e-ISSN: 2745-9535
No. 105/E/KPT/2022
Jurnal Pengabdian Masyarakat
Editorial Office: Jl. Soekarno-Hatta, Rembuksari No. 1A, Malang, East Java, Indonesia, 65113
Contact: Phone: +62 (341) 478494 e-mail: jpm@asia.ac.id
The journal is published by Institut Teknologi dan Bisnis Asia Malang
Website: https://jurnal.stie.asia.ac.id/index.php/jpm
Member of:
Indexed in:

# Analysis of SMAN 2 Fatuleu Students' Responses to The Use of The Demonstration Method In Physics Learning

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**Volume**
7
**Issue**
2
**Edition**
November
**Page**
741-749
**Year**
2026

**Article History**

Submission: 13-11-2026
Review: 19-11-2026
Accepted: 22-11-2026

**Keyword**

Students;
Methods;
Demonstration;
Learning;
Physics;

**How to cite**

Warsito, A., & Sutaji, H. I. (2026). Analysis Of Sman 2 Fatuleu Students' Responses To The Use Of The Demonstration Method In Physics Learning. Jurnal Pengabdian Masyarakat, 7(2), 741–749. https://doi.org/10.32815/jpm.v7i2.3177

**Abstract**

**Purpose:** This community service activity at SMAN 2 Fatuleu aimed to increase students' interest in physics by transforming abstract concepts into concrete visual representations, addressing low engagement identified through preliminary observations and interviews.

**Method:** The activity comprised preparation, material delivery, and guided demonstrations. Data were collected through observation sheets and questionnaires, then analysed by mapping observation indicators onto corresponding questionnaire indicators.

**Practical Applications:** Physics teachers can adopt demonstrations as a low-cost, interactive strategy to visualise abstract material, strengthen conceptual understanding, and motivate learners in resource-limited schools.

**Conclusion:** The consistency between observation and questionnaire results confirms that the demonstration method effectively stimulates students' interest and serves as a viable alternative approach for physics instruction.

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## Introduction

Learning can be interpreted as a process that occurs in individuals when they seek to acquire knowledge from information sources in particular fields such as the humanities, social sciences, engineering, and science. In the field of science, especially physics, learning is defined as a process of interaction between teachers and students related to nature and its phenomena, encompassing mastery of concepts, laws, theories, principles, and applications in everyday life (Aprilia et al., 2022). Ideally, the interaction between teachers and students should be educational and two-way, in which the teacher, as a facilitator, not only delivers material but also serves as a guide, motivator, mentor, and example, while students are expected to reconstruct the knowledge they have acquired as an effort to solve problems both in class and in relation to natural phenomena occurring in their surroundings. This is important because the aim of physics learning is to help students develop and shape their understanding of various physics concepts, so that they are able to build the knowledge needed to solve problems as well as recognize and cultivate attitudes toward scientific culture (Hau et al., 2025; Sabilla et al., 2025; Mawarni et al., 2023).

The objectives of physics learning are certainly what all parties associated with education expect, although in practice, physics learning is still regarded as learning that students do not particularly enjoy, because physics is difficult, has many formulas, and is theoretical and abstract (Sasmi et al., 2025; Sari et al., 2026; Sihombing et al., 2023). This perception was one of the reasons for conducting preliminary observations and interviews with several teachers and students at SMAN 2 Fatuleu regarding physics lessons. The results of the preliminary observations and interviews provided information that, in general, students were identified as having less-than-optimal interest in physics lessons because they found the concepts difficult to understand, the formulas numerous, and the subject abstract, so they were less interested in studying it further. Several factors causing this less-than-optimal interest include economic and family conditions, peer environment, insufficient study time, and the limited availability of school laboratory equipment. In response to this condition, the teachers concerned have made various efforts, and as a form of support, this community service team introduced one learning method, the demonstration method, as an alternative.

The demonstration method is a method used by teachers to present lesson material to their students through oral explanation accompanied by a display or direct demonstration of something using aids, whether real or simulated, and involving students during the learning process (Natalia & Tacoh, 2023; Selviana & Wahyuni, 2023; Firdaus et al., 2024). The advantages of this method include making the material clearer and more concrete, being engaging and enabling students to observe actively, and focusing learners on the main topic (Setiawan, 2022; Yani et al., 2026; Napitupulu et al., 2022).

Several community service activities using this demonstration method have shown that students can understand physics concepts and that their interest in physics lessons increases (Fardela et al., 2024). In addition, demonstrations of simple physics innovation devices have proven effective as an alternative form of contextual learning that is interactive, enjoyable, and relevant to technological developments (Wea et al., 2026).

