



Development of Interactive Learning Media Assisted by Google Sites in Building Materials for Elementary Schools Grade V

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Abstract: This research is motivated by the lack of use of multimedia in Mathematics learning in elementary schools, teachers more often use one-way based learning media which will make students feel bored. The aim of this research is to develop interactive learning media assisted by Google Sites on Class V Elementary School Building Materials. This research uses research and development (R&D) methods using the 4D development model (Define, Design, Develop, Disseminate). Data collection in this research uses a questionnaire to determine expert assessments of media and test media practicality. Effectiveness testing is carried out using tests. In the Define stage, an initial analysis of the curriculum and students is carried out. In the Design stage, the design of the Flowchart and Storyboard for the Google Sites interactive media being developed is carried out. Validation by experts on Google Sites media in the material aspect received a score of 91.56% in the Very Valid category, in the media aspect it received a score of 61.33% in the Valid category, and in the language aspect it received a score of 84.23% in the Very Valid category. Furthermore, the results of the practicality test by the teacher got a score of 97.33% and the students got a score of 88.33% in the Very Practical category. The results of the effectiveness test showed that the average student score was 90.92, there was an increase in the students' knowledge score. Meanwhile, the average N-Gen Score obtained from the difference between students' pre-test and post-test scores obtained a percentage value of 79.31% in the Effective category. From the research carried out, it can be concluded that Interactive Learning Media Assisted by Google Sites in Building Materials for Class V Elementary Schools is valid, practical and effective interactive media, so it can be used in the learning process.

Keywords: Building space; Google sites; Learning media

Introduction

Education plays a very important role in life (Duggan & Gott, 2002; Roth & Lee, 2004). Currently, education has entered the 4.0 era, where the role of technology has become very important. Increasing interaction and connectivity as well as the development of digital systems are the impact of a world that has entered the era of the industrial revolution generation 4.0. The times and advances in sophisticated technology

have an impact on all aspects of life. One of the impacts is the impact on the education system in Indonesia.

For this reason, education must always improve in order to produce better quality than before (Dilla & Hidayat, 2023; Pradana et al., 2024). Education in Indonesia continues to change to keep up with the times. The development of the world of education with various kinds of reforms is expected to improve the quality and quantity of education. With education, it is hoped that it can give birth to the nation's next generation with intelligent and qualified individuals, which means a

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generation that is able to make the best use of existing progress.

Mathematics is a mandatory subject taught at every level of education, starting from elementary school, junior high school, and senior high school. Mathematics is the science of patterns and rules, the science of things that have regular patterns and logical sequences. Mathematics is not a solitary knowledge that can be perfect by itself, but mathematics exists to help humans understand and overcome their problems (Lathiifah & Kurniasi, 2020).

Mathematics grows and develops because of the thought process, therefore logic is the basis for the formation of mathematics. One of the main reasons for teaching mathematics subjects to students in schools is to provide individuals with knowledge that can help them deal with various things in life, such as education, work, or conducting research. However, in implementing mathematics learning, there are still several obstacles, such as students' perceptions that mathematics is difficult to learn and understand (Putri & Widodo, 2018). One of the reasons for the problems above is that teachers generally prefer traditional approaches in teaching mathematics in the classroom (Fauzan et al., 2018).

Mathematics learning outcomes in class V elementary schools also tend to be low, there are still some students who get scores that do not reach the minimum achievement, so teachers must make more efforts to improve student learning outcomes, one of which is by using learning media. Because the existence of learning media can help teachers in conveying learning material and students will also understand more easily with the help of using learning media (Saifulloh et al., 2023).

Teachers tend to develop learning tools without considering students' learning styles. This makes learning less than optimal. Teachers still experience difficulties in explaining material to students because it appears that students have different learning styles. Students with intrapersonal intelligence prefer to study alone, while students with interpersonal intelligence prefer to study together. Students who have an understanding intelligence learning style carry out activities through an inquiry process and do not have problems with abstract concepts. Students who have a Musical Intelligence Mastery learning style carry out activities through concrete objects, while an understanding learning style carries out activities through an inquiry process and have no problems with abstract concepts (Yerizon et al., 2018).

