuntasan hasil belajar siswa. Berdasarkan hasil penelitian, nilai keterlaksanaan pembelajaran *hands on minds on activity* melalui model pembelajaran inkuiri pada pertemuan pertama sebesar 72,21% (kriteia baik), pertemuan kedua sebesar 81,45% (kriteria sangat baik), pertemuan ketiga sebesar 90,41% (kriteria sangat baik) dengan kriteria rata-rata adalah sangat baik. Aktivitas siswa pada pembelajaran inkuiri yang paling dominan yaitu mendengarkan dengan perolehan persentase pada pertemuan pertama, kedua dan ketiga berturut-turut sebesar 31, 67%, 30 %, dan 28,89%. *Hands on activity* siswa ditunjukkan melalui kegiatan melakukan percobaan pada pertemuan pertama sebesar 11,11%, pada pertemuan kedua sebesar 12,78% serta 11,66 % pada pertemuan terakhir. Dari tes ketuntasan hasil belajar siswa, ketuntasan hasil belajar siswa secara klasikal dari 32 siswa sebesar 90,62%.

**Kata kunci:** *hands on and minds on activity, guided inquiry, laju reaksi.*

**Abstract**

*The aims of this research are to know the enforceability, the student activity, and student learning mastery by implementing hands-on minds-on activity approach through guided inquiry in factors that affect the reaction rate in class XI IPA SMAN 1 Sooko Mojokerto. This research is pre-experiment research by using the One shot case study's method and analyzed by descriptive qualitative and quantitative. The instrument that used is the learning enforceability's observation sheet, the student activity observation sheet and student learning mastery's test. According to the result of this research, the average score of learning enforceability for the first meeting is 72,21%% (good criteria), the second meeting is 81,45% (very good criteria), and the third meeting is 90.41% (very good criteria). The most dominant student activity is listening, the average of the three meeting are 31, 67%, 30%, and 28.89%. Hands on activity of students through experiment at the first meeting is 11.11%, the second meeting is 12.78% and 11.66% at the last meeting. From the student learning mastery's test, the student learning mastery is good with the percentage of the learning mastery is 90,62%.*

**Keywords:** *hands-on and minds-on activity, guided inquiry, the rate of reaction.*

## INTRODUCTION

Science is one of the main education in improving the quality of human resources because it is the foundation of the technology, while the technology itself is a wheel for the development rate of a nation. Science has several branches including Chemistry. Chemistry is a part of Science which deals with how to find out about natural phenomena systematically, so that the learning process is not just a mastery of knowledge in the form of a collection facts, concepts, or principles but also a process of discovery. Science learning process is characterized by the emergence of the scientific method that materialized through a series of scientific work, scientific values and scientific attitudes. In this case the learners must be able to develop the experience to formulate the problems, to develop and propose the hypotheses, to design the experiments, to test hypotheses through the experiments, to collect the data, to process and interpret data and to communicate the results of the experiments. By undergoing this learning process, it is expected that the students' learning outcomes can achieve the criteria of the Standard of Competence which includes attitudes, knowledge, and skills. [1]

The researchers conducted the preliminary study to thirty-two students and the chemistry teacher of eleventh graders of Science class in SMAN 1 Sooko Mojokerto. This preliminary study aimed to determine the chemistry learning in SMAN 1 Sooko Mojokerto. The data obtained from the result of the students' questionnaires showed that as many as 66.67% of the 32 students stated that chemistry is a subject that is difficult to understand. A total of 55.5% of the 32 students chosed the reaction rate as the

most elusive materials. In addition, as many as 77.78% of students stated that the commonly teaching method used during the learning of reaction rate is a lecture method. In fact, 74.07% of the students wanted to learn through the experimentation in order to understand the concepts in chemistry learning. This statement is in line with the results of the interview with the chemistry teacher of SMAN 1 Sooko Mojokerto. The teacher stated that experimentation is rarely performed because of the lack of time, so that the teachers often taught the students by the lecture method in order to finish quickly. Moreover, the value of the students' daily test on the reaction rate materials showed that there are 35% of the students who did not pass the minimum passing grade, in which the score of the minimum passing grade of Chemistry in SMAN 1 Sooko is 75. Based on the result of preliminary study, questionnaires, and interview, it is needed to put an effort to improve the learning outcomes at the reaction rate materials.

