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Development Of Google Sites-Based Learning Media To Increase Student Learning Interest

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ABSTRACT: Educational websites utilize information and communication technology to facilitate active learning for students, unrestricted by time and location. As a form of digital media, websites offer numerous benefits, such as the capacity to host extensive materials, making them ideal supplementary resources for students. The flexibility of websites allows for easy access without concerns about time constraints or high costs. One effective platform for creating educational websites is Google Sites, which is user-friendly, efficient in internet data and storage usage, and requires no complex programming skills. Furthermore, Google ensures security for its users and offers free website development. These sites can be designed to feature comprehensive content and visually appealing layouts to boost student engagement. The accessibility and advantages presented by Google Sites address the challenge of low student interest in chemistry, making its development a suitable solution. This research is classified as research and development (R&D), using the ADDIE instructional development model which aims to produce products in the form of google site-based learning media on the material of the mole concept. The study's findings indicated a validation score of 90.26% from subject matter experts, categorized as very feasible/valid, and 89.67% from media experts, also deemed very feasible/valid. Additionally, a readability assessment of the learning website achieved a score of 86.11%, meeting easy-to-understand criteria. The website has been implemented in classroom learning. The results of the analysis of student scores before and after the test showed an increase in learning interest. Although the increase is relatively low, with an N-Gain value of 0.21, these results indicate the potential for further improvement if the research is developed more optimally. Thus, it can be concluded that Google Sites-based learning media on the material of the mole concept has the potential to increase student interest in learning.

Keywords: student engagement, active learning, google sites, learning interest

INTRODUCTION

Education plays a key role in improving the standard of living of Indonesians, ensuring they remain globally competitive [1]. In Indonesia, the education sector continues to evolve to meet the demands and challenges of an increasingly complex world [2]. Efforts to improve the quality of education include updating the curriculum, training teachers, and implementing various learning innovations [3]. Innovation in teaching can be achieved through the use of technology [4], which gives teachers the opportunity to be more creative in designing learning experiences, both as tools and media [5]. Technology-based learning media is an adaptation of technological advances and plays an important role in improving the effectiveness and efficiency of education [6].

Learning media is an important component in the education process [7]. Learning media helps overcome the limitations of teachers in delivering material. Learning media consists of various aids in the student's environment that aim to improve learning effectiveness, facilitate communication between

teachers and students, and motivate students to engage in learning [8]. The variety of learning media means teachers must choose the right resources to ensure an effective learning experience tailored to students' needs [9]. Appropriate learning media can assist teachers and students in achieving the desired educational outcomes.

Based on research conducted by waraga et al in 2023 it is mentioned that one of the effective technology-based learning media today is the learning website [10]. These websites utilize information and communication technology, which allows students to engage in active learning without time and space constraints [11]. Research conducted by kori et al in 2024 revealed that most students prefer digital media to access information related to their studies, given the scarcity of textbooks and the impracticality of using them as primary resources [12]. Websites, as a form of digital media, have the advantage of hosting a wide range of materials, making them an ideal supplementary resource for students. One suitable platform for developing learning websites is Google Sites, which offers easy-to-use features, efficient internet data consumption, and minimal memory requirements on mobile devices. In addition, Google Sites does not require complex programming skills, offers security backed by Google, and allows for free website development [13]. Google's web-based learning media can be accessed anywhere. Students can use it as a learning tool at home, in class or in the lab. They can access it through smartphones, tablets or computers, either their own or provided by the school with internet connectivity. Previous research shows that the use of Google Sites as learning media has a positive impact on the educational process and student learning outcomes.

The concept of mole is an important topic in chemistry, specifically included in phase E learning outcomes for grade 10 students at the secondary level, making it a fundamental concept for students to understand. The topic is characterized by its abstract nature, involving many concepts and calculation formulas [14]. Students who struggle with the concept of mole may find it difficult to understand subsequent material. In addition, field observations conducted by Sumarni and Prasetyo in 2024 stated that molecular concept learning is often only delivered through lectures and exercises without collaboration with interactive media. This results in low learning interest and a lack of conceptual understanding of the material among students [15]. Research conducted by Depiyahani et al in 2023 revealed that the use of new, more interactive media can improve student understanding by collaborating with existing methods. It is important to explain chemical concepts in more detail, so that students do not feel bored and stay focused during the lesson [16].

