Journal of Creativity Student
http://journal.unnes.ac.id/journals/jcs

Development of Google Sites-Based Learning Media Integrated with Wizer.me Using CBL-STEM Approach for Relations and Functions

Marissa Nada Alyani[1]*, Puput Relitasari[2]

[1,2]Universitas Negeri Semarang, Indonesia
[2] PUI IPRA – CoE in Child-Friendly Education Innovation

*Corresponding Author: marissanada33@students.unnes.ac.id

Abstract
Advances in digital technology call for innovative, interactive mathematics learning media to facilitate the understanding of abstract concepts, such as relations and functions. This research and development study aims to describe the design process, the level of technical feasibility, and the effectiveness of using Google Sites-based learning media integrated with Wizer.me interactive digital worksheets. Using a descriptive method in a limited-scale pilot study, the study subjects included 32 eighth-grade students from Class VIII-F at SMP Negeri 15 Semarang and a mathematics teacher serving as an expert validator. Data were collected through validation sheets, classroom observation, post-instructional interviews, student reflections, and learning outcome assessments. The results indicate that the learning medium met the criteria for "highly suitable," with a validation score of 86.76% from the subject teacher; the implementation process was effective, with an average class assessment score of 76.16; and the majority of students provided positive feedback, although internet infrastructure constraints remained the primary technical challenge in the field. These results conclude that the integration of Google Sites and Wizer.me has great potential to serve as an alternative platform to support digital mathematics learning in schools.

Keywords: cbl-stem, google sites, mathematics learning media, relations and functions, wizer.me

INTRODUCTION

The development of digital technology has brought significant changes to various aspects of life, including education. The use of technology in the learning process enables the creation of learning experiences that are more interactive, flexible, and student-centered (Ratheeswari, 2018). The integration of technology into learning also supports the transformation of learning from conventional methods to more innovative approaches through the use of various digital media that can be accessed anytime and anywhere (World Economic Forum, 2015). Therefore, optimizing and utilizing technology in learning has become a strategic effort that can be undertaken to continuously improve the quality of the teaching and learning process.

In the field of education, mathematics is one of the subjects that plays a crucial role in developing students' logical, critical, systematic, and creative thinking skills. However, mathematics is still often perceived as difficult by most students because many of its concepts are abstract, making it challenging for students to grasp the material (Engelbrecht et al., 2020). This situation is exacerbated by classroom learning processes that are still dominated by the use of printed textbooks and one-way lecture methods, which result in students being less actively engaged in learning activities. This phenomenon highlights the urgent need for innovative learning media capable of helping students understand mathematical concepts more easily, concretely, and engagingly.

One form of innovation that can be effectively implemented is the use of web-based learning media. Web-based learning media offer advantages such as ease of access, flexibility in use, and the ability to integrate various learning resources into a single, cohesive platform (Muhit & Maulana, 2022). Furthermore, web-based media allows for the delivery of more engaging content through a combination of text, images, videos, or interactive activities, thereby increasing student engagement in learning (Zahro et al., 2025). The use of well-designed digital media can also help students learn independently according to their individual needs and learning pace (Arifin & Badri, 2021).

One user-friendly platform that educators can utilize to develop web-based learning materials is Google Sites. This platform offers various features that allow educators to organize instructional materials systematically without requiring complex programming (coding) skills (Fitroh et al., 2025). Through Google Sites, educators can integrate various learning resources, external links, video clips, and learning activities into a single main page that is easily accessible to students. Previous studies have shown that the use of Google Sites in learning can support a more effective learning process and has been proven to increase student engagement during the learning process (Wiratama & Anriani, 2024).

To ensure that these web-based resources are not merely one-way informational tools, the Wizer.me platform serves as an interactive activity medium. Wizer.me is a digital worksheet platform (E-LKPD) that allows educators to create various types of activities, such as essay questions, multiple-choice questions, matching exercises, reflections, and multimedia-based assignments (Tanti et al., 2025). This platform provides interactive practice features that offer immediate feedback to help students actively participate in the learning process (Nawawi, 2016). The integration of Google Sites and Wizer.me enables the availability of learning resources that not only present material in textual form but also facilitate learning activities and formative assessment within a fully integrated platform.

