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Development of Google Sites Website Based Learning Media to Improve IPAS Learning Outcomes on the Material of Sound and Its Properties

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Abstract: This research applied Borg and Gall's research and development (R&D) method. There are 10 stages, but this research only reaches stage 8, namely the usage trial. The difficulty experienced by students in learning the material is due to the lack of technology-based media so that the value of complete students is 35 and 65% is not complete. The data collection methods used are tests and non-tests (observation, interviews, questionnaires, and documentation). This is the main reason for this research, which is to make learning media based on Google Sites, test its feasibility, and evaluate its effectiveness. The results showed that Google Sites-based media was created using Google Sites, with contents in the form of a main page, main menu (learning objectives, materials, LKPD, videos, music, and profile), and navigation guides. A very feasible assessment was obtained with a percentage of 93.75% material experts and 92.5% media experts. The effectiveness of the media is measured from the pretest and posttest scores as evidenced by the calculation of the t value of -10.699 and the sig value. (2-tailed) of 0.000 < 0.05. The N-Gain test obtained a medium category with an average N-Gain result of 0.6154. The results of this study indicate that the media design has been made, feasible, and effective to improve the learning outcomes of fifth grade students of SDN Rejamulya 02 Cilacap Regency on the material of Sound and its Properties.

Keywords: Learning media; Learning outcomes; Website-based Google Sites

Introduction

Education must be obtained because it is important for the creation of a quality Indonesian society. According to Article 31 paragraph (1) of the 1945 Constitution states that "Every citizen has the right to education"(Lanawaang & Mesra, 2023; Khoirudin, 2024). A quality golden generation will be produced in the future after citizens' rights to education are fulfilled. The foundation used as a reference in the implementation of education is the curriculum (Azis, 2018; Hakim, 2023). Based on Permendikbud No. 718/P/2020, a set of plans, arrangements, and goals pertaining to learning materials, objectives, and content that serve as instructions for structuring learning activities in order to accomplish specific educational goals is known as the curriculum (Kemdikbud Ristek, 2020). The independent curriculum is currently being implemented in Indonesian education, focusing on essential material that is expected to strengthen student competitiveness and deepen learning (Sasmita & Darmansyah, 2022; Widyastuti, 2024). To develop the education unit curriculum for quality learning, the independent curriculum provides support for teaching tools including training materials that can be accessed flexibly by educators (Lubis et al., 2024; Violeta & Achadi, 2024).

The structure of the standalone curriculum is stated in the Decree of the Minister of Education, Culture, Research and Technology No. 262/M/2022 which states that the learning outcomes for SD/MI are divided into three phases, for classes I and II in phase A, phase B for classes III and IV, for classes V and VI in phase C

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(Kemdikbud, 2022). The combination of social science and natural science into one learning resource is known as IPAS (Natural and Social Science) (Wijayanti & Ekantini, 2023; Susilowati, 2023). In this integration, it is intended that students can understand the natural and social aspects of life, so that in teaching the two subjects are connected to each other and not taught separately (Anggraini et al., 2024; Iffah et al., 2024). As a result, IPAS is anticipated to enhance students' critical thinking, teamwork, communication, and innovative skills. This research focuses on science subjects, especially on the clumps of science (Natural Sciences). Science learning in elementary schools teaches about recognizing scientific concepts that are close to nature such as plants, animals, humans and the natural environment (Tsaniyyanti & Andriani, 2024; Ansya et al., 2024).

However, in reality, in the implementation of science learning in elementary schools, students' problem solving skills are still low. The results of PISA 2022 show that the pandemic is to blame for the drop in national learning performance (Fauzi et al., 2024; Kholiq, 2024). Indonesia's score dropped 13 points for science literacy, while the international average dropped 12 points. In PISA 2022, participating countries experienced a 52% decrease in science literacy scores compared to PISA 2018 (Paiticen et al., 2024). From the PISA 2022 results, to improve science scores for countries that score below the average, can utilize digital-based technology in learning that can be accessed by students, with this utilization can help improve PISA scores (Idil et al., 2024). The problems found based on observations and interviews are declining learning outcomes and the absence of creative and technology-orientated learning media. From this opinion, teachers must determine the appropriate learning media to support learning to improve student learning outcomes.

