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# Development of Website-Based Learning Media Based on Learner Behaviorism

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**ABSTRAK**

Penelitian ini untuk mengembangkan media pembelajaran berbasis web berdasarkan behaviorisme peserta didik SMP dalam mengasah kemampuan numerasi matematis, serta menguji kelayakan media pembelajaran. Menggunakan metode pengembangan R&D dengan model pengembangan luther-sutopo. Metode pengumpulan data yaitu survey. Instrumen penelitian yaitu lembar validasi. Teknik analisis data dengan mendeskripsikan tahapan pengembangan media web dengan model pengembangan luther-sutopo. Hasil analisis data menunjukkan tingkat kelayakan dari ahli materi sebesar 76,66% (kategori layak), ahli media sebesar 100% (sangat layak). Pada tahap uji coba beta didapatkan sebesar 95,33% termasuk kategori sangat layak.

**Kata Kunci**: Behaviorisme; Media pembelajaran; Pengembangan berbasis website.

**ABSTRACT**

This study aims to develop web-based learning media based on junior high school students' behaviorism in honing mathematical numeracy skills and to test the feasibility of learning media. Using the R&D development method with the Luther-Sutopo development model. The data collection method is a survey. The research instrument is a validation sheet. Data analysis techniques by describing the stages of web media development with the Luther-Sutopo development model. The results of the data analysis show the level of feasibility from material experts of 76.66% (feasible category), and media experts of 100% (very possible). At the beta trial stage, 95.33% were obtained, including the very feasible category.

**Keywords**: Behaviorism; Learning media; Website-based development.

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## 1. INTRODUCTION

The rapid development of technology today encourages the application of IT-based learning in the field of education (Widyatama & Pratama, 2022). One of the technologies that affect learning is internet technology. Internet technology can penetrate the boundaries of space and time. The advantage of technology in the field of education is that it facilitates the learning process that can be done anywhere and anytime (Nuraeni, Nurjanah, & Siregar, 2024).

This will create new patterns in the learning process and encourage us to adapt quickly. If in the past learning only depended on the presence of teachers and students, then now with the advancement of the internet that is all mobile, learning technology is very important. In the learning process, the use and utilization of technology in the classroom has become a necessity as well as a demand (Rijal & Jaya, 2020).

The use of technology in mathematics helps learners to be able to increase learner engagement, increase learning motivation, help learners to be able to understand mathematical concepts (Murphy, 2016; Rayahu, Aima, & Juwita, 2023). According to (Fabian, Khristin., Topping, Keith J & Barron, 2016) learning mathematics using mobile learning provides fun activities and presentation of material that is easy to understand for students.

One of the breakthroughs that can be made is by choosing the right learning media. This is because learning media functions as a means of visualization for students, which means that learning media can provide an overview of the concept of material, increase interest and motivation to learn, facilitate the explanation of material, and can clarify abstract concepts to be more concrete and simple (Hamdi et al., 2020; Septia et al., 2024). Learning media is one of the important elements in the learning process that must keep up with technological developments to be effective and efficient (Arisuci & Utomo, 2024).

Learning media developed using technology can overcome space limitations (Muhson, 2010). The importance of innovative changes in learning, especially by using technology to make it more interesting for students (Ali & Lestari, 2023). Online learning media that can help improve the quality and quantity of learning, one of which is the application of web-based learning (Arifin & Nugroho, 2023). Website is a collection of pages summarized in a domain or subdomain that contains multimedia in the form of audio, text, images, and video and can be accessed through a web browser (Destiningrum & Adrian, 2017; Ikashaum & Wahyuni, 2023).

The use of website-based media has several advantages (Aditya, 2018) states that the use of website-based learning media can reduce the static atmosphere and can create an effective, interesting, interactive learning process and can generate student learning motivation. Another advantage of using the website as a learning media is that it contains interactive multimedia that can be used in the learning process in order to increase students' learning motivation to learn independently (Danaswari & Gafur, 2018).

Learning activities using web-based media have an advantage over using social media, as they can be learned quickly. The use of web-based media was chosen because it was proven to have a significant impact in increasing learner involvement in the learning process (Lo, Jia Jiunn., Chan, Ya Chen & Yeh, 2012). This is in line with research conducted by (Suprianto et al., 2019) which revealed that the use of website media can be effective in improving students' learning performance.

However, most of the existing websites do not pay attention to user feedback and characteristics. According to (Pradita, 2021) a good website must consider and pay attention to its users. A website must keep up with the latest design developments to be attractive to users (Mangelep, 2017; Wiryana, 2022).