In accordance with the abstract nature of mathematics subject matter, mathematics learning must be appropriate to the child's level of personal development. Mathematics is a subject that most

students are less interested in, because students already consider that mathematics is difficult and complicated because it is always related to numbers, formulas and calculations. The cause of students' fear of learning mathematics is due to the incorrect way of understanding the material in mathematics learning.

The result of the learning above is that students become less likely to enjoy learning mathematics and think that mathematics is something difficult and scary. Conventional mathematics learning can cause boredom and boredom. Students who are less talented in learning mathematics will be very afraid of mathematics. Another measurable effect is on mathematics learning outcomes which show low results (Mutrikoh et al., 2020).

To anticipate this, learning media is needed which can help a teacher deliver learning to students in a more interesting way. Learning media is anything that can be used to channel messages (learning materials), so that it can stimulate students' attention, interest, thoughts and feelings in learning activities to achieve learning goals. Learning media is an integral component of the learning system, which means that learning media cannot be separated from the learning process. Without learning media, the teaching and learning process cannot occur (Rasyid et al., 2017).

In terms of the interactivity of a learning media, interactive learning media has the advantage that it inherently forces users to interact with the material. These interactions vary from the simplest to the most complex. In mathematics learning, interaction in the use of learning media, for example, the user must press the keyboard or click with the mouse to move pages (displays) or enter answers to an exercise and the computer responds by providing the correct answer through feedback and can also click. mouse to see changes in the shape of objects. Complex interactions include activities in a simple simulation where the user can change a certain variable or a complex simulation such as a simulation of rotating a three-dimensional object (Sumilat, 2018).

One of the interactive learning media that can be applied is Google Sites. Google Sites can be used interactively, which is one of Google's products that can be used to create learning media based on e-learning websites. Google Sites. Dynamic software is a medium that can provide opportunities for teachers to improve their abilities (Pubian & Herpratiwi, 2022). Google Sites gives teachers the opportunity to manipulate objects, which is very useful in delivering mathematics learning material, one of which is spatial structure material. The advantage of Google Site is that it is a platform that can be used free of charge. Then, the process of creating Google Sites is quite easy with various tools that have been provided such as content blocking, videos

connected to YouTube, image carousels, placeholders for placing the content you want to display, forms that connect directly to Google Forms, and so on.

Method

This type of research is development research. Research and development (Research and Development) or usually abbreviated as R&D. R&D research is an effort or activity to develop a product that is efficient to use (Erita & Hamimah, 2020). Research and Development is a series of processes or steps in order to develop a new product or improve an existing product so that it can be accounted for (Nixon, 1998). 4D Development Model (Four-D Model).

This 4D development model was developed by Thiagarajan. The Four-D development model consists of 4 main stages, namely: Define, Design, Develop and Disseminate. The Four-D development model consists of 4 main stages, namely: Define, Design, Develop and Disseminate (Rizki et al., 2016). This method and model was chosen because it aims to produce a product in the form of interactive learning media assisted by Google Sites on class V elementary school building materials. The product developed was then tested for its suitability with validity to determine the extent of the suitability of Google Sites-based interactive mathematics learning media, building materials for class V elementary school.

Result and Discussion

This research uses the Research and Development (R&D) method with a 4D model, where there are four stages, namely Define, Design, Develop, and Disseminate. The following are the research results from each stage as follows:

Define Stage

The definition stage is carried out by analyzing several aspects which include: initial analysis, curriculum analysis, student analysis and concept analysis. The results of the analysis are described as follows:

Preliminary Analysis

Based on observations of the implementation of learning activities in class and interviews with teachers, it is known that the learning process has not used learning media for Mathematics lessons. The teacher explains that the learning process carried out in class is in accordance with the teaching module, textbooks in the school, and questions in the textbook. According to the teacher, the teaching modules used are not yet detailed so that the activities carried out by students during the learning process cannot be seen.

