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Development of Macromedia Flash-Based Learning Media On Water Cycle Material for Grade V Elementary Schools

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Abstract: This research has a background problem in SDN Wates, Kediri Regency. In grade V teachers are only fixated on lecture methods and conventional learning media, namely textbooks that only contain writing to explain the material, the material in the book is also limited. Textbooks that have a single purpose do not involve students' activeness directly. The less consistent font form in the textbook makes students more bored and there is no variation such as less interesting images. The solution to this research is that researchers develop interactive learning media based on macromedia flash in science subjects for grade V Elementary School students. The purpose of this study is to determine the validity, practicality, and effectiveness of Macromedia Flash-Based Learning Media for grade V Elementary School students. The model used in this research and development is the ADDIE model consisting of five stages, namely: 1) analysis, 2) design, 3) development, 4) implementation, and 5) evaluation. The results of the validation study by media experts are 82% and material experts 88% with an average of 85% very valid. Practicality obtained from teacher responses was 92% and student responses were 94%, with an average of 93% being very practical. Media effectiveness was 87% on a broad scale and 85% on a limited scale with an average of 86%, meaning it met the Minimum Competency Standard (KKM) and was effective to use.

Keywords: Macromedia Flash, Development, Water Cycle

PRELIMINARY

Science is a subject in elementary school that provides crucial, hands-on experience for students, enabling them to gain experience in researching truth and organizing concepts. Therefore, science learning emphasizes implementing scientific processes and attitudes, aiming to apply science concepts and principles to everyday life. This allows students to understand the concepts they have learned and apply them to other aspects of life (Sekaringtyas (2017).

The primary objective of science learning in fifth grade elementary school, as stated in Minister of Education and Culture Regulation Number 37 of 2018, focuses primarily on the cognitive or knowledge domain. The cognitive domain is a learning

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outcome related to students' thinking skills, the ability to acquire knowledge, recognize, understand, conceptualize, determine, and reason. The cognitive domain can be defined as intellectual ability. Nurlindayani et al. (2021) further confirms that cognitive learning outcomes encompass both thinking skills and knowledge, which are key indicators of success in the learning process, particularly in science subject matter under Theme 8, the water cycle.

Based on observations in class V of Wates Elementary School, teachers are focused on conventional lecture methods and learning media, namely textbooks that only contain writing to explain the material. The material in the books is also limited. Textbooks that have a one-way goal do not involve direct student activity, one-way activities cause students to become bored. In addition, the visual media used by teachers, such as small pictures, cause students to be less clear in observing them. The less consistent font shape in the textbooks makes students more bored and there is no variety such as less interesting pictures. Students have not been able to master the water cycle material because the teacher still uses the lecture method and only uses visual media in the form of small pictures stuck on the board. This is a student complaint due to the lack of detailed explanations in the media used. Another problem is the difficulty of teachers and students in adjusting the learning materials so that the results are not well understood by students and the learning materials are not conveyed well.

Based on the analysis of daily test results, it was found that the learning outcomes of fifth-grade students at Wates Elementary School (SDN Wates) in the science subject were low. This is demonstrated by the following facts: 50% of students scored below the Minimum Competency (KKM), 35% of students scored equal to the KKM, and 15% of students scored above the KKM. Interviews with fifth-grade teachers at SDN Wates revealed that student engagement in learning was as follows: 70% low, 20% medium, and 10% high. This indicates that students are not actively engaged in the learning process, with only a small number of students actively participating. Therefore, a solution was proposed: the use of technology-based learning media, in line with current developments, namely Macromedia Flash.

To improve science learning, particularly in the water cycle, it is necessary to develop technology-based interactive media, namely Macromedia Flash. Macromedia Flash is a software application that can contain images, videos, text, and audio as media.

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The resulting media can be used on a computer or laptop. The advantages of Macromedia Flash include being able to create interactive buttons with a movie or other object, being able to make animation changes from one form to another, being able to create animation movements by following a predetermined flow. Macromedia Flash interactive learning media is effective to use and can improve students' critical thinking skills (Fandu Z, F., Suryanti and Azizah, U., (2020). The difference with this research is the research location and research subjects. Previous research aimed to improve students' thinking skills while this research aims to improve student learning outcomes. Based on this description, interactive learning media is expected to help teachers in the teaching process as a creative and innovative learning media by following current technological developments. The role of learning media is quite important in the process of learning activities in the classroom so that the material delivered by the teacher is easily understood optimally by students (Wicaksono, 2016).

Macromedia Flash is a multimedia-based audiovisual medium. It explains the water cycle. It includes moving animations that make the water cycle appear realistic. Furthermore, it includes games that serve as learning experiences, allowing students to sequence the water cycle and assess their learning outcomes. Students also complete evaluation questions within the interactive Macromedia Flash media. By using interactive media, abstract concepts can be concretely presented to students, engaging them through various animations. This is reinforced by research (Meighozah et al., 2021), which found that interactive Macromedia Flash media can increase student interest and learning outcomes by up to 79%.

