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Development of Blog-Based Mathematics Learning Media

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Abstract

The rapid development of technology goes hand in hand with its use in learning media. One of them is in the form of a blog, especially in learning that is often considered difficult and boring, such as mathematics. So this study aims to describe the development of Blog media in learning mathematics as well as validity. The method used is Research and Development (R&D) with the ADDIE development model (Analyze, Design, Development, Implementation, Evaluation) aimed at research subjects of 26 students in class 8C at MTsN Kota Batu. The results showed that the Development of Blog-Based Mathematics Learning Media had a media validity score of 95.39% and a material validation result of 87.5%, both of which were categorized as very good. Meanwhile, the media readability questionnaire in this study has a value of 85.19% in the very good category.

Keywords: *Development; Instructional Media; Blogs*

Abstrak

Perkembangan teknologi yang semakin pesat beriringan dengan penggunaannya pada media pembelaran. Salah satunya berbentuk blog, terutama pada pembelajaran yang sering kali dianggap sulit dan membosankan seperti matematika. Maka penelitian ini bertujuan untuk mendeskripsikan terkait pengembangan media Blog pada pembelajaran matematika serta kevalidannya. Metode yang digunakan adalah Research and Development (R&D) dengan model pengembangan ADDIE (Analyze, Design, Development, Implementation, Evaluation) yang dtujukan pada subjek penelitian sebanyak 26 peserta didik di kelas 8C bertempat di MTsN Kota Batu. Hasil penelitian menunjukkan bahwa Pengembangan Media Pembelajaran Matematika Berbasis Blog memiliki angka kevalidan media sebesar 95,39 % dan hasil validasi materi sebesar 87,5% yang keduanya dikategorikan sangat baik. Sedangkan angket keterbacaan media penelitian ini memiliki nilai 85,19 % dengan kategori sangat baik.

Kata Kunci: *Pengembangan; Media Pembelajaran; Blog*

INTRODUCTION

The development and progress of the times in the current era began to be seen with the emergence of various computer application technologies. Especially during the Covid 19 period, online learning was also an option because it was not possible to do face-to-face learning(Nurhuda & Setyaningtyas, 2022). In addition, mastering information technology and knowledge is a requirement for someone to advance science and technology. Internet Network has also been launched which can be used by the wider community(Nugroho et al, 2017). Today's learning process can be implemented in the form of media that is easy to use by all parties. Learning media is a necessity that cannot be avoided to achieve changes in the teaching and learning activities of students both in terms of affective, cognitive, and psychomotor (Khotimah, 2021). Meanwhile, it is also said that media can optimize students' sensitivity to learning because it contains messages (Nurhuda, 2022a).

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The process of learning mathematics requires learning support tools because mathematics lessons tend to be filled with assignments, sometimes there are even frequent additions to teaching hours because the delivery of material does not match the allotted time. So we need a media that can be used by educators without spending more time at school (Nugroho et al, 2017). The media that will be developed by researchers is in the form of blogs to support student learning. Blogs are effective interaction media created to increase knowledge and create a fun learning atmosphere (Naro et al 2020). Blogs are often used as a platform to develop writing skills and learn new things like web development and content management. Besides that, it also makes parents create conducive conditions for the development of their children (Maheningsih & Nurhuda, 2023).

The researcher chose this material because it can be found in everyday life so that the process of science can be implemented in the daily life of students regarding the material of flat-sided spaces such as finding out the capacity of water in a cube-shaped bathtub using the volume of a cube (Initiated, 2019). This study aims to determine the validity of developing blog media in learning mathematics.

RESEARCH METHODS

Researchers used the Research and Development (RnD) research method or commonly called the research and development method. In education research and development methods can assist teachers in producing a media or product that will assist teachers in teaching and learning activities (Nurhuda, 2023d). In this study, researchers used the ADDIE development model. There are 5 stages in the ADDIE development model, namely Analyze, Design, Development, Implementation, and Evaluation. The analysis stage is the most important stage, namely to analyze the need to develop learning media for this blog and identify problems through interviews with grade 8 math teachers who teach at MTsN Kota Batu.

At this design stage, the researcher designed a blog learning media product in mathematics subject matter on flat-sided spaces. At this stage, the researcher plans the selection of materials and designs products such as designing any application usage. The development stage is in the form of steps for making and displaying the results of learning media blogs, media validation, and revisions. The implementation stage is to apply the product that has been designed to the subject that has been determined into learning activities. The evaluation stage is the final stage in the ADDIE development model. This stage is a process to provide an assessment of the product that has been implemented.