Nur explained that the constructivist theory developed by Piaget and Vygotsky believes that knowing is a process and the students themselves must actively find and transform the information obtained on his own. [2] By actively engaging in the learning process, the students will construct their background knowledge with their new knowledge, so that their knowledge will be more meaningful in the future.

Based on these complex problems, it is necessary to have the the learning model that appropriate with the reaction rate materials. One of the learning model that can construct the ability of the students is inquiry. Joyce stated that the inquiry is stimulated through a problem and the obtained knowledge, and is produced through the process of asking or

investigation. [3] The main objective of the inquiry learning is helping the students to develop critical thinking skills and construct the knowledge on their own. Inquiry is a series of learning activities that emphasizes the process of critical thinking and analytically seeking and finding their own answer to the problem in question.

The meaningful learning can be reached by obtaining the information or knowledge earnestly in accordance with the theory of information processing which stated that people dealing with the stimulation at different levels of mental processing and will only store the information that has been handled by the most earnest and profound process. [4] According to the Government Regulation No. 32 of 2013, the standards of competence in curriculum 2013 are the criteria regarding the qualification of graduates' capability which include the attitudes, knowledge, and skills. The students are expected to have a balanced knowledge, between the hands-on and minds-on. [5]

The hands-on activity in science learning is defined as any science laboratory activities that allows the students to handle or perform, manipulate and observe a scientific process. The physical activity of the students in the laboratory can be in the form of experimentation. During the experimentation, the students also perform the psychic activity (minds-on activity). [6] Minds-on an activity is an activity that focuses on the basic concept, which allows the students to develop their thinking process and encourage them to ask and seek answers that improve their knowledge and thus they can gain an understanding of the universe in which they live. [7]

Based on the descriptions above, the problems in this research can be formulated as follows: (1) how is the enforceability in learning by the implementation of hands-on and minds-on-activity approach through guided inquiry on the subject matter of reaction rate? (2) how is the students' activity on the implementation of a hands-on and minds-on-activity approach through guided inquiry on the subject matter of reaction rate? (3) how is the students' learning mastery on the implementation of hands-on and minds-on-activity approach through guided inquiry on the subject matter of reaction rate?

Based on those research problems, the objectives of this research is to know the enforceability of learning, students' activity, and students' learning mastery.

## METHOD

The type of this research is pre-experimental. The subjects of this research are the eleventh graders students of Science class in SMA Negeri 1 Sooko Mojokerto.

The design of this research is "One shot case study design". It can be described as follows [8]:

**X → O**

Notes:

- X: The treatment which is the implementation of learning process using hands-on and minds-on-activity approach through guided inquiry
- O: The result of given treatment using hands-on and minds-on-activity approach through guided inquiry

The learning devices used in this research are the syllabus, lesson plan, textbook, and worksheets. As for the

research instruments used in this study are the enforceability of inquiry learning model observation sheets through hands-on and minds-on-activity, the students' learning mastery tests (post test and pre test), the students' activity observation sheets of hands-on and minds-on activity.

The analysis technique of the enforceability of hands-on and minds-on activity through inquiry learning model, the analysis technique of the students' activity during the learning process using hands-on and minds-on activity through inquiry learning model, the analysis technique of the students' learning mastery.

The observation analysis of the inquiry learning model enforceability is interpreted using the following scores. [9]:

Table 1. Score of enforceability learning

Score	Criteria
5	Very good
4	Good
3	Good enough
2	Not good
1	Bad
0	Not done

The observation data obtained are then processed in the form of a percentage by the following formula. [9]

$$\text{Percentage} = \frac{\sum \text{student score}}{\text{max score}} \times 100\%$$

The results are interpreted in accordance with the interpretation criteria scores which are summarized in the following table. [9]

