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Utilization Of Website-Based Learning Videos For Mathematics Learning

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ABSTRACT

This research has the aim of developing learning media in *website*-based mathematics lessons by using video as a material deliverer. Research and Development with a 4D model is used in this study in the process of developing mathematics learning media using the *website*. The interpretation, design, development, and distribution are the four main stages in the 4D model. There are 77 grade VII students of SMPN 11 Depok as the subjects of this research. Media expert validation is the source of the validity test in this study while the validity of media experts and student responses are the basis of the practicality test in this study so that the development of *website*-based media in this study is assessed as valid.

Keywords : Math, Development of media, *website*, tutorial video.

ABSTRAK

Penelitian yang dibuat ini memiliki tujuan untuk mengembangkan media pembelajaran pada pelajaran matematika berbasis *website* dengan menggunakan video sebagai penyampai materi. *Research and Development* dengan model 4D digunakan di dalam penelitian ini pada proses pengembangan media pembelajaran matematika menggunakan *website*. Pengertian, perancangan, pengembangan, dan pendistribusian menjadi empat Stagean utama di dalam model 4D. Terdapat 77 siswa kelas VII SMPN 11 Depok sebagai subjek penelitian ini. Validasi ahli media merupakan sumber dari uji kevalidan dalam penelitian ini sedangkan validitas ahli media dan respon siswa menjadi dasar dari uji kepraktisan dalam penelitian ini sehingga pengembangan media berbasis *website* pada penelitian ini dinilai sebagai valid.

Kata kunci: Matematika, pengembangan media, web, video pembelajaran.

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PRELIMINARY

By improving methods and methods in the learning process, it will improve the quality of education. According to (Umam & Azhar, 2021) The words "introductory" and "intermediary" are literal meanings of the word media. In this day and age there are various

types, forms, and functions of each of the learning media. With the rapid need for interactive multimedia, in the world of Indonesian education this need is finally realized by the existence of Information and Communication Technology (ICT) subjects in the 2013 curriculum (Batubara & Ariani, 2016). High motivation for students is the goal and function of the teacher with the demands of providing interesting learning models (Suprihatin, 2019) for example, such as developing learning media in order to improve a good learning process. Thus, maintaining efficiency in the teaching and learning process by using information technology media is needed.

Website is a collection of pages contained in hosting and has a domain or sub domain that is on the internet. Website is a facility that is assisted by an internet network in it so that a document can be connected to each other both locally and even remotely. (Laugi, 2018) continued that the process of developing the internet network is closely related to the development of the website. That way, the needs of the website will greatly affect the needs of the community. The general public can access the website easily. According to the needs of each individual, there are many types of websites, such as commercial, personal, government websites, meeting the needs of profit, non-profit, and others. With so many people's needs for website facilities, there are several websites that are made with special purposes, namely education, entertainment, and social.

Learning mathematics online is very difficult for teachers and students to do many things including direct communication. This limitation should not reduce the quality of mathematics learning provided to students (Umam & Azhar, 2021). Students can easily repeat the learning that has been given by the teacher in the classroom through web learning facilities and video media so that they can replace the teacher's role when the teacher is unable to help students. Interesting, efficient, and effective learning will be felt in the website and media-based learning process. Then, students' motivation to learn will be higher due to a low static atmosphere during the learning process (Darussalam, 2015). (Darussalam, 2015) explains some of the benefits of learning through media on the website, namely: 1) student knowledge and insight that will develop more widely because students can access learning media independently, 2) try and observe activities will build many activities during the learning process through the website because students not just be quiet and listen to the teacher like in class, and 3) the learning materials that students have will be more and more from additional learning resources provided through the website.

