

# PjBL Learning Training Based on Science Practicum Tools for Vernier Calipers and Screw Micrometers at Pondok Pesantren Attohiriyah Alfadiliyah Bodak

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**Abstract:** PjBL learning training based on practicum tools and learning videos on caliper material and screw micrometers at the Attohiriyah Alfadiliyah Islamic Boarding School, Bodak, Central Lombok. Measurement using a screw micrometer and caliper is one of the materials taught in high school physics subjects. The problem faced is the tool's small size, making it difficult for students when the teacher demonstrates the tool. The solution that can be offered is to watch the learning videos on how to read caliper calipers and screw micrometers on a computer or mobile phone and can be demonstrated directly with measuring instruments. The use of visual aids and videos in learning really helps the effectiveness and efficiency of delivering messages and lesson content. The use of tools and videos of caliper and screw micrometer visual aids in learning effectively increases the average student understanding of the concept of measurement.

**Keywords:** caliper; screw micrometer; Tutorial video

## Introduction

Physics is the science that studies natural phenomena as a whole, therefore Physics is one of the basic natural sciences widely used as a basis for other sciences (Sumarsono, 2008 in Sitti Rugaya et al., 2022).

In learning Physics, several important factors support the success of learning achievement, not only determined by intellectual factors but also the accompanying factors, namely the existence of facilities and infrastructure to support teaching and learning activities (Yulianci et al., 2019).

Measurement is the key to scientific and technological progress. Any theory developed in Physics or other fields of science must be proven by measurement. If the theory does not match the measurement results, the theory is rejected (Sumarsono, 2008).

In Pjbl training based on practicum tools and learning videos, this is a course on Science concept

analysis and learning, by providing opportunities for students to conduct Pjbl training based on practicum tools and make learning videos related to caliper measurement material and screw micrometers.

Video learning is one of the learning media that belongs to the types of audio and visual learning media. In addition, Yunita and Suprpto (2021) explain that learning videos are a combination of various types of learning media which can be in the form of images, audio, video, animation, and others that can be utilized in the learning process. The existence of learning videos is a response to developments in the field of technology in the field of education.

In Pjbl learning training based on science practicum tools on caliper measurement material and screw micrometers where science teachers at the Attohiriyah Alfadiliyah Islamic boarding school Bodak Central Lombok have not been able to teach measurement material to the fullest due to a

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shortage of teaching aids, where learning videos are also really needed to help students better understand reading measuring instruments carefully and can directly practice them with measuring instruments directly.

**Method**

The method used in this study is the creation of learning media in the form of learning videos. Learning videos were made in the Physics Laboratory of FKIP University of Mataram using teaching aids in the form of calipers and screw micrometers on measurement learning material.

**Result and Discussion**

A measuring instrument is a tool used to measure an object, in this article the measuring instrument that will be discussed is the measuring instrument for length, namely vernier calipers and screw micrometers. Physics learning materials for measuring lengths (caliper and screw micrometer) match the teaching method with practicum. But the teacher has problems showing the main scale and nonius scale that the measuring instrument shows to students because of the small size of the micrometer and calipers. Therefore, teachers can use video learning media that can be viewed by students via computers or cellphones.

*Vernier calipers*

Calipers are tools capable of measuring workpieces with an accuracy of up to 0.01 mm and 0.05 mm. Calipers are used to measure the thickness, inside diameter, outside diameter and measure the depth of an object. The shape of the caliper can be seen in Figure 1.

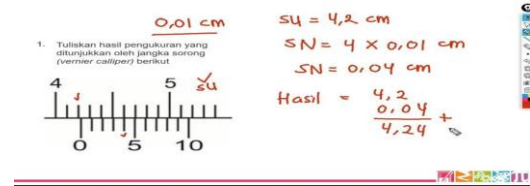


**Figure 1.** Caliper

How to calculate caliper measurement results

$$\text{Measurement Result} = \text{Main Scale} + (\text{Nonius Scale} \times \text{Accuracy})$$

Information :  
Accuracy Caliper 0.01



**Figure 2.** An example of a learning video for measuring caliper

*Screw Micrometer*

A screw micrometer is a measuring tool capable of measuring the thickness of objects and has an accuracy of 0.1 mm. objects that can be measured using a screw micrometer are metal plates and ball diameter. The shape of the screw micrometer can be seen in Figure 2.

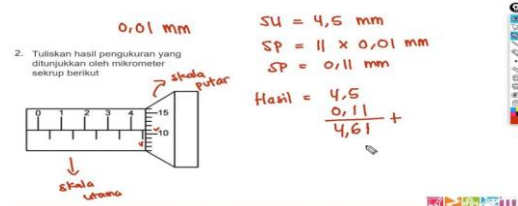


**Figure 3.** Micrometer screw

How to calculate the results of a screw micrometer measurement

$$\text{Measurement Result} = \text{Main Scale} + (\text{Nc Scale} \times \text{Accuracy})$$

Information :  
Accuracy Caliper 0.01



**Figure 4.** Example of a screw micrometer measurement learning video

The use of learning video media in learning really helps the effectiveness and efficiency of delivering messages and lesson content. Learning videos are useful so that the lesson material

conveyed by the teacher is easier for students to understand and provides a realistic understanding of the actual concepts. The use of learning videos can improve students' understanding of concepts and physics learning outcomes (Riyanti et al., 2015).

Learning through video will makes it easier for teachers to convey learning material, also makes it easier for students to understand the context of the subject. Student learning outcomes can be influenced by the teacher's skills in using learning media during the learning process (Pingge & Wangid, 2016). In creating a learning atmosphere, educators need auxiliary tools in conveying a material, namely learning media.

Learning media is anything that has uses as a means of conveying messages conveyed by educators to their students, so that they can stimulate students' thinking, emotions, and interest in the learning process (Tafonao, 2018). Learning media is an alternative in learning activities useful teaching to facilitate educators in the process of delivering the core of learning to students in order to achieve the goals of the learning process (Adam & Syastra, 2015).

## Conclusion

The use of video learning media that can be seen via computers and cell phones is very helpful in helping the effectiveness and efficiency of delivering messages and lesson content. Learning videos are useful so that the lesson material conveyed by the teacher is easier for students to understand and provides a realistic understanding of the actual concepts. delivery of messages and lesson content about vernier caliper length measuring instruments and screw micrometers, both related to students' understanding of the parts of measuring instruments or how to read measurement results on these measuring instruments.

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