Table 2. Criteria of learning enforceability

Percentage (%)	Categori
0 - 20	Bad

Continue of Table 2. Criteria of learning enforceability

Percentage (%)	Categori
21 - 40	Not Good
41 - 60	Good Enough
61 - 80	Good
81 - 100	Very Good

The students' activity observation sheets that is dominant measured using the formula:

$$\% \text{ Activity} = \frac{\text{student activity}}{\text{total student activity in 90 minute}} \times 100$$

Whereas the value of the students' learning mastery is calculated using the formula:

$$\text{Student score} = \frac{\sum \text{true answer}}{\sum \text{total question}} \times 4$$

The score results of this research is interpreted by the criteria in Table 3.3 as follows [10]

Table 3. Score conversion in predicate

Score range	Predicate
3.67 - 4	A
3.34 - 3.66	A-
3.01 - 3.33	B+
2.67 - 3.00	B
2.34 - 2.66	B-
2.01 - 2.33	C+
1.67 - 2.00	C
1.34 - 1.66	C-
1.01 - 1.33	D+
0 - 1	D

Based on Table 3.3, the students is considered "passed" when they can achieve B score.

## RESULT AND DISCUSSION

The results of the obtained data can be seen in the figure 1. below.

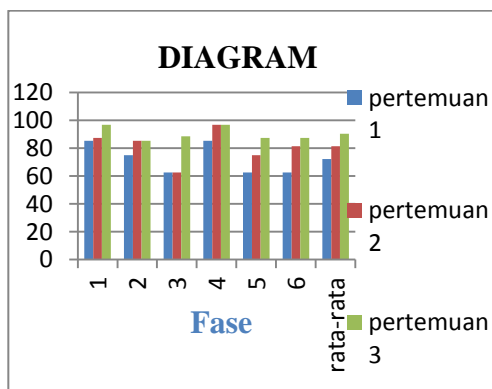


Figure 1. Learning enforceability in three meeting

The learning process of hands-on and minds-on activity through inquiry learning model consists of six phases. The first phase of a hands-on and minds-on activity through inquiry learning model is focusing the students' attention and describing the inquiry proceeding. The first phase was accomplished on "excellent" category with the percentage of 85.4% in the first meeting, 87.50% in the second meeting and 96.8% in the third meeting. In the first phase, the teacher did greeting, and gave the apperception by linking the previous material of the collision theory. The meaningful learning is the learning that connects the information or concepts that the students had which means that the new information is associated with the structure of students' prior knowledge who are in the process of learning. [4]

The second phase is presenting the inquiry problems or phenomenon. This second phase achieved the percentage of 75%, 84.5% and 84.5% in three consecutive meetings. The third phase is helping the students to formulate the hypotheses to explain the problems or phenomenon. The third phase was carried

out in "good" category at the first, second, and third meeting with the percentage of each is 62.5%, 62.5% and 88.5%. One way that the teachers can do to develop the hypotheses ability on each students is by asking the questions that can encourage the students to formulate temporary answers or can be formulated as the estimation of possible answers from the issues studied. [11]

The fourth phase is encouraging the students to collect data to test the hypothesis which was accomplished on "excellent" category with the percentage of each 85.4%, 96.8%, and 96.8%. The fifth phase is formulating explanations or conclusions of the study they had done. The fifth phase was accomplished on "good" category with the percentage of 62.5% in the first meeting, and 75% in the second meeting. Whereas, it is obtained "excellent" category in the third meeting with the a percentage of 87.5%.

The last phase is the sixth phase which is also the closing stage. The sixth phase is reflecting the situation of the problem and thought processes. The percentages on each meeting is 62.5%, 81.5%, and 87.5%. The learning enforceability on those three meetings belonged to "good" category so that it can be concluded that the learning management of hands-on and minds-on activity through guided inquiry is effective when it is applied to the subject matters of factors that affect the reaction rate in class of XI MIA 9 SMAN 1 Sooko Mojokerto.

The results of the observation on the students' activity in learning the reaction rate materials using hands-on and minds-on activity through inquiry learning model showed that the most dominant activity is listening with the percentages gained in the first, second and third meeting, respectively for 31, 67%, 30%, and 28.89%.