In addition to technological support, the development of mathematics learning media must also be reinforced by a learning approach that enables students to master abstract concepts through real-world problems relevant to their lives. One such approach is Challenge-Based Learning (CBL). The CBL approach places students at the center of learning by presenting challenges relevant to daily life, thereby encouraging them to think critically, collaborate, and seek solutions to the problems presented (Nichols et al., 2016). To make learning more contextual, the CBL approach can be seamlessly integrated with the Science, Technology, Engineering, and Mathematics (STEM) approach. The integration of STEM into mathematics instruction helps students understand the close relationship between mathematical concepts and their real-world applications, as well as the technological advancements around them (Wang & Li, 2024).

The need to develop interactive media is particularly important for the topic of relationships and functions. Relationships and functions are one of the foundational topics in secondary school mathematics that require a solid conceptual understanding, as they serve as a prerequisite for subsequent mathematical topics. In practice, the topic of relations and functions requires effective visualization and active student engagement so that the concepts of relationships between sets, graphical representations, and their applications can be deeply understood. However, students often struggle to distinguish the characteristics of relations and functions and their applications in daily life. Therefore, there is a need for learning media capable of presenting material on relations and functions in an engaging, interactive, and contextual manner through adequate digital visualization.

Although many studies on the use of Google Sites and Wizer.me in learning have been conducted, most previous studies have focused on the use of only one platform in isolation. Furthermore, studies integrating Google Sites and Wizer.me developed through the collaborative CBL-STEM approach, specifically for the topic of relationships and functions, remain relatively limited in secondary school settings. Most teachers still use these platforms merely as tools for collecting assignments rather than as a coherent digital learning ecosystem. Based on this background, this study was conducted with the aim of developing and describing the implementation of Google Sites-based learning media integrated with Wizer.me using the CBL-STEM approach for the topic of relationships and functions, as well as to determine the suitability of the media based on expert evaluations and feedback from teachers and students regarding its use in mathematics instruction. It is hoped that the learning media produced from this development research can serve as an engaging, interactive, easily accessible, and effective alternative for digital mathematics learning to support students' independent learning in the classroom.

METHOD

The type of research used in this study is research and development (R&D). The research and development method is a research approach used to produce a specific product while simultaneously testing the product's effectiveness. To produce a specific product, needs analysis is employed, while to test the product's effectiveness, pilot testing is used to ensure the product functions effectively among the general public or the target audience (Sugiyono, 2019). The development procedure in this study applies the ADDIE model developed by Dick and Carry. This model consists of five structured stages: the analysis stage, the design stage, the development stage, the implementation stage, and the evaluation stage (Tegeh et al., 2014). The subjects in the pilot test of this study included eighth-grade students at SMP Negeri 15 Semarang and a mathematics teacher serving as a field validation expert. Meanwhile, the object of this study was a website-based mathematics learning medium in the form of Google Sites integrated with Wizer.me digital worksheets on the topic of relationships and functions.

Data collection for media suitability was conducted using a validation sheet that expert validators filled out continuously after examining the product. The quantitative data obtained from the validation sheet, which used a Likert scale, was then analyzed using quantitative descriptive analysis techniques to calculate the product's suitability percentage. The formula used to calculate the media suitability percentage is

$$P = \frac{F}{N} \times 100\%$$

where P is the suitability percentage being calculated, F is the sum of the empirical scores obtained from the validators' assessments, and N is the maximum ideal score for the entire item assessment instrument. Once the final acceptability percentage was obtained, the results were then converted into product acceptability levels based on the standardization criteria and media assessment for to determine whether the product is ready for implementation or requires further review (Akbar, 2013).

Table 1. Feasibility Categories

Percentage Range	Feasibility Category
81% - 100%	Highly Eligible
61% - 80%	Eligible
41% - 60%	Fairly Acceptable
21% - 40%	Not Acceptable
0% - 20%	Highly Unsuitable

Data from observations of student learning activities, interview results, and self-reflection sheets were analyzed using qualitative descriptive methods to provide an accurate picture of the technical challenges and ease of use of the media in the field. In addition, data from students cognitive assessment exams conducted via the Wizer.me platform were analyzed using descriptive statistics, including the calculation of the minimum, maximum, and lowest scores for each group. Through data triangulation from validation scores, the observation process, and learning outcomes, the overall success and suitability of the developed learning media could be comprehensively concluded.