The subjects in this study were 26 class IIC students at MTsN Kota Batu. Here's how to calculate the percentage of blog readability questionnaires according toArikunto (2013).

$$P = \frac{\sum Xi}{\sum x} \times 100\%$$

Information:

- Q: Percentage of eligibility
- $\sum Xi$: the total number of scores obtained from the validator
- $\sum x$: Total ideal score

The collected data were analyzed through quantitative descriptive analysis through the results of the percentage score against the predetermined rating scale criteria. The following is the qualification level of validity based on the average percentage according to(Khoirilah, 2021):

Table1Rating scale criteria

Percentage (%)	Qualification	Eligibility Criteria
85-100	Very good	Very valid, no revision is needed
75-84	Good	Valid, no revision needed
65-74	Enough	Valid enough, need revision
55-64	Not enough	Invalid, need revision
0-54	Very less	Invalid, total revision

RESULT AND DISCUSSION

Learning Media

According to Moh Suardi (2018), learning should start from the essential wisdom of a person from the spiritual realm to the cognitive realm. This can be obtained through the meaning of the senses from the Creator, which means the content of learning studies is environment-based so it can relate the material being taught to situations in everyday life (Nurhuda, 2023a). Then get the name cognitive. So that the term learning correlates with learning, teaching, and learning and occurs simultaneously. In addition, learning experiences last throughout life under any conditions and anywhere (Nurhuda & Putri, 2023).

Types of learning media according to Sadiman, Arif, et al quoted from Alwi (2017) divided into three classifications as follows:

1. **Viewing Media**

   Media related to the sense of sight is called visual media. Visual media can be useful in terms of motivation, memory, and understanding. This media provides an important role in the learning process.
2. Media Listen

Media related to the sense of hearing is called hearing media. Messages are conveyed either verbally or non-verbally. Media like this can motivate students to learn more material.

3. Media View Listen

This media can help students motivate, develop and apply with the help of hearing and vision. Of course, this is in line with the times and can attract the attention of students in the learning process. This media includes gadgets, laptops/computers, and others that are all digital. Even so, the development of digital tools and access to information in digital forms has both challenges and opportunities (Syukri et al., 2023).

Blogs

Blogs commonly called a web blog are a form of web application that contains written posts or commonly referred to as 'uploads' on web pages (Nurhuda, 2022b). Uploads on the web are loaded in order of date, meaning that the posts with the latest date will be displayed at the top.

The components of the blog consist of a header which includes a menu, then there is the main content section which contains embedded uploads, there is also a sidebar that displays the most popular uploads and social media from the author, and finally, there is a footer which contains various information such as contact information, disclaimer, and also privacy policy. A disclaimer is usually defined as a document that can protect website owners from possible lawsuits from visitors (Suprapto & Eng, 2020).

1. **Analyze*(Analysis)***

In this analysis stage, the researcher carried out a needs analysis and identified problems through interviews with mathematics teachers and representatives of grade 8 students. This needs analysis and problem identification is the first steps that need to be taken in developing media products according to actual conditions.

The following is a presentation of the results of interviews with mathematics teachers as follows:

Researcher: "How is the process of learning mathematics at MTsN Kota Batu?"

Teacher "Lessons are still as usual, the teacher explains in front of the students and then listens."

Researcher: "What media is used in learning?

Teacher: "Use module books provided by the madrasa and use teaching aids according to the material being discussed, for example building a flat side room using used box teaching aids."

Researcher: "What are the obstacles faced by teachers during learning during the pandemic?"

Teacher: "The problem is that there are many teachers there who still can't keep up with science and technology developments, especially myself (mathematics teacher), I've attended training such as GeoGebra training but I keep forgetting and don't understand how to use it."
Researcher: "Does that mean you used GeoGebra media during lessons?"
Teacher: "Yes, but maybe only basic geogebra which is still easy like that and is only shown on the LCD so students can only see and not practice."
Researcher: "Is there a computer lab or wifi in this madrasah?"
Teacher: "Yes, there is a computer lab here and also full wifi in all areas, even in the computer lab itself there are 3 wifi networks provided."
Researcher: "Have students ever been allowed to practice on their own to learn by utilizing the available computers?"
Teacher: "No, because I don't use media, I have to use a computer."
Researcher: "Is it possible for students to carry out teaching and learning activities using a computer?"
Teacher: "Yes, it is possible if there is media used, students will even prefer learning in the computer lab, students will be able to explore their abilities and be more creative in finding material."

