



# OLABS-BASED VIRTUAL PRACTICUM MEDIA TO IMPROVE CONCEPT UNDERSTANDING FRIED STYLE MATERIAL

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## ABSTRACT

This study aims to determine if this OLabs-based virtual practicum medium effectively increases the understanding of the concept of frictional force material among class X students of Madrasah Aliyah Lita. The type of research used was pre-experimental, using the one-group pre-test–post-test design. The research results show that OLabs-based virtual practicum media effectively increase students' conceptual understanding of Madrasah Aliyah Lita. The mean value of the pre-test understanding of the concept is 36.66 and the result of the post-test understanding is 73.80. Based on hypothesis testing with t count 20.98 and t table 2.086, it is concluded that  $H_0$  is rejected, and  $H_a$  is accepted. It shows that OLabs-based virtual practicum media effectively increases students' understanding of physics concepts in class X at Madrasah Aliyah Lita.

**Keywords:** Virtual practice media; OLabs; frictional forces

## 1. INTRODUCTION

In Indonesian Constitution Law No. 20 of 2003 concerning the National Education System, Article 1, Paragraph 1, states that "education is a conscious and planned effort to create a learning atmosphere and learning process so that students actively develop their potential to have religious, spiritual strength, self-control, personality, intelligence, noble character, and skills needed by themselves, society, nation, and state. Based on the article above, education is expected to develop students' potential to benefit the progress of themselves, society, nation, and state (Zaini, 2011).

The reality in the field is that there are still many physics lessons that only use conventional or lecture methods, even though learning physics is more understandable by directly involving students, one of which is by practicing in the laboratory so that students can draw conclusions, be active, and grasp the subject matter more quickly. In this hands-on activity (practicum), students are invited to question, seek answers, try to measure, look for data, analyze, and conclude what they find.

One of the facts found in the field was through interviews with one of the educators at Madrasah Aliyah Lita, Ms. Sarina Sulfi (July 15, 2021). Where to get information that this school has a laboratory but is constrained by facilities and infrastructure Learning activities in the laboratory were only carried out several times before and after the pandemic. Learning should be carried out through practicum, but what is taught is only in the form of theory. This happened because of time constraints and inadequate laboratory facilities. In addition, the lack of attention by laboratory staff has resulted in less-than-optimal management of laboratory activity time. Even though this activity played a major role in increasing students' understanding of concepts in physics subjects, some students lack understanding of concepts; this can be seen in most of the material taught in physics subjects. When learning takes place, students do not dare ask for difficulties in understanding the material or working on the questions the educators gave. Student initiative is lacking; this can be seen when educators provide opportunities for students to ask questions or argue that students are not using them properly. This is what causes educators and students to have many obstacles in carrying out practica, especially in learning physics, so there is a need for breakthroughs to find out how to solve this problem.

One solution to continue to provide learning within these limitations is to implement a virtual laboratory, which can save costs and time. A virtual practicum is a computer-operated laboratory activity. One of the virtual labs that exist today is OLabs.

Virtual practicum is a series of laboratory tools in the form of interactive multimedia-based software or a computer that is operated by a computer and simulates activities in the laboratory as if the user were in a real laboratory. A virtual practicum also enriches students' experiences with real things. Students can develop an attitude of scientific thinking by trying, researching, observing, and concluding a scientific concept or principle. Practicum allows students to form their own concepts in a way that helps them learn something so that they can develop their creativity (Ulpiah, 2020).

By and large, Olabs is an experimental laboratory based on the idea that experiments can be taught using the Internet, which is more efficient and cheaper. This helps them compete with students in more schools - completing and bridging digital

divide and distance geographic. The experiment can be accessed anywhere and anytime on the website page <http://www.olabs.edu.in/> (Achuthan, 2011).

Before explaining something, students must know what will be explained. Then, in explaining something, students must understand it very well so that it is easy to explain to other students; only after that can they draw conclusions. Therefore, students need to understand the concept (Ruqoyyah, Murni, & Linda, 2017). According to Rafiqah et al., conceptual understanding is a process of action to properly understand a design or an abstract idea that allows one to classify an object or event (Dani & Hilwa, 2020).