With the development of technology, it can make it easier for teachers to create and design learning media. Without being limited by space and time, learning can use the use of internet technology as a web-based learning medium. Media that can be accessed via a computer or smartphone is not just putting material on the web as a substitute for paper materials or information (Tatang Aditya, 2018). There are several reasons why education should use website facilities, namely: 1) to support government programs and optimize the internet presence in the educational environment, 2) staff, participants, and school facilities are increasing, 3) educational modules found on the internet will reduce the use of the internet. internet negatively, and 4) helping the program to promote the internet. (Wiryotinoyo et al., 2020) explained that there are several obstacles in the application of the website in learning. These obstacles are often encountered by teachers. Therefore, several solutions are needed to overcome the existing problems, such as 1) planning regarding the creation of a website that also includes teachers, 2) Design planning tailored to the teacher, 3) assignments, materials, lesson plans, and learning media that are starting to be uploaded to the site. by the teacher, and 4) further learning on technological developments for teachers and students. The website as a learning medium must have interesting content and be easy to operate.

There have been many website-based models and methods developed for learning Mathematics (Bragg et al., 2016). (Romadhani & Harahap, 2022) Explaining in learning mathematics there is a very important theoretical basis, namely understanding concepts to be able to solve problems in life. Through learning mathematics using website facilities, it can encourage students' understanding of understanding the concepts of mathematics. The teaching material provided through the website is a concept teaching with similar generalizations and characteristics. In today's changing times, students will have more control over the application of website facilities compared to understanding the mathematical formulas given by the teacher in class. With teaching materials through the website, it will help students to develop learning motivation and find out how the most suitable learning model is used for each individual.

In quantitative solutions based on the basis of logic and reasoning in all lessons, mathematics becomes something that has an important role. However, feelings of fear and difficulty are still often a stereotype of mathematics lessons for society (Putra, 2016). (Yusmin, 2017) continued that learning mathematics is one that is poorly understood by students due to the many perspectives that say this lesson belongs to the group that is difficult to understand. The difficulty of learning mathematics for students according to

many studies is caused by a misconception of the material provided by the teacher in the learning process.

Referring to research conducted by Tatang Aditya in 2018, namely research on web-based mathematics learning at the Junior High School (SMP) level and resulted that the learning process had good results for use (Tatang Aditya, 2018) . Valid categories according to experts were also obtained from the validation results of the developed media. It was also continued by Nuritha in 2021 conducting research entitled "Development of Geogebra Assisted Learning Videos to Improve Student Learning Independence" and resulted that there was a standard gain value of 1.32 and was included in the high category so that it was illustrated that students became more independent in carrying out the process learning (Nuritha & Tsurayya, 2021). The conclusion from the results of this study is that students become more independent in their learning process from learning through video media.

The learning process through the media that has been described above shows that it can improve the learning process and is beneficial for students because learning is more interesting. In addition, with the help of web facilities, students can access learning anywhere and anytime through electronic devices, such as gadgets, laptops, computers, and other devices. Therefore, researchers are interested in developing products in website development using video media in delivering the material. The purpose of this research is to develop learning media for website-based mathematics lessons using video as a material so that students who have problems understanding lessons can quickly repeat the material taught through video. In line with the research objective to determine the level of mathematical anxiety and learning outcomes after using information technology-based mathematics learning modules with the results that the application of the PMB IT module can reduce mathematical anxiety (Istikomah et al., 2022).

METHODS

Research and Development (R&D) is the method used in this research. The results of the product and the efficiency test of a particular product are the objectives of this type of research. Four-D (4D) is a development model that has several stages which are then used in the development model of this research. According to (Darussalam, 2015) there are four main stages in 4D development, namely define, design, development, and disseminate. Define has stages in meaning, Design is a stage in designing, development is a stage for developing, and disseminate is a stage for distributing. With an easy

understanding of the 4D development model, the researchers chose the 4D model in this study.

The product developed in this research is the development of a learning website with video as a material for delivering mathematics lessons. Small-scale trials, revisions, and validation from experts are a series of product trials in this study. Mathematics Education Lecturers become validators as media experts in the expert test in this study.

Media expert validation is the source of the validity test in this study while the validity of media experts and student responses is the basis of the practicality test in this study so that the development of website-based media in this study is assessed as valid.

RESULTS AND DISCUSSION

Development procedure

In this study, researchers developed procedures for development activities using the 4D model.

Defining Stage

This stage is the initial stage to analyze what is needed. To determine what learning websites can be developed, an initial analysis is carried out in this study. Literature studies and previous research can be used for needs analysis at this stage. There are five activities in this stage according to: (Lembaga Penelitian dan Pengabdian Masyarakat, 2022):

1) First analysis

At this stage the researcher analyzes and determines the problems to be faced so that development can be described. Alternative solutions to the selection of development in the learning process are obtained at this stage.

