Tersedia online di http://ejournal.iain-tulungagung.ac.id/index.php/jtm
Jurnal Tadris Matematika 1(2), November 2018, 145-156
ISSN (Print): 2621-3990 || ISSN (Online): 2621-4008
Diterima: 30-09-2018 *Direvisi: 01-11-2018* *Disetujui: 13-11-2018*

Animation Media to Improve Student Learning Results

Nadia Roosmalita Sari
Department of Manajemen Dakwah, Institut Agama Islam Negeri Tulungagung
e-mail: nadiaroosmalitasari@gmail.com

ABSTRAK

Metode pembelajaran di sekolah-sekolah cenderung menggunakan model ceramah dan buku sebagai media pembelajaran. Sedangkan saat ini, teknologi sangat berkembang pesat. Pemanfaatan teknologi sebagai media pembelajaran sangat penting untuk menarik minat belajar siswa. Di jenjang Sekolah Dasar, anak-anak masih suka belajar sambil bermain. Penelitian ini mengusulkan animasi sebagai media pembelajaran siswa di Sekolah Dasar. Media ini dapat digunakan oleh guru sebagai media pembelajaran. Media animasi ini diharapkan dapat menarik minat belajar siswa, khususnya pada mata pelajaran matematika. Dalam animasi, visualisasi berupa gambar bergerak pada mata pelajaran matematika menjadi salah satu hal yang perlu dioptimalkan. Tujuan dari penelitian ini adalah untuk mengembangkan media pembelajaran animasi sebagai alternatif alat pembelajaran mandiri untuk membantu penguasaan mata pelajaran matematika bagi siswa dan mengetahui kelayakan produk untuk pembelajaran matematika. Metodologi penelitian dan pengembangan yang digunakan dalam penelitian ini adalah *Research and Development* (R&D). Metodologi ini mencakup keseluruhan hal yang berkaitan dengan pengembangan untuk menghasilkan perangkat lunak media pembelajaran interaktif yang berkualitas. Berdasarkan uji coba, diperoleh hasil 81% dari ahli media, 88% dari ahli materi, 70% dari uji lapangan awal, dan 93% dari uji coba lapangan. Berdasarkan hasil tersebut, media animasi untuk mata pelajaran matematika telah layak digunakan sebagai media pembelajaran mandiri dengan nilai rata-rata validasi sebesar 83%.

Kata kunci: animasi, siswa, Sekolah Dasar, matematika

ABSTRACT

Learning methods in schools tend to use lecture and book models as learning media. Whereas at present, technology is growing rapidly. The use of technology as a learning medium is very important to attract students' interest in learning. At the Elementary School level, children still like learning while playing. This research proposes animation as a learning media for students in elementary schools. This media can be used by teachers as learning media. This animation media is expected to attract students' interest in learning, especially in mathematics subjects. In animation, visualization in the form of images moving on the subject of mathematics becomes one of the things that need to be optimized. The purpose of this study was to develop animation learning media as an alternative self-learning tool to help to master mathematics subjects for students and find out the feasibility of products for mathematics learning. The research and development methodology used in this study is Research and Development (R & D). This methodology covers all things related to development to produce quality interactive learning media software. Based on the trial, 81% of media experts, 88% of material experts, 70% of initial field tests, and 93% of field trials were obtained. Based on these results, the animation media for mathematics subjects has been feasible to be used as a medium of self-learning with an average value of 83% validation.

Keywords: *animation, students, elementary school, mathematics*

DOI: 10.21274/jtm.2018.1.2.145-156

INTRODUCTION

Rapid technological development has affected developments in various aspects of life. In the world of education now learning methods do not only use conventional methods such as from textbooks and explanations from teachers, but also with effective and efficient learning methods by utilizing computer technology.

Problems that are often experienced by students in school, especially in mathematics learning is material that requires understanding and memory of students (Suroso, 2016). Seeing from the level of education students that elementary school students still have an interest in the world of children, meaning they are still interested in learning while playing. In the world of children, they still need encouragement or triggers to be able to understand something especially the material provided by the teacher in the classroom.

