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Submission date: 27-May-2022 02:46PM (UTC+0700)

Submission ID: 1845198384

File name: 1.Mahendra_2021.pdf (417.34K)

Word count: 2157

Character count: 11305

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To cite this article: Maulana Rais Mahendra *et al* 2021 *J. Phys.: Conf. Ser.* **1783** 012006

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Development of Macromedia Flash-Based Mathematics Learning for Elementary School Students

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Abstract. One of the learning media that needs to be developed is Macromedia Flash-based learning media the purpose of this study was to develop mathematics learning media in the form of a Macromedia application in solid Geomet for fifth-grade students of SDN Paseban 01 Pagi. The development research method used is Research and Development (R&D), with the ADDIE development model. At the analysis stage, a problem analysis and needs analysis are carried out. At the design stage, an initial design is made which is then validated by material experts and media experts. At the implementation stage, the design of instructional media was tested on 24 students of SDN Paseban 01 Pagi. The evaluation stage aims to analyze expert validation data and student trials. The data collected using the observation method were qualitatively analyzed. The validation data were then evaluated qualitatively and quantitatively in summary. The results showed that Macromedia flashed on space building materials that had been developed based on expert media assessments in terms of display feasibility 85% with highly viable categories, 83% writing learning design with highly feasible categories, engineering and software aspects with highly feasible categories so that the overall assessment of 83% with categories was very feasible. Material expert assessment in terms of feasibility of displaying 90% material with very decent category, 93% learning media utilization aspect with very decent category, quiz aspect 90% with the category is very feasible so overall assessment 91% with the category is very feasible. The trial of the learners was obtained as a result of the 84% display feasibility aspect with a very decent category, the presentation aspect of the material 81% with a very decent category, the aspect to the engineering and software appeal 83% with the category is very feasible the overall assessment of 83% with the category is very feasible. Based on the results of this acquisition, it can be concluded that the



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Macromedia Flash application on spatial geometry material is very suitable for use as a learning medium in mathematics subjects.

1. Introduction

The emergence of the globalization period, distinguished by the rapid use of IT, has successfully shifted the idea of organizing training in a modern way. [1, p. 1]. Therefore, ICT benefits must

be introduced to students so that they have adequate supplies and experience to be able to implement and use them in learning activities, as well as various aspects of daily life[2]. Humans continuously need the understanding to be able to utilize ICT optimally in the face of the challenges of the development of the times[3]. The guidance of the era of the development of the times is inseparable from extra science such as mathematics[4].

According to the Ministry of Justice [5, p. 199] states that The Latin word media is a plural "medium," literally meaning intermediary or introduction. The general sense is all that can relay information from the source of the information to the receiver.

According to Sandman in the book [6, p. 266] states that the media is everything that can channel messages from the sender to the recipient of the message to stimulate the mind, feelings, attention, and interests of the recipient of the message in such a way that there is an exciting learning process between the two.

Macromedia flash is one that can be used to create an animated work, not least animators make various animations, such as interactive animation or noninteractive Website (Nurjannagung, 2013). Adobe Flash is a program specially designed by adobe and a standard application program authoring professional tools used to create animations and bitmaps that are very interesting for building interactive and dynamic website[7]. Websites Many people think that math is complicated, for that reason many people avoid mathematics[8]. Whereas mathematics can be found in daily life, and inevitably we must use mathematics [9, p. 1]

The main purpose of this research is to understand the process of stages and results of Macromedia flash a basis learning media on Space Building material. The research question for this study is (1) Developing Macromedia Flash-based learning media in grade V of SDN Paseban 01 Pagi? ,(2) Knowing the quality of Macromedia Flash-based learning media products in-room building materials in class V Sdn Paseban 01 Pagi?