The second dominant activity is formulating the hypothesis with the percentage of 20.55% in the first meeting, 20.55% in the second meeting and 20.53% in the last meeting.

The students' activity while conducting the laboratory experimentation obtained a percentage of 11.11% in the first meeting, 12.78% in the second meeting and 11.66% in the third meeting. The observation activity is amounted to 6.67%, 10%, and 11.11%. These experiment activities include the components of taking and putting the chemical solution using pipette, measuring activity using the measuring cup, pouring the chemical solution in test tubes, and measuring the temperature using the thermometer.

When doing the experiments, it is not only students' hands-on activity which is active, but also students' minds-on activity. Hands-on activity in science learning is defined as any science laboratory activities that allows the students to handle or perform, manipulate and observe the scientific process. [6]

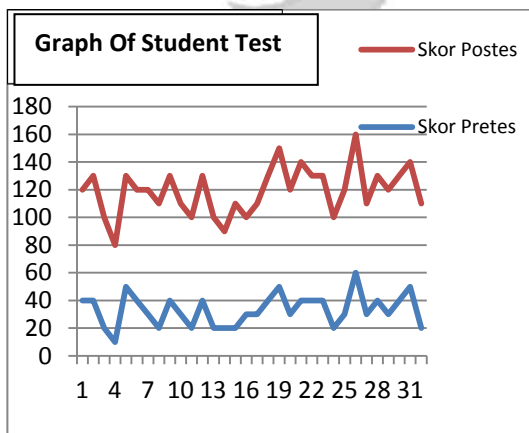


Figure 2. Student posttest and pretest

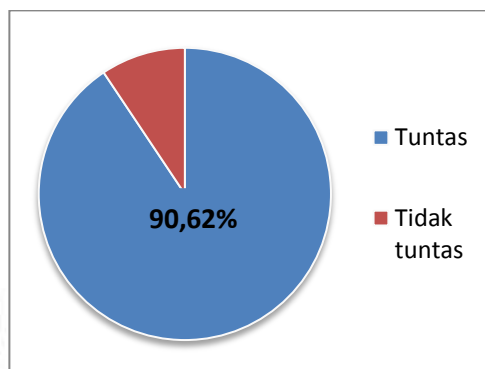


Figure 3. Student learning mastery result

Based on the score list of students' learning mastery, as many as 29 out of 32 students or 90.62% of the total students achieved more than B score, while the remaining of the students, which is 9.38% of the students achieved B- score. It means that 90.62% of the total students who took the test is considered "passed" on the subject matter of the factors that affect the reaction rate with the minimum passing grade criteria by 75%. Therefore, it could be said that the learning of hands-on and minds-on activity through guided inquiry is effective to make the students' pass the minimum passing grade.

The learning mastery achieved by the students is affected by two main factors which are the internal factors that come from the students themselves and the external factors which come from the students' environment. [12] The learning mastery achieved by an individual is the result of the interaction of several factors that affect both internal factors and external factors within that individual. The factors that come from the students in the form of student ability in understanding the subjects have big influences on their learning mastery. Whereas, the external factors that also affect the students' learning mastery is the quality of teaching.

## CONCLUSION

Based on the results of research findings and discussions that had been explained previously, it can be concluded that:

1. The learning enforceability of hands-on and minds-on activity through inquiry learning model at the first, second, and third meeting, respectively 72.21% ("good" criteria), 81.45% ("very good" criteria), and 90.41% ("very good" criteria), so that all the meetings had achieved "good" criteria in general.
2. The students' activity in the inquiry learning is dominated by the most dominant activity which is listening with the percentage in the first, second and third meeting, respectively for 31, 67%, 30%, and 28.89%, which all of the meetings had meet the criteria of either or greater of 61%. The students' hands-on activity was demonstrated through the experiment activity at the first meeting with the percentage of 11.11% in the first meeting, 12.78% in the second meeting and 11.66% in the last meeting, while the students' minds-on activity during the experimentation can be seen on the stages on the students' worksheet (LKS).
3. The students' learning mastery percentage of 32 students is 90.62% in the third meeting.

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