Student learning outcomes will be completed with the support of technology-based learning media because learning can run optimally and effectively. Student learning outcomes that have not met the KKM (Minimum Completeness Criteria) standard indicate that the science learning outcomes of the material Sound and its Properties are still low, supported by evidence of the results of daily tests of fifth grade students of SD Negeri Rejamulya 02 Cilacap Regency. In class V all students totaled 20. The presentation of students who scored above the KKM or complete was 35% or 7 students while for students who scored below the KKM or incomplete was 65% or 13 students.

Based on the existing problems, to improve learning outcomes, technology-based media is needed in learning. By using media with digital technology, visualization of science concepts can be done by the teacher and taught to students, so that students can receive material in an interesting and understandable way (Aminullah & Irwansya, 2024; Rahmadhea, 2024). With learning media, students can focus more on listening to learning. The learning media in question is media that can combine audio, images, video, and animation into a component, so that interest in learning will grow because of the interaction between students and teachers. Researchers will develop website-based Google Sites learning media, so that student learning outcomes increase in IPAS learning on sound material and its properties. The purpose of this research is to develop a Google Sites-based website, test its feasibility, and find out how much the effectiveness of the website at SDN Rejamulya 02, Cilacap Regency.

Method

The research design used is research and development (R&D) to create or improve existing products to achieve the objectives of this study. The R&D method is a research approach that creates, develops, or refines a product to test its efficacy, according to Sugiyono (2021). The Borg & Gall model has 10 stages in research and development (Al Hilal & Aulia, 2021; Hajar et al., 2024; Mufidah & Khori, 2021) namely: potential and problems; data collection; product design), design validation; design revision; product trial; product revision; usage trial; product revision; product revision; and mass production (Handayani et al., 2024; Nandadewi & Faturrahman, 2024). In this development, the Borg and Gall model was used (Waruwu, 2024; Wati & Sukmayasa, 2024). This research only reached the 8th stage, which is the trial of use. This was based on the limited time and money owned by the researcher. To revise the product and the mass production stage requires a long time and is not cheap. Basically, there are ten steps of Borg & Gall development, but these ten steps cannot be done in their entirety, but can be modified into several steps and stages according to development needs (Neolaka & Jiwantono, 2023).

Student understanding can be developed by learning using Google Sites media so that student learning outcomes about sound and its properties increase. Researchers conducted an initial analysis through observations of schools, classes, students and teachers, interviews with principals, class teachers, and students, documentation of learning outcomes, needs and responses questionnaires for teachers and students. From the data analysis, the researcher developed a web-based learning media design google sites. Assessments from media experts and material experts obtained can be used to determine the feasibility of the resulting media. Table 1 can be used to convert the percentage value of feasibility data.

Table 1. Assessment criteria

Percentage (%)	Criteria
81-100	Very Feasible
61- 80	Feasible
41- 60	Less Feasible
21-40	Not Feasible
0-20	Very unfeasible

During the learning process, the effectiveness of Google Sites web-based learning resources was assessed by comparing pretest and posttest results. This test includes normality test, paired sample t-test, and N-Gain test. The Shapiro-Wilk test algorithm and SPSS 25 software were used to conduct the normality test. The t-test was also conducted using the same application. The N-Gain test was used as an analysis to ascertain whether students' learning outcomes had improved. Based on the modification of students' learning outcomes, N-Gain inference is used to assess the success of a lesson. How to use the formula to calculate N-Gain.

$$\text{N} - \text{Gain} = \frac{\text{Posttest score} - \text{Pretest score}}{\text{Maximum score} - \text{Pretest score}} \quad (1)$$

The predefined criteria in Table 2 are used to categorize the findings.

Table 2. N-Gain interpretation criteria

Value	Criteria
N-Gain ≥ 0.70	High
0.30 ≤ N-Gain < 0.70	Medium
N-Gain < 0.30	Low

Result and Discussion

This research is related to the development of website-based google sites media on IPAS class V material on sound and its properties. By looking at the results of research that has been done, then there are three things that there are three things that will be reviewed in the results of this research and discussion, namely; the results of the development of media-based google sites website; feasibility of media-based google sites website; and the effectiveness of media-based google sites website to improve social studies learning outcomes; and the effectiveness of website-based google sites media to improve the learning outcomes of grade V students at SDN Rejamulya 02, Cilacap Regency.