Furthermore, the success of the learning process relies heavily on the active participation of students [17]. To promote active engagement, students must first develop an interest in the material being taught. Strong interest in learning significantly impacts academic success, with highly interested students generally displaying greater enthusiasm for participation [18]. They noted that students' learning interest manifests through indicators such as attention, enjoyment, enthusiasm, active participation, and overall pleasure in learning. When students find lessons engaging, their motivation to learn increases, as happiness stimulates enthusiasm, and focused attention enhances concentration, making material easier to comprehend [19]. Additionally, attention fosters more active engagement in learning activities. Therefore, it is crucial to address these factors in the educational process, emphasizing the urgent need for initiatives aimed at boosting student interest [20].

Given the above insights, developing learning media based on Google Sites is crucial as an innovative approach to enhance engagement in learning activities, especially regarding the mole concept. This development aims to assist teachers in capturing students' interest in chemistry topics related to the mole concept. The accessibility of resources via Google Sites, along with the delivery of interactive and comprehensible content, can significantly foster student enthusiasm for learning. Additional benefits from this initiative include enhanced technology-based learning management and active learning experiences that promote more effective use of technological resources in educational institutions.

RESEARCH METHODS

Materials and Tools

This research was conducted at SMAN 6 Malang. The learning media developed used the material of the mole concept. The instruments used in this research are validation sheets given to media expert validators and material experts and readability test sheets given to XI grade students who are considered potential to provide feedback on the products that have been developed. The instrument is

in the form of a questionnaire. In addition, researchers also used instruments used for pre-test and post-test in the form of student interest questionnaire sheets to measure the increase in student interest in learning from before and after using the learning website. The students involved in filling out this test amounted to 30 people.

The research incorporated three data collection methods: observation, questionnaires, and testing. The data analysis methods were divided into qualitative and quantitative approaches. Qualitative analysis was performed on observation data using a thematic approach, while quantitative analysis focused on expert validation results, student feedback from product trials, and test measurements. Processed data were presented in tabular format.

The assessment on the validation sheet was carried out using a Likert scale, which gives a score between 1 to 5. Each score in this scale has certain criteria which are described in detail in Table 1. This table is used by validators to assess each statement item on the material and media aspects.

TABLE 1. Likert scale

Score	Scoring Criteria
5	Very suitable
4	Suitable
3	Moderately suitable
2	Less suitable
1	Not suitable

Source: Downs [21]

After all the scores from the validation sheet were collected, the next step was to calculate the average total score from each validator. This average score is then interpreted using the criteria for product validity levels, as listed in the Table 2.

TABLE 2. Product Validity Criteria

Percentage	Criteria
76% < P ≤ 100%	very feasible/valid, can be used without revision
56% < P ≤ 75%	feasible/moderately valid, can be used but requires partial revision
40% < P ≤ 55%	quite feasible/less valid, must be revised
P < 40%	less feasible/invalid, must be completely revised

Source: Hazari [22]

The interpretation of the readability test results is presented in Table 3 below. This table displays the results of the analysis regarding the extent to which the text is easily understood by the reader. Through this table, readers can assess the level of clarity and quality of the text that has been tested.

TABLE 3. Product Readability Criteria

Percentage	Criteria
60% < P	Easy to understand
41% ≤ P ≤ 60%	Appropriate for students
P ≤ 40%	Difficult to understand

Source: Alderson [23]

Method of Qualitative Analysis

This study falls under the category of research and development (R&D), which focuses on creating a product and assessing its viability through various implementation and testing phases. In this research, the product developed is a learning media based on Google Sites, centered around the topic of the "Mole Concept." The development process followed the ADDIE instructional model, which consists of five key phases: analysis, design, development, implementation, and evaluation, as outlined in [24]. The ADDIE model is advantageous due to its effective and efficient systematic approach, which

enhances the interactions among students, teachers, and their environment [25]. The sequence of phases in the ADDIE model is illustrated in the Figure 1.