One of the innovations and motivations provided is through relevant media intermediaries to facilitate the delivery of material. Animation-based media is an appropriate medium in learning mathematics for elementary students because mathematics lessons not only require brain function, but mathematics is an abstract lesson. Mathematics is material that requires understanding and memory of students. Visualization in the form of moving images in these subjects becomes one of the things that are also needed in the delivery. Thus, the media delivery factor needs to be optimized. Therefore, in the learning process, a teacher is required to always be creative in creating an atmosphere of learning, so as to create a pleasant learning atmosphere and students become motivated to learn.

The main purpose of using animation-based media is that the concepts or material in the subject matter of mathematics that are abstract in nature can be studied, understood, and achieved by students' reasoning, especially students who still need the help of tools that are real in nature, clearly visible in understanding the concepts or material taught (Daryanto, 2010).

This animation-based media is expected to be better received by elementary students. The obstacles contained in learning can be overcome by the use of learning media so that they will be able to receive messages better and make learning very interesting and effective. This is consistent with the opinion of Sadiman, et.al (2002), namely the media is everything that can be used to channel messages from the sender to the recipient so that it can stimulate the thoughts, feelings, attention and interests and attention of students in such a way that the learning process occurs.

Siskawati, et al. (2016) developing learning media in the form of monopoly media to determine the effectiveness of media and to increase student interest in the subject of Geography. The development method used in the study is Research and Development (R & D). The results of the study show that the media monopoly is effective for improving student learning.

Furthermore, a researcher developed interactive learning media in the form of multimedia for electromagnetic field subjects (Ali, 2009). The research method used in developing multimedia

learning is R & D. The results showed that the use of computer-assisted learning media had a significant influence on the attractiveness of students to learn the competencies taught.

Interactive multimedia has also been developed by Yuliandari and Wahjudi (2014) on economic subjects. The study aims to: (1) find out the process of developing interactive multimedia-based learning media on economic subjects; (2) testing the feasibility of developed learning media; and (3) knowing students' responses to interactive multimedia-based learning media that have been developed. The results of the study show that interactive multimedia-based learning media developed are suitable for use in the learning process. From the opinions of students, the feasibility of interactive multimedia-based learning media obtained a value of 90.83% with very decent criteria. Research related to the development of multimedia learning has also been successfully carried out by Arda, et.al (2015) for eighth-grade junior high school students.

METHOD

This research proposes a Research and Development research method developed by Borg and Gall (R & D). This method was chosen because it is in accordance with the research objectives and based on previous research. Some previous studies have succeeded in developing learning media using the Research and Development method developed by Borg and Gall. According to Borg and Gall, development research has steps to implement the strategy shown in Figure 1 (Sukmadinata, 2007).

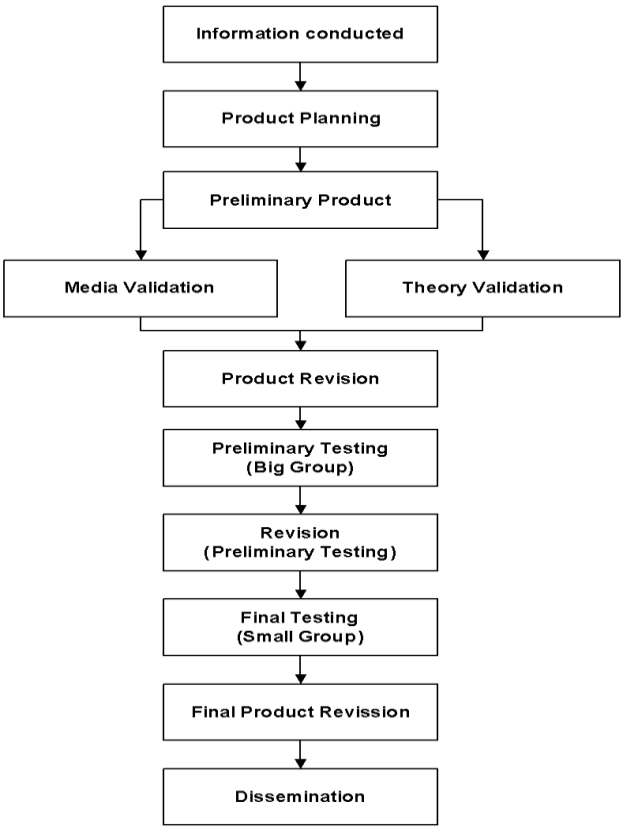

Figure 1. Flow diagram of Research and Development (R & D) "Borg and Gall"
Adapted: (Sukmadinata, 2007)

The procedure of research and development of animation media consists of ten stages, namely information gathering, product design, initial product development, material testing and testing media, product revision, initial field test (large group), product revision, field test (small group), final product revision, dissemination.