2) Student analysis

The characteristics of students will be analyzed so that they are in accordance with the development targets to be carried out. Motivation, cognitive, skills, academic ability, language, media, and format are the characteristics that are reviewed in this analysis.

3) Task analysis

Researchers will analyze the main tasks that must be mastered so that the results of the development can also help achieve the required competencies. If needed, there are several learning skills required from the results of the analysis.

4) Concept analysis

This stage analyzes what concepts are needed for the amount and type of teaching materials to be delivered. At this stage, the researcher will be able to arrange steps rationally.

5) Formulation of learning objectives

This stage is a summary of the series of analyzes that have been carried out. the results of the summary become the basic basis for designing and developing learning materials in research.

In this define stage, the researcher conducts a concept analysis, website analysis, and the purpose of using the website. At the time of concept analysis was carried out to identify the concept of making a learning website that was considered in accordance with the learning needs to be developed. Website analysis is carried out to consider the appearance and various features that will be used. The purpose of using the website is to find out what videos will be displayed on the developed learning website.

Design Stage

At this stage there are four steps with the Thiagarajan model (Kurniawan et al., 2017; Lestari, 2018) that is:

1) Preparation of Test Standards

This step is the result of combining the definition stage. Design of learning tests that will provide learning test grids to evaluation guides in providing scores so that the answer keys for learning test questions.

2) Media Selection

This step is the selection of media based on the characteristics of students so as to maximize the design for the provision of teaching materials.

3) Format Selection

Learning resources, approaches, learning media, strategies, and approaches are things that will be designed in this stage.

4) Preliminary Design

Before the trial can be carried out, there must be a complete initial design of the learning device. Existing learning activities must be different from existing teaching and skills practice.

At the design stage, the researcher selects the programming language that will be used to create the website, selects images/animations, formats, colors, fonts, font size, background, user flow, and creates a user interface. The initial design was carried out by

the researcher and thus resulted in prototype I. All selections in this stage were based on the results of the previous definition.

Development Stage

Product development is the result of this development stage. There are two steps carried out in this stage, namely:

1) Expert Assessment

In order for learning tools to have effective, tested, precise, and high technical values, an assessment from experts is needed so that suggestions are given to be able to develop better tools.

2) Development Trial

So that learning tools are consistent and effective, trials are given directly to students in order to get direct input regarding comments, reactions, and observations from learning tools that have been prepared.

At the development stage, experts will help validate the existing media. Prototype II will be generated on the learning website design from the results of improvements resulting from suggestions, comments, and assessments from the results of experts on product design as a validation stage.

At the stage of developing learning media with the content of learning videos on the website obtained from the media at this stage. In the process of developing website-based mathematics learning media, it begins by creating a left-aligned display with html and then the design is given with css, then logic is given so that the website can run responsively.

The domain for the website is <https://sinuacademy.netlify.app/>. So that students are able to remember the name of the website, a unique domain name is chosen on the website. The home page is the first page you see when you open the website. This page contains websites and promotional videos, then there are features about, courses, pages (teacher), and contact.