During learning activities in class, it was seen that student activity was still lacking. Students do not dare to ask the teacher about material they do not understand. Students look embarrassed and afraid to ask questions so that learning occurs more dominantly in one direction, namely from the teacher only. Only a few students actively ask questions, opinions or suggestions during class learning. The teacher explains that students' abilities are very diverse and their understanding of the material is very different. There are those who understand quickly and there are students who take a very long time to understand the material presented. Students' mathematical abilities are not very visible during the learning process and are still relatively low. Apart from that, many students still find learning mathematics very difficult to understand and there are lots of formulas so they are more passive and their interest in learning decreases.

In an interview, the class V teacher said that during learning students only used the textbooks provided by the school. The teacher only relies on the book without any other references. According to the fifth grade teacher, it would be better to use appropriate learning media during the mathematics learning process so that it can attract students' interest in learning and can increase students' competence in learning mathematics.

Based on the results of the needs analysis that has been carried out, it is necessary to develop interactive learning media based on Google Sites in Building Class V material. In this way, learning will be more optimal and interesting and can help students improve their competence in learning (Hidayat et al., 2023; Rijal et al., 2024; Rozhana et al., 2023; Safei, 2024). Apart from that, the learning process using interactive media will facilitate students finding answers to mathematical problems independently or in groups, so that learning is more meaningful and not easily forgotten.

Design Stage

To produce interactive learning media assisted by Google Sites on Building Space material in class V Elementary School, flowcharts and storyboards were first created as design plans for the interactive learning based on Google Sites that was developed. Next, create interactive learning media with the help of Google Sites on building materials for class V elementary schools.

Development Stage

In this development stage, interactive learning media was created using Google Sites and media product validation was also carried out with the aim of determining the suitability and quality of the product. Validation of media products is carried out by validators who are experts and practitioners. The validator's assessment was carried out as a reference in improving

the interactive learning media assisted by Google Sites that was developed. The validators who carry out product assessments in this research are Material Expert Validators, Media Expert Validators, and Language Expert Validators.

The assessment of interactive media products was carried out by four validators, namely three expert validators from university lecturers and one practitioner validator from elementary school teachers. The validator will provide an assessment using an assessment instrument and provide suggestions for the product being developed. After that, the researcher made improvements to the product according to the suggestions given by the validator. The following are the results of product assessments carried out by experts on the interactive learning media assisted by Google Sites that researchers developed.

Assessment Results by Material Experts

The assessment of material or content is carried out by experts from higher education institutions who are lecturers. Meanwhile, practitioner validators from elementary schools are teachers with a minimum master's qualification who have teaching experience and experience in the elementary school field.

The following are the names of material expert validators who assessed the material for the interactive learning media based on Google Sites that was developed: Mr Dr. Syafri Ahmad, S.Pd., M.Pd., Ph.D. is a lecturer at the Faculty of Education, Padang State University. Mrs. Mai Suryanti, M.Pd is a senior teacher at SDN 25 Sisawah.

The results of the assessment of interactive learning media products based on Google Sites by material expert validators can be seen in Table 1.

Table 1. Assessment Results by Material Expert Validators

| Parameters | Valuation Percentage |
|---------------------------|----------------------|
| Validator 1 | 88 |
| Validator 2 | 93 |
| Total number | 181 |
| Average Rating Percentage | 90.5 |
| Category | Very Valid |

Based on the results of the assessment by material or content experts, an average score percentage of 90.5% was obtained in the Very Valid category. The media developed can be tested with revisions according to suggestions from the validator. Suggestions and input provided by material experts, namely revise Learning Objectives; and adjust the grid to cognitive level.

Assessment Results by Media Experts

The assessment carried out by media experts is related to aspects of media suitability, design and layout and ease of operation. The media expert who assessed the interactive learning media based on interactive Google Sites that was developed was Mrs. Dr. Ulfia Rahmi, M.Pd. He is a lecturer in Educational Technology at Padang State University. The results of the assessment by media experts can be seen in Table 2.