From the two opinions above, it can be concluded that this application can create interactive media containing objects that can be animated, making the media more engaging and interactive. Macromedia Flash is widely used as software for creating interactive learning media today. Developing this interactive learning media does not require high costs or large space. Quite practical in the process of creation and development. Harahap, (2021: 956), "Macromedia Flash Pro 8 learning media is easy and practical to use by teachers and students in learning activities." The purpose of this study is to develop valid, practical, and effective Macromedia Flash-based learning media on the water cycle material for grade V elementary schools. Meanwhile, the benefits of this

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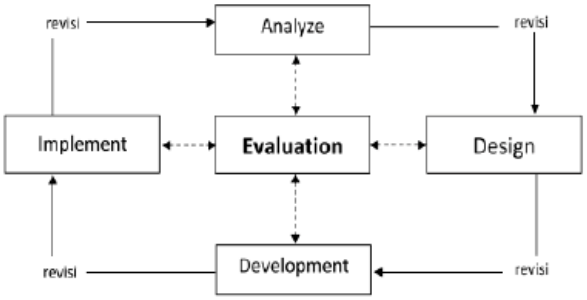
study are that it can be used to improve the quality of learning and make it easier for students to understand the water cycle material.

METHOD

The type of development carried out uses the research and development (R & D) method. According to Borg and Gall in Sugiono (2015: 28) "Using the name Research and Development/R & D which can be translated as research and development". This development develops interactive media products Macromedia Flash Natural Science subjects on the water cycle for grade V students of SDN Wates, Wates District. This media development research refers to the opinion of Robert Maribe in Sugiyono (2015: 38) namely, "Developing Instructional Design (Learning Design) with the ADDIE approach, which is an extension of Analysis, Design, Development, Implementation and Evaluation". As in the picture below:



Source: (Hidayat, F. 2021)

So, ADDIE development research goes through the analysis stage, which means analyzing the product to be developed. Design means designing the product according to what will be developed. Development involves the activities of making and testing the product. Implementation means the activity of applying the product to its use. Evaluation means assessing whether the product has met specifications.

Data collection techniques used included observation, questionnaires, and tests. The data analysis techniques employed were quantitative and qualitative analysis, with 28 fifth-grade students at SDN Wates, Wates District, as the subjects. This study consisted of two trial stages: a limited trial conducted by 5 students and a broad trial conducted by 23 students. Media validation assessments were conducted to test the validity of the

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developed media. Assessments used a Likert scale. According to Rahma et al. (2019: 181), validity results can be categorized as follows:

Range (%)	Kriteria Kualitatif
0 – 40	Sangat tidak valid
41 – 60	Tidak valid
61 – 80	Valid
81 - 100	Sangat valid

Figure 1. Validity and practicality criteria

Calculating the research data obtained using the formula above will produce a percentage. The effectiveness of learning media is assessed based on the evaluation scores. This is done by averaging students' scores on the initial evaluation questions. The results of the student evaluations determine the effectiveness of the media developed. The following are the steps for collecting media effectiveness data.

1. Calculate student evaluation results using the following formula.

$$\text{Nilai hasil belajar} = \frac{\Sigma \text{ soal benar}}{\Sigma \text{ skor maksimal}} X\ 100$$

(Napitupulu, 2021:127)

2. Calculate the average evaluation results of students in one class using the following formula.

$$\text{Nilai rata-rata} = \frac{\Sigma \text{ nilai hasil belajar}}{\Sigma \text{ (jumlah siswa)}} x\ 100$$

(Napitupulu, 2021:127)

Description:

Learning outcome score = total student score

Number of Students = students who took the test

3. Calculating the percentage of classical learning completion (KBK) for all students.

Calculating classical learning completion using the formula:

$$P = \frac{\Sigma \text{ Jumlah siswa yang mendapat nilai} \geq 70}{\Sigma \text{ Jumlah soswa yang ikut tes}} x\ 100$$

According to (Islahudin & Rini, 2019: 68) classical learning completion is said to be successful if 85% of students who take the test get a score of ≥ 70.

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RESULTS

Science learning generally includes reading, writing, listening, and observation activities. Based on the results of observations in the classroom, teachers who use the lecture method make students unable to master the water cycle material well. The use of conventional learning media by teachers such as textbooks that have shortcomings such as inappropriate fonts, no interesting pictures, one-way activities cause students to become bored, in addition to the visual media used by teachers such as small pictures that cause students to be not very clear in observing them. Based on the analysis of the results of daily tests, it is known that the learning outcomes of fifth-grade students of Wates Elementary School in science maple are low. This is shown by the following facts: students who obtained scores below the Minimum Competency Minimum (KKM) are 50%, students who obtained scores equal to the Minimum Competency Minimum (KKM) are 35%, and students who obtained scores above the Minimum Competency Minimum (KKM) are 15%. According to the results of interviews with fifth-grade teachers of Wates Elementary School, it shows that student activity in participating in learning is as follows: with the low category = 70%, medium = 20% and high = 10%. Thus, this shows that students are not actively interested in participating in the learning process, only a few students actively participate in learning. Therefore, a solution is provided by using technology-based learning media in line with current developments, namely Macromedia Flash.