According to the learning theory of behaviorism psychology developed by behavioristic psychologists, one example of behaviorism theory states that there are changes in behavior as a result of the learning process experienced by students (Mytra et al., 2022). Pavlov's theory states that behavior change can be done through habituation to respond to the learning process (Santrock, 2021). The essence of behaviorism is to focus on observing observable learning events, such as the relationship between stimulus and response.

Based on the theory of behaviorism, it states that changes in attitudes and behavior in learners occur as a result of the interaction between stimulus and response, changes from learners due to the desire to know something that has not been understood (Sipayung & Sihotang, 2022). Therefore, by paying attention to feedback and characteristics of learners in developing websites, it can create effective communication media, as well as provide comfort and convenience in its use.

One of the mathematics materials studied in class VII is flat geometry material contained in the AKM (Minimum Competency Assessment) test, especially in mathematical numeracy skills, where students are required to be able to use various kinds of numbers and symbols related to basic mathematics to solve problems in various contexts of everyday life.

In the study (Ali et al., 2023) stated that there are some difficulties that students recognize in flat geometry material including problems related to understanding essential concepts, difficulty in working or solving problems thoroughly, difficulty applying material in other forms to real objects, difficulty determining strategies in performing mathematical procedures and difficulty solving problems on the problems given.

Based on this, innovation is needed to be able to assist students in facilitating media that is tailored to the behaviorism of students so that it can be used as a learning tool, especially in honing the mathematical numeracy skills of students, especially in flat geometry material.

## 2. METHOD

The type of research used in this study is R&D (Research & Development). Development is a process of creating a product or making new innovations to a previously created product that can be designed, developed, utilized and also evaluated according to the needs of students. The object developed in this study is a website-based learning media based on student behaviorism on flat geometry material.

The development model used is the Luther-Sutopo version of the MDLC development model which consists of several stages namely concept, design, material collecting, assembly, testing and distribution (Sutopo, 2003). The Luther-Sutopo development model is used on the basis of the consideration that this model was developed with structured and clear stages that can facilitate development in following the right stages and ensure that the development process goes well.

1. Creating a concept (concept)

   The media to be developed is a website-based learning media on flat geometry materials including square, rectangular and triangular flat shapes. The website developed will be adapted to the behaviorism of students when learning by using the website. Learners will be given material on the concept of flat shapes and can practice practice questions with realtime feedback.
2. Design

   At this stage, researchers design a website that is tailored to the behaviorism of students when learning with the website. The material presented is adjusted to the learning syllabus of junior high school students.
3. Material collecting

   At this stage, various assets needed in developing the website will be created or collected, such as images, videos, sounds, buttons and various other assets. This stage can be done linearly with the assembly stage.
4. Creating a website (assembly)

   This assembly stage begins to make the design of the website adjusted to the design that has been designed.
5. Testing the website

   After the website has been made, testing will be carried out to determine the functionality of the website whether it is running properly, the hyperlink buttons can function, and the learning videos run properly so that if there are errors, improvements can be made immediately.

   Testing is carried out in two stages, namely alpha and beta testing. Alpha testing is carried out by testing two aspects, namely media tests and material tests carried out by media

experts and material experts so that the products produced meet the standards and needs of students. Beta testing is carried out by students as users.

6. Distribute (distribution)

   This stage of the website has been completed and tested so that it is ready to be distributed.

The data analysis technique used in this research is to describe the stages of website media development with the Luther-Sutopo model. Testing is done by testing two aspects, namely material test and media test. The material test focuses on the content presented on the website. The media test focuses on the suitability of the website display components. Validation was conducted by media experts and material experts. Validation is done to see the feasibility of web-based learning media developed.

To calculate the feasibility level of learning media from the validation results of experts, the feasibility percentage formula is used as follows:

$$feasibility\ percentage\ (\%) = \frac{total\ score\ obtained}{maximum\ score} \times 100\%$$

The eligibility category is based on the following criteria (Arikunto, S., & Jabar, 2014):

Table 1. The Eligibility Category

| Presentation | Interpretation |
|---|---|
| $0 - 20\%$ | Very unfeasible |
| $21 - 40\%$ | Not feasible |
| $41 - 60\%$ | Fairly feasible |
| $61 - 80\%$ | Worth |
| $81 - 100\%$ | Very feasible |

## 3. RESULT AND DISCUSSION

The results of this study are to comprehensively discuss the procedures for developing web-based learning media based on student behaviorism with the Luther-sutopo version of the MDLC development model and test the feasibility of the developed media.