Table 2. Assessment Results by Media Experts

| Validator | Valuation Percentage |
|------------------------|----------------------|
| Media Expert Validator | 61.33 |
| Category | Valid |

Based on the results of the assessment by media experts, a score of 61.33% was obtained in the Valid category, this means that what was developed contained an attractive, proportional design and was easy for students to use. Suggestions and input provided by media experts are: provide Instructions for use; headers need to be adjusted to be relevant to the material; supporting images for content should not have a white background; and the appearance and presentation of the material after the game is not sufficient to help students' understanding.

Assessment Results by Linguistic Experts

Language validity data was obtained from a lecturer at the Faculty of Education, namely Mr. Dr. Adrias, M.Pd. The results of the assessment of the language aspects of the media being developed are shown in Table 3.

Table 3. Assessment Results by Linguistic Experts

| Validator | Valuation Percentage |
|--------------------|----------------------|
| Linguist Validator | 82.86 |
| Category | Very Valid |

Based on the results of the assessment by language experts, an average score of 82.86% was obtained in the Very Valid category. This means that the media developed has used good and correct language rules. The suggestions and input from language experts are:

Table 4 is a recapitulation table of validation of material, language and media from interactive learning media assisted by Google Sites on Building Class V Elementary School material. Based on the data, the overall score obtained from the validator for each aspect of the indicator states that the interactive learning media assisted by Google Sites in the Class V Elementary School Room Building material developed is in the valid category. Then, there are several comments that can be used as input and guidance in revising the product that the researcher developed.

Table 4. Recapitulation of Material, Media and Language Validation

| Assessment Aspects | Evaluation % | Category |
|--------------------|--------------|------------|
| Material | 91.56 | Very Valid |
| Media | 61.33 | Valid |
| Language | 82.86 | Very Valid |
| Amount | 235.75 | |
| Average | 78.58 | Valid |

Dissemination Stage (Disseminate)

At this stage, the product is distributed to be tested on teachers and students. Trials were carried out to see the level of practicality and effectiveness of the media being developed. After being declared valid, the next stage is the implementation stage. At this stage the researcher tested interactive learning media assisted by Google Sites on Building Class V material for small/limited groups and large/wide groups. The researchers carried out small group trials at one elementary school, namely SDN 30 Manganti, while the researchers carried out large group trials at two elementary schools, namely SDN 10 Sumpur Kudus and SDN 1 Sumpur Kudus.

Product trials in small and large groups were carried out during mathematics learning in class V. Before and after conducting product trials, researchers conducted tests on students. Then, what the researchers did was distribute practicality instruments for teachers and students in the form of questionnaires. Then, researchers carried out data analysis on the test instruments that had been given to students. This test instrument was used to show the effectiveness of interactive learning media assisted by Google Sites on the Elementary School Class V Building material that the researcher developed. The following is a further explanation regarding the implementation stages that researchers carried out:

Results of Media Practicality Tests for Teachers

Data on the practicality trial of interactive learning media assisted by Google Sites on Building Class V material was obtained from primary data obtained directly from three class V teachers from SDN 10 Sumpur Kudus, SDN 30 Manganti and SDN 1 Sumpur Kudus.

The variables in the practicality test of interactive learning media assisted by Google Sites in the material for Building a Class V Room are ease of use of interactive teaching materials, usefulness and appearance. After carrying out trials on products in the form of interactive learning media, the three teachers from elementary schools provided assessments and suggestions for interactive media. Teachers provide assessments by using products in the form of interactive learning media, observing the learning process and filling out

practicality questionnaires that researchers have provided. The results of the practicality test assessment that was carried out during the trial can be seen in the Table 5.

Table 5. Results of Teacher Questionnaire Practicality Trial

| User (Class V Teacher) | Percentage % | Category |
|------------------------|--------------|----------------|
| SDN 10 Sumpur Kudus | 96.00 | Very Practical |
| SDN 30 Manganti | 98.00 | Very Practical |
| SDN 1 Sumpur Kudus | 98.00 | Very Practical |
| Amount | 292 | |
| Average | 97.33 | Very Practical |

Based on the results above, the overall score obtained from the teacher practicality test was 97.33%, this states that the interactive learning media assisted by Google Sites in the Elementary School Class V Building material developed is in the very practical category.

