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# The Influence of Wordpress-Based Interactive Learning Media on Student Learning Outcomes in Sound Wave Material

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**ABSTRACT**

This study aims to determine the influence of Wordpress-based interactive learning media on student learning outcomes in sound wave material. The population in this study was all students of class XI/4 in the 2024/2025 academic year at SMA Negeri 1 Gorontalo. The data collection techniques was using an instrument in the form of a student learning outcome test sheet, in the form of a multiple-choice test of 30 questions given to students, namely the initial test (pretest) and the final test (posttest).Based on the results of research on the effect of interactive learning media based on wordpress on student learning outcomes on sound wave material, researcher can draw the conclusion that there is an effect of interactive learning media based on wordpress on student learning outcomes on sound wave material. This is shown by the calculation of the paired sample test with a t-count value less than the t-table value or -15.86 < 1.67. Thus, based on the decision-making criteria, H0 is rejected and H1 is accepted, meaning that there is a significant difference in the average learning outcomes between the pretest and posttest data of the experimental class.

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## INTRODUCTION

Education is a gateway to a better life, because it is a provision to achieve life goals and develop individual potential, both in terms of knowledge, skills, and attitudes (Aspi STAI Rakha Amuntai et al., 2022) In 21st century learning, the use of technology is an important strategy to improve the effectiveness and quality of education (Fitri, 2021).

Technological developments provide great opportunities for the world of education, especially through computer- and web-based interactive learning media, such as simulation, animation, e-learning, and the WordPress platform. This media can improve students' understanding of concepts, learning achievements, critical thinking skills, and interest in learning ((Nurillahwaty, 2021).; Rizaldi et al., 2020; Fadilah et al., 2023). WordPress, as a content management system (CMS), allows teachers and students to interact through forums, quizzes, assignments, and discussions, making the learning process more flexible and interactive (nurain, 2021).

Sound wave material in physics is an abstract concept and difficult to observe directly, so it requires a learning medium that can visualize these concepts. With WordPress-based interactive media, students can understand sound wave material more realistically, increasing learning motivation, active participation, and learning outcomes ((Azahari et al., 2022).

Based on this background, this study has several problem identifications, namely low student learning outcomes in sound wave material and lack of student understanding due to teaching methods that are still lectures. The formulation of this research problem includes: (1) the influence of the use of WordPress-based interactive learning media on student learning outcomes, (2) factors that affect the effectiveness of the media,

and (3) students' responses to learning with interactive media. The purpose of the study was to determine the influence of the use of WordPress-based interactive learning media on student learning outcomes on sound wave materials, identify factors that affect its effectiveness, and find out students' responses to the learning media.

This research is expected to be useful for teachers, by providing practical guidance in using interactive learning media; for students, to understand abstract concepts more easily and increase learning engagement; for schools, as the basis for the development of technology-based learning facilities; and for researchers, to train their ability to solve educational problems through learning media innovation.

## METHOD

This study uses a weak experimental method with a one group pretest-posttest design to determine the influence of WordPress-based interactive learning media on student learning outcomes on sound wave materials. The subject of the study was 38 students in grade XI4 of SMA Negeri 1 Gorontalo. The free variable in this study is the application of WordPress-based interactive learning media, while the bound variable is the learning outcomes of students. Data was collected through learning outcome tests (pretest and posttest), learning implementation observation sheets, and student response questionnaires. All instruments have been tested for validity and reliability. Data analysis was carried out through the Shapiro-Wilk normality test, hypothesis test using a paired sample t-test, and N-Gain calculation to determine the effectiveness of the application of learning media.

## RESULTS

This research was carried out at SMA Negeri 1 Gorontalo in the even semester of the 2024/2025 school year, involving 38 students in class XI4 as a population as well as a sample for the experimental class. The research process took place in three meetings.

At the first meeting, a pretest was carried out to find out the initial ability of the students, then continued with the provision of material about sound waves. The second meeting focused on sound resonance material, accompanied by the screening of an animated video to visualize the concept, and ended with the giving of a quiz as a formative evaluation. The third meeting was given material on the Doppler effect, which then ended with a posttest to assess student learning outcomes after treatment.

During the learning process, students use WordPress-based interactive learning media with a discovery learning model, which aims to encourage active participation, abstract concept understanding, and collaboration between students in solving the given problems.