Based on these conditions and studies, the community service team chose to implement the demonstration method in physics learning at SMAN 2 Fatuleu. The purpose of this activity is to foster students' interest in learning physics by visualizing abstract concepts so that they become more concrete and easier to understand, while actively involving students in the learning process. Another expectation of this activity is that students can continue to develop curiosity, collaboration, and other scientific attitudes based on the experiences they have had.

## Method

The implementation of this community service activity involved lecturers and students from the Physics Study Program, Faculty of Science and Engineering, Universitas Nusa Cendana. This activity was carried out in three stages: the initial stage, the implementation

stage, and the final stage. The initial stage consisted of preparation, namely coordination between the community service team and the school, selection of materials, preparation of equipment for the demonstrations, and development of evaluation instruments in the form of observation sheets and questionnaires. The implementation stage consisted of delivering the material and conducting guided demonstrations of the tools related to the material presented. The materials delivered included electrical measuring instruments, basic electronic components, electronic circuits, operational amplifiers (op-amps), and seven-segment displays. The final stage consisted of observation and the distribution of questionnaires to students to assess their responses to the activity, as well as evaluation and reflection for subsequent community service activities. Five observation indicators were used as evaluation criteria in this activity, as shown in Table 1.

*Table 1*. Observation Indicators For Students

| Evaluation Type | Indicator |
|---|---|
| Observation | 1. Focused attention<br>2. Curiosity<br>3. Clarity of communication<br>4. Returning equipment to its proper place<br>5. Drawing conclusions |

Source: Author's Work, 2026.

Each observation indicator was assigned a score of 1–4, which was then expressed as a percentage using the following formula:

$$\text{Percentage } (\%) = \frac{\text{Total score}}{\text{Maximum possible score}} \text{ x } 100\ \% \quad \text{..... (1)}$$

The percentage criteria indicating the observation results are presented in Table 2, with an interval from 0% to 100%.

*Table 2*. Criteria for the observation results for students

| No. | Score (P %) | Rating category |
|---|---|---|
| 1. | 90 % ≤ P % ≤ 100% | Excellent |
| 2. | 80 % ≤ P % < 90% | Good |
| 3. | 70 % ≤ P % < 80% | Fair |
| 4. | 60 % ≤ P % < 70% | Poor |
| 5. | 0 % ≤ P % < 60% | Very Poor |

Source: Author's Work, 2026.

In contrast, the questionnaire used six indicators for its evaluation, as presented in Table 3.

*Table 3*. Questionnaire indicators for students

| Evaluation Type | Indicator |
|---|---|
| Questionnaire | 1. Systematic organization of activity procedures<br>2. Active participation<br>3. Conceptual understanding<br>4. Satisfaction with the implementation of the activity<br>5. Learning motivation<br>6. Expectation of continuation |

Source: Author's Work, 2026.

The score for each questionnaire indicator ranges from 1 to 4, while the percentage value is expressed using the following formula:

$$\text{Percentage } (\%) = \frac{\text{Total score for the selected indicator item}}{\text{Ideal score}} \text{ x } 100\ \% \quad \text{..... (2)}$$

This questionnaire evaluation has percentage criteria as presented in Table 4.

*Table 4*. Criteria for the questionnaire results for students

| No. | Percentage (P %) | Criterion |
|---|---|---|
| 1. | 75 % < P % ≤ 100 % | Very High |
| 2. | 50 % < P % ≤ 75 % | High |
| 3. | 25 % < P % ≤ 50 % | Fair |
| 4. | 0 % ≤ P % ≤ 25% | Poor |

Source: Author'a Work, 2026.

**Result**

This community service activity proceeded smoothly from the initial stage, through the implementation stage, to the final stage. The positive response, high level of enthusiasm, and full support from the school during the initial stage encouraged the service team to complete all preparations in this stage and to proceed to the implementation stage.

At the implementation stage, students showed high enthusiasm during the delivery of the material, during the demonstration activities, and when they were given the opportunity to demonstrate the apparatus in a guided manner. Many topics were discussed during the implementation, including measurement techniques, soldering techniques, component names, current flow in the circuit, and techniques for constructing circuits on a PCB, along with examples of their applications, such as a seven-segment display.

*Photo 1*. Discussion of Circuit Current and Demonstration of a Seven-Segment Display




Source: Private Documentation, 2026.