The implementation of virtual practice media can be seen from the research conducted (Hikmah, Saridewi, & Agung, 2017a) entitled "Implementation of Virtual Laboratories to Improve Understanding of Concepts". The results of his research show that there is a difference in the average final ability of students, so it can be concluded that implementing virtual laboratory simulations affects students' conceptual understanding of the reaction rate material.

Based on the description above, the author means to study with the use of OLabs-based virtual practicum media with the title "The Effectiveness of OLabs-Based Virtual Practicum Media to Improve Understanding of Frictional Style Material Concepts in Class X Students of Madrasah Aliyah Lita."

## 2. METHODS

This research was conducted at Madrasah Aliyah Lita for the 2021–2022 school year from November 1 to November 12, 2021. The type of research used is pre-experiment. Then the design used is One Group Pretest-Posttest Design. This design can be depicted as follows (Bungin, 2017):



Figure 1. One group pretest-posttest design

Information:

$O_1$ : Pre-test to measure students' understanding of concepts before being given treatment

X: Providing treatment to research subjects, namely providing frictional material through virtual practicum simulations based on OLabs.

$O_2$ : Post-test to measure students' understanding of concepts after being given treatment

As for who became the population in the study, This is participant education class X at MIA Madrasah Aliyah Lita, totaling 67 people.

Selection technique sample used in the study This is purposeful sampling. Consideration by the researcher in choosing a sample study, i.e., from recommendations for educators and computer mastery skills, and the samples in this study were from class X MIA B, which totaled 21 people.

### *Instrument Study*

Instruments used in the study This is a concept comprehension test. This test is in the form of multiple-choice questions consisting of five answer choices, namely a, b, c, d, and e, where a score of 10 is given when answered correctly, and when answered incorrectly, a score of 0. This concept understanding test consists of pre-test and post-test tests.

### *Data Processing and Analysis Techniques*

As for the technique of analysis of data used in research, This is analysis statistics descriptive, and analysis statistics inferential.

#### 1) Analysis Statistics Descriptive

- Average (Mean)
- Standard Deviation
- Concept: Understanding Categorization

To find out the level of understanding of physics concepts students follow the procedures set by the 2008 DIKNAS, namely:

Table 1. Categories understanding draft participants educate

No.	intervals	Category
1	80-100	Very high
2	70-79	Tall
3	50-69	Low
4	$\leq 49$	Very low

#### a. Statistics Inferential

##### 1) Normality Test

Normality test in study This that is use method Kolmogorov Smirnov.

##### 2) Homogeneity Test

In a study, testing homogeneity was done using F -test max from Hartley-Pearson.

### 3) Hypothesis Test

Hypothesis testing is a way to prove the hypothesis made in research. The statistical test procedure is as follows:

- Make a hypothesis ( $H_0$  and  $H_a$ ) in the description sentence
    - $H_0$ : Virtual practice media based on OLABS Simulation is not effective in increasing students' understanding of concepts in class X students of Madrasah Aliyah Lita.
    - $H_a$ : Virtual practicum media based on OLABS Simulation is effective in increasing students' understanding of concepts in class X students of Madrasah Aliyah Lita.
  - Determine criteria testing
    - a. If value significance (2-tailed)  $< 0.05$  then  $H_0$  is rejected, and  $H_a$  is accepted
    - b. If value significance (2-tailed)  $> 0.05$  then  $H_0$  is accepted, and  $H_a$  is rejected
- Or
- a. If  $t_{count} > t_{table}$ :  $H_0$  rejected  $H_a$  accepted
  - b. If  $t_{count} < t_{table}$ :  $H_0$  accepted  $H_a$  rejected
- Determine statistical test value (value  $t_0$ )

In the analysis precondition: If obtained normally distributed data or homogeneous, will use statistics parametric with t-test formula.