Table 1. Schedule for Experimental Class Research

| Meeting | Date | Instruments | Material | Time |
|---|---|---|---|---|
| I | 15 May 2025 | Tests, Teaching Modules | Sound Waves | 2 × 45' |
| II | May 21, 2025 | WordPress Media, Teaching Module | Sound Resonance, Animated Videos, Quizzes | 2 × 45' |
| III | May 22, 2025 | Tests, Teaching Modules | Doppler Effect | 2 × 45' |

The data obtained by the researcher was collected through test results. The test was used by researchers to determine student learning outcomes by applying interactive-based learning media with the help of WordPress.

### Analysis of Pretest and Posttest Data on Student Learning Outcomes

### Description of Pretest and Posttest Scores

The pretest and posttest scores of students of the experimental class are presented in descriptive statistics in Table 4.4. The average pretest score was 40.95 and the posttest was 84.48, with an average difference of 43.53. This shows an increase in student learning outcomes after being given treatment.

Table 2 Descriptive Statistics of Pretest and Posttest Scores of Experimental Classes

| Value | N | Min | Max | Std. Dev | Variance | Mean |
|---|---|---|---|---|---|---|
| Pretest | 38 | 16 | 63 | 14,24 | 22,87 | 40,95 |
| Posttest | 38 | 67 | 100 | 9,14 | 83,55 | 84,48 |

### Inferential Statistical Tests

### Normality Test

Before being analyzed, the data is tested for normality using Excel. Decision criteria: if $\chi^2$ is calculated > $\chi^2$ table, the data is normally distributed; If $\chi^2$ is calculated < $\chi^2$ table, the data is not normal.

Table.3 Pretest and Posttest Normality Test Results

| Yes | Value | $\chi^2$ count | $\chi^2$ Table | Decision |
|---|---|---|---|---|
| 1 | Pretest | 32,08 | 11,07 | Normal Distributed |
| 2 | Posttest | 257,73 | 11,07 | Normal Distributed |

Based on Table 3, the $\chi^2$ value is calculated > $\chi^2$ table for both data, so it can be concluded that the pretest and posttest data are normally distributed and there is an average difference between the two.

**Homogeneity Test**

The variance homogeneity test was carried out on the pretest and posttest scores of experimental class students using Excel.

Table 4. Pretest and Posttest Variance Homogeneity Test Results

| Yes | Value | Variance | F count | F table (α=0.05) | Decision |
|---|---|---|---|---|---|
| 1 | Pretest | 22,86 | 2,43 | 1,73 | Homogeneous |
| 2 | Posttest | 83,55 | – | – | Homogeneous |

Based on Table 4 the value of F is calculated > F table, so that $H_0$ is accepted. This means that the variance of pretest and posttest data is homogeneous and there is no difference in variance between the two.

**Hypothesis Test**

Hypothesis testing was carried out after the data was declared normal and homogeneous, using a paired sample t-test to determine the influence of interactive learning media on student learning outcomes.

**Research hypothesis:**

$H_0$: There was no significant difference in average learning outcomes between pretest and posttest.
$H_1$: There is a significant difference in average learning outcomes between pretest and posttest.

Decision-making criteria:
If Sig. (2-tailed) < 0.05 → $H_0$ is rejected
If Sig. (2-tailed) ≥ 0.05 → $H_0$ is accepted

Table 5. Paired Sample Test Results t-Test Pretest and Posttest

| Yes | Value | Average ($\bar{X}$) | t count | t table | Conclusion |
|---|---|---|---|---|---|
| 1 | Pretest | 40,95 | -15,86 | 1,67 | $H_1$ Accepted |
| 2 | Posttest | 84,48 | – | – | – |

The test results show that t calculates < t table (α = 0.05), so that $H_0$ is rejected and $H_1$ is accepted. This means that there is a significant difference between pretest and posttest scores. Descriptively, the average pretest score of 40.95 increased to 84.48 after being given WordPress-based interactive learning media, showing the positive influence of the media on student learning outcomes on sound wave material.

