

## THE INFLUENCE OF GUIDED INQUIRY LEARNING MODEL ON STUDENTS' LEARNING OUTCOMES IN VIRUS TOPIC

Ameliana <sup>1</sup>, Samsuar <sup>1\*</sup>, Syarifah Farissi Hamama <sup>1</sup>

<sup>1</sup> Biology Education Study Program, Abulyatama University

Email Correspondence: [samsuar\\_biologi@abulyatama.ac.id](mailto:samsuar_biologi@abulyatama.ac.id)

### ABSTRACT

The aim of this study is to determine the effect of the guided inquiry learning model on students' learning outcomes in the topic of viruses for Class X at SMA N 1 Baitussalam. This research employs a quasi-experimental design with a pre-test post-test control group design using a quantitative approach. The sampling technique used is purposive sampling, where Class X-1, consisting of 28 students, serves as the experimental class, while Class X-2, consisting of 27 students, serves as the control class. The research instrument consists of 20 multiple-choice test questions, and data analysis is conducted using the percentage formula to calculate students' learning outcomes, the N-gain test to measure the improvement in students' learning outcomes, and the Independent Sample T-test using SPSS 27 to test the hypothesis. The data analysis results show that: (1) the average learning outcome of the experimental class is higher at 86.61 compared to the control class, which is 73.33; (2) the N-gain value for the control class is 0.44, while for the experimental class, it is 0.60, indicating that the improvement in learning outcomes in both classes falls into the medium category; (3) the hypothesis testing using the Independent Sample T-Test resulted in a significance value (sig. 2-tailed) of  $0.00 < 0.05$ , leading to the rejection of  $H_0$  and acceptance of  $H_a$ . This finding indicates that the guided inquiry learning model has a significant effect on students' learning outcomes in the topics of viruses for Class X at SMA N 1 Baitussalam.

Keywords: Guided Inquiry Learning Model, Learning Outcomes, Virus Topics

### INTRODUCTION

The future of a child is influenced, among other factors, by the education they receive. Therefore, quality education is essential. The quality of education is affected by the learning process, which means that the teaching and learning process conducted by teachers and students must be planned, directed, and systematic to achieve high-quality education (Alilyaman et al., 2022). One way to obtain quality education is through an appropriate learning model. Thus, teachers are expected to choose a learning model that aligns with students' conditions, the classroom environment, and the learning setting. Additionally, it must also be suitable for the learning objectives (Samrah, 2020). One of the challenges in the learning process is the low student learning outcomes, which result from inadequate support in the learning process, students' low learning abilities, and the abstract nature of many topics, making it difficult for students to understand lessons (Siahaan et al., 2023). The topic of viruses includes descriptions of the history of their discovery, characteristics, reproduction, classification, and their roles in life. Viruses, as transitional living organisms, can only be observed using an electron microscope (Irnaningtyas, 2016). Schools that do not have an electron microscope face difficulties in studying viruses through practical methods. Therefore, an appropriate learning model is needed to help students understand the abstract concept of viruses (Sari, 2019).

The inquiry learning model is an effective approach to improving students' learning outcomes and is particularly suitable for subjects such as science and biology (Trianto, 2017). The guided inquiry model provides students with valuable opportunities to develop their reasoning potential in investigating a problem, making choices related to real-life applications, and exploring information and ideas on the discussed topics. Additionally, the guided inquiry model helps students broaden their perspectives and take responsibility for their own learning progress (Fatimah et al., 2023).

A previous study conducted by Maida et al. (2019) found that classes using the guided inquiry learning model achieved an average score of 86.27, which was categorized as quite good in learning outcomes for Class XI MIA students at SMAN 4 Padang. In contrast, the control class (which did not implement the guided inquiry model) obtained an average score of 74.40. Similarly, a study conducted by Fatimah et al. (2023) confirmed the influence of the guided inquiry model on students' learning outcomes in the virus topic for Class X students at SMA N 2 Janeponto, with a significance value of 0.016, which is lower than 0.05. Based on preliminary observations at SMA N 1 Baitussalam, the learning process was mostly teacher-centered, with teachers defining, explaining, concluding, and assigning tasks. Meanwhile, students primarily listened to the teacher's explanations and completed assignments as instructed. As a result, students showed low enthusiasm in learning biology and tended to feel bored due to the teacher-dominated learning process. This condition negatively impacted students' learning outcomes, which were relatively low. The guided inquiry model is considered an alternative solution to this issue, as it is regarded as an effective learning model in the educational process. Implementing the guided inquiry model can enhance students' engagement during the learning process (Salimardayanti, 2018). Research on the use of the guided inquiry model for the virus topic has never been conducted in Class X at SMA N 1 Baitussalam. Therefore, this study aims to determine the influence of the guided inquiry learning model on the learning outcomes of Class X students at SMA Negeri 1 Baitussalam in the virus topic.