Evaluation, as the final stage of the activity, was carried out through observation and the administration of student questionnaires. Observation was conducted on the indicators of focused attention, curiosity, clarity of communication, returning equipment to its proper place, and drawing conclusions, yielding the results presented in Table 5. The questionnaire, which included the indicators of systematic organization of activity procedures, active participation, conceptual understanding, satisfaction with the implementation of the activity, learning motivation, and expectation of continuation, produced the results presented in Table 6.

*Table 5*. Observation Results by Indicator

| No. | Indicator | Observation Results (%) | Category |
|---|---|---|---|
| 1. | Focused attention | 81.4% | Good |
| 2. | Curiosity | 90.7% | Excellent |
| 3. | Clarity of communication | 83.7% | Good |
| 4. | Returning equipment to its proper place | 93.0% | Excellent |
| 5. | Drawing conclusions | 88.4% | Good |

Source: Author's Work, 2026.

The observation results provide a general picture that students' focused attention was in the "Good" category, with a percentage of 81.4%. This is common among some high school students, who are easily distracted by their friends and mobile phones and may feel anxious about being asked questions on lesson material during learning. This condition is consistent with the findings of a study stating that inhibiting factors that can affect students' level of focus and learning concentration include peer influence and students' readiness for learning (Betaviana et al., 2023).

Curiosity was also an observed indicator, with a percentage of 90.7%, which falls into

the "Excellent" category. This high percentage was reflected in the large number of students who stood up when the demonstration apparatus was brought into the classroom in order to look at it. In addition, many students asked questions, whispered to one another, and explained the demonstration apparatus to other students.

For the clarity-of-communication indicator, the percentage was 83.7%, placing it in the "Good" category. The observation results indicate that many of the students possessed basic skills for communicating well. This ability was evident during discussions that took place throughout the learning process. However, efforts to accustom students to communicating scientifically still need to be emphasized, together with deeper mastery of the lesson material to build students' confidence in communicating clearly.

The equipment-returning indicator was in the "Excellent" category, with a percentage of 93.0%. Students' awareness of the functions and benefits of the demonstration apparatus fostered care and caution during the implementation and after the activity, as shown by their returning the demonstration apparatus to its designated place and keeping it clean. This indicates that students already possess the foundations of other scientific attitudes, such as responsibility, care, and collaboration, which can be developed further.

The indicator of drawing conclusions in the observation yielded a percentage of 88.4% in the "Good" category. This percentage value and category are reasonable because the indicator of drawing conclusions is presumed to be related to the indicators of focused attention (81.4%) and communication clarity (83.7%), both in the "Good" category. This presumption arises because students' ability to draw conclusions begins with focused attention during learning in order to acquire knowledge, which is then further expressed through clear communication during discussions.

*Table 6*. Questionnaire Results by Indicator

| No. | Indicator | Questionnaire Results (%) | Category |
|---|---|---|---|
| 1. | Systematic organization of activity procedures | 76.7% | Very High |
| 2. | Active participation | 62.8% | High |
| 3. | Conceptual understanding | 55.8% | High |
| 4. | Satisfaction with the implementation of the activity | 88.4% | Very High |
| 5. | Learning motivation | 51.2% | High |
| 6. | Expectation of continuation | 83.7% | Very High |

Source: Author's Work, 2026.

**Discussion**

The questionnaire results obtained by the community service team showed that the percentage of students' responses for the indicator of the systematic organization of activity procedures was 76.7%, in the "Very High" category. This percentage indicates that students understood the systematic procedures for implementing the demonstration of the apparatus used, including the introduction of the apparatus, objectives, benefits, data collection techniques, data processing, and drawing conclusions. In addition, students also understood the efforts that must be made so that the demonstration apparatus lasts a long time and is not easily damaged during and after the activity. Students' ability to understand the systematic organization of activity procedures is presumed to be related to the ability reflected in the indicators of focused attention, communication clarity, and drawing conclusions, which showed percentages of 81.4%, 83.7%, and 88.4%, respectively, in the "Good" category in the observation results. This presumption is well founded because focused attention is the main prerequisite for students' success in fully understanding the explanations delivered and in restating them through clear communication to draw conclusions appropriately, so as to make the mastery and conceptual understanding of the material discussed more meaningful.