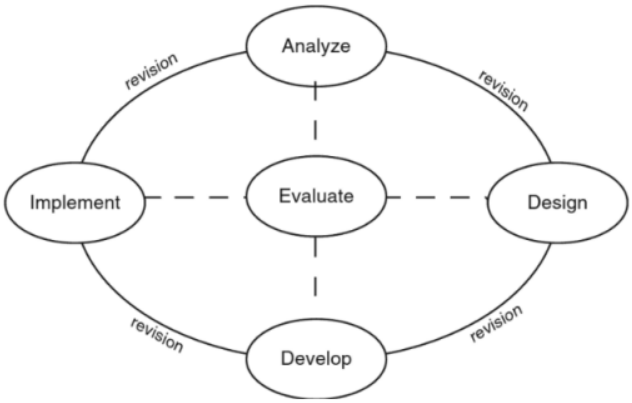

FIGURE 1: Flow of phases of ADDIE development model

The initial phase of this study involves analysis. This analysis phase serves as a preliminary investigation aimed at recognizing and collecting the necessary information and data for the development of a learning website. During this phase, a needs assessment was performed for chemistry teachers and students. Chemistry teachers involved in this analysis were all Chemistry teachers at SMAN 6 Malang, namely two people. Meanwhile, the students involved amounted to 30 people. The needs analysis of teachers was carried out through the distribution of needs questionnaires and interviews, while the needs analysis of students was carried out through filling out a pre-test needs questionnaire related to student learning interest. The needs analysis stage begins at the beginning of the school year.

The second phase is dedicated to design. This entails detailed planning for the creation of learning media based on the outcomes of the needs assessment conducted earlier. The researchers designed a chapter map and a flow of learning activities, presented as learning scenarios, to provide direction for the website development. Following this, the project moved on to the website design phase, where the conceptual design of the initial product was established for further development, which will later undergo validation by experts.

The third phase focuses on development, which involves creating the learning website on the Google Sites platform in accordance with the established design, integrating previously prepared content. The development process encompasses aspects such as appearance, material presentation, and accessibility effectiveness. Once completed, the product is evaluated by media and content specialists. This validation by experts serves as an assessment phase based on specific criteria and the results inform the first round of revisions. The product is also tested with a group of potential students to gauge their feedback, which helps assess the product's practicality and guides the final revisions. After making these last changes, the product is considered complete.

The fourth stage is the implementation stage, where the developed product is implemented in the classroom learning process. This stage aims to see the effect of using the learning website that has been developed in the learning process in the classroom. At this stage, a pre-experiment was conducted on one class to see an increase in student interest in learning.

The final phase of this research is the evaluate phase. At this phase, the final evaluation of the learning website that has been developed based on the results of previous trials and implementations is carried out. At this phase the final assessment and identification of the feasibility of the learning website if it will be used in the learning process is also carried out.

RESULT AND DISCUSSION

Analyze

The initial phase is to analyze the needs carried out by distributing questionnaires. The questionnaire was given to students and chemistry teachers. The number of respondents from chemistry teachers was 2 people, while from students as many as 30 people. The data obtained is then processed to provide results that the learning that has been carried out at school has utilized technology, but the technology used has not been diverse, only limited to Powerpoint, learning videos, and commonly used

online quiz platforms. Another learning resource that is also commonly used by teachers is the independent curriculum chemistry package book. Other data in this questionnaire also shows that 54% of students feel less interested in learning chemistry in class. Then as many as 100% of students agree in utilizing electronic media as their learning aids.

Based on these results, it is taken into consideration to develop learning media in the form of a learning website that is tailored to the needs of students. Suggestions and input from students and teachers are also taken into consideration in the development of this learning website. As many as 69% of students suggested an inquiry learning model. As many as 85% of students suggested using the practicum method in classroom learning and 81% suggested using the game method. The preparation of the learning website is adjusted to the curriculum being used by the school, namely the independent curriculum. In addition, the results of the observation data analysis show that learning in the classroom has utilized technology, but the types of technology used are still limited, namely only PowerPoint, digital handouts, and learning videos. The provision of separate learning resources makes it difficult for students when they want to access the material again. In terms of activeness, students seem less enthusiastic during the learning process. This can be seen from the interaction of students who tend to be passive towards activities provided by the teacher.