Potential and Problems

To find the potential and problems that exist in class V at SDN Rejamulya 02, Cilacap Regency, researchers conducted observations through interviews, questionnaires and document data in the form of learning outcomes of sound and its properties. Based on the results of the observations made, it shows that there are limitations in the use of media to support science learning; have not utilised technology-based media; the learning model is still one-way (teacher centered). To overcome these problems in science learning, researchers conducted research and development of website-based google sites media on science subjects of sound and its properties.

Data Collection

Data collection conducted by researchers is to analyze the questionnaire of student needs and teacher needs. In the needs questionnaire, several questions have been provided that must be answered by students and teachers related to learning, learning media, and website-based google sites learning media designResearchers used the needs questionnaire answers as a guide to create media that met the learning needs of teachers and students. Based on the results of observations, it can be seen that the learning outcomes of science material on sound and its properties are still low. In addition, the results of interviews with teachers and the results of questionnaires of student needs show that. There is a great need for technology-based learning media by utilizing smartphones owned by students and other infrastructure at school. Students need website-based google sites learning media equipped with pictures, images, videos, audio and evaluation questions that are attractively packaged on bamboo material. Interestingly packaged on the material of sound and its properties.

Design and Product

In creating a website for learning media, researchers use a digital platform, namely google sites (Sugiarto et al., 2024). By using website creation tools such as Google Sites, the website can be utilized as one of the media in learning (Hidayat et al., 2023). There are several advantages possessed by Google Sites, namely that it takes a fast time and provides convenience in accessing information because in the platform there are features such as audio, animation, images, videos and so on that can be combined into one file, so that it can contain a lot of information and learning materials (Khoiriyah et al., 2024; Noprina et al., 2024).

To achieve learning goals, teachers can utilise these features according to their needs. In utilizing Google Sites, users only need to have a Google account, after which users can take advantage of the features available free of charge (Kayyis et al., 2024; Mukti et al., 2020; Uskenat & Yuliatun, 2023). Therefore, visually appealing web-based media designed using Google Sites is very important so that the learning outcomes of sound and its properties in IPAS learning increase. This will help teachers in assisting student learning. The following is the Google Sites website media design.