The results of the needs analysis and problem identification obtained by the researcher are as follows:

1) Researchers see that there is no variation in the media used in learning mathematics. Because mathematics is an abstract subject, sometimes students cannot just study with books to better understand the material. Therefore innovations are needed in learning mathematics so that students can remain enthusiastic and have a better understanding of the mathematics material being taught (Nurhuda, 2023c).
2) Most teachers and students in the current era more or less know and have skills in the field of technology, at least have a smartphone or laptop so that they can support and facilitate this research.
3) Determining the location of research for the development of learning media. The researcher chose the MTsN Kota Batu school as the research location with the balance that at MTsN Kota Batu there was an adequate computer lab and there was wifi provided by the madrasa so that it supported technology-based learning at MTsN Kota Batu.

2. **Design**

After analyzing the needs and identifying the problem, the next stage is the design or planning to make the product. There are three sub-chapters in the planning of media production.

a) Material selection

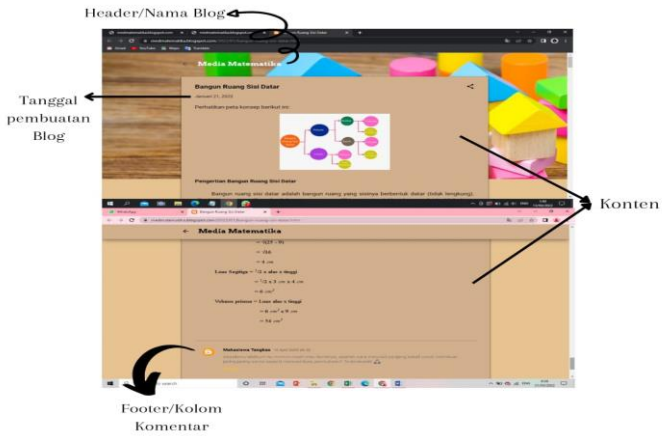
In this study, researchers used materials as well as KI and KD that were by the KI and KD in the 2017 Revised Edition of Mathematics Books by the Ministry of Education and Culture of the Republic of Indonesia. 8 SMP/MTs. Apart from preparing the material, the researcher also prepared appropriate questions regarding cubes, blocks, pyramids, and prisms to be displayed in the Blog media.

b) Designing Products

Next, the researcher will start designing the product to be made. The researcher prepares by starting to create an email to create a Blogspot account and preparing supporting applications to assist the media creation process, namely the Geogebra, Canva, and Youcut applications (Nurhuda, 2023b).

The Canva application is used to make a concept map of the flat-sided space material, then the GeoGebra application is used to make an animation of flat-sided space shapes, and finally, the Youcut application is used to edit video animation of flat-sided shape nets.

After preparing the application, the researcher also prepares supporting images needed in the media and creates a concept for the sequence of material to be displayed in the media. Accessible links vizhttps://medmatematika.blogspot.com/2022/01/build-flat-side-room.htmlThe following is a design for making media blogs:



Picture 1. Blog Media Design

c) Preparation of Validation Instruments and pre-test and post-test questions

Product validation instruments consist of media validation instruments and material validation instruments. The media validation instrument is in the form of a questionnaire consisting of 18 aspects consisting of 2 aspects of suitability with the characteristics of students, 8 aspects of media appearance, 3 aspects of media effectiveness, 2 aspects of media efficiency in learning, 2 aspects of media quality, and 1 aspect of media safety. Whereas in the material validation instrument, there are 12 aspects consisting of 10 aspects of content feasibility, 1 aspect of systematics, and 1 aspect of grammar.

3. **Development*(Development)***

a) Media Creation

In the stages of making the media, the researcher will make the media according to the design that was done in the previous stage. The beginning of making the media was choosing a theme to be used in the media, initially, the theme used was grass and sky but after consulting with the media validator he suggested changing the theme to something simpler and related to mathematics so the researchers changed the theme to gray. After getting a suitable background, the researcher begins to write down the material that has been prepared and implements the supporting pictures and videos that have been prepared in the previous stage to attract and add to students' understanding.