The following development procedures using the Luther-sutopo model in producing web-based learning media based on student behaviorism on flat geometry material.

1. Concept

The purpose of making web-based learning media based on student behaviorism to help students, especially junior high school level in facilitating the learning process on flat geometry material, especially square, rectangle and triangle. This website media is published so that it can run using a web browser with a laptop or mobile device.

After conducting observations, interviews and literature studies, the findings of functional requirements include: a) website content includes material in accordance with the VII grade syllabus and adapted to the indicators of mathematical numeracy skills, b) the website is adapted

to the behaviorism of students in order to provide comfort in its use, besides the website is equipped with practice questions with realtime feedback.

The target of this website is junior high school students grade VII. It is expected that students can understand the concept of geometry of flat shapes more easily and quickly because it is presented in an interesting way and adapted to the behaviorism of students.

Based on the results of google analytics obtained an overview of user behavior when accessing the website including: user duration in accessing the website an average of 2 minutes, the device used through laptops and mobile phones, with android and windows systems, in accessing the website as many as 89.94% of users access through chrome. Some of the users access the website with the aim of finding answers directly.

Based on this, this research will focus on providing website media developed based on learner behaviorism including: providing material that is easy and quick to understand, providing practice questions that have been adjusted to the indicators of mathematical numeracy skills and realtime feedback (directly) can be seen after completing the problem, website design that is displayed using colors and images to make it attractive and can increase learner motivation.

2. Design

Storyboard is a description of the scenario or flow of using the website shown in the following Table 2:

Table 2. Storyboard

| Scene | Description |
|---|---|
| Scene 1 | The main page is the initial menu of the website, containing media introduction, opening video, basic competency menu, material, learning video, concept check question, test, and development profile. |
| Scene 2 | Basic competencies contain indicators of learner competency achievement |
| Scene 3 | In the material section contains three sub-materials, namely recognizing the types and properties of flat shapes, formulas and how to calculate the perimeter and area of flat shapes. |
| Scene 4 | Learning video contains a summary of flat geometry material |
| Scene 5 | Concept check question contains learning activities in the form of exercise questions on flat geometry material. |
| Scene 6 | Developer profile contains the bio of the developer |

3. Material Collecting

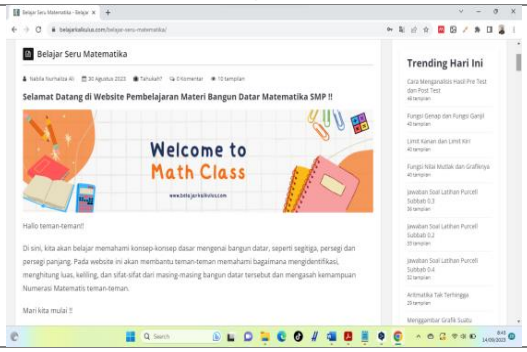
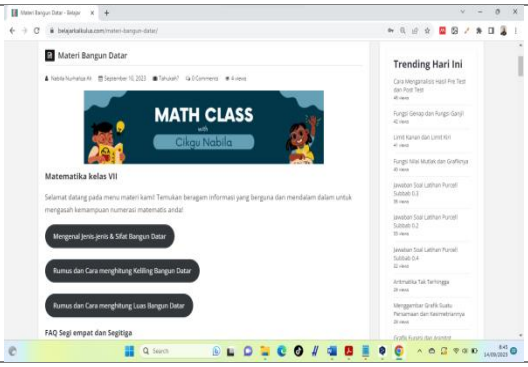
To build a website in accordance with the desired design, assets and features are generally needed, consisting of images, hyperlink buttons and sound. For images and learning videos made on canva tailored to the needs of the material. The sound is obtained from the asset library available on the internet with an open or free license. Here is the hyperlink button asset used:

Figure 1. Hyperlink Button Assets

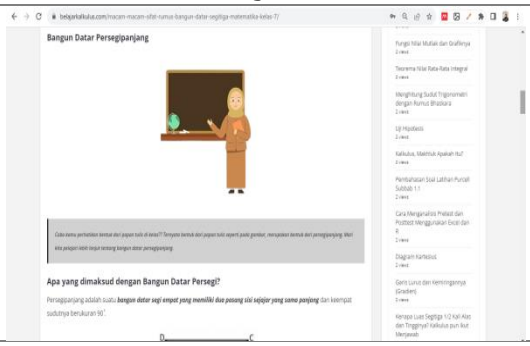
4. Assembly

Assembly is the core stage of website development. At this stage the design and assets are ready. Assembly is done by creating new posts, inserting assets into posts, setting each asset with hyperlinks so that they can connect one page to another.