RESULTS AND DISCUSSION

This section of the study presents objective data obtained directly from the implementation of the designed research method, namely a pilot test of Google Sites-based mathematics learning media integrated with Wizer.me using the CBL-STEM approach in Grade 8 at SMP Negeri 15 Semarang. The data obtained in this study include the results of the learning media development, the media validation results, the implementation of the learning media, and the responses of teachers and students to the developed media. The research results and discussion are presented as follows. The learning media developed consists of a Google Sites-based mathematics learning website integrated with Wizer.me and designed using the Challenge-Based Learning (CBL) Science, Technology, Engineering, and Mathematics (STEM) approach for the topic of relations and functions. The media development process began with the preparation of learning materials, the design of page structures, and the integration of learning activities and assessments into a single digital platform accessible online.

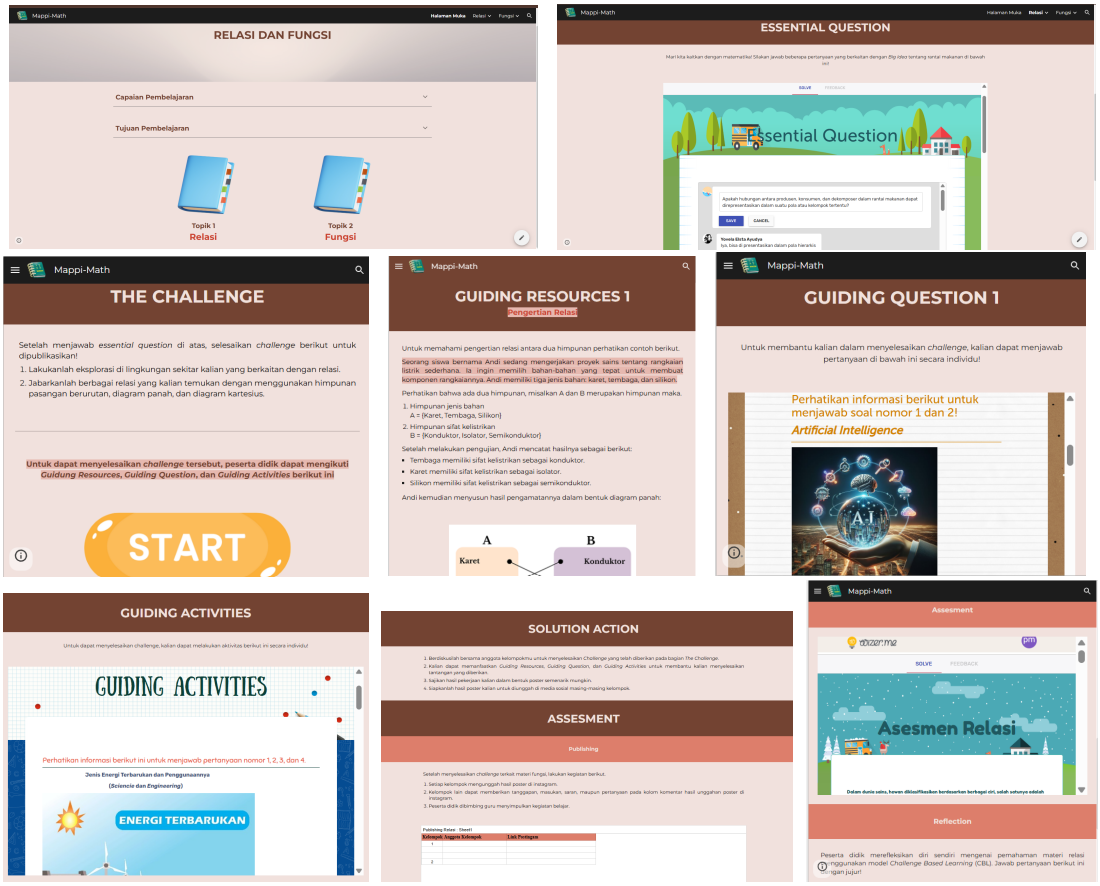

Figure 1. Interface of the Learning Media

The developed platform consists of three main pages: the home page, the relations page, and the functions page. The home page displays the course title, learning outcomes, learning objectives, and navigation links to the relations and functions content. Meanwhile, the relations and functions pages have similar structures organized according to the CBL-STEM approach. Each lesson includes the following components: big idea, essential question, guiding resources, guiding questions, guiding activities, solution action, challenge, reflection, and assessment. The big idea serves as the initial context for learning, linked to real-life problems. Next, the essential question and guiding questions are used to guide students in exploring the concepts being studied. In the guided activities section, students are provided with learning activities integrated with Wizer.me so they can be carried out interactively. Additionally, this platform includes challenges that guide students to collaboratively develop solutions to the problems presented.