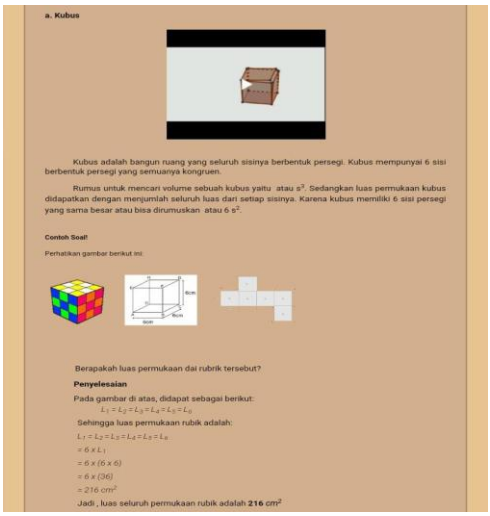
The following is a display of media blogs compiled by researchers:

1) Initial View/Title

Picture 2. Initial view/title

In Figure 2 the media compiler writes down the title of the material to be discussed, apart from that there is also a concept map as an illustration of the flat-sided geometric material, on top of the concept map there is the inscription "pay attention to the following concept map:" which is used as a guide for students that the image is a concept map of flat-sided space build material. Next is also given an initial introduction regarding the flat side shapes by giving an understanding which is then explained about the various types of flat side shapes.

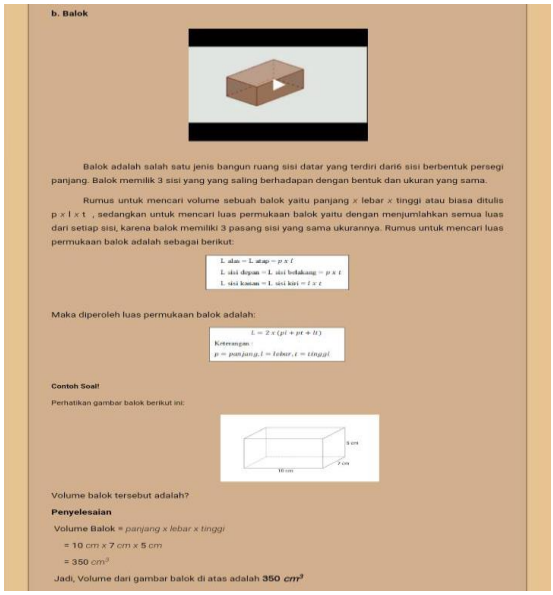
2) Display Material and examples of cube problems



Picture 3. Display material and examples of cube problems

The first types of geometric shapes that will be explained are cube shapes. The display in Figure 3 shows an animated video of cube nets along with an explanation of the material such as explaining the formula for the volume and surface area of a cube and practice questions for cube material which consists of practice questions and their discussion.

3) Display of Material and Sample Problems with Blocks

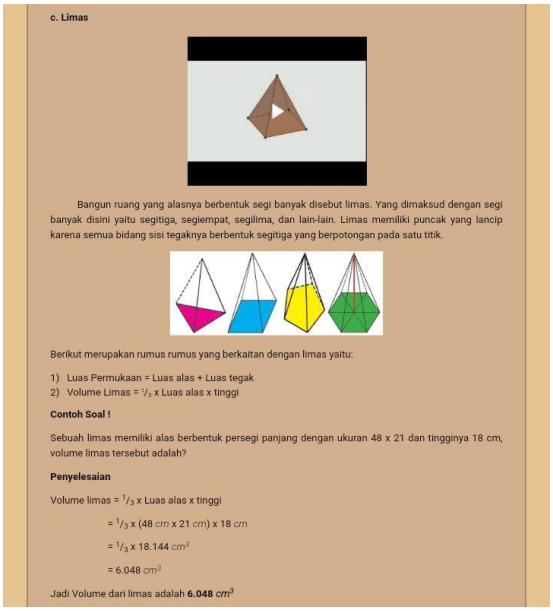


Picture 4. Material display and examples of beam questions

Figure 4 displays material about blocks accompanied by an animated video of beam nets and the formula for finding the volume and surface area of a block. Figure 4.4 also displays practice questions for block material consisting of practice questions and their

discussion, as well as supporting pictures to increase students' understanding of the questions.