To determine the feasibility of the product, this study uses the feasibility of the product or media shown in Table 1. Table 1 explains that the eligibility criteria are divided into 4 parts, namely valid, quite valid, less valid, and invalid. Each eligibility criterion has a certain percentage range as shown in Table 1 (Wahono, 2006).

Table 1. Media Feasibility Criteria

Percentage	Criteria	Specification
76% - 100%	Valid	No Revision
56% - 75%	Fairly Valid	Not Revised
40% - 55%	Less Valid	Partial Revision
<40%	Invalid	Total Revision

Adapted: (Firmantika & Mukminan, 2014)

RESULT AND DISCUSSION

This research has done trial according to procedures or stages of research and development of Borg and Gall. The results of the study are presented as follows.

Information Conducted

In the initial stage, a preliminary study related to the material that will be used as teaching material obtained at SD X. The material has been consulted with the teaching teacher so that the material that will be used as teaching material is "addition" material. The material is taught to class 1 students.

In addition to looking for material that will be used as teaching materials, learning media or tools also need to be consulted with media experts. Based on the results of discussions with media experts, animation-based media suitable for learning media for elementary school students in grade 1. Animated media was chosen because the object of this study was grade 1 elementary school students. So that animation is considered to be able to attract students' learning interest.

Product Planning

This stage is the stage of product planning. Products developed in the form of flash-based multimedia applications. The media contains animated material and also practice questions. The material to be displayed: (1) Introduction to the number 1-10; (2) The introduction of 11-20 counts; (3) Addition; and (4) Summarization is short-lived. Each material is given practice questions.

Preliminary Product

At this stage, the product begins to be developed. At the beginning of the media opened there is an introduction as shown in Figure 2.

Figure 2. Introduction to animation media

The media consists of several menus, namely "GOAL" and "MATHEMATICS". Menu Objectives contain about learning objectives (Standards of Competence, Basic Competencies, Indicators, and Objectives)

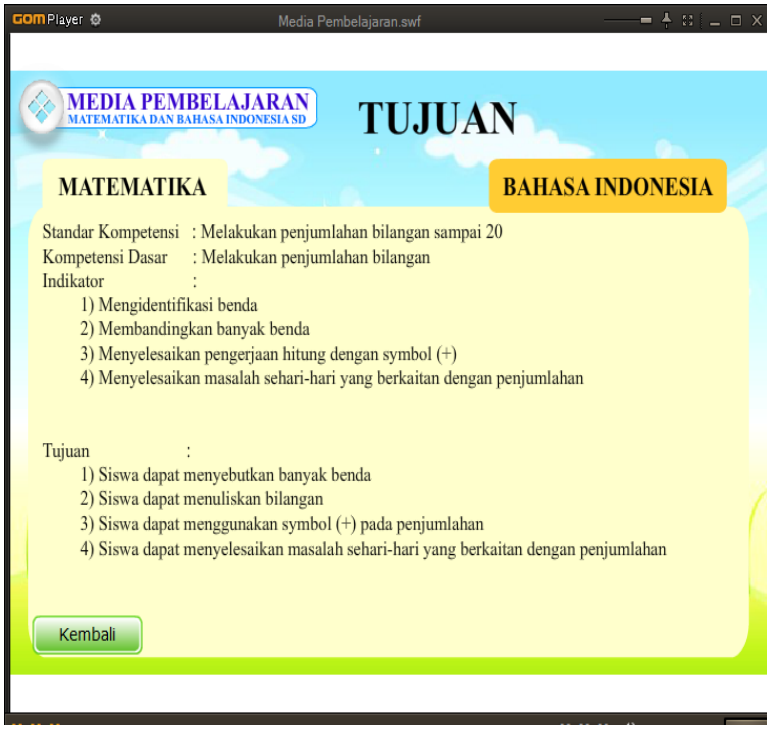

Figure 3. "Destination" Menu

Next, there is a "MATHEMATICS" menu. This menu presents several topics as described in Figure 4.