Results of Media Practicality Tests for Students

Data from the practicality trial of interactive learning media assisted by Google Sites on Building Class V material is in the form of primary data obtained directly from students using an assessment instrument in the form of a questionnaire as well.

As test subjects, the small group was class V students at SDN 30 Manganti. Then, as test subjects, the large group was class V students at SDN 10 Sumpur Kudus and SDN 1 Sumpur Kudus. This practicality test was carried out at the end of the trial meeting. The variables for testing the practicality of interactive learning media for students are ease of use of interactive learning media, usefulness and appearance. After using the product during testing, students provide an assessment of the interactive learning media by filling in the practicality questionnaire that the researcher has provided. The results of the student practicality test assessment can be seen in Table 6.

Table 6. Results of Practicality Testing of Student Questionnaires

| User | Percentage % | Category |
|---------------------|--------------|----------------|
| SDN 10 Sumpur Kudus | 89.57 | Very Practical |
| SDN 30 Manganti | 86.40 | Very Practical |
| SDN 1 Sumpur Kudus | 89.00 | Very Practical |
| Amount | 265 | |
| Average | 88.33 | Very Practical |

Based on the results above, the overall score obtained from the practicality test for class V students is 88.33%, this states that the interactive learning media assisted by Google Sites in the Class V Room Building material developed is in the very practical category.

Based on the practicality results for students above, it can be seen that the total practicality value is 88.33% in

the Very Practical category. Based on the criteria contained in the practicality test on students, the resulting media is included in the Very Practical criteria for use.

Results of Testing the Effectiveness of Interactive Learning Media Based on Google Sites

After carrying out a practicality test, it is continued with an effectiveness test whose data source is obtained from student learning outcomes. Data taken on student learning outcomes were taken before and after following the learning process using interactive learning media assisted by Google Sites in the Building Space material, namely through the results of the Pre-test and Post-test. The product being developed is said to be effective if the assessment aspect of student learning outcomes achieves 80% completeness or above the KKM (Minimum Completeness Criteria). In order to find out whether there is an influence of interactive learning media assisted by Google Sites in this Build Space

material on learning outcomes, this is why the researchers conducted this Pre-test and Post-test at SDN 30 Manganti as the subject of a small group trial.

Based on the comparison results, the Pre-test results obtained an average of 60.54 and during the Post-test it increased to 90.43 after using the product that the researcher developed. The results of the post-test also show that there is an increase in student learning outcomes after using interactive learning media assisted by Google Sites in the Build Space material. This can be seen from the achievement of these values which are above the KKM. Apart from that, researchers have also carried out the Pre-test and Post-test on large group trial subjects, namely SDN 10 Sumpur Kudus and SDN 1 Sumpur Kudus. Next, the following are the recapitulation results of the Pre-test and Post-test along with the results of the N - Gain Score analysis from both small groups and large groups which can be seen in the Table 7.

Table 7. Recapitulation Results of Pre-Test and Post-Test Values and N-Gain Test

| Schools | Pre-Test | Post-Test | N-Gain Score | Category | N-Gain Score (%) | Category |
|---------------------|----------|-----------|--------------|----------|------------------|-----------|
| SDN 10 Sumpur Kudus | 56.65 | 90.58 | 0.80 | High | 80.12 | Effective |
| SDN 30 Manganti | 60.43 | 90.43 | 0.78 | High | 77.59 | Effective |
| SDN 1 Sumpur Kudus | 65.33 | 91.75 | 0.80 | High | 80.21 | Effective |
| Total | 182.41 | 272.76 | 2.38 | | 237.92 | |
| Amount | 60.80 | 90.92 | 0.79 | High | 79.31 | Effective |

Based on the results of the comparison of values above, the average value of the Pre-test results obtained by both the small group and the large group averaged 60.80 and during the Post-test it increased to 90.92 in the high category after using the product that the researcher develop. The results of the post-test also show that there is an increase in student learning outcomes after using interactive learning media assisted by Google Sites in the Build Space material. This can be seen from the achievement of these values which are above the KKM.