## 3. RESULTS AND DISCUSSION

### *Research Result*

#### *a. Descriptive Analysis*

The data analyzed in the analysis is descriptive There are two namely pre-test and post-test data class X MIA B. Where pre-test test is a test that is given before being

given treatment, meanwhile, the post-test test is a test given after being given treatment. As for analysis descriptive as follows:

- 1) Descriptive analysis of the understanding of the concept of frictional forces before applying the O Labs Simulation-based virtual practicum media

Table 2. Statistics descriptive the results of the pre-test students' understanding of the concept of class x mia b madrasah aliyah lita bone (before) virtual practicum media based on olabs simulation were applied

DESCRIPTIVE STATISTICS	PRETEST
Number of Samples	21
Maximum	60.00
Minimum	10.00
Average	36,66
range	50.00
Standard deviation	12.39
Variance	153,517

Table 3. Categorization of concept understanding levels

No	interval	Frequency	Percentage	Category
1	80-100	0	0	Very high
2	70-79	0	0	Tall
3	50-69	6	28.6%	Low
4	≤49	15	71.4%	Very low
Amount		21	100 %	

Data obtained in the table\_3 become a benchmark for determining categorization understanding draft participant education before \_ given treatment. The following

category score understanding draft physics participant education is shown in the following diagram:



Figure 2. Graph of categorization level of understanding of the concept of the pre-test test

Based on the graph in Figure 2, it can be seen that most students' understanding of the concept is in the range of  $\leq 49$ , namely the very low category with a frequency of 15 people and a percentage of 71.4%.

Based on Table 3, and Figure 2, the categorization of students' concept understanding test results at the pre-test is further described to see the ability of students to answer questions in each indicator of conceptual understanding, which can be seen in Table 4 below:

Table 4. Aspects of students' ability to answer questions (pre-test) understanding concepts

No	Concept Understanding Indicator	Correct Answer Frequency	(%)
1	Translation	25	32%
2	Interpretation	35	45%
3	Extrapolation	18	23%
	<b>Amount</b>	78	100%

Apart from Table 4 aspects of students' ability to answer questions (pre-test) and understanding the concept in the following figure:

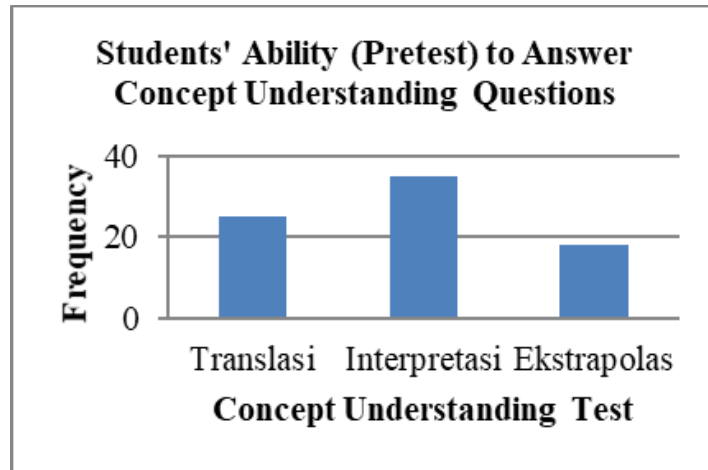


Figure 3. Graph of aspects of students' ability to answer questions (pre-test) understanding the concept

2) Descriptive analysis of the understanding of the concept of frictional forces after applying virtual lab media based on O Labs Simulation

Table 5. Statistics descriptive the results of the post-test students' understanding of the concept of class x mia b madrasah aliyah lita bone (after) implementing virtual practicum media based on olabs simulation

DESCRIPTIVE STATISTICS	POSTTEST
Number of Samples	21
Maximum	100.00
Minimum	50.00
Average	73,80
range	50.00
Standard deviation	13.59
Variance	184,762



Table 6. Categorization of concept understanding levels

No	intervals	Frequency	Percentage	Category
1	80-100	9	42.8%	Very high
2	70-79	6	28.6%	Tall
3	50-69	6	28.6%	Low
4	≤49	0	0	Very low
<b>Amount</b>		21	100 %	

The data obtained in Table 6 become a benchmark for determining categorization understanding draft participants educate already given treatment. Following category score understanding draft physics participant education is shown in the following diagram:



Figure 4. Graph of categorization level of understanding of the concept of the pre-test test

Based on the graph in Figure 4, can is known Nahwa Mark’s understanding draft participants teaching the most is in the range of 80 – 100 is the very high category with a frequency of 9 people and 42.8% presentation.