Design

During the design phase, an extensive initial design is conducted, which involves creating a chapter map focused on the mole concept. This map helps in organizing the subdivision of topics for each session. The subsequent phase entails developing learning activities using the backward design approach, starting with establishing the intended learning objectives. After setting these objectives, the next step is to determine the assessment methods that will evaluate whether the objectives have been met, followed by the formulation of a learning scenario. Considering the findings from the needs analysis and the unique characteristics of the mole concept, a learning website is developed utilizing the Discovery Learning model. Various learning methods incorporated include discussions, presentations, practical exercises, and games. Following the development of the learning scenario, content is created and gathered for inclusion in the website, such as a website usage guide, assessments, student worksheets, handouts, PowerPoint presentations, educational videos, and online simulations. The website is designed using language that is clear and easy to understand. The use of letters is proportional with fonts that are well read, and supported by images that are displayed clearly.

Development

At this phase, researchers develop learning media based on google sites. The resulting product is a learning website on the material of the mole concept. The learning website was developed by adjusting to the learning syntax of the discovery learning model. Learning with the material of the mole concept is made into 3 meeting cycles, where the first cycle is the sub material of the number of particles and molar mass, the second cycle is molar mass and volume, and the third cycle is substance content. The learning website is also equipped with information on learning objectives, student assessment, and apperception in each cycle.

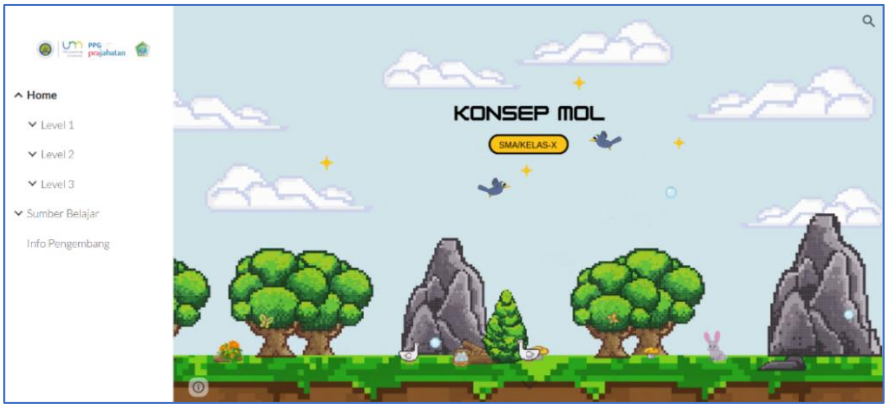

FIGURE 2. Website Main Page

The pages in the website are divided into 6 main pages, namely the home page, developer info, learning cycle 1 (in the website mentioned with level 1), learning cycle 2 (in the website mentioned with

level 2), learning cycle 3 (in the website mentioned with level 3), and learning resources page. Figure 2 shows the home page of the website, where the left part of the display contains information on the number of core pages of this learning website.

Each learning cycle page has 3 access buttons to the introduction, core activities, and closing sub-pages. This view page can be seen in Figure 3.

FIGURE 3. Learning Cycle Page

On the core activity sub-page, there are discovery learning syntax sub-pages which include stimulation, problem formulation, data collection, data processing, verification, and generalization where each syntax stage explains what learning activities are carried out by students. Sub-pages on core activities can be seen in Figure 4.

FIGURE 4. Sub Page Core Activities

The introduction page contains apperception, learning objectives, student assessment information, and initial assessment. The closing page contains formative assessment and reflection. Some assessments that have been made are packaged by utilizing online platforms in the form of google forms, and quizzes. Other platforms embedded in this website are padlet and phet colorado.

The advantage of this learning website is the complete learning resources provided in the form of handouts, powerpoints, and learning videos. The learning website also utilizes an online simulator that students can try. In addition, learning activities are designed with various activities that aim to maintain the enthusiasm of students during the learning process. The appearance of the website is made as attractive as possible by using bright colors. In order to increase students' interest in learning.

Product validation results

The learning website featuring content on the mole concept has undergone validation by both material and media expert reviewers. This validation process is designed to assess the overall suitability

of the developed learning website. The results of the validation carried out by the material expert validator can be seen in Table 4.