Meanwhile, the average N-Gen Score obtained from the difference between students' pre-test and post-test scores obtained a percentage value of 79.31% in the Effective category. This shows that the use of Google Sites interactive learning media in Class V Elementary School Building Materials is effectively used in the learning process.

Based on the results of the final product evaluation questionnaire for students, it was stated that on average students stated that there were no obstacles to the material taught in the integrated thematic teaching materials with interactive learning media assisted by Google Sites. The material taught is not too difficult and the material can be understood well (Endaryono et al., 2022; Gumilar & Effendi, 2022; Kurniawati et al., 2024; Ubaidi et al., 2023). The questions given can also be done

well. Regarding the operation of this product, some students stated that they could operate it, but there were also those who stated that at the beginning of learning, they were not very good at operating this product, but over time in the learning process, they were able to operate this product well. Suggestions and input given by these teachers include the images used in this product that could be added. The image referred to here is a real image related to the material. Furthermore, the teachers also stated that they hope that more researchers will develop interactive media that is appropriate to current developments. Media that can make it easier for teachers and students to carry out the learning process, as well as teaching materials that can make the learning process more active, interesting and not boring. For suggestions and input given by students, including wanting to add more material and questions. Then, I want to add more learning material. This can be input for future researchers to add this material to the products they want to develop. Students also wrote that they enjoyed learning using interactive learning media assisted by Google Sites and wanted to learn using interactive learning media assisted by Google Sites with other materials (Adam et al., 2023; Mukti et al., 2024; Novemby, 2021).

Conclusion

Based on research on interactive learning media based on Google Sites on Building Class V Elementary School classroom material that has been carried out, it can be concluded: the validation results have a validation assessment on the material aspect which obtained a score of 91.56% with the Very Valid category, the validation results on the media aspect obtained a score of 61.33% with the Valid category, and the validation results for the language aspect obtained an average score of 82.86% in the Very Valid category; the practicality results show that the criteria are very practical after assessing the practicality by students with an average score of 88.33% and teachers with an average score of 97.33% in the very practical category; and effectiveness test results from Pre-test and Post-test score data, the average Pre-test score was 60.80% and during the Post-test it increased to 90.92% after using interactive learning media products assisted by Google Sites on material for Building Class V Elementary School Rooms. This shows that there is an increase in student learning outcomes after using integrated thematic teaching materials with interactive learning media assisted by Google Sites in the material for Building a Class V Elementary School Room which was developed

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Conflicts of Interest

The authors declare no conflict of interest.