Figure 1. Cover page

Figure 2. Instructions

Figure 3. Home

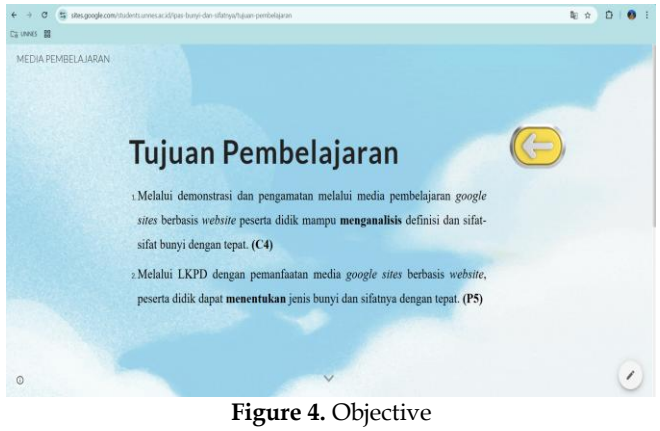

Figure 4. Objective

Figure 5. Learning song

Figure 6. Material

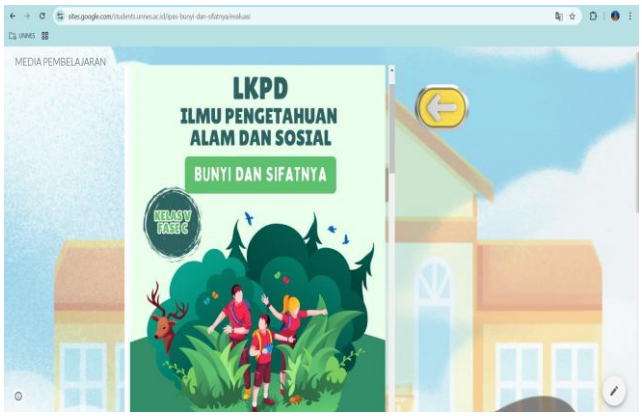

Figure 7. LKPD

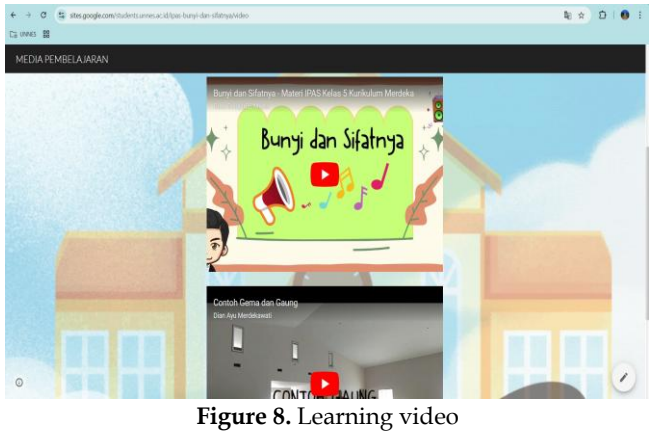

Figure 8. Learning video

Figure 9. Developer

Design Validation

Media experts are a team that provides media validation, input, assessment, suggestions for the media that researchers have developed (Musabihatul & Mijahamuddin, 2020; Nurhasanah, 2022). With the media experts, the developed media can be tested properly. Material validation is assessed by material experts. Material experts provide an assessment or validation using a validation instrument for assessing the feasibility of sound and nature IPAS material. Material experts also submit suggestions for material improvement.

Design Revision

The results of the assessment of media and material validation of the website-based google sites media received a score with very feasible criteria to be tested. Products can be tested on small groups first.

Small Group Product Trial

The website-based Google Sites media has been validated by a team of media experts, so small groups can test the media to find out whether it can be used. Six students from SD Negeri Rejamulya 02 with different academic levels (two pupils with low ability, two with medium ability, and two with excellent ability) were given a small-scale product trial of the website-based Google Sites learning material. To measure the ability of students' academic levels, purposive sampling techniques can be used. Before the learning media is tested in a product trial or large-scale trial, a small-scale study is first conducted to ensure the feasibility of the website-based Google Sites learning media.

During the first stage of the small group trial, the researcher asked pretest questions to measure students' ability before media-based learning. We then used Google Sites media to discuss the properties of sound and its properties. At the conclusion of the class, students answered posttest questions to compare their performance before and after utilizing Google Sites media.

At the beginning of small group learning, there was a pretest to determine the score before using the media, the highest score was 76 and the lowest score was 36. The pretest completeness presentation was 16.67% because the KKM chosen for IPAS learning is 70. The posttest results after students follow media-based learning are 100 for the highest score and 72 for the lowest score. The posttest completeness presentation was 100%, and an average score of 84.67 was obtained based on these results.

Table 3. Pretest and Posttest results

Value	Highest	Lowest	Mean	Percentage (%)
Pretest	76	36	58	16.67
Posttest	100	72	84.67	100

Based on Table 3 after using website-based google sites media, student learning outcomes from pretest to posttest increased. Based on these findings, it is possible to use Google Sites learning media for educational purposes. Students' learning outcomes improved when this learning media was used. The researcher distributed to teachers and students a response questionnaire to find out more about their reactions to the learning media.

Based on the results of the analysis of teacher and student responses in the small group trial of SD Negeri Rejamulya 02, it was found that the media applied was very feasible and there were no revisions from researchers regarding the media developed. So that large group trial research can be carried out.

Product Revision

Based on the results of teacher and student response questionnaires through small-scale trials conducted by researchers, there is no product revision because it is appropriate.

Large-Scale Usage Trial

In the next stage, the large-scale trial or utilisation trial. This large-scale trial was conducted to determine the effectiveness of using learning media based on the Google Sites website. Twenty students from class V of SDN Rejamulya 02 participated in the large-scale trial. The instruments used in this trial were students' pretest and posttest results.

The lowest student score on the usage exam was 32, while the highest score was 88, according to the results of the pretest that was given at the start of the learning process. With these results, the average score is 61.2. In IPAS learning, the KKM set is 70, so the presentation of completeness during the pretest is 40%. After students follow the media-based learning, the posttest results show that 65 is the lowest score and 100 is the best score. From these results, an average of 80.4 was obtained and

the presentation of completeness during the posttest was 85%.

The Feasibility of Website-Based Google Sites Learning Media to Improve IPAS Learning Outcomes on Sound and Its Properties

Media experts and material experts are validations that assess website-based google sites media. The assessment results are shown in Table 4.

Table 4. Media and material expert validation results

Expert	Score	Total Score	Percentage (%)	Criteria
Media	37	40	92.5	Very feasible
Material	45	48	93.75	Very feasible

In the media expert validation assessment, the website-based google sites media received a score of 37 values of 92.5 with very feasible criteria. In the material assessment from the material expert, the sound material and its properties get a score of 48 scores 93.75 with very feasible criteria, so that the media and sound material and its properties are ready to be tested in large groups.