Figure 1. Page Home

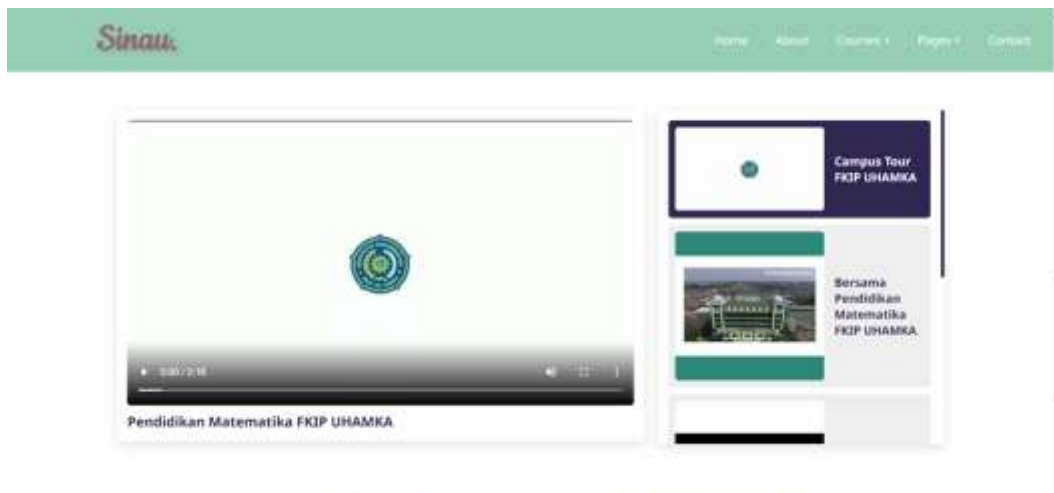


Figure 2. Page Video Home

In Figure 1 and Figure 2 is the Home page. A page containing a promotional explanation of the website in the form of text and videos made as attractive as possible. The promotion focused on the pandemic period when lessons in Indonesia had to do online learning. This website provides an opportunity for Indonesian students to expand their knowledge and insight even if only at home. In addition, there is a profile from the University of Muhammadiyah Prof. Dr. Hamka packaged as promotional media.

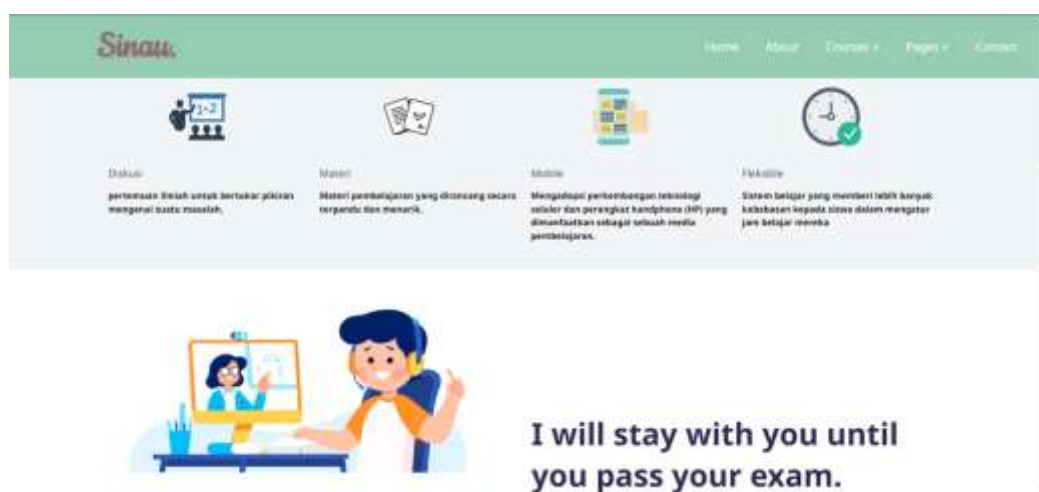


Figure 3. Page About

In Figure 3, it can be seen that some of the advantages provided by the website are explained. Some of the advantages on this website are students who can discuss with presenters directly to ask related materials needed, the material provided on this website is interesting material and is in accordance with the material students need, websites that can be accessed via gadgets so students can open website anywhere and anytime when they need material, and provide opportunities for students to be able to manage the study time they need with flexible learning materials.