TABLE 4. Material expert validation test results

Material expert validation		
Aspect	**Percentage Score**	**Criteria**
Suitability of material	93.33%	Very feasible/valid
Presentation of material	90.00%	Very feasible/valid
Appropriateness of Syntax and Student Learning Activities with Discovery Learning Language	85.71% 92.00%	Very feasible/valid Very feasible/valid
The overall average	**90.26%**	**Very feasible/valid**

Based on the results of the material expert validation, it can be concluded that overall the aspects of the developed learning website are considered highly feasible and valid for use. This is supported by the percentage of the total validation value of 90.26%, which shows that most aspects meet the eligibility criteria with an ideal percentage of 100%. With these validation results, this learning website has met the required material standards and is ready to be used as learning media. In addition, evaluations from media expert validators are presented in Table 5.

TABLE 5. Media expert validation test results

Media expert validation		
Aspect	**Percentage Score**	**Criteria**
Graphic Learning Media Design	90.76%	Very feasible/valid
Presentation and Use of Media	88.57%	Very feasible/valid
The overall average	**89.67%**	**Very feasible/valid**

Based on the results of media expert validation in the table above, it can be concluded that overall the aspects of the learning website developed are very feasible or valid for use. The total validation score reached 89.67% of the ideal score of 100%, indicating that the technical and media aspects meet the eligibility standards. These results indicate that the learning website has good media quality and is ready to be used as a learning tool.

Readability test results

After the validity test is carried out, then the readability test of the website that has been developed is carried out. The readability test is a test of the product on the sample group which aims to determine the level of readability of the developed learning website. The results of the readability test are presented in the Table 6.

TABLE 6: Readability test results

Aspect	**Percentage Score**	**Criteria**
View	88.03%	Easy to understand
Presentation of material	85.00%	Easy to understand
Language	85.30%	Easy to understand
The overall average	**86.11%**	**Easy to understand**

The readability test results presented in the table indicate that across the three evaluated areas—appearance, material presentation, and language—the overall percentage achieved is 86.11%, which falls within the "easy to understand" category. Alongside this percentage, students provided various constructive feedback and suggestions for enhancement, with the majority of comments being favorable. Generally, students noted that the website has an appealing and visually engaging design. Furthermore, they found the information to be comprehensive and clearly presented, which boosted their enthusiasm for learning.

Implement

At this phase, the products that have been tested are implemented in the classroom. Implementation in the classroom is observed by observers where the observers are peers (PPG students), master teachers, and lecturers. The data from this observation is in the form of descriptive data. Through this implementation, the observer found that student interactions in the classroom were gradually improving.

Students who were initially so passive in participating in learning began to show their activity. Students also began to look enthusiastic in participating in learning, especially in learning activities through games. In addition, students also seemed enthusiastic when the teacher gave apperception, where the apperception given was contextual. The discussion that took place during the learning process went well. Some students actively seek information about the material through learning resources that have been provided on the website. The results of this implementation are then supported by the results of the pre-test and post-test on student learning interest. The analysis of pre-test and post-test results is presented in the Table 7.

TABLE 7. Normality test results

	Shapiro-Wilk			
	Statistic	df	Sig.	Criteria
Pre-test (learning interest)	.961	30	.331	Normal
Post-test (learning interest)	.952	30	.192	Normal

The Table 7 is the normality test results for pre-test and post-test data on student learning interest. The normality test is carried out to determine whether the data is normally distributed or not. Based on the results of the normality test that has been carried out, it can be concluded that the data is normally distributed, so it can be continued at the next phase of data analysis. The next phase is to analyze the results of the T-test. This data analysis is carried out to determine whether there is a significant change in student learning interest before using the learning website and after using the learning website. The T-test results table is presented in Table 8.

TABLE 8. Results of paired T-test

		Paired Differences 95% Confidence Interval of the Difference Upper	t	df	Sig. (2-tailed)	Description
Pair 1	learning interest 1 - learning interest 2	-6.632	-5.777	29	Significant	Significant

Based on these results, it is stated that the sig value. (2-tailed) <0.05, so it can be concluded that there is a significant difference in students' interest in learning before using the learning website and after using the learning website. Furthermore, to find out the increase in students' interest in learning before and after using the learning website, a pre-experiment was conducted in one class. The pre-test and post-test were carried out in that class and the data obtained were tested for N-gain. The results of the N-gain test can be seen in Table 9.