References

- Adam, N., Rahman, M. H., Nana, N., Saprudin, S., & Yusuf, D. S. A. (2023). Analisis Respon Guru Dan Siswa Terhadap Pengembangan Bahan Ajar Fisika Berbasis Model POE2WE Berbantuan Google Site. *EDUKASI*, 21(3), 579-591. <https://doi.org/10.33387/j.edu.v21i3.6828>
- Dilla, S. C., & Hidayat, W. (2023). Development of google site-based mathematics learning media with core model for grade VIII students. *Pi Radian: Journal of Mathematics Education*, 1(2), 73-82. Retrieved from <https://journal.pustakailmiah.id/index.php/piradian/article/view/32>
- Duggan, S., & Gott, R. (2002). What sort of science education do we really need? *International Journal of Science Education*, 24(7), 661-679. <https://doi.org/10.1080/09500690110110133>
- Endaryono, E., Mahyudi, M., Kurniawan, I., & others. (2022). Pelatihan Pembuatan Website Pembelajaran Menggunakan Google Site Learning Website Development Training Using Google Site: Learning Website Development Training Using Google Site Learning Website Development Training Using Google Site. *Jurnal Suara Pengabdian* 45, 1(2), 41-52. <https://doi.org/10.56444/pengabdian45.v1i2.88>
- Erita, Y., & Hamimah, A. A. (2020). The Effectiveness of Entrepreneurship Learning In Higher Education. *ICASI 2020: Proceedings of the 3rd International Conference on Advance & Scientific Innovation, ICASI 2020, 20 June 2020, Medan, Indonesia*, 66. <https://doi.org/10.4108/eai.20-6-2020.2300722>
- Fauzan, A., Armiati, A., & Ceria, C. (2018). A learning trajectory for teaching social arithmetic using RME approach. *IOP Conference Series: Materials Science and Engineering*, 335(1), 12121. <https://doi.org/10.1088/1757-899X/335/1/012121>
- Gumilar, C. B. S., & Effendi, K. N. S. (2022). Analisis kebutuhan media pembelajaran berbasis Web Google-Sites materi Statistika pada pembelajaran matematika SMA. *JP3M (Jurnal Penelitian Pendidikan dan Pengajaran Matematika)*, 8(1), 9-18. <https://doi.org/10.37058/jp3m.v8i1.4445>
- Hidayat, H., Hidayat, O. S., & Widiasih, W. (2023). Development of Google Sites-Based Learning Resources to Improve Mastery of Concepts and Process Skills in Electrical Circuit Materials. *Jurnal Penelitian Pendidikan IPA*, 9(6), 4624-4631. <https://doi.org/10.29303/jppipa.v9i6.3612>
- Kurniawati, D. F., Permana, P. G., Yuli Styawan, P., Fadlilah, A. L., Awalulhikmah, R., Anggrasari, L. A., & others. (2024). Pengembangan Media Pembelajaran Tematik Berbasis Google Site Untuk Kelas 5: Tema 3 Subtema 1 Materi Sistem Pencernaan Pada Hewan. *Seminar Nasional Sosial, Sains, Pendidikan, Humaniora (SENASSDRA)*, 3(3), 233-244. Retrieved from <https://prosiding.unipma.ac.id/index.php/SENASSDRA/article/view/5836>
- Lathiifah, I. J., & Kurniasi, E. R. (2020). Analisis Kemampuan Pemecahan Masalah Siswa Pada Pembelajaran SPLDV Berbasis STEM. *Jurnal Cendekia: Jurnal Pendidikan Matematika*, 4(2), 1273-1281. Retrieved from <https://j-cup.org/index.php/cendekia/article/download/>