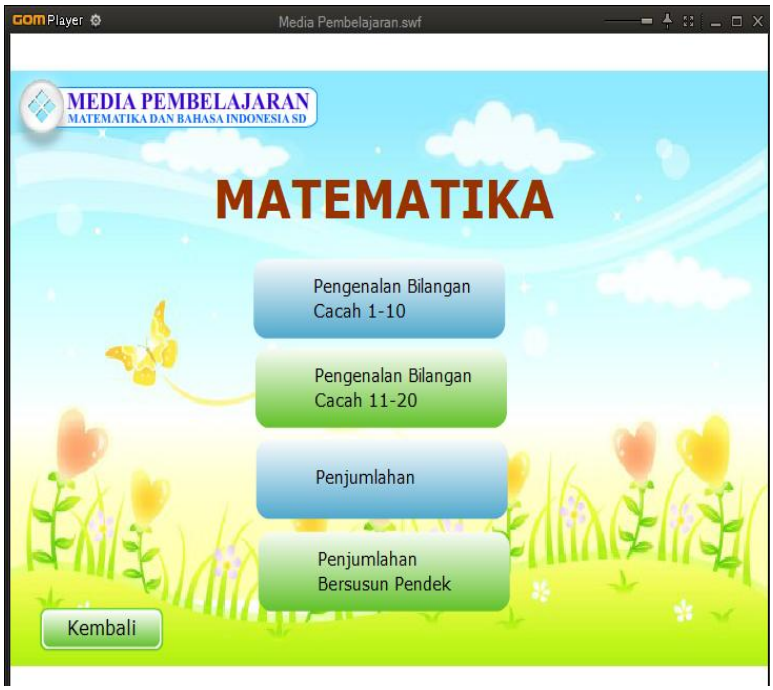

Figure 4. The "Mathematics"

In the "MATHEMATICS" menu there is a discussion: (1) Introduction to the number of numbers 1-10; (2) The introduction of 11-20 counts; (3) Addition; and (4) Summarization is short-lived. Figure 5 displays the contents of the "Introduction to the number" menu.

Figure 6. Menu "Introduction to the Number of Counts"

Next, in the submenu "Introduction to Counting Numbers" there are also practice questions to test students' understanding after being given teaching materials as shown in Figure 7.

Figure 7. Menu of "Exercise Questions"

Media and Topic Validation

Before testing the product in the field, this research first conducts media and material testing to ensure the product is ready to be tested in the field. Media testing was conducted by media experts, namely UM Electrical Engineering lecturers by considering several feasibility criteria as shown in Table 2.

Table 2. Media Validation Results by Media Experts

No	Gain Assessment Rating	Score ∑ X	Maximum Score ∑ Xi	Description
1	Effective and efficient	6	8	Valid
2	Reliable	3	4	Valid
3	Maintenance	3	4	Enough Valid
4	Usability	7	8	Valid
5	Compatibility	8	8	Valid
6	Documentation of learning media programs	2	4	Enough Valid
7	Reusable	4	4	Enough Valid
8	Interactivity	3	4	Valid
9	Ease to be understood	3	4	Valid
10	Systematic, coherent, flow of logic clear	3	4	Fairly Valid
11	Communicative	4	4	Quite Valid
12	Creative in the following ideas pouring ideas	3	4	Valid
13	Audio	12	12	Valid
14	Visual	10	16	Valid
15	Moving media	3	4	Valid
16	Layout Interactive	4	4	Valid
	Total	**78**	**96**	**Percentage 81.25 (Valid)**

Based on the results of validation conducted by media experts, the percentage results were 81% with valid criteria. The next test is testing the material carried out by material experts, namely elementary school mathematics teachers. The results of material testing are shown in Table 3.