The integration of Google Sites and Wizer.me allows all materials, learning activities, reflections, and assessments to be presented on a single platform that is easily accessible to students. The media presentation is designed using a combination of text, images, and interactive links to support student engagement throughout the learning process. The instructional media that were developed were then validated by mathematics teachers before being implemented with students. The validation process was conducted to assess the suitability of the media based on aspects of software engineering, visual communication, content and material suitability, and innovation.

The results of the validators assessment showed that the developed instructional media received an empirical score of 118 out of a maximum ideal score of 136. Based on the calculation formula used in the analysis, the media achieved a suitability percentage of 86.76%. According to the assessment criteria, this percentage places the media product in the “Highly Suitable for Use” category. In addition to the quantitative assessment, the validators provided qualitative feedback stating that the media features engaging visuals and is ready for implementation in the field with only minor technical refinements. The detailed scores for each aspect are presented in Table 2 below.

Table 2. Media Validation Results

Evaluation Aspects	Maximum Score	Score Obtained	Eligibility Percentage	Eligibility Category
Software Design	20	17	85,00%	Highly Eligible
Visual Communication	40	36	90.00%	Highly Eligible
Content Suitability and Material	60	52	86,67%	Highly Eligible
Innovation	16	13	81,25%	Highly Eligible
Total	136	18	86,76%	Highly Eligible

Based on the data in Table 1, the visual communication aspect achieved the highest percentage, at 90.00%. This indicates that the layout, graphic aesthetics, and navigational readability on Google Sites were rated as appealing and user-friendly by users. On the other hand, the content and material relevance dimension also achieved a high percentage of 86.67%. These findings support Arsyad, who stated that effective learning media should present information clearly, attract students attention, and facilitate the learning process through well-designed visual elements (Arsyad, 2019). Furthermore, the high score in the content and material suitability aspect indicates that the curation of relational and functional materials presented in the medium aligns with curriculum objectives and is appropriate for the cognitive development characteristics of students in Phase D.

The effectiveness of using Google Sites-based learning media integrated with Wizer.me was measured quantitatively through students' academic achievement in each digital activity provided on the website. This assessment is divided into two main categories: self-administered formative assessment conducted directly on the Wizer.me platform, and group performance assessment in the form of creating a digital poster project for the "Challenge" component. In general, the level of students' cognitive understanding is measured based on their performance on assessment instruments. Based on the analysis of cognitive data from 32 students in Class VIII-F who took the practice exam. A comprehensive comparison of statistical performance between self-assessment scores and group performance outcomes is presented in Table 3.

Table 3. Performance of Student Assessments

Group Statistical	Parameters Assessment	Challenge
Average Score	76.16	73.38
Maximum Score	100	85
Minimum Score	19	0

The comparative data presented in Table 3 shows that students learning achievements were competitive across all assessment categories. The class average score on the assessment instrument reached a high of 76.16, with the highest score being a perfect 100 and the lowest score at 19. This class average score collectively indicates good performance, as it exceeded the standard threshold for the Learning Objective Achievement Criteria set by the school, which is 75. Based on the classical mastery level, 18 students (56.25%) were deemed to have achieved the minimum mastery level, while the remaining 14 students (43.75%) were still below the mastery threshold and required a remedial program. Meanwhile, in the challenge component, students recorded a group average score of 73.38, with a highest score of 85 for creating context-based digital posters. The presence of a minimum score of 0 in the challenge component was due to a technical issue involving a late file submission (not yet submitted) by one of the group members. These results indicate that the learning media helped students understand the concepts of relations and functions. The combination of instructional materials, interactive exercises, and immediate feedback through Wizer.me contributed to students conceptual understanding and learning achievement.

