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Development of "METALIK" Learning Media in Class VI Elementary School Science Lesson Content

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Abstract: This research aims to analyze the needs of teachers and students for the development of interactive digital learning media in science lesson content for grade VI students and measure the effectiveness of METALIK learning media in science lesson content in improving the cognitive learning outcomes of grade VI elementary school students. The method used is the research development (R&D) method using research steps by Sugiyono (2016: 298) limited to the 8th step, namely trial use. Data collection techniques in this research include: observation, interviews, questionnaires, documentation, and tests. Product feasibility is seen from the validation results of material experts, media experts and language experts. The validation results from three experts obtained an average of 91%. This means that METALIK media is suitable for use. The N-gain calculation result in the experimental class was 0.77 in the high category. Meanwhile, the results of the N-gain calculation in the control class were 0.21 in the low category. The result of tcount is 4.493 in ttable with df 39 and a = 5%, the value obtained is 2.023. With the result tcount> ttable. From the results of this research, it can be concluded that METALIK media can be used in science learning for class VI elementary school.

Keywords: Learning Media, Interactive digital, science

1. Introduction

The current development of digital technology has had a major impact on human life, especially in the world of education (Widiara, 2018). Technology can be applied by a teacher as a medium in learning to maximize the learning process so that it is more effective and efficient and successful in creating innovative and interesting learning to increase children's learning motivation (Putra and Ishartiwi, 2015).

Learning media is a tool in the learning process to assist teachers in presenting learning material to students. Appropriate learning media can help students understand and achieve learning goals (Sidabutar, 2017:119). Interactive learning media such as videos, animations, games and applications can help children learn complex concepts more easily and with fun. Children at the concrete operational stage will respond well to visual and audio tools to help them understand a concept (Rusman, 2013).

Based on the results of observations of the learning process and interviews conducted with class VI teachers at SD Negeri Samaran, Pamotan District, Rembang Regency,

information was obtained that the media used by teachers was very minimal. Teachers mostly teach using the lecture method which only explains material verbally and in one direction so that students become bored and less active in the learning process. The observation results also show that SDN Samaran received 15 chromebooks which should be able to support the learning process as interactive digital media, but the teachers did not maximize the use of these facilities. As a result, it has an impact on low student learning outcomes. The average score for the second semester PAS results for class VI students in science subjects for the 2022/2023 academic year is 70, there are still 10 students out of 18 students who get scores below the KKM. So, student learning outcomes in the cognitive domain are still relatively low.

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1.1 Conceptual framework

The research results of Rofiq, et al (2019) stated that "interactive learning multimedia is valid and effective in improving student learning outcomes in social studies subjects". The results of other research related to interactive media from Abdurrahman, et al (2020) state that "interactive learning multimedia is declared valid and effective, and can improve student learning outcomes in Integrated Social Sciences subjects". This is confirmed by research by Dwiqi, et al (2020) which states that "interactive learning media shows valid and effective results in improving science learning outcomes so that it is suitable for use in the learning process".

Based on the background of the problem above, the author will develop METALIK (Interactive Digital Media) learning media, namely innovative and interactive digital media that actively involves students in the learning process. This media uses the Canva for Education platform which is easily accessible for teachers and students, which contains many interesting designs to support learning creativity so that it can improve student learning outcomes.

1.2 Research objectives

This research aims to analyze the needs of teachers and students for the development of interactive digital learning media in science lesson content for grade VI students and measure the effectiveness of METALIK learning media in science lesson content in improving the cognitive learning outcomes of grade VI elementary school students.

2 Methodology

2.1 Research design

This type of research is research and development (R&D). Researchers use 10 R&D research steps according to Sugiyono (2016:298), but are limited to the 8th step, namely product validation. The description of the research steps developed by Sugiyono (2016) is as follows:

1. Identify the problem

This research began with observations and interviews to find out the problems found in developing METALIK media in science lesson content.

2. Data collection

Data collection was carried out to analyze students' and teachers' needs for Interactive Digital Media.

3. Product design

METALIK learning media products are designed based on an analysis of student and teacher needs which are adapted to the learning material in the Class VI Elementary School science lesson content. The product is in the form of interactive digital media that can be operated using a computer, laptop or Android that is connected to the internet and can access the Canva website.

4. Validate the design

Design validation is carried out to find out deficiencies in the product design. This design validation is carried out by experts or experts. Validation includes validation of material, media and language.

5. Revise the design

Revisions are made based on the results of the validation assessment, suggestions and input from experts.

6. Test the product

After revising the METALIK media product design based on assessments, suggestions and input from experts, it was then tested in the experimental and control classes.

7. Product revision

After identifying weaknesses and shortcomings at the product testing stage, revisions are then carried out to improve the product.