## RESEARCH METHOD

This research was conducted at SMA N 1 Baitussalam, located in Lambaro Angan, Klieng Cot Aron Village, Baitussalam District, Aceh Besar Regency. The study was carried out in July during the 2024/2025 academic year. The research method used was quasi-experimental with a Pre-test-Post-test Control Group Design. The study employed a quantitative approach. The population in this study consisted of all Class X MIPA students at SMA Negeri 1 Baitussalam, totaling 162 students across six classes. The sample selection was determined using the purposive sampling technique. Purposive sampling is a technique for selecting samples based on specific considerations (Sugiyono, 2018). As a result, Class X-1 was chosen as the experimental class, while Class X-2 served as the control class. The data collection technique used in this study was a multiple-choice test. The test was administered twice, consisting of a pre-test and a post-test, using 20 multiple-choice questions on the topic of viruses. These questions were adapted from the undergraduate thesis titled "The Effect of the Master Learning Model (Mind, Acquire, Search, Out, Trigger, Exhibit, Reflect) on Students' Biology Learning Outcomes in the Concept of Viruses" (Sari, 2019), which was based on Bloom's Taxonomy levels C1-C5.

The collected data were analyzed using the following steps: (1) Descriptive analysis of learning outcomes using percentage formulas; (2) Learning improvement analysis using the N-gain test;

(3) Prerequisite tests, which included normality and homogeneity tests; and (4) Hypothesis testing using the Independent Sample T-Test, with the hypotheses tested as follows:

$H_0$ : There is no significant effect of the guided inquiry learning model on students' learning outcomes in the virus topic in Class X at SMA Negeri 1 Baitussalam.

$H_a$ : There is a significant effect of the guided inquiry learning model on students' learning outcomes in the virus topic in Class X at SMA Negeri 1 Baitussalam.

The decision-making criteria in this study were as follows:

1. If the significance value (2-tailed) < 0.05, then  $H_0$  is rejected, and  $H_a$  is accepted.
2. If the significance value (2-tailed) > 0.05, then  $H_0$  is accepted, and  $H_a$  is rejected.

Both tests were conducted using SPSS version 27.

## RESULTS AND DISCUSSION

### Results

Based on the results of the tests carried out in this study, the results obtained can be explained as follows.

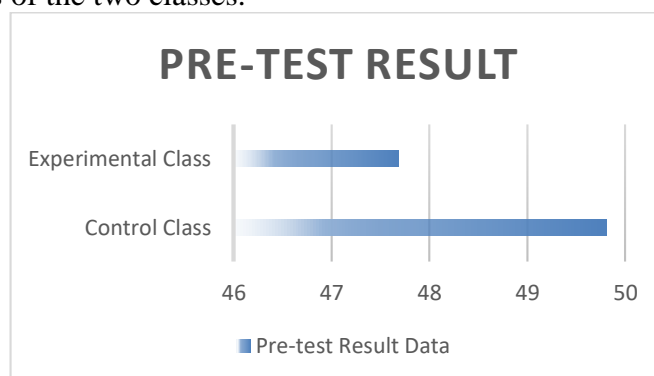
#### 1. Description of Student Learning Outcomes

The results of the pre-test calculations from the two classes obtained results that can be seen in Table 1 below.

**Table 1. Student Pre-test Score**

Data	Control Class	Experimental Class
Number of Students	27	28
Minimal Score	30	32
Maximum Score	70	75
Average	49,81	47,68
Median	50	49
Modus	45	44

Based on Table 1, it is known that the average value of the pre-test learning outcomes of the control class is 49.81 while the experimental class is 47.68. From the results of the two classes, it can be concluded that the pre-test values of the learning outcomes of the experimental class and the control class have almost the same value. The following illustrates the difference in the average pre-test values of the two classes.



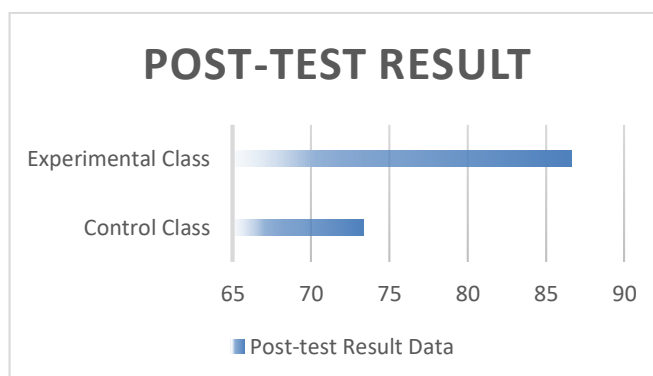
**Figure 1.** Comparison of Pre-test Result Data for Both Classes

Meanwhile, the results of the post-test value calculations for the two classes produced results that can be seen in Table 2 below.