Table 3. Results of Material Validation by Material Experts

No	Grid Rate	Earned Scores Σ X	Scores Maximum Σ Xi	Description
1	The relevance of the learning objectives with SK / KD / Curriculum	4	4	Valid
2	Interactivity	3	4	Enough Valid
3	Contextuality and actualities	4	4	Valid
4	completeness and quality of study grants	3	4	Valid
5	Conformity material with learning objectives	4	4	Valid
6	Depth of material	3	4	Valid
7	Ease to be understood	4	4	Valid
8	Systematic, coherent, clear logic	4	4	Valid
9	The consistency of evaluation with learning material	3	4	Enough Valid
10	Accuracy and provision of evaluation tools	4	4	Valid
11	Providing feedback on evaluation results	3	4	Valid
12	Communicative	4	4	Valid
13	Visual	3	4	Valid
	Total	**46**	**52**	**Percentage 88.46 (Valid)**

Based on the results of material validation, an average validation of 88% was obtained which showed that the material used as teaching material was valid. It can be concluded that these results do not require revision and can be directly tested in the field.

Preliminary Testing (Small Group)

Initial field trials are carried out in small groups. The initial field trial subjects were grade 1 elementary school students with a number of 1 student taken randomly. The results of the initial field trial results are shown in Table 4. The average percentage of the results of the initial field trials was 70% indicating that the mathematics learning media was quite feasible to use and did not require revision. However, to improve the media, researchers chose to make revisions.

Table 4. Test data at preliminary testing

No	Grading Assessment	Gain Score ∑ X	Maximum Score ∑ Xi	Information
	Aspects of Software Engineering			
1	Ease of using media	1	1	Valid
2	Usage instructions have been displayed clearly	0	1	Invalid
	Aspects of Learning Design			
3	Media can improve learning motivation	1	1	Valid
4	Easy material to be understood	0	1	Invalid
5	Material and evaluation have been displayed properly	0	1	Invalid

No	Grading Assessment	Gain Score ∑ X	Maximum Score ∑ Xi	Information
	Visual Communication Aspects			
6	Depth of material	1	1	Valid
7	Images are displayed clearly	1	1	Valid
8	Posts easy to read	1	1	Valid
9	Colors in media learning are comfortable to see	1	1	Valid
10	The animation is clear and understandable	1	1	Valid
	Total	**7**	**10**	**Percentage 70 (Valid)**

Revision (Preliminary Testing)

In this section, revisions have been made to the "Instructions for Use" and "Material and Evaluation" sections. Improvements that have been made based on the results of validation at Preliminary Testing to improve the media to be tested in the next stage, namely Final Testing. The results of improvements are shown in Figures 3, 4, and 7.

Final Testing (Big Group)

At this stage, a large group was tested after going through several improvements in the previous stage. At this stage, 10 students were chosen as the research subjects. These 10 students were chosen randomly. After going through a media trial, the results of the final trials are shown in Table 5.

Table 5. Final Testing Validation (Large Groups)

No	Gain Assessment Rating	Score ∑ X	Maximum Score ∑ Xi	Description
	Aspects of Software Engineering			
1	Ease of using the media	10	10	Valid
2	Usage instructions have been displayed clearly	9	10	Valid
	Aspects of Learning Design			
3	Media can improve learning motivation	9	10	Valid
4	Material easy to understood	9	10	Valid
5	Material and evaluation have been displayed well	10	10	Valid
	Visual Communication Aspects			
6	Depth of material	9	10	Valid
7	Images have been displayed clearly	9	10	Valid
8	Posts easy to read	9	10	Valid
9	The colors in the learning media are comfortable for visits	9	10	valid
10	Animations clear and understandable	10	10	valid
	Total	**97**	**100**	**Percentage 93 (valid)**

Product Final revision

Based on the results of testing at the stage of Final testing, media validation of the results obtained by 93% which indicates that the media is valid and does not require revision. So that in the Final Product Revision stage, no revisions are needed. So, you can go to the dissemination stage.

Dissemination

At this stage, the spread of the product in the form of Compact Disk (CD) is carried out. Media that is ready to be inserted into the CD so that it is ready to be used and installed into the Packet Computer (PC) or laptop.

Overall Data Analysis

Based on media expert tests, expert material tests, preliminary testing, and Final Testing obtained the following data. Based on the percentage results, animation-based learning media can attract students to learn with a percentage of 83%. This result is also the same as the results of Suroso (2016) which shows that the role of learning media is very important in attracting students' interest in learning.