Based on Table 6 and Figure 4 the categorization of students' concept understanding test results on the post-test test is further described to see the ability of students to answer questions in each indicator of conceptual understanding can be seen in Table 7 below:

Table 7. Aspects of students' ability to answer questions (post-test) understanding concepts

No	Concept Understanding Indicator	Answer Frequency	(%)
1	Translation	40	26%
2	Interpretation	67	43.5%
3	Extrapolation	47	30.5
<b>Amount</b>		154	100%

Apart from Table 7, aspects of students' ability to answer questions (post-test) and understanding of the concept in the following figure:

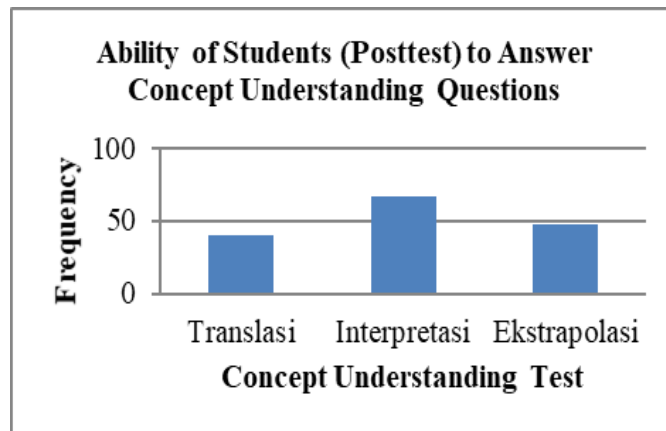


Figure 5. Graph of aspects of students' ability to answer questions (post-test) understanding the concept

*b. Analysis Inferential*

*1) Normality Test*

The normality test is carried out to determine whether students' test results are normal or not, both on the pre-test and post-test tests. The normality test used in this study is the Kolmogorof-Smirnov test at a significant level of 0.05. The results of the normality test analysis in this study are:

a) Normality test concept understanding test pre-test test

For the pre-test test, students obtained D count = 0.1481 and D table = 0.287. Based on these data, it can be seen that D count < D table, so it can be concluded that the data is normally distributed.

b) Test the normality test of understanding the concept of the post-test test

Post-test test students obtained D count = 0.1062 and D table = 0.287. Based on these data, it can be seen that D count < D table, so it can be concluded that the data is normally distributed.

2) Homogeneity Test

A homogeneity test was carried out to determine the distribution of samples in the pre-test and post-test. The homogeneity test used in this study is the Analysis of Variance test because the number of samples used in the pre-test and post-test tests is the same with a significant rate of 0.05.

The results of the homogeneity test analysis in this study obtained F count = 1.20 and F table = 2.12. This shows that the value  $F_{hitung} < F_{tabel}$  so that it can be concluded that the data is homogeneous.

3) Hypothesis testing

The hypothesis test aims to determine whether there is an increase in understanding of the concept after being given treatment with OLabs-based virtual practicum media. The hypothesis test used is the Paired Sample T Test at the level of  $\alpha = 0.05$ .

The hypothesis test obtained in this study is as follows:

If a value is obtained  $-t_h < -t_t$  or  $t_h > t_t$  then  $H_0$  is rejected and  $H_a$  accepted.

Conversely, if  $-t_t \leq t_h \leq t_t$  then  $H_0$  accepted and  $H_a$  rejected.

1) Left side ( $-t_h < -t_t$ )

<i><b>t<sub>hitung</sub></b></i>	<i><b>t<sub>tabel</sub></b></i>
-20.98	-2,086

2) Left side( $t_h > t_t$ )

$t_{hitung}$	$t_{tabel}$
20.98	2,086

Based on the table above, the result is that  $H_0$  is rejected because  $-t_h < -t_t$  or  $t_h > t_t$  and  $H_a$  are accepted. This means that the OLabs Simulation-based virtual practicum media is effective in increasing students' understanding of concepts in class X students of Madrasah Aliyah Lita.

*a. Students' understanding of physics concepts before being taught using virtual practicum media based on OLabs Simulation*

Before students are given frictional material, the researcher first gives a pre-test, namely a conceptual understanding test in the form of test questions. This pre-test aims to measure students' initial abilities and determine how far their knowledge of frictional forces has come. From the test results of understanding the concept of physics before being taught using virtual lab media based on OLabs Simulation in class X MIA B Madrasah Aliyah Lita, the minimum score is 10 and maximum scores are 60.

The categories for the level of understanding of the concept in this study consisted of 4 categories: very high (80–100), high (60–79), low (50–59), and very low (49). The level of understanding of the concept in this pre-test is in the very low category, with a percentage of 71.4%.