8. Test use

At this stage the final learning product is ready to be used.

2.2 Respondents of the study

The data sources in this study are divided into two parts, namely the analysis of the needs and effectiveness of METALIK media in science learning in grade VI and the validity of the media. After grouping the data sources of needs and media experts, it can be concluded that the data were taken from students, teachers, and media experts.

The data required in this study are data on media needs analysis and the effectiveness of METALIK learning media on students' cognitive learning outcomes. The first data used observation and interview guidelines with teachers and students to obtain a needs analysis. The second data, namely the effectiveness of METALIK learning media, was obtained through a questionnaire addressed to expert validators and written tests for students and the scores of students' cognitive learning outcomes through test instruments.

3. Findings and discussion

The results of the development of METALIK learning media explain four problems according to the existing problem formulation, including:

1.Analysis of Teacher and Student Needs for the Development of METALLIC Learning Media in Science Lesson Content for Class VI Elementary Schools.

This research began by analyzing media needs in science learning for class VI elementary schools in Pamotan District, Rembang Regency. Based on the results of learning observations and interviews at SDN Samaran and SDN Tempaling, the results showed that teachers and students need interactive digital media. Researchers will develop interactive digital media called "METALIK" in the science lesson content on Animal Adaptation to Their Environment.

2.Development of METALLIC Learning Media for Science Lesson Content for Class VI Elementary School Students

METALIK learning media design was developed based on the results of needs analysis and literature study. The media development design is depicted in the following chart.

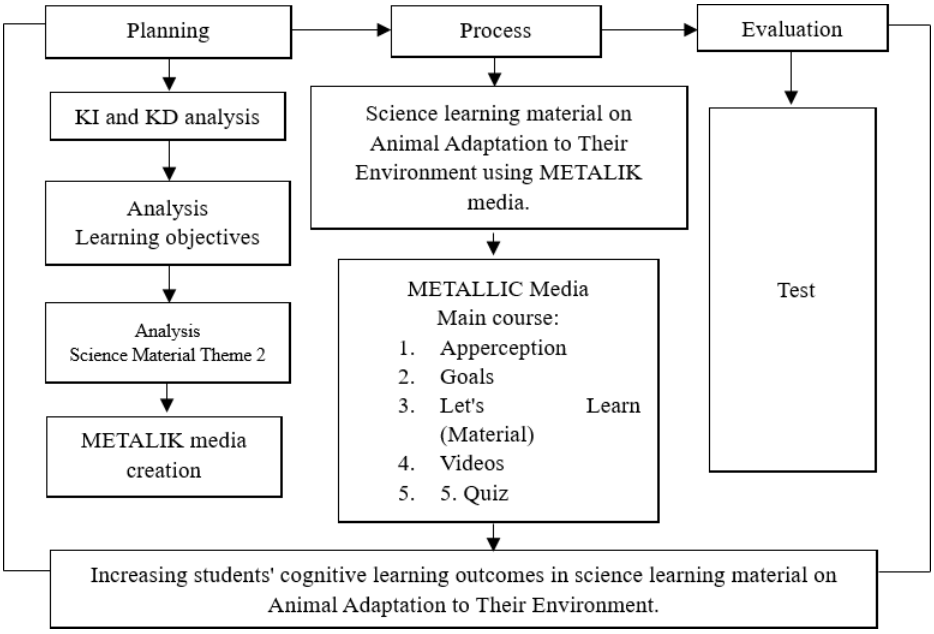


Figure 1. Development Procedure

a. Planning

In the planning process, the steps taken by researchers include:

1) Analysis of Core Competencies and Basic Competencies

Analysis of core competencies and basic competencies was carried out after analyzing media needs in science learning. Core competencies in the cognitive and psychomotor domains.

2) Analysis of Learning Objectives

The next step is to formulate learning objectives for science lesson content theme 2, subtheme 2, lesson 1 for class VI elementary school.

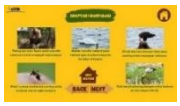
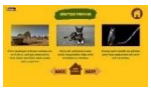
3) Analysis of Learning Materials

In this step, the researcher analyzed the science lesson content in theme 2 (Unity in Differences) subtheme 2 (Working Together to Achieve Goals) of the 1st lesson. The results of the analysis of learning materials in the science lesson content are "Adaptation of Animals to Their Environment".

b. Development of METALLIC media in science learning material on Animal Adaptation to Their Environment. Some METALIK media displays can be seen in the following table 1.

Table 1. Development of METALIK

No	Page Name	Appearance	Information
1	Home view/ Front page		The initial appearance or what could be called the front page of METALIK media displays a cover with an animal theme.