Based on the results of the interviews and reflections, teachers and students responded positively to the developed learning media. Teachers stated that the Google Sites-based learning media integrated with Wizer.me has an attractive interface, is easy to use, and facilitates the learning process because learning materials and activities are presented on a single platform. Students also provided positive feedback on the use of these materials. Most students stated that learning became more engaging, less monotonous, and easier to understand because the materials were presented visually and linked to real-life contexts. Additionally, students felt more active during learning because they were engaged in various interactive activities provided by the platform.

Table 4. Results of Student Reflections

Aspect	Average Score	Category
Understanding of the Material	2.6 out of 3	High
Ease of Use	2.5 out of 3	High
Media Interest	2.7 out of 3	Very High
Relevance to Life	2.6 out of 3	High

The reflection results show that the average level of students' understanding of the material studied reached 2.6 out of a maximum score of 3. Some constraints still encountered during the learning process included internet connection disruptions, difficulties accessing certain links, and limitations of the devices used. However, these constraints did not hinder the overall implementation of the learning process.

CONCLUSION

Based on the research results, it can be concluded that the Google Sites-based mathematics learning media integrated with Wizer.me for the topic of relations and functions has a very good level of feasibility, with a percentage of 86.76%. The implementation of this learning medium in the classroom showed that students were able to participate well in learning activities and achieved an average assessment score of 76.16. Additionally, this learning medium received positive feedback from teachers and students because it created a more interactive, engaging, and accessible learning experience.

REFERENCES

Akbar, S. (2013). *Learning Instrument Development*. Remaja Rosdakarya.

Arifin, I. F., & Badri, M. I. (2021). Digital Learning Media as an Independent Learning Tool During the Pandemic in History Education. *SANDHYAKALA: Journal of History, Social, and Cultural Education, 2*(2), 1–10.

Arsyad, A. (2019). *Learning Media* (Rev. ed.). Rajawali Pers.

Engelbrecht, J., Llinares, S., & Borba, M. C. (2020). Transformation of the Mathematics Classroom with the Internet. *ZDM Mathematics Education, 52*(5), 825–841.

Fitroh, Q., Arifin, S., & Puspitasari, I. (2025). The Application of Google Sites Learning Media to Support Students' Conceptual Understanding. *JIIP: Journal of Scientific Education, 8*(1), 565–571.

Muhit, A., & Maulana, F. (2022). Utilization of Islamic Educational Websites as Learning Resources in Online Learning. *IQ (Ilmu Al-Qur'an): Journal of Islamic Education, 5*(1), 60–72.

Nawawi, S. (2016). The Potential of Challenge-Based Learning Models in Empowering Critical Thinking Skills. *Proceedings of the National Mathematics Seminar, 1*(1), 153–164.

Nichols, M., Cator, K., Torres, M., & Henderson, D. (2016). *Challenge Based Learning User Guide*. Digital Promise.

Ratheeswari, K. (2018). Information Communication Technology in Education. *Journal of Applied and Advanced Research, 3*(S1), 45–47.

Sugiyono. (2019). *Research and Development Research Methods*. Alfabeta.

Tanti, L., Adhar, D., & Simalango, C. M. (2025). Implementation of Technology-Based Worksheets for Effective Learning in Private Senior High Schools in Medan. *ORAHUA: Journal of Community Service, 2*(2), 111–118.

Tegeh, I. M., Jampel, I. N., & Pudjawan, K. (2014). *Research and Development Models*. Graha Ilmu.

Wang, B., & Li, P. (2024). Digital Creativity in STEM Education: The Impact of Digital Tools and Pedagogical Learning Models on Students' Creative Thinking Skills Development. *Interactive Learning Environments, 32*(6), 2633–2646.

Wiratama, N., & Anriani, N. (2024). Development of STEM-Based E-Worksheets Using Wizer.me to Support Students' Critical Thinking Skills. *Wilangan: Journal of Innovation and Research in Mathematics Education, 5*(4), 369–377.

World Economic Forum. (2015). *A New Vision for Education: Unlocking the Potential of Technology*. World Economic Forum.

Zahro, F., Syahda, S. L., & Ni'mah, L. (2025). Implementation of Multimedia-Based Learning Models to Improve Students' Understanding and Interest in Learning Islamic Education at Namira Junior High School. *Journal of Islamic Education and Pedagogy, 2*(1), 69–77.