Based on the results of the researcher's initial observations before conducting the treatment on students, there were very low student scores because there was a lack of facilities and infrastructure in the laboratory at school, which made it less possible to do the practicum. Educators also rarely carry out practical activities in the laboratory.

According to Bloom, students have not been able to apply the three aspects of understanding to learning. Educators also only provide lessons with the lecture method or conventional methods. Where the lecture method has deficiencies, as in research journals in the title of the lecture learning method (Wirabumi, 2020).

*b. Students' understanding of physics concepts before being taught using virtual practicum media based on O Labs Simulation*

After students are given learning materials in a frictional style, the researcher then gives a post-test, namely a conceptual understanding test, in the form of test questions that are more or less the same as the previous pre-test questions, only slightly different from the context. This post-test aims to measure students' conceptual understanding abilities and determine how far they have grasped the material about a frictional force that researchers have taught. From the results of the physics concept understanding test after being taught using virtual practicum media based on O Labs Simulation in class X MIA B Madrasah Aliyah Lita, the minimum score is 50, and the maximum scores are 100. The concept level category in the post-test is in the high category of 42.8%.

Students' understanding of concepts after being taught using O Labs-based virtual practicum media has increased because students find it easier to understand the material because it is arranged with virtual practicum. This is in accordance with research by (Indihartati & Ariyatun, 2022) with the title "Effectiveness of Virtual Laboratory Media in Physics Learning in the Era of the COVID-19 Pandemic on Students' Science Process Skills". The results of his research show that media-based laboratory activities can be utilized to develop students' understanding of science concepts and process skills. Students can formulate problems, plan experiments, use experimental tools that can be seen in a real and interesting way, observe, check results, write trial reports, and present them. After being taught using virtual practicum media, students are able to apply the three aspects of understanding according to Bloom to their learning.

*c. The effectiveness of virtual practicum learning media based on O Lab's simulation on understanding concepts*

Based on the results of hypothesis testing, where the results obtained are t count t table either based on the manual T test or based on the T-test using SPSS, where the count value obtained manually is 20.98. The t table value is 2.086, Based on these results, we can conclude that H<sub>0</sub> was rejected. H<sub>a</sub> was accepted, so O Labs simulation-based virtual practicum media effectively increases students' understanding of concepts in class X students of Madrasah Aliyah Lita.

Based on KKM Physics implemented by X MIA B Madrasah Aliyah Lita Bone District, by whole results, test understanding draft participant educate Class X MIA B after teaching using virtual practicum media based on O Labs Simulation Far more people

have reached KKM than when the test was taught using virtual practicum media based on OLABS Simulation. As for KKM eye lesson physics applied in school, X MIA B Madrasah Aliyah Lita Bone District is 70.00.

Based on observations made by the writer during research, before being taught using virtual practicum media based on OLABS Simulation, delivery material learning is delivered through talk, asking an answer, doing a task, and no practicum. This causes activity learning to be only energy-centered by the educator, just so that the participant becomes passive in following the learning. Participant educators tend to memorize every material they are learning, accept it without understanding it, and study it more. This can cause a lack of understanding among participants.

Based on exposure, a number of participants were educated that at the time they were taught using virtual practicum media based on OLABS simulation, they were more likely to understand and understand learning, and they were also more likely to submit questions related to material frictional force compared to the moment they used learning models directly. They feel learning using virtual practicum media based on OLABS simulation No boring Because participants are more active in learning in a group.

This research is in line with previous research conducted by (Hikmah, Saridewi, & Agung, 2017) entitled "Implementation of Virtual Laboratories to Improve Understanding of Concepts". The results of his research show that there is a difference in the average final ability of students, so it can be concluded that implementing virtual laboratory simulations affects students' conceptual understanding of the reaction rate material.

Based on the description above, we concluded that understanding the draft participant experience enhancement after being taught using virtual practicum media based on OLABS Simulation Hence, learning using virtual practicum media based on OLABS Simulation has been proven statistically to answer problems in this study, so that hypothesis (H<sub>0</sub>) is rejected and hypothesis (H<sub>a</sub>) is accepted, and the virtual practicum media based on OLABS Simulation is effective in increasing students' understanding of concepts in class X students of Madrasah Aliyah Lita.

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