The next questionnaire-result indicator, namely active participation, showed a

percentage of 62.8% in the "High" category. This percentage provides information that students were generally interested in the demonstration method used. This interest, together with the opportunity to be directly involved in the activity and the perception that the material could be understood more easily through demonstration apparatus than through lecture-based explanations and problem solving, made students more active. In addition, the observation results for focused attention (81.4%, "Good"), curiosity (90.7%, "Excellent"), and communication clarity (83.7%, "Good") are also presumed to have influenced the level of students' active participation, which was used as an indicator in the questionnaire. Focused attention serves as the main asset for students in understanding the material and the instructions explained, while curiosity serves as students' motivation to be actively involved in carrying out the activity. Meanwhile, communication clarity acts as a means of conveying opinions and ideas so that learning is more effective, easier, and smoother.

For the conceptual understanding indicator, with a percentage of 55.8% and the "High" category, the results provide a general picture that students already had an understanding of basic concepts, which served as the foundation for understanding the concepts of the material discussed in the activity. The indicators of focused attention (81.4%), communication clarity (83.7%), and drawing conclusions (88.4%), each of which was categorized as "Good" in the observation results, are presumed to influence students' level of conceptual understanding. Focused attention enables students to select relevant information as material concepts and to connect it with prior knowledge. These concepts can later be restated through clear communication in discussions, so that students can draw conclusions about a complete concept by considering other students' conceptual understanding through discussion.

The percentage of satisfaction with the implementation of the activity, namely 88.4% in the "Very High" category in the questionnaire results, indicates that students were generally very satisfied with the implementation of the activity. The "Very High" category for this indicator may have occurred because students considered the demonstration method interesting, engaging, and participatory during the implementation of the activity, as well as helpful for mastering the material and understanding concepts. Students' interest and active participation were evident during the learning process, beginning with their high level of focused attention, curiosity, and ability to tidy up the apparatus after the activity was completed. This is in line with the observation results, which showed that focused attention was at 81.4% in the "Good" category, curiosity at 90.7% in the "Excellent" category, and tidying up the apparatus at 93.0% in the "Excellent" category.

Learning motivation, as one of the indicators in the questionnaire administered to students, showed a percentage of 51.2% in the "High" category. The information that can be derived from this percentage is that students generally already had high motivation to learn, which makes the selection of an appropriate learning method important in the learning process. The selection of the demonstration method in the implementation of this activity was considered appropriate because it can foster and develop interest, focused attention, curiosity, and students' direct involvement in the learning process, including training students to communicate clearly through discussion when presenting the results of the demonstration using the apparatus, which serves as the basis for drawing conclusions. This presumption is consistent with the observation results, which showed a percentage of 81.4% for focused attention in the "Good" category, 90.7% for curiosity in the "Excellent" category, 83.7% for communication clarity in the "Good" category, and 88.4% for drawing conclusions in the "Good" category.

For the expectation-of-continuation indicator, the questionnaire results yielded a percentage of 83.7%, which falls within the "Very High" category. In general, these results indicate that students have experienced positive impacts from the implementation of this activity, so the activity should be continued. Students' focused attention and curiosity, as well as their care in tidying up the equipment after the activity, as reflected in their involvement during the learning process, indicate that students have very high interest, enjoyment, and

enthusiasm, thereby generating a desire for the activity to be continued. The observation results also showed that the focused-attention indicator had a percentage of 81.4% in the "Good" category, curiosity 90.7% in the "Excellent" category, and tidying up equipment 93.0%, also in the "Excellent" category.

The presumed relationship between the questionnaire results and the observation results suggests that students' responses can be identified through observations of their behavior during learning activities, such as focused attention, curiosity, clarity of communication in learning, and the ability to tidy up equipment and draw conclusions. This provides a basis for inferring students' positive responses to learning using the demonstration method, as reflected in their questionnaire answers after the activity was implemented. For example, the observation indicator of curiosity is related to the questionnaire indicators, namely students' active participation and learning motivation. This is consistent with the study by Usfah & Agustin (2026), which found that students' learning motivation and curiosity have a significant influence on their active participation in learning. In addition, the learning-motivation indicator in the questionnaire is also related to focused attention in the observation indicators, as Meiyanda et al. (2026) stated, increased learning motivation can have a tangible impact on improving the quality of students' learning processes, particularly in the aspects of focus and attention in receiving learning material.

## Conclusion

The implementation of the community service activity at SMAN 2 Fatuleu proceeded smoothly and as expected. Students' positive responses during the implementation of the activity were observed through several observation indicators, the results of which are presumed to be related to the indicators in the questionnaire. This presumed relationship is plausible because the demonstration method aims to present abstract aspects of learning in a more concrete form by involving students directly through equipment demonstrations so that they can understand it more easily. Therefore, in physics learning, the demonstration method is worthy of consideration as an alternative for fostering and developing students' interest in learning physics through an integrated understanding of physics concepts.

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