**Table 2. Student Post-test Score Data**

Data	Control Class	Experimental Class
Number of Students	27	28
Minimum Score	60	70
Maximum Score	85	100
Average	73,33	86,61
Median	75	85
Modus	75	85

Based on Table 2, it is known that the average post-test value of the control class learning outcomes is 73.33 while the experimental class is 86.61. From the results of the two classes, it can be concluded that the post-test value of the experimental class learning outcomes is higher than the post-test value of the control class. The following illustrates the difference in the average post-test values of the two classes.



**Figure 2.** Comparison of Post-test Result Data for Both Classes

## 2. Improving Student Learning Outcomes

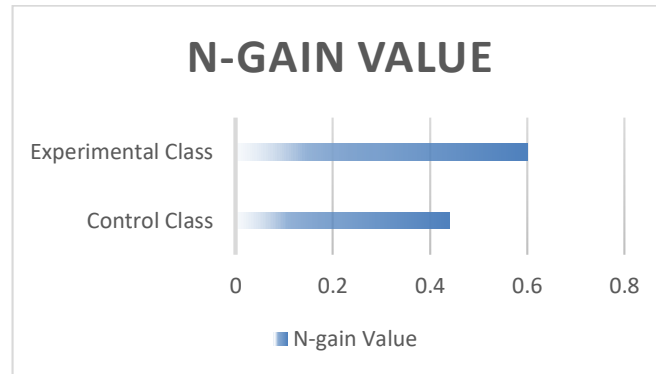
The results of the test of improving student learning outcomes in the control class and experimental class after being given guided inquiry learning model treatment using the N-gain test can be seen in Table 3 below.

**Table 3. Results of the Student Learning Outcome Improvement Test (N-gain)**

Data	N-gain Value	
	Control Class	Experimental Class
Highest	0,77	1,00
Lowest	0,17	0,00
Average	0,44	0,60
Category	Medium	Medium

Based on the data in Table 3, it can be seen that the N-gain value in the control class is 0.44, while in the experimental class it is 0.60. The value of the 2 classes obtained a difference where

the N-gain value in the experimental class is higher than the control class. However, both values are in the medium category. So it can be concluded that the increase in student learning outcomes in both the control class and the experimental class is not too significant but with a moderate increase. The following illustrates the difference in the average N-gain values of the two classes.



**Figure 3.** Comparison of Average Values of the Two Classes

### 3. Hypothesis Testing

Before hypothesis testing is carried out, a normality test is first carried out which aims to test whether the research sample is a normal distribution type or not. The results of the normality test can be seen in Table 4 below.

**Table 4. Normality Test Results**

Data	Sig	Sig Level ( $\alpha$ )	Keputusan
Pre-test Control Class	0,10	0,05	Normal
Post-test Control Class	0,14	0,05	Normal
Pre-test Experimental Class	0,10	0,05	Normal
Post-test Experimental Class	1,14	0,05	Normal

Based on Table 4 regarding the results of the normality test, the results of the normality value of the pre-test data of the control class are 0.10, the results of the post-test data of the control class are 0.12 and the pre-test data of the experimental class are 0.10, and the post-test data of the experimental class are 0.14. The results obtained from all data show a value higher than the sig value  $> 0.05$ . So it can be concluded that the sample in this study is normally distributed. Then, the data obtained were also tested for homogeneity to determine whether the two sample groups came from a homogeneous population or not. The results of the homogeneity test in this study can be seen in Table 5 below.

**Table 5. Homogeneity Test Results**

Data	Sig	Sig Level ( $\alpha$ )	Decision
Pre-test and posttest for both classes	0,40	0,05	Homogeneous

Based on Table 5 regarding the homogeneity test conducted, it is known that the sig value obtained is 0.40 where the value is greater than 0.05. So it can be concluded that the sample used in this study is homogeneous. Furthermore, the results of the hypothesis test to prove the hypothesis proposed in this study were carried out using the independent sample t-test. Where the results obtained can be seen in Table 6 below.