Table 6. Average validation results for all tests

No	Validation	The result (%)
1	Media Expert	81
2	Material Expert	88
3	Preliminary Testing	70
4	Final Testing	93
	Average of Validation	**83**

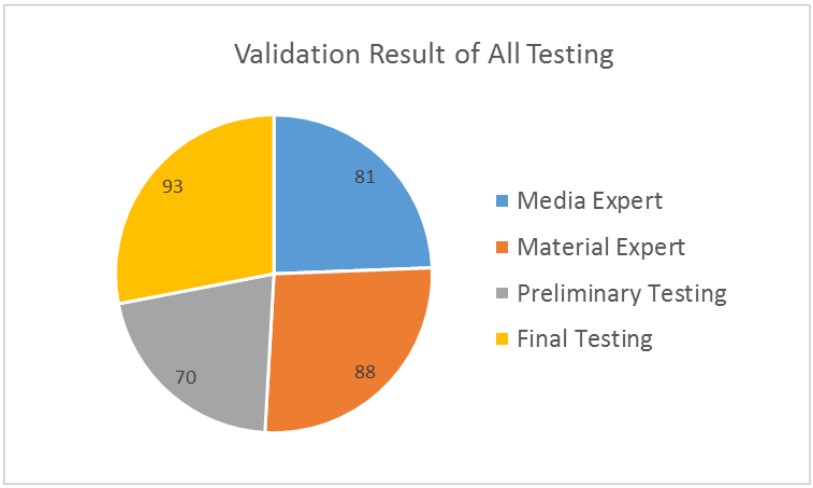

Figure 7. The result of each testing

CONCLUSION

Based on the results of research and development that have been done it can be seen that animation-based media in mathematics subjects for elementary students is included in the eligibility criteria with an average grade of 83% so that it can be used in the learning process both in class and outside of class.

The development of current technology, the author wants to develop current research by making mobile-based applications so that the animation media can be used at any time without having to use a notebook.

REFERENCES

Ali, M. (2009). Pengembangan Media Pembelajaran Interaktif Mata Kuliah Medan Elektromagnetik. *Jurnal Edukasi@Elektro*, *5*(1), 11–18.

Arda, Saehana, S., & Darsikin. (2015). Pengembangan Media Pembelajaran Berbasis Komputer untuk Siswa SMP Kelas VIII. *E-Jurnal Mitra Sains*, *3*(1), 69–77.

Daryanto. (2010). *Media Pembelajaran: Perananannya Sangat Penting dalam Mencapai Tujuan Pembelajaran*. Yogyakarrta: Gava Media.

Firmantika, L., & Mukminan. (2014). Pengembangan Media Pembelajaran Berbantuan Komputer untuk Menanamkan Kesadaran Lingkungan bagi Siswa SMP. *Harmoni Sosial: Jurnal Pendidikan IPS*, *1*(2), 155–164.

Sadiman, A. S., Rahardjo, R., Haryono, A., & Rahardjito. (2002). *Media Pembelajaran dan Proses Belajar Mengajar: Pengertian, Pengembangan, dan Pemanfaatannya*. Jakarta: Raja Grafindo Persada.

Siskawati, M., Pargito, & Pujiati. (2016). Pengembangan Media Pembelajaran Monopoli untuk Meningkatkan Minat Belajar Geografi Siswa. *Jurnal Studi Sosial*, *4*(1), 72–80.

Sukmadinata, N. S. (2007). *Metode Penelitian Pendidikan*. Bandung: Remaja Rosdakarya.

Suroso. (2016). Peningkatan Daya Ingat Terhadap Pelajaran Matematika Melalui Penggunaan Media Pembelajaran. *JURNAL SIGMA*, *1*(2), 41–46.

Wahono, R. S. (2006). Aspek dan Kriteria Penilaian Media Pembelajaran. Retrieved October 30, 2018, from http://romisatriawahono.net/2006/06/23/media-pembelajaran-dalam-aspek-rekayasa-perangkat-lunak/

Yuliandari, S., & Wahjudi, E. (2014). Pengembangan Media Pembelajaran Berbasis Multimedia Interaktif Pada Mata Pelajaran Ekonomi Materi Jurnal Penyesuaian Perusahaan Jasa. *Jurnal Pendidikan Akuntansi (JPAK)*, *2*(2), 1–9.