Abstract

Purpose – The aim of this study is to know the level of comprehension to understand the concept of vibration and wave by using the demonstration method for students in SMAN 1 Peureulak, Aceh.

Design/Methodology/Approach – The study was conducted at SMAN 1 Peureulak in September 2016. This study is done by using a demonstration method with 40 students consisting of 22 male and 18 female.

Findings – The results showed that the level of understanding of the concept of vibration and the wave of students SMAN 1 Peureulak, Aceh, were classified very well with the value of 8.01, while the concept of error was very low level about 1.925.

Keywords Vibration, wave, Peureulak, Aceh

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1. Introduction

Physics is a science that studies the events of nature and the interaction of objects or materials in nature (Indrajit, 2002). Physics also studies natural phenomena, giving students knowledge to live by natural laws. In addition, learning physics becomes a learning to understand scientific concepts and their application in society.

Physics is one of the subjects considered difficult by most high school students. The results of the preliminary observation made on students in SMA Negeri 1 Peureulak showed that 76% of students have difficulty in studying and understanding the subject of physics.
This is because the learning atmosphere still presents weaknesses and shortcomings, resulting in failure in learning. Lectures including the use of media or props are less effective so the learning process only makes a single impression. This causes students to be less active in the learning process.

The learning process involves people in person as a whole so that there is a change in knowledge, skills, and attitudes. To produce a meaningful learning of physics must understand how the learning physics must be student centered, which starts from the interests and motivation of students. This is done to increase the students’ absorption and comprehension on the material being taught and to increase students’ confidence in the learning process. Student-centered learning is expected to encourage students to optimize self-awareness and explore all the advantages of the students themselves.

Demonstration method is one of the good methods to increase students’ motivation to learn so as to improve learning outcomes. Demonstration method is a way of presenting lessons by modeling or showing students a particular process, situation, or object being studied, whether actual or imitative, often accompanied by oral explanation (Djamarah and Zain, 2006). Through learning using demonstration methods, then students can directly observe things that happen in the lab. With the correct concept will make it easier for students to understand the material of physics. Several studies have shown that the use of demonstration methods can improve student learning outcomes (Dahyana, 2014; Rini et al., 2014; Ambomide et al., 2015; Sarina, 2016). The aim of this study is to know the level of comprehension to understanding the concept of vibration and wave by using the demonstration method for students in SMAN 1 Peureulak, Aceh.

2. Materials and methods
The research was conducted at SMA Negeri 1 Peureulak located on Jl. Pasir Putih, Cot Geulumpang Kec. Peureulak, Aceh Province in September 2016. The subjects of this study were the students of class X SMAN 1 Peureulak which involved as many as 40 students consisting of 22 male and 18 female. This research was carried out through the stages of planning, implementation, observation, and reflection. Data collection is done in two ways, namely written test and questionnaire. Measuring the level of students’ understanding through the results of test assessments, while the level of motivation and interest in learning was measured by the results of the questionnaire observation.

3. Data analysis
To know how much interest and motivation of students for learning physics vibration and wave matter, the analysis conducted on the questionnaire of student learning interest is as follows:

\[
\text{Percentage} (\%) = \frac{n}{N} \times 100\%
\]

where, \( n \) = total score of all students; \( N \) = maximum number of scores; \( % \) = level of percentage to be achieved.

Criteria interpretation of this research variable is determined: 81–100 = very good; 61–80 = good; 41–60 = fair; 21–40 = less; 0–20 = not good

To know the level of students’ understanding of the vibration and wave matter through the result of written test assessment with criteria: 8.0–10 = very good; 6.6–7.9 = good; 5.6–6.5 = fair; 4.0–5.5 = less; 0–4.0 = fail
3. Results and discussion
The study has been conducted on 40 students at SMA Negeri 1 Peureulak. Overall research results both interest, learning motivation, and student learning outcomes fall into either category. Student motivation and student learning interests are shown in Table 1.

According to Table 1, it can be seen that the motivation and interest of students of SMA Negeri 1 Peureulak are included in the good category. Motivation and interest in learning has an important role in improving student learning outcomes. According to Uno (2008) motivation has a great role to the success of a person in learning. Motivation to learn physics grows because of the desire to be able to know and understand something, and encourage and direct students interest in learning so earnest to learn and motivated for achievement (Iskandar, 2009).

The results of the research have shown that demonstration methods can trigger students to be motivated to learn. The motivation is caused by the demonstration method of giving understanding to the students through observation, attention, memory, thinking power, and fantasy. According to Dimyati and Mudjiono (2009) students’ ability to observe, pay attention, remember, think, and fantasize will strengthen student motivation. The demonstration method will also create a pleasant learning environment that will increase students’ interest and motivation in learning. The condition of student learning environment will both strengthen interest and motivation to learn (Dimyati and Mudjiono, 2009). Students have the feelings, the attention of the will, the memories, and the changed mind as a result of a pleasant learning experience. Experience with peers and the learning environment will directly affect the interest, motivation, and learning behavior. Rubiyo (2011) showed that the use of demonstration learning method gives positive influence to student’s learning interest.

Students interest and motivation influence the level of students’ understanding of the subject physics of vibration and wave matter. The results showed that the students’ understanding level on vibration and wave materials in SMA Negeri 1 Peureulak students varied relatively (Table 2).

According to Table 2, it can be seen that most of the students in SMA Negeri 1 Peureulak have a good level of understanding (30%) and very good (65%) after being given a demonstration method. This suggests that demonstration methods are well suited to improve students’ understanding of vibration and wave materials.

The level of students’ understanding of the concept of vibration and waves in students of SMA Negeri 1 Peureulak amounted to 8,075. Meanwhile, the level of misconception of the concept of vibration and wave is relatively small that is only equal to 1,925. Student misunderstanding of the concept of vibration and waves is allegedly sourced from their daily experiences. In the process of learning physics, especially about the basic concept is a

<table>
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<tr>
<th>Aspects</th>
<th>Average Percentage</th>
<th>Category</th>
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<tr>
<td>Motivation</td>
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<td>Good</td>
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<tr>
<td>Student learning interests</td>
<td>82</td>
<td>Good</td>
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<table>
<thead>
<tr>
<th>Value</th>
<th>Number of Student</th>
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5. Conclusion
Demonstration methods can improve students’ understanding of SMA Negeri 1 Peureulak on the concept of vibration and wave matter. The average student’s understanding level is 8,075 (very good), while the student misconception level is only 1,925. Student’s interest and motivation in SMA Negeri 1 Peureulak is categorized as good.

References

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