**Table 6. Results of the Independent Sample t-test**

Data	t	Sig (2-tailed)	Sig Level ( $\alpha$ )	Decision
Post-test Values of Control Class and Post-test Values of Experimental Class	6,829	0,00	0,05	Influential

Based on Table 6 above regarding the independent sample t-test to test the hypothesis, the value obtained is 0.00. The value obtained is smaller than 0.05 ( $0.00 < 0.05$ ). So it can be concluded that  $H_0$  proposed in this study is accepted, meaning that there is an influence of the guided inquiry learning model on student learning outcomes on virus topics in class X of SMA Negeri 1 Baitussalam.

## Research Discussion

Based on the data obtained from the pre-test, the experimental class achieved an average score of 47.68, with the highest score being 85 and the lowest score 50. Meanwhile, the control class had an average score of 49.81, with the highest score being 70 and the lowest 30. After conducting the learning process using the guided inquiry model in the experimental class and the conventional model in the control class, there was an improvement in learning outcomes, as seen in the post-test results. The post-test average score in the experimental class increased to 86.61, with the highest score 100 and the lowest 70. In contrast, the control class obtained an average post-test score of 73.33, with the highest score 85 and the lowest 60. These data indicate that the post-test average score of the experimental class was higher than that of the control class. This finding is consistent with the study by Salimardayanti (2018), which reported an increase in students' scores before and after applying the guided inquiry learning model, with an average post-test score of 76.29. Thus, the pre-test and post-test learning outcomes in both classes show a significant difference. Furthermore, the N-gain analysis results also indicate an improvement in students' learning outcomes after applying the learning model in both the experimental and control classes. The experimental class had an average N-gain score of 0.60, categorized as moderate, while the control class had an average N-gain score of 0.44, also categorized as moderate. This result shows an improvement in learning outcomes in both classes; however, the increase in the experimental class was higher than in the control class. These findings align with the study by Amatullah (2018), which stated that learning using the guided inquiry model resulted in a higher average N-gain score of 0.62, compared to the conventional learning model, which had an N-gain score of 0.30, based on pre-test and post-test results. Based on the findings of this study, it has been proven that the guided inquiry learning model significantly affects students' learning outcomes. This is because the guided inquiry model encourages students to be actively involved in the learning process, leading to improved learning outcomes. This aligns with the research conducted by Inayati (2019), which found that the application of the guided inquiry learning model had a significant influence on

students' learning outcomes, particularly in science subjects related to plant structures. According to Kunandar (as cited in Lovisia, 2018), the guided inquiry learning model encourages students to engage actively with concepts and principles, allowing them to gain experience and conduct experiments that enable them to discover principles independently.

The learning process in the experimental class, which applied the guided inquiry learning model, showed that nearly all students were active in searching for and solving problems given by the teacher. This is supported by Sumarni et al. (2017), who stated that guided inquiry learning allows students to freely develop the concepts they are learning. Students were given opportunities to solve problems individually or in groups, and in the classroom, they were trained to interact with classmates to exchange information. The average learning outcomes of students in the experimental class significantly improved after applying the guided inquiry learning model. This improvement was due to active participation from both students and teachers during the learning process, with teachers playing an essential role in guiding students. This is one of the advantages of the guided inquiry model, where teachers do not completely relinquish control over students' activities. As a result, students with lower cognitive abilities can still follow the learning process, while those with higher thinking abilities do not dominate the activities (Hosnah et al., 2017). Therefore, the guided inquiry learning model is highly suitable for use at SMA Negeri 1 Baitussalam to enhance students' learning outcomes on the virus topic. Observations revealed that teachers still played a dominant role in teaching, which made students feel bored and ultimately affected their learning outcomes. Several studies have shown that the guided inquiry model can significantly improve students' learning outcomes. For example, the research by Muliani & Citra (2019) found a significant difference in science learning outcomes between students taught using guided inquiry with video assistance and those taught using the conventional model. Similarly, the study conducted by Sundari & Indrayani (2019) titled "The Application of the Guided Inquiry Learning Model to Improve Mathematics Learning Outcomes" reported successful results.

## CONCLUSION AND SUGGESTIONS

Based on the research results obtained, it can be concluded that the use of guided inquiry learning models significantly influences learning outcomes, this can be seen from the results of the hypothesis test where  $H_0$  is rejected and  $H_a$  is accepted, meaning that there is an influence of guided inquiry learning models on student learning outcomes on virus topics for class X of SMA Negeri 1 Baitussalam. Suggestions that can be given include school organizers making guided inquiry models as one of the learning models that can be used in the learning process, especially on virus topics so that learning objectives can be achieved. In addition, this research is limited to a limited location scale, so that it becomes a development to be tested in other locations that have different characteristics but have the same obstacles and problems so that it can perfect the results of this study and become a contribution to science in the field of education.

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