Teachers and students took part in evaluating the Google Sites-based websites that were created. Teachers and students assessed the feasibility of the media by filling out a response questionnaire. The questionnaire on the small group trial of the student response assessment scored 58 out of 60 with a very feasible category because it obtained a calculation of 96.67%. While the teacher response assessment questionnaire scored 11 out of 12 total scores, or 91.67% with very feasible criteria. In the large-scale trial there were 20 students and teachers who gave an assessment of the response questionnaire. In tables 6 and 7 there are the results of the acquisition of student and teacher responses.

Table 5. Results of small-scale response

Response	Score	Percentage (%)	Criteria
Students	58	96.67	Very Feasible
Teacher	11	91.67	Very Feasible

Table 6. Results of large-scale response

Response	Score	Percentage (%)	Criteria
Students	197	98.5	Very Feasible
Teacher	12	100	Very Feasible

In the large group trial, out of 20 students, the score was 197 out of 200 total scores or 98.5% if presented. While the teacher's score gets the maximum score of 12 or the equivalent of 100% if presented. These results indicate that the use of website-based google sites media in learning IPAS sound material and its properties is considered very feasible to use and provides good benefits for students and teachers.

The Effectiveness of Website-Based Google Sites Learning Media to Improve IPAS Learning Outcomes on Sound and Its Properties

The effectiveness value of website-based google sites media is done by calculating the normality test, t-test, and N-gain test. To find out whether the values are normally distributed or not, the normality test is carried out. Researchers used the SPSS 25 application in the normality test with Shapiro Wilk.

Table 7. Normality test results

Class	Statistic	df	Sig
Small pretest	.941	6	.667
Small posttest	.957	6	.794
Large pretest	.933	20	.175
Large posttest	.950	20	.362

Based on the results of the SPSS output above, the results of the pretest and posttest normality test obtained the value for the small pretest Sig < 0.667 and the value for the small posttest < 0.794 while the Sig value > 0.175 for the large pretest and the value for the large posttest < 0.362. If the sig value > 0.05 then the data accepts H0 and is said to be normally distributed. If the sig value < 0.05 then the data is said to be not normally distributed. From the normality test that has been carried out based on the pretest and posttest results, it is concluded that the pretest and posttest values are normally distributed and can proceed to the t test through parametric statistics as shown in Table 8.

Table 8. T-test results

Action	Mean	Std. deviation	Std. error	Df	Sig. (2-tailed)
Small Pre-Post	-26.66667	7.44759	3.04047	5	.000
Large Pre-Post	-21.60000	9.02861	2.01886	9	.000

Based on the above output calculated from SPSS version 25, the average difference between pretest and posttest sig.(2-tailed) 0.000. In the Paired Samples T-Test, if the sig. (2-tailed) value is < 0.05 then there is a significant difference in value between pretest and posttest. While there is no significant difference in value if the sig value. (2-tailed) > 0.05. From the results of the t-test that has been carried out, the sig. (2-tailed) 0.000 < 0.05, it can be concluded that the pretest and posttest scores show a significant difference.

The N-Gain test is a test that measures the effectiveness of the media and is the final test used. Based on modifications in student learning outcomes, N-Gain inference is used to assess the efficacy of a lesson or intervention. From the calculation and analysis of N-Gain, it is obtained that the average value of N-Gain is

included in the medium group, namely 0.6154. Based on these final results, it can be said that in learning the use of Google Sites media on the website effectively helps students in learning.

Table 9. N-Gain test results

Action	N	Min	Max	Mean	Std. Deviation
N-Gain score	26	.22	1.00	.6154	.19806
N-Gain percent	26	22.22	100.00	61.5437	19.80625

Conclusion

The development of website-based *google sites* media through this R&D research contains instructions for using the media, learning objectives, learning videos, materials, LKPD, learning songs, and developer profiles. The assessment from the material expert scored 93.75% and the media expert scored 92.5%. Both assessments received very feasible criteria. The effectiveness of the media is measured from the pretest and posttest scores as evidenced by the calculation of the t value of -10.699 and the sig. (2-tailed) of 0.000 <0.05, while the n-gain value is 0.6154. It can be concluded that the research on google website-based learning media has been successfully developed, very feasible and effective for use in science learning.

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