2. Methodology

In an implementation, the approach adopted by researchers is the ADDIE model and uses research methods research and development (RND). According to Hanafi (2017: 130) Research and development, Research and Development (R&D) aim to produce certain products and test the validity and effectiveness of such products in their application. The approach and method of development research from the design of the development research has 5 stages of development, namely: (1) analysis stage (Analysis), (2) the initial product design stage (design), (3) the stage of product development (development), (4) the stage of implementation, (5) the stage of Product Evaluation. The resulting product is in the form of 2D media Mathematics learning materials Solid Geometry.

3. Result and Discussion

Feasibility of Developed Learning Media based on Macromedia flash Media assessment by experts and materials experts [10]. Based on the validation results of media experts get the following comments/suggestions that need to be changed the background of material design. Material delivery still needs a little improvement. The evaluation just ordinary

needs to be reshaped [11]. Media eligibility results based on media expert assessments presented in Table 1 Validation of both Media Experts.

Table 1 Validation of both Media Experts

		Media Expert 1	Media Expert 2	Total Score	Maximum Score	Results	Total Percentage	Overall
Display Eligibility Aspect	question 1	4	4	8	10	80	85%	83%
	question 2	4	4	8	10	80		
	question 3	5	5	10	10	100		
	question 4	4	4	8	10	80		
Writing learning design aspects	question 5	4	4	8	10	80	83%	
	question 6	5	4	9	10	90		
	question 7	4	4	8	10	80		
	question 8	4	4	8	10	80		
Engineering and Software aspect	question 9	4	3	7	10	70	80%	
	question 10	4	5	9	10	90		
	question 11	5	4	9	10	90		
	question 12	4	3	7	10	70		

Based on the results of validation material experts get the following comments/suggestions Need to be added Audio, Animation nets 1, 3, 4, not yet running, Need to be added contextual examples in daily life to be meaningful for students, Material delivery needs to be edited to make it simpler [12] to support [8]. Media feasibility results based on expert assessment of materials presented in table 2

Table 2 Validation of Both Media Experts

		Media Expert 1	Media Expert 2	Total Score	Maximum Score	Results	Total Percentage	Overall	
Aspect Display Eligibility	question 1	5	5	10	10	100	90%	91%	
	question 2	4	5	9	10	90			
	question 3	5	4	9	10	90			
	question 4	4	4	8	10	80			
	Utilization of Learning Media	question 5	4	4	8	10	80		93%
		question 6	5	5	10	10	100		
question 7		4	4	8	10	80			
Quiz		question 8	5	5	10	10	100		90%
		question 9	5	5	10	10	100		
		question 10	5	4	9	10	90		
Quiz	question 11	5	4	9	10	90	90%		
	question 12	4	5	9	10	90			

Media assessment by students for product trials. Based on the assessment results conducted by 24 students, overall it can be said to be very feasible with an average of 83% with very decent criteria [13]. media eligibility results are presented in Table 3.

Table 3 Test validation results for Learners

No	assessment aspect	Number of Items Soal	Score	Maximum Score	Results	category	Overall
1	Display Eligibility	4	401	480	84%	Very Decent	83%
2	Presentation of Materials	7	682	840	81%	Very Decent	
3	To the appeal of Engineering and software	5	499	600	83%	Very Decent	

4. Conclusion

Can be concluded based on results and discussion, the results of this development research in the form of Macromedia flash-based application (. Exe). This app is about mathematic learning space building material. What is happening supporting factors in the development of learning media is the implementation process, this application supports the learning process of students during the COVID-19 pandemic outbreak that occurs around the world so that learning only relies on technology in the delivery of learning. While the inhibitory factor in the development of this media is limitations in mobility. Researchers are unable to visit the school to be studied because the school is off so the researcher cannot monitor the students directly during the media implementation process.

Acknowledgment

We are grateful for the cooperation of the institution in the distribution of questionnaires by the Elementary School Program University of Muhammadiyah Prof. Dr. Hamka. Thanks, in particular to the editor and anonymous reviewer for their useful recommendations.

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