TABLE 9. N-Gain Test Results

	N	Minimum	Maximum	Mean	Std. Deviation
N-gain_score	30	-0.12	0.55	0.2547	0.21303
Valid N (listwise)	30				

Based on the results of the N-gain test in Table 9, it shows that the magnitude of the increase in student interest in learning is 0.2. While in states that there are 3 criteria in the N-gain assessment. These criteria can be seen in the Table 10.

TABLE 10: Criteria for n-gain test scores

N-gain interval	**Criteria**
$g < 0,3$	Low
$0,3 \leq g < 0,7$	Medium
$0,7 \leq g$	High

Source: Hake [26]

By comparing the N-Gain test results obtained with the data in Table 10, it can be concluded that there is an increasing students' interest in learning before using the learning website and after using

the learning website. Although the increase is in the low category, with an N-gain value of 0.21, this result still indicates that the development of learning media based on Google Sites has the potential to increase student learning interest. This low increase may be caused by several factors, one of which is the limited implementation time which only lasted for two meetings, so that students are not fully familiar with the learning media used. This research is supported by previous research in [27]. The research conducted was a study on increasing the learning interest of 12th grade vocational high school students through interactive learning media based on Google Sites. The results of the study showed that there was an increase in student learning interest between before and after using Google Sites-based learning media with an N-gain value of 0.776.

Evaluate

The final phase of this ADDIE development model is the evaluation phase. At this phase, an evaluation of the learning website that has been implemented in the classroom is carried out. The learning website has passed several tests and overall got good results. The use of learning websites has also shown an increase in student interest in learning. Therefore, it can be concluded that learning media based on google sites on the material of the concept of mole is feasible to use in the learning process.

In addition to mole concept material, Google Sites can also be used as a learning medium for various other materials, especially those that are exploratory and conceptual in nature. The design features offered by Google Sites allow the addition of images and videos, so that learning materials become more interesting and interactive. This is important to increase student engagement in the learning process. However, for materials that are phenomenological in nature and require experimentation, Google Sites can be designed to present basic information and theories that need to be understood before conducting experiments. Users can also add online simulations of the experiments as practice before doing the real thing, so that students can strengthen their understanding before diving into hands-on experiments.

In general, Google Sites can be applied to various chemistry learning concepts, such as atomic structure, chemical reactions, stoichiometry, colloids, and so on. with content adjustments according to the characteristics and needs of each material.

CONCLUSION

The research and development conducted has succeeded in increasing students' interest in learning by applying Google Sites-based learning media using the Discovery Learning model on the material of the mole concept. The Google Sites media developed integrates the syntax of the Discovery Learning model and is designed with various interesting activities. This learning site is equipped with interactive features such as videos, quizzes, and hyperlinks that aim to increase student engagement. This product received a validation score of 90.26% from material experts and 89.67% from media experts, indicating a ‘very good’ category. Teacher assessment shows that this learning media is very feasible to be applied in teaching and learning activities. On the other hand, students' responses showed a positive appreciation of all aspects of the developed media, with 86.11% of respondents stating that this media is interesting. In addition, the pretest and posttest results also showed an increase in student interest in learning, with an n-gain value of 0.2. Thus, it can be concluded that this media shows potential as a valid additional learning resource for learning the concept of mole.

In the future, this research can be developed by integrating this Google Sites-based learning media into various other chemistry learning materials, such as stoichiometry, chemical reactions, or acid-base. Then further research can be conducted to evaluate the effectiveness of this media through wider trials at various levels of education and various student characteristics. In addition, the development of interactive and collaborative features in Google Sites should also be considered to increase student engagement and facilitate their cooperation in the exploration of chemical concepts.

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REFERENCES

[1] S. Kurniawati, and Z. H. Ramadan, "Development of Learning Media Based on Google Sites on the Material I Am a Pancasila Student for Third Grade Elementary School Students," *Jurnal PAJAR (Pendidikan dan Pengajaran)*, vol. 9, no. May, pp. 432–442, 2025, doi: 10.33578/pjr.v9i3.118.