**N-Gain Test**

The improvement of student learning outcomes was analyzed using N-Gain based on the cognitive level with WordPress-based interactive learning media. Of 38 students:

Recall level (C1): N-Gain 0.27 → low
Understanding level (C2): N-Gain 0.98 → high
Applying level (C3): N-Gain 0.32 → medium
Analyzing level (C4): N-Gain 0.16 → low

These results show an improvement at all cognitive levels, although some levels are still low, as the average pretest score is relatively low (40.95), while the average posttest increases to 84.48.

Based on the sub-material of each meeting:

Sound waves (meeting I): N-Gain 0.95 → high
Resonance (meeting II): N-Gain 0.95 → high
Doppler effect (meeting III): N-Gain 1.00 → high

The average pretest score before treatment was 42.90 and posttest after treatment was 84.73, with an average N-Gain of 0.71 → the "high" category. This shows that WordPress-based interactive learning media is effective in improving student learning outcomes.

**Learning Implementation Analysis**

Learning activities in the experimental class were carried out for three meetings using WordPress-based interactive learning media. The results of the observation of the implementation of learning are shown in

Table 6 Results of Calculation of Implementation of Experimental Class Learning

| Meeting | I | II | III | Average | Category |
|---|---|---|---|---|---|
| Value | 3,7 | 3,6 | 3,6 | 3,67 | Very High |

The average score of learning implementation was 3.67 out of a maximum of 4 included in the "Very High" category. This shows that learning with WordPress-based interactive media runs effectively and all learning steps are carried out well during the three meetings.

## DISCUSSION

This study aims to determine the influence of WordPress-based interactive learning media on the learning outcomes of grade XI students of SMA Negeri 1 Gorontalo on sound wave material, especially in the cognitive aspect through a 30-question multiple-choice test which includes the ability to remember (C1), understand (C2), apply (C3), and analyze (C4).

The results of the study showed an increase at each cognitive level. In the ability to remember (C1), most students were able to answer the questions correctly, with a score of 0.27 which was relatively low, but 36 out of 38 students managed to answer correctly, indicating an increase in learning outcomes. The factor of student learning readiness is an important determinant in this achievement (Dalyono in Nuraeni, 2021). Comprehension (C2) indicates higher results, with a score of 0.98, indicating that all students have comprehended the material thoroughly, supported by students' attention and interest in learning (Rina Fadiya, Susanti Sufyadi, 2022).

In the ability to apply (C3), some students still had difficulty applying the material, but overall 37 out of 38 students managed to answer correctly, with a score of 0.32, showing a significant increase in learning outcomes. This emphasizes the importance of interesting teaching methods to support problem-solving and knowledge application (Nuraeni, 2021). Analytical ability (C4) showed some students still had difficulties, with a score of 0.16, although 30 out of 38 students managed to answer correctly. Students' motivation and interest in learning play a big role in achieving this analytical ability (Rina Fadiya, Susanti Sufyadi, 2022).

The use of WordPress-based interactive learning media makes a significant contribution to improving learning outcomes. Students are more participatory in the learning process, active in group discussions, and able to operate the WordPress platform to expand their horizons and creativity (Kinanthi & Raini, 2023; Andini, et al., 2025). These media support 21st-century learning by facilitating active student engagement, creating an enjoyable learning experience, and enhancing interaction between teachers and students (Nugraha, 2025).

Despite technical constraints such as internet access and the need to understand the basics of WordPress operation, the pretest and posttest results showed an average increase of 43.53, with an average posttest score of 84.48, higher than the pretest, and meeting the KKM of 75 (Nurdayati et al., 2021). This is in line with previous research that showed WordPress was able to increase students' interest, creativity, and learning outcomes (Ekasari et al., 2021).

Overall, the use of WordPress-based interactive learning media is effective in improving student learning outcomes on sound wave materials. This media allows teachers to design activities that are interesting, dynamic, and able to activate the role of students optimally in the teaching and learning process, so that learning goals are achieved effectively (Effendy, 2016)

## CONCLUSION

Based on the research that has been conducted, the researcher draws the conclusion that there is an influence of wordpress-based interactive learning media on student learning outcomes on sound wave material.

## SUGGESTION

Teachers are advised to take advantage of WordPress-based interactive learning media to make the learning process more interesting and effective, especially in physics learning.

Students are expected to improve technical skills in accessing and operating the WordPress platform to support the learning process

Schools need to ensure adequate internet network facilities so that the use of WordPress-based learning media can run smoothly and optimally.

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