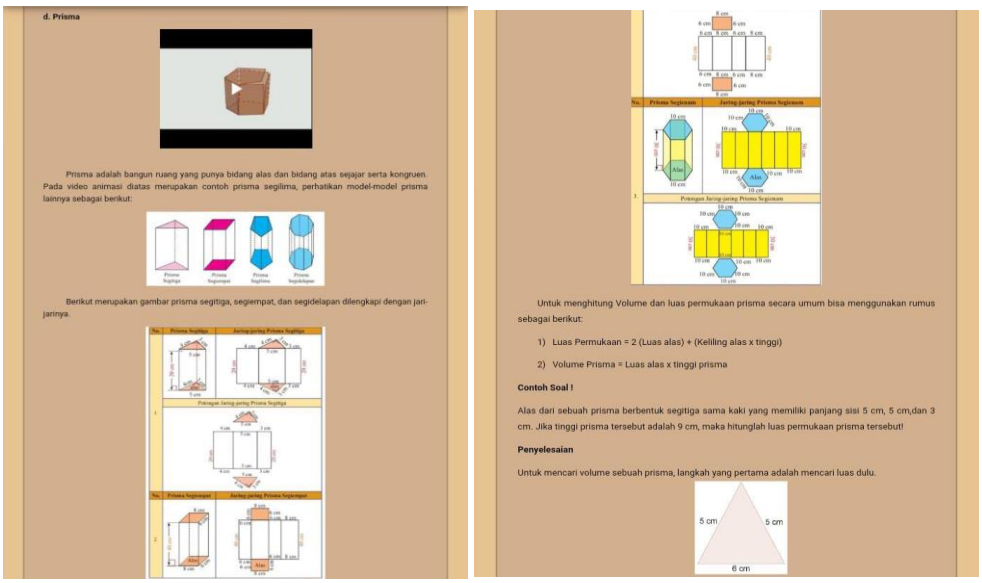
4) Display Material and Examples of Limas Questions

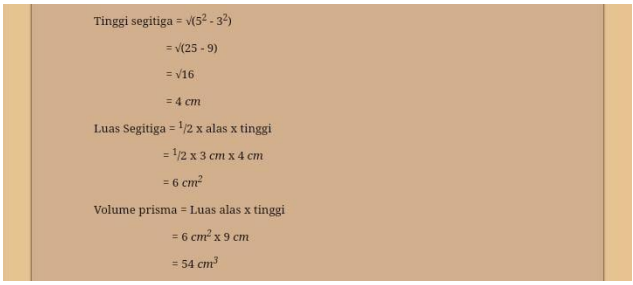


Picture 5. Material display and examples of Limas questions

The display in Figure 5 shows an animated video of pyramid nets along with an explanation of the material, and types of pyramids and also explains the formula for finding the volume and surface area of the pyramid and practice questions for pyramid material which consists of practice questions and their discussion, as well as supporting pictures to increase students' understanding of the questions.

5) Display Material and Examples of Prism Problems





Picture 6. Display Material and Examples of Prism Problems

The display in Figure 6 shows an animated video of prism nets along with an explanation of the material, types of prisms and also explains the formula for finding the volume and surface area of a prism and. Display of practice questions for prism material consisting of practice questions and their discussion, as well as supporting pictures to increase students' understanding of the questions.

After compiling the materials, animated videos, sample questions, and other components on Blogspot, the researcher publishes the media that has been created so that it can be accessed by anyone and can be accessed by validators to validate the media.

b) Blog Validation

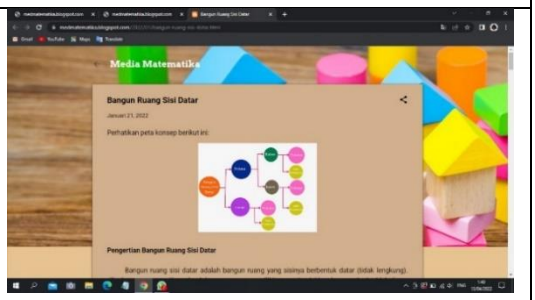
After developing this media, the researcher then validated it with the validator. Links from media blogs as well as validation instruments are given to validators to be validated. The validation results are in the form of quantitative data obtained from validation questionnaires and qualitative data from criticism and suggestions provided by the validator. The results of the material validation score get a value of 87.5% and the results of the media validation score get a value of 96%.

c) Blog Revision

After being validated by the validator, the researcher revised it according to the suggestions given by the validator. The improvements will be presented as follows:

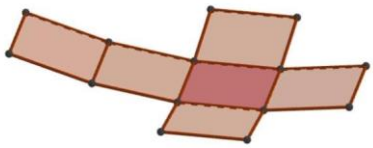
a. Replace the background with a theme that leads to mathematics. The first revision of the media expert validator. In Table 2, the media display, which was originally grass and sky, was replaced with an image that displays spatial shapes so that the background theme matches the existing material.