[2] R. F. Ramadannisa and M. M. Hartina, "The Design of Web-Based Learning Using Google Sites for Teaching Heat and Temperature Topic," *Jurnal Penelitian & Pengembangan Pendidikan Fisika*, vol. 7, no. 2, pp. 107–114, 2021, doi: 10.21009/1.07202.

[3] H. Hidayat, O. S. Hidayat, and W. Widiasih, "Development of Google Sites-Based Learning Resources to Improve Mastery of Concepts and Process Skills in Electrical Circuit Materials," *Jurnal Penelitian Pendidikan IPA*, vol. 9, no. 6, pp. 4624–4631, 2023, doi: 10.29303/jppipa.v9i6.3612.

[4] R. Astarina, Yerizon, A. Bentri, and M. Zainil, "Development of Interactive Learning Media Assisted by Google Sites in Building Materials for Elementary Schools Grade V," *Jurnal Penelitian Pendidikan IPA*, vol. 10, no. SpecialIssue, pp. 226–233, 2024, doi: 10.29303/jppipa.v10ispecialissue.8555.

[5] A. B. Syafruddin, H. R. Widarti, and D. A. Rokhim, "Development Of Instagram-Based Learning Media To Increase Students Learning Interest In Acid-Base Materials Chemistry Education Program Universitas Negeri Malang Malang, Indonesia," *TOJDE: Turkish Online Journal of Distance Education*, vol. 25, no. 2, pp. 228–247, 2024, [Online], Available in: https://dergipark.org.tr/en/download/article-file/3201900.

[6] F. N. J. Nasution and T. Astuti, "Website-Based Learning Media Using Google Sites to Improve Student Learning Outcomes in Natural and Social Sciences Subjects on Biodiversity Material," *Jurnal Penelitian Pendidikan IPA*, vol. 10, no. 10, pp. 7904–7913, 2024, doi: 10.29303/jppipa.v10i10.7967.

[7] H. Hikmawati, I. W. Suastra, K. Suma, A. A. I. A. R. Sudiatmika, and D. Susanti, "Analysis of The Practicality of Google Sites-Based Teaching Materials to Improve Student Learning Outcomes," *Jurnal Ilmiah Profesi Pendidikan*, vol. 9, no. 2, pp. 1160–1167, 2024, doi: 10.29303/jipp.v9i2.2194.

[8] L. H. Lubis, B. Febriani, R. Fitra Yana, A. Azhar, and M. Darajat, "The Use of Learning Media and its Effect on Improving the Quality of Student Learning Outcomes," *International Journal Of Education, Social Studies, And Management (IJESSM)*, vol. 3, no. 2, pp. 7–14, 2023, doi: 10.52121/ijessm.v3i2.148.

[9] A. N. Aeni, M. Abdullah, F. Fitriyatunnisa, N. Wulan, and S. A. Zahra, "Development of Google Sites-Based Learning Media for Islamic Education Learning in Elementary Schools," *Al-Hayat: Journal of Islamic Education*, vol. 8, no. 2, p. 742, 2024, [Online], Available: https://alhayat.or.id/index.php/alhayat/article/view/668/255. .

[10] S. S. Waraga, T. Abdjul, and A. H. Odja, "Development of Google Sites-Assisted Learning Devices on Vibrations and Waves Material," *Jurnal Penelitian Pendidikan IPA*, vol. 9, no. 8, pp. 6101–6110, 2023, doi: 10.29303/jppipa.v9i8.4275.

[11] D. I. P. C. Ningrum and Jumadi, "Development of Physics Websites Based on STEM Assisted of Google Sites on Momentum and Impulse Materials to Improve Creative Thinking Skills," *Jurnal Penelitian Pendidikan IPA*, vol. 10, no. 9, pp. 6766–6776, 2024, doi: 10.29303/jppipa.v10i9.5168.

[12] K. Sundari, A. Marini, and N. Nurhasanah, "Google Sites Based on Guided Inquiry to Improve Social Studies Critical Thinking in Elementary Schools," *Journal of Education Research and Evaluation*, vol. 8, no. 1, pp. 107–117, 2024, doi: 10.23887/jere.v8i1.70079.