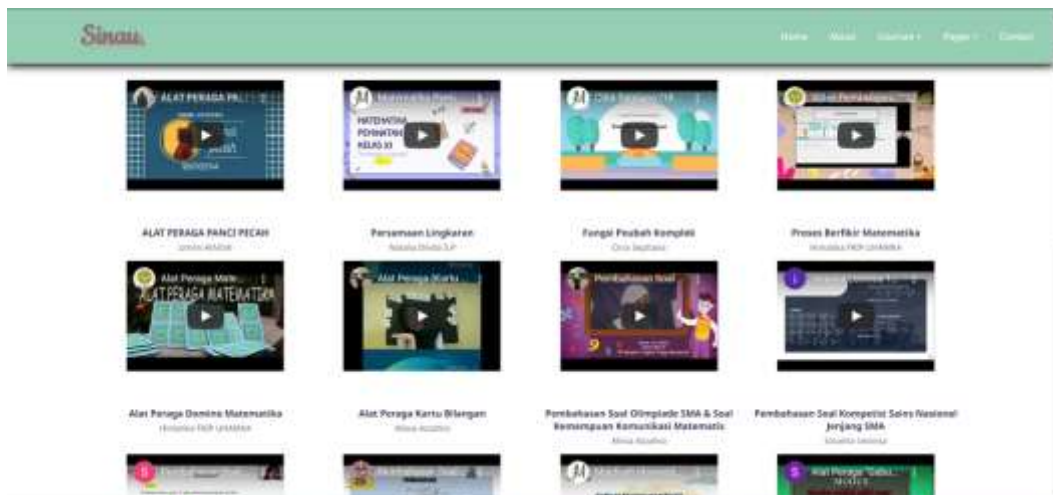


Figure 4. Page Course

In Figure 4 this is the course page. This page contains learning videos that can be accessed by students easily and lightly. Learning videos are videos with different levels of education ranging from Junior High School (SMP) to Senior High School (SMA). The learning videos contained on this page are easy to understand with basic to detailed explanations with the help of animations on several videos. Learning videos are made as interesting as possible so that students are not bored and bored in the learning process independently. Based on research (Waskitoningtyas, 2016) states that learning difficulties are the lack of success of students in mastering concepts, principles of problem solving, and this is coupled with the teacher's habit of teaching mathematics which is only by taking notes on the blackboard, therefore by using video as a medium of learning students can repeat return material that he finds difficult to understand quickly.

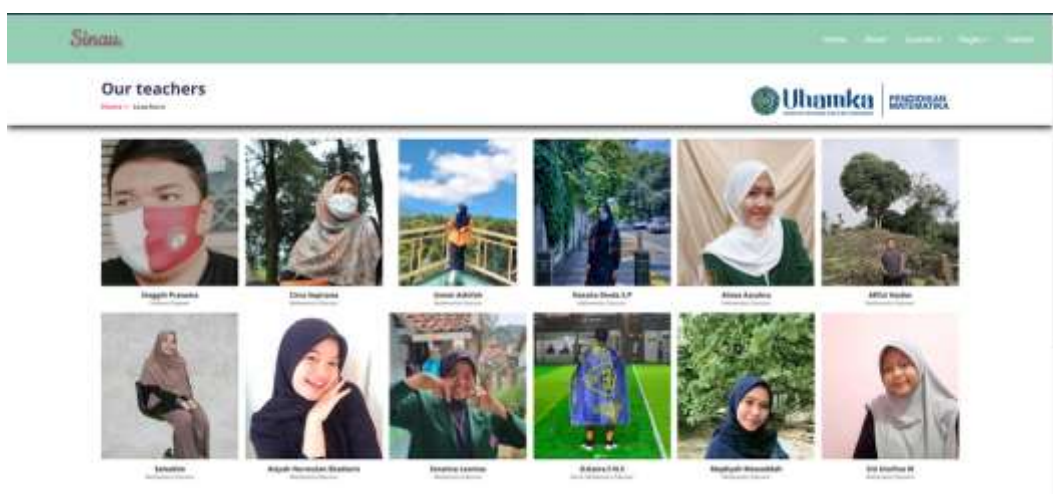


Figure 5. Page Teacher

In Figure 5 is the page of the presenters who contributed to the making of learning videos. Website users can find out who is involved in making math learning videos on this site. In addition, website users can also find out the contacts of each presenter, so if anyone wants to contact one of the presenters further, students can easily get the personal contact of the presenters on this page. In line with research from (Angga Winata Harahap, 2019) which states that optimizing the teacher's role is very important in supporting the learning process.



Figure 6. Page Contact

The page containing the contact is on the next page. The contact for the media maker is on this page with a video as a material for learning mathematics. Website users who need to contact media creators more directly for certain needs can visit this page.

Disseminate Stage

In the disseminate stage, the product or result of the learning media is disseminated that can help students in the learning process based on the website that has been produced. Themes, strategies, timing, media selection, and user analysis are the things that need to be considered at this stage.