- 354/232
- Mukti, D. S., Mulia, R. I., Khasanah, N. U., Putri, S. D. K., Merliana, F., Marosgun, V. S., & Anggrasari, L. A. (2024). Pengembangan Media Pembelajaran Berbasis Google Sites Pada Materi Organ Tubuh Manusia Untuk Kelas 4 Sekolah Dasar. *Seminar Nasional Sosial, Sains, Pendidikan, Humaniora (SENASSDRA)*, 3(3), 191–200. Retrieved from <https://prosiding.unipma.ac.id/index.php/SENASSDRA/article/view/5821>
- Mutrikoh, M., Marzuki, M., & Sabri, T. (2020). Pengembangan Multimedia Power Point Berbasis Ispring 8 Pada Pembelajaran Matematika Di Sekolah Dasar. *Jurnal Pendidikan Dan Pembelajaran Khatulistiwa*, 9(4). Retrieved from <https://www.academia.edu/download/103225001/1369.pdf>
- Nixon, B. (1998). Research and development performance measurement: a case study. *Management Accounting Research*, 9(3), 329–355. <https://doi.org/10.1006/mare.1998.0079>
- Novemby, K. P. (2021). *Pengembangan media pembelajaran berbasis web google sites materi hukum Newton Pada Gerak Benda* [UIN Raden Intan Lampung]. Retrieved from <http://repository.radenintan.ac.id/15301/>
- Pradana, G. Y., Mariana, N., & others. (2024). The Influence of the Problem-Based Learning Model Assisted by Google Sites Interactive Multimedia on Critical Thinking Skills in the Science Subject of Grade V Elementary School. *Jurnal Pendidikan Dasar Nusantara*, 10(1), 102–116. <https://doi.org/10.29407/jpdn.v10i1.23093>
- Pubian, Y. M., & Herpratiwi, H. (2022). Penggunaan Media Google Site Dalam Pembelajaran Untuk Meningkatkan Efektifitas Belajar Peserta Didik Sekolah Dasar. *Akademika: Jurnal Teknologi Pendidikan*, 11(01), 163–172. Retrieved from <https://jurnal.uia.ac.id/akademika/article/view/1693>
- Putri, I. D. C. K., & Widodo, S. A. (2018). Hubungan antara minat belajar matematika, keaktifan belajar siswa, dan persepsi siswa terhadap prestasi belajar matematika siswa. *Seminar Nasional Pendidikan Matematika Etnomatnesia*. Retrieved from <https://shorturl.asia/crUGL>
- Rasyid, M., Azis, A. A., & Saleh, A. R. (2017). Pengembangan media pembelajaran berbasis multimedia dalam konsep sistem indera pada siswa kelas XI SMA. *Jurnal Pendidikan Biologi*, 7(2), 69–80. Retrieved from <https://shorturl.asia/sMh3L>
- Rijal, M., & others. (2024). *Pengembangan Buku Saku Elektronik Berbasis Google Sites pada Materi Gelombang Bunyi dan Cahaya Tingkat SMA/MA* [UIN Ar-Raniry Banda Aceh]. Retrieved from https://repository.ar-raniry.ac.id/id/eprint/35309/?__cf_chl_tk=4XU12tMf5ixsy6QORrT54p2QK1gGT76tCwwa58Oc2UQ-1723279595-0.0.1.1-3839
- Rizki, S., Linuhung, N., & Dacholfany, M. I. (2016). Design research and development 4D model for developing mathematics teaching materials. *The First International Conference on Education ICONLEE*, 1(1), 288–291. Retrieved from <https://shorturl.asia/JIQh1>
- Roth, W.-M., & Lee, S. (2004). Science education as/for participation in the community. *Science Education*, 88(2), 263–291. <https://doi.org/10.1002/sce.10113>
- Rozhana, K. M., Widodo, W., Cahyono, D., Sugiharto, F. B., & Chotimah, C. (2023). Development of learning media for the Google site web-based on character. *JINoP (Jurnal Inovasi Pembelajaran)*, 9(2), 178–190. <https://doi.org/10.22219/jinop.v9i2.22760>
- Safei, S. (2024). *Pengembangan Media Ajar E-Learning Desain Gambar Tugging Lampung Berbasis Google Sites Untuk Siswa Kelas X SMA* [Universitas Lampung]. Retrieved from <http://digilib.unila.ac.id/78598/>
- Saifulloh, F., Sudiyanto, S., Muchtatom, M., & others. (2023). Innovation of E-Learning Based Google Site on Islamic Lesson For High School Students an Effort To Facilitate Self-Control. *Edukasi Islami: Jurnal Pendidikan Islam*, 12(04). <https://doi.org/10.30868/ei.v12i04.5265>
- Sumilat, J. M. (2018). Pemanfaatan Media Pembelajaran Matematika Interaktif Untuk Meningkatkan Hasil Belajar Siswa di SD Negeri 2 Tataaran. *INVENTA: Jurnal Pendidikan Guru Sekolah Dasar*, 2(1), 40–46. <https://doi.org/10.36456/inventa.2.1.a1624>
- Ubaidi, A., Nabila, R., Raffi, M. A., & Marini, A. (2023). Pengembangan Media Interaktif Berbasis Website Google Sites Terhadap Minat Belajar Matematika Peserta Didik di Kelas V Sekolah Dasar. *Jurnal Pendidikan Dasar Dan Sosial Humaniora*, 2(8), 943–952. <https://doi.org/10.53625/jpdsh.v2i8.5749>
- Yerizon, Y., Putra, A. A., & Subhan, M. (2018). Student responses toward student worksheets based on discovery learning for students with intrapersonal and interpersonal intelligence. *IOP Conference Series: Materials Science and Engineering*, 335(1), 12113. <https://doi.org/10.1088/1757-899X/335/1/012113>