Table 3. The Result of the Assembly Stage

| Figure |
| --- |
|  |
| Home page |
| Here is the initial appearance of the website. There are six menus, namely the basic competency menu, material menu, learning video menu, concept check question menu, test menu and developer profile menu. |
|  |
| Display on the material menu |
| On this website, three sub-materials are displayed and there are sample questions in the section |

Figure




Material Page

On each sub-material presented there are illustrations related to the material presented.

5. Testing

At the testing stage (testing) is carried out after completing the assembly stage by running the application and seeing whether there are errors or not. The purpose of this stage is to analyze the aspects of practicality, aspects of usefulness and quality of website media to determine the quality of the effectiveness of website learning media. Testing is carried out in two stages, namely alpha and beta testing. Alpha testing is done by testing two aspects, namely media tests and material tests carried out by media experts and material experts so that the products produced meet the standards and needs of students.

The material test focuses on the content presented on the website media. The aspects assessed include content components, presentation components, suitability of material content with mathematical numeracy skills and suitability of website components with users. The material test was conducted on two material experts (validators). The following are the results of the material expert validation:

Table 4. Material Expert Validation Results

| Aspect | Score | Percent | Description |
|---|---|---|---|
| Content component | 13 | 72,22% | worth |
| Presentation component | 12 | 100% | very feasible |
| Suitability of material content with mathematical numeracy skills | 12 | 66,66% | worth |
| The suitability of the website component with the user | 9 | 75% | worth |
| **Total** | **46** | **76,66%** | **worth** |

The total score from the material expert (validator) amounted to 46 out of a maximum score of 60 or 76.66%. Based on the criteria table, the total score is included in the feasible category. There are suggestions from the material expert: 1) Take other contexts on the example of flat shapes in everyday life, to anticipate misconceptions about the context of flat shapes.

Furthermore, the media test focused on the components of graphics, website appearance or design and the website content suitability component. The media test was conducted on two media experts (validators). The following are the results of media expert validation:

Table 5. Media Validation Results

| Aspect | Score | Percent | Description |
|---|---|---|---|
| Graphics component, website appearance or design | 26 | 100% | very feasible |
| Website content appropriateness component Content component | 18 | 100% | very feasible |
| **Total** | **44** | **100%** | **Very feasible** |

The total score from media experts (validators) amounted to 44 out of a maximum score of 44 or 100%. Based on the criteria table, the total score is included in the very feasible category.

After being validated by media experts and material experts which included alpha trials, further revisions were made according to the suggestions of the validators. Next, enter the beta trial stage conducted by the user. Web-based learning media was tested on 6 seventh grade students and 2 math teachers. The instrument used is a questionnaire assessing the quality of content & objectives and technical quality using a Likert scale with a range of 1 to 5. In the assessment of the quality of content and objectives carried out by the math teacher. There are several aspects that are assessed on the quality of the content including: accuracy, importance, completeness, balance, learner interest, and suitability to the situation of students. The total score obtained on the assessment of the quality of content and objectives is 100 with a maximum score of 100 or 100%. Based on the eligibility criteria table, the percentage is included in the very feasible category.

The technical quality assessment was conducted by math teachers and students. Aspects assessed in the technical quality assessment include: readability, appearance, convenience, media management, handling answers. The total score obtained from the math teacher on the technical quality assessment was 97 with a maximum score of 100 or 97%. Based on the eligibility criteria table, the percentage is included in the very feasible category. Meanwhile, the total score obtained from students on the technical quality assessment is 286 with a maximum score of 300 or 95.33%. Based on the eligibility criteria table, the percentage is included in the very feasible category.

6. Distribution

At this stage the website media that has been developed and has been tested for feasibility is disseminated to teachers, especially junior high school mathematics teachers so that it can be used in the learning process to make it more effective and efficient.

Web-based learning media has been published and can be accessed anywhere and anytime with the link: https://belajarkalkulus.com/belajar-seru-matematika/

## 4. CONCLUSION

Website-based learning media using the Luther-Sutopo version of the MDLC development model as described, the results of data analysis show the feasibility level of material experts of 76.66% which is included in the feasible category, media experts of 100% including the very feasible category. At the beta trial stage conducted by math teachers and students as users, 95.33% was obtained, including the very feasible category.

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