By disseminating learning website products with videos as a material transmitter to all seventhgrade students at SMPN 11 Depok and mathematics subject teachers as practitioners. From the results of filling out the questionnaire from students, they received several inputs, namely so that more learning videos with various themes were made, the display was made even more attractive. The results of the validity analysis and experimental tests show that the website media with video as a material for learning can be

declared valid to be used as teaching materials and supporting media for learning mathematics.

Table 1. Learning Media Validity Test

Respondents	Ideal Score	Actual Score	Category
Media experts	40	38	Very worthy
Teachers & Students	40	38	Very worthy

Better quality product designs are suggested for learning media with websites by media expert validators. The input given by the media expert was then accepted and the researcher immediately made improvements to the product design and then tested it again on the students of SMPN 11 Depok. The number of samples as many as 77 participants from class VII SMPN 11 Depok with a questionnaire that has 10 questions as a test of learning media is carried out again after the product revision is carried out. In measuring the level of reliability and validity, a one-time test was conducted. The test results of the validity coefficient of the question with X_{tot} 0.361 were declared valid with the help of the IBM SPSS 25 for windows program. The results of this test get rcount of 0.542 in the lowest category and rcount of 0.803 in the highest category.

Explains that in obtaining steady and constant measurement results can use the ability of measuring instruments Reliability (steady) Tests. Reliability, scale, check menu item, analyze, click Alpha, scale if item deleted, statistics, click ok, and continue inside, the Alpha-Cronbach method is used to generate reliability tests on multiple choice questions. A reliable statement will be obtained if the value of is 0.361 and Cronbach's-Alpha is 0.842. (Utami & Ulfa, 2021) added that in providing consistent and constant research results, the research uses the ability of the test reliability measuring instrument. There are five categories within the reliability index range, namely: 1) index 0.81 - 1.00 which means very reliable, 2) index 0.61 - 0.80 which means reliable, 3) index 0.41-0.60 which means quite reliable, 4) index 0.21-0.40 which means less reliable, and 5) index <0.20 which means not reliable. From the explanation, it can be concluded that the data found are reliable. The following is a table regarding the results of the reliability test in the limited trial.

Based on the Cronbach Alpha value of 0.842 which has a value of > 0.8 , it shows that the criteria of the ten statements are very reliable. Therefore, referring to the results of the research, the website-based learning media with video as a material conveyer, the validator provides validation results which show that mathematics learning with the

feasibility of its products is considered very feasible to be used as a learning medium with an actual score of 38 out of 40 and also based on the reliability results that have the value of > 0.8 is 0.842. The advantages of using the website as a learning medium are that it can be accessed anywhere, anytime, is interesting, and is easy to operate so that students become more interested. In line with that according to research (Suryandaru & Setyaningtyas, 2021) In a series of introductions to websites for learning media, students showed enthusiastic feelings. Continued by research (Tatang Aditya, 2018) that the advantages of website-based mathematics learning media are 1) Simple but elegant media display, 2) Contains video tutorial content, 3) The material provided is easy to understand, and can be a learning supplement by students.

Researchers have several limitations based on empirical experience so that they can be considered again for future researchers so that in perfecting research they can provide even better results. Some of the limitations in this study are: 1) The number of respondents is only 77 people, of course this number is still not enough to be able to describe the actual situation. 2) The object of research is only focused on the seventhgrade junior high school.

The researcher also found several important implications that can be input for teachers and prospective teachers. By fixing and paying attention to learning methods and also the use of media using appropriate learning media. Although there is no interaction between learning methods and learning motivation, it is hoped that there will be cooperation between students and teachers in carrying out the teaching and learning process.

CONCLUSION

Website-based mathematics learning media with video media as the delivery of the developed material is found to be efficient, valid, and easy to use for students who want to learn. There are several inputs from validators to improve the appearance, learning models, learning modules, and others. That way, this website still has limited content and appearance so it needs more development in it. Therefore, suggestions for further researchers who want to develop website-based learning media for learning mathematics need to develop new innovations and better ways so that website users get satisfaction and fulfill the goals of using learning media.

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