[13] K. M. Rozhana, W. Widodo, D. Cahyono, F. B. Sugiharto, and C. Chotimah, "Development of learning media for the Google site web-based on character," *JINoP (Jurnal Inovasi Pembelajaran)*, vol. 9, no. 2, pp. 178–190, 2023, doi: 10.22219/jinop.v9i2.22760.

[14] V. T. Babalola, "Relationship Between On-site Learning and Students' Mindfulness, Conceptual Understanding and Academic Performance in Chemistry: A Focus on the Mole-Concept," *US-China Education Review A*, vol. 15, no. 02, pp. 120–130, 2025, doi: 10.17265/2161-623x/2025.02.005.

[15] W. Sumarni and A. T. Prasetyo, "Effectiveness of DL (Discovery Learning) Learning Model Integrated IDA (Identify, Explore, Actualize) Assisted by CET Media (Chemo Edutainment) on

The Material of The Mole Concept," *International Journal of Active Learning*, vol. 9, no. 2, pp. 84–90, 2024, [Online]. Available: https://journal.unnes.ac.id/journals/ijal/article/view/19063/2820.

[16] I. Depiyahani and F. Azra, "Development of android-based learning media applications on mole concept topics for high school students," *Jurnal Pijar Mipa*, vol. 18, no. 2, pp. 194–200, 2023, doi: 10.29303/jpm.v18i2.4725.

[17] D. Harefa, M. Sarumaha, K. Telaumbanua, T. Telaumbanua, B. Laia, and F. Hulu, "Relationship Student Learning Interest To The Learning Outcomes of Natural Sciences," *International Journal of Educational Research & Social Sciences*, vol. 4, no. 2, pp. 240–246, 2023, doi: 10.51601/ijersc.v4i2.614.

[18] N. Y. Khumairoh, U. Nuha, and N. Ahmad, "Development and Validation of Google Sites Technology-Assisted Student Worksheet to Increase Students' Collaboration Skills in Science Learning in Junior High School," *Science Education and Application Journal*, vol. 7, no. 1, pp. 41–52, 2025, doi: 10.30736/seaj.v7i1.1144.

[19] L. M. Madhani and M. J. Susilo, "Implementation of Online Learning Using Google Sites in Increasing Student'S Interest in Learning in Islamic Education," *At-Thullab : Jurnal Mahasiswa Studi Islam*, vol. 5, no. 2, pp. 167–179, 2023, doi: 10.20885/tullab.vol5.iss2.art16.

[20] B. Basori and S. Jufri, *Increasing Learning Interest and Learning Competency Using Google Sites-Based Problem-Based Learning*, no. Veic 2023. Atlantis Press SARL, 2024. doi: 10.2991/978-2-38476-198-2_56.

[21] F. S. Downs, "Handbook of Research Methodology," *Dimensions of Critical Care Nursing*, vol. 9, no. 1, p. 60, 1990, doi: 10.1097/00003465-199001000-00018.

[22] A. Hazari, "Research Methodology for Allied Health Professionals," *Research Methodology for Allied Health Professionals*, 2023, doi: 10.1007/978-981-99-8925-6.

[23] J. C. Alderson, *Assessing Reading*. United Kingdom: Cambridge University Press, 2000.

[24] R. M. Branch, *Instructional Design: The ADDIE approach*. New York: Springer, 2009.

[25] A. P. I. Puspita, H. R. Widarti, A. M. Laili, A. R. Rizqi, N. K. Amrullah, dan R. G. Aini, "Development of Discovery Learning-Based Learning Website Assisted by Learning Journal to Increase Students' Self-Efficacy," *SAR Journal*, vol. 8, no. 2, pp. 203–208, Jun. 2025, doi: 10.18421/SAR82-11.

[26] R. R. Hake, "Interactive-engagement versus traditional methods: A six-thousand-student survey of mechanics test data for introductory physics courses," *Am J Phys*, vol. 66, no. 1, pp. 64–74, 1998, doi: 10.1119/1.18809.

[27] E. Yusnita, S. Kartikowati, and H. Hendripedes, "Using Google Site-Based Learning Media for Enhancing Students' Interests in Entrepreneurial Learning," *International Journal of Educational Best Practices*, vol. 7, no. 2, p. 287, 2023, doi: 10.31258/ijebp.v7n2.p287-302.