In an effort to improve science learning, particularly on the water cycle, it is necessary to develop technology-based interactive media, namely Macromedia Flash. Macromedia Flash is a software application that can contain images, videos, text, and sound as media. The resulting media can be used on a computer or laptop. The advantages of Macromedia Flash include the ability to create interactive buttons with a movie or other object, the ability to create animations that change from one shape to another, and the ability to create animated movements that follow a predetermined flow.

Based on previous research using Macromedia Flash learning media, also conducted by Fandu Zakariya Firdaus, Suryanti, and Utiyah Azizah (2020). The study stated that Macromedia Flash interactive learning media was effective and could improve students' critical thinking skills. The differences with this study lie in the location and subjects. Previous research aimed to improve students' thinking skills, while this study

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aims to improve student learning outcomes. Based on this description, interactive learning media is expected to assist teachers in the teaching process as a creative and innovative learning medium that keeps pace with current technological developments. The role of learning media is quite important in classroom learning activities, ensuring that the material presented by teachers is easily understood by students (Wicaksono, 2016). Therefore, Macromedia Flash can be used as a learning medium for the water cycle. The media product developed, related to fifth-grade science, theme 8, on the water cycle, yielded data.

Table 1. Results of the data obtained

Validity		Practicality		Effectiveness	
Subject matter expert	**Media expert**	**Student response**	**Teacher's response**	**Limited testing**	**Area test**
82%	88%	94%	92%	87%	85%

The research results show that based on the development of interactive Macromedia Flash-based media for the "Water Cycle" material for fifth-grade elementary school students, which has been approved by material experts and media experts, the results obtained are 82% from material experts and 88% from media experts. Therefore, it can be concluded that the interactive Macromedia Flash-based learning media is categorized as very valid at the validity level. Based on the development of interactive Macromedia Flash-based learning media obtained from the questionnaire results of students, 94% and 92% of teachers. It can be concluded that the interactive Macromedia Flash-based learning media is ready for use by students. The effectiveness of the media obtained by 87% (5 students) on a limited scale and 85% on a broad scale (23 students) can be categorized as very effective with a score range of 80% - 100% and is ready to use so it can be used without improvement.

DISCUSSION

1. Validity Percentage Results from Material and Media Experts

   The percentage results obtained from the material experts were 82% and the media experts were 88%. To determine the average validation percentage results, the following is obtained:

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Table 2. Percentage of validity results

No.	Validator	Score
1.	Subject matter expert	82
2.	Media expert	88
Total Score		170
Average score obtained		85%

Based on the results of the average percentage of material and media experts, the results showed 85%, which means that the interactive learning media based on Macromedia Flash was declared very valid and can be used in the teaching and learning process without revision. According to (Rahma, et al. 2019: 181), the validity results of 85% resulted in very valid so that the learning media can be used and without revision with its validity.

2. Practicality Data Percentage Results from Teacher Response Questionnaire and Student Response Questionnaire. The percentage results obtained from the teacher response questionnaire were 92% and the percentage results obtained from the student response questionnaire were 94%. To find out the average percentage results for practicality, the following is obtained:

Table 3. Results of practicality percentage

No.	Validator	Score
1.	Teachers	92%
2.	Students	94%
Average		93%

Based on the results of the average percentage of experts, the results showed 93%, which means that the interactive learning media based on Macromedia Flash according to (Rahma, et al. 2019: 181) the validity results were stated to be very practical and could be used in the teaching and learning process without revision.

3. Assessment Data Results from the post-test (Effectiveness)

The effectiveness of interactive learning media based on Macromedia Flash was obtained from the results of post-test data that was given by researchers to students.

Table 4. Results of the percentage of effectiveness

No.	Validator	Score
1.	Limited	87%
2.	Spacious	85%
Average		86%

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From the results of the post-test conducted on 28 students of Wates Elementary School, the percentage of classical learning completion (KBK) was 86%. According to (Islahudin & Rini, 2019: 68), classical learning completion is said to be successful if 85% of students who took the test got a score of ≥ 70. Based on these results, it can be concluded that interactive learning media based on Macromedia Flash is effective for use in supporting the teaching and learning process.

CONCLUSION

The results of the study can be concluded that based on the interactive development media based on macromedia flash material "Water Cycle" for fifth grade elementary school students that has been approved by material experts and media experts, the results obtained are 82% from material experts and 88% from media experts with an average of 85%. So it can be concluded that the interactive learning media based on macromedia flash in the validity level is categorized as very valid. The results of the practicality of the percentage obtained from the teacher response questionnaire were 92% and the results of the percentage obtained from the student response questionnaire were 94%. With the results of the average percentage of experts showing results of 93% which means it is very practical and can be used in the teaching and learning process without revision. To find out the average results of the percentage In the effectiveness of the data, the limited test was 87% and the broad test was 85% so that it got an average of 86% which means it exceeds 85% so it can be categorized as very effective.

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