2	Instruction		Contains instructions on how to operate METALIK media.
3	Developer Profile Information		Contains profiles of METALIK media researchers or developers.
4	Main page/ Home		The Main / Home page has menus that cover all content from METALIK media.
5	Objective		Contains the purpose of using METALIK media.
6	Apperception		Contains initial sentences and trigger questions that link to the main material.
7	Let's learn (Material)	    	Contains learning material on Animal Adaptation to Their Environment.
8	Videos	  	Contains animated animal videos that integrate material on Animal Adaptation to Their Environment.
9	Quiz	   	Contains quizzes with questions about the material that are made interesting and given effects if students answer right or wrong.

After the creation of METALLIC media for grade VI elementary school science content was completed, validity testing was carried out by experts. Material expert validation was carried out by Dr. Khamdun, S.Pd., M.Pd. lecturers at Muria Kudus University, the percentage obtained was 92% in the valid category. Media validation is related to design, ease of operation, and usefulness of METALIK media. Validation was carried out by Mr. Bagas Kurnianto, S.Pd., M.Pd. get a percentage of 90% with a valid category. who is a lecturer at Semarang State University. Linguist validation was carried out by Moh. Farizqo Irvan, S.Pd., M.Pd. is a PGSD lecturer at Semarang State University with a concentration in Language, getting a percentage of 92% in the valid category. From the three expert validations, the average obtained was 91% with the valid category.

3.1 Knowledge

Researchers carry out prerequisite tests before conducting research, namely normality tests and homogeneity tests. In the normality test in the experimental class, Lcount was 0.192 and Ltable was 0.213, while in the normality test in the control class, Lcount was 0.136 and Ltable was

0.173. The normality test results for the two sample classes Lcount < Ltable, this shows that the normality test results are accepted.

After carrying out the normality test, the second prerequisite test is the homogeneity test. The average value of the experimental class was 71.86 and the average value of the control class was 67.20. The variance in the experimental class obtained 162,917 and the control class variance 212,667. The homogeneity test results obtained Fcount 0.684 with Ftable 4.38. From the results of Fcount < Ftable, it can be concluded that the samples of the two classes are homogeneous.

The effectiveness of METALIK media in science learning based on the t test between control classes and experimental classes. The experimental class at SDN Samaran uses METALIK media while the control class at SDN Tempaling does not use METALIK media. Amir (2014:74) states that tests and student participation can be used to measure the success of learning.

Based on the results of the experimental class Theme 2 Science lesson content assessment test, in the initial assessment (pre-test) the average score was 72 and this increased in the final assessment (post test) to 92. With the highest score being 100 and the lowest score being 70. From the average calculation The average value obtained for the experimental class variance (s2) was 162.917 with a standard deviation (s) of 12.76 with the result N-gain = 0.77 in the high category. Meanwhile, in the control class, the average increase was obtained from 67 in the pre-test score to 72 in the post-test score. The variance value (s2) is 212.667 and the standard deviation (s) is 14.58. The N-gain calculation result in the control class is 0.21 in the low category. Then the researcher did a t test. The tcount result is 4.493. In a table with df 39 and a = 5%, the value obtained is 2.023. With the results tcount > ttable which means that the average value of the two classes is different.

The application of interactive learning media is able to improve students' cognitive, affective and psychomotor learning outcomes with learning outcomes that exceed achievement targets. This presentation is in accordance with the results of research conducted by Aulia (2014). Research by Hakim (2016) shows that mathematics learning using interactive multimedia has a significant effect on improving student learning outcomes. This is confirmed by research by Biassari (2021) which states that the use of interactive learning video media can improve elementary school mathematics learning outcomes. Based on the results of existing research and research conducted by researchers, it can be concluded that the use of METALIK media can improve student learning outcomes in grade VI elementary school science content.

4. Conclusions and recommendations

Analysis of teachers' and students' needs for media development in science lesson content was carried out using observations, interviews and questionnaires. The results of the analysis show that sixth grade elementary school teachers and students need interactive digital media, so researchers developed METALIK media.

Steps for developing METALIK media in science lesson content: Animal Adaptation to Their Environment. The first thing the researcher did was KI-KD analysis, learning objective analysis, learning material analysis, and media development design. Then the researchers designed METALIK media using Canva which was developed into an interactive digital media in which there are menus that students can operate directly.

METALIK media was validated by 3 validation experts consisting of material experts, media experts and language experts. The validation results from material experts obtained a percentage of 92% with a valid category. The media expert validation results obtained a percentage of 90% with a valid category. Linguist validation results obtained a percentage of 92% with a valid category. Based on the results of the three expert validations, METALIK learning media received an average percentage of 91% with a valid predicate. This means that METALIK media is suitable for use in sixth grade science learning in elementary schools.

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