Table 2 Media Revision 1

Before revision	After revision
	

b. Revise the animated flat side shape video so that it is added with audio that explains the related flat side shape and is given a title or description in the video. Table 3 shows the changes before the revision and after the second revision. In the second revision, the researcher provides information in the video about what flat-sided wake nets are in the animation video listed

Table 3 Media Revision 2

Before revision	After revision
	

c. Provide information or invite readers to view the available concept maps. Table 4 shows the changes before the revision and after the third revision. In this revision, the researcher gave a sentence inviting students to see the concept map that had been made by the researcher.

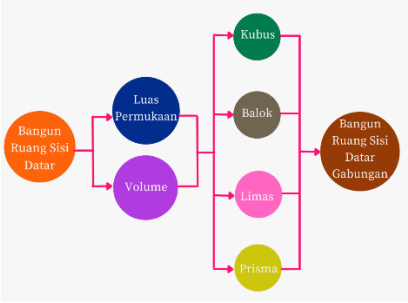
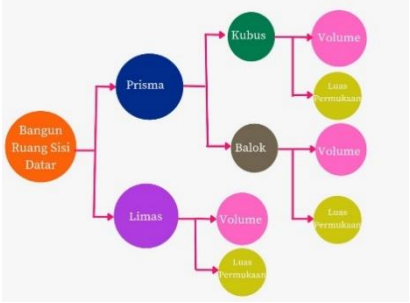
Table 4 Media Revision 3

Before revision	After revision
	

d. Change the concept map to one that is more appropriate according to the existing material because the one from the book is not appropriate. Table 5 shows the changes

before the revision and after the fourth revision. In the fourth revision, the researcher revised the concept map according to the suggestions given by the validator.

Table 5 Media Revision 4

Before revision	After revision
	

4. **Implementation*(Implementation)***

Implementation is one of the characteristics of the program that is running characteristics of the program consisting of planning, implementation, and evaluation (Abid Nurhuda & Hadziq, 2022). After validating and revising the previous stage, the implementation stage will then be carried out. At this stage, the researcher took class 8C as the subject. Blog media is applied to class 8C where previously it has been tested on 6 students.

5. Evaluation (Evaluation)

The last stage is the evaluation stage, this stage is carried out after implementing the product on the subject. After the subject has used the product developed by the researcher, the subject is given a readability questionnaire to assess whether the product is valid or not. The data generated from the readability test can be seen in Table 4.16. It is known that the total score on the readability aspect of the media is 1329 with a maximum score of 1560, so using the resulting formula: $P = \frac{\sum Xi}{\sum X}\ x\ 100\%$

$$P = \frac{\sum Xi}{\sum X}\ x\ 100\%$$

$$P = \frac{1329}{1560}\ x\ 100\%$$

$$P = 85{,}19\ \%$$

The results of the final score percentage of the legibility questionnaire by 26 students produced a score of 85.19%. The final score of 85.19% is a very good category which means it

is valid without revision. So that it can be seen that the Blog media on flat-sided spatial material can be read properly.

This research is said to be valid after validating the product, the validation is in the form of material validation and media validation. The results of the material validation score get a value of 87.5% and the results of the media validation score get a value of 96%. These results are in line with research Khoirilah (2021), stated that the results of the validation assessment with a percentage of> 85% included very valid criteria. The results of the readability test after conducting field trials obtained a value of 85.19% with validity according to qualifications Khoirilah (2021) was very well read.

In this study, the product produced by the researchers was in the form of media blogs with flat-sided spatial material. This development process uses the ADDIE development model which consists of 5 stages. This development model is sequential and systematic which makes it easier for researchers to develop media. Aligned with researchTegeh & I Made (2015), the ADDIE model is arranged programmatically with systematic sequences of activities to solve learning problems according to needs and characteristics.

Blog-based media is used as a tool used to convey messages in teaching (Azhar Arsyad, 1997). This Blog media is included in the learning media class of hearing media (Alwi, 2017). This Media Blog contains evaluation questions, learning animation videos, and supporting materials. The material in this learning media is blocks, cubes, pyramids, and prisms. This material adapts the material taught to grade 8 students in the even semester of the 2021/2022 academic year.

CONCLUSION

This media blog is said to be valid after being validated by the material validator and media validator. The results of the material validation score get a value of 87.5% and the results of the media validation score get a value of 95.39%. The results of the validation assessment with a percentage of > 85% are very valid criteria. The results of the readability test after conducting field trials obtained a value of 85.19% with very good readability qualifications.

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