

Designing Thematic Learning Media for Elementary School Students

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Abstract

Technology is currently very influential in the world of education; technology is no longer a common thing today. This study aims at designing thematic learning media for grade 5 of Curriculum 2013, especially theme 6 about heat and displacement and its influence on the student learning outcomes. The design of the thematic learning media uses the Adobe Animate CC 2019 application. The method used in this research is Research and Development with the development model ADDIE (Analysis-Design-Development-Implementation-Evaluation). The media was tested individually to get responses from the users; the first was tested on 3 lecturers at the University of Muhammadiyah Surakarta to determine the effectiveness of the media and the result is 25 items had a value of 0.84 V with a lower limit of 0.64 to an upper limit of 0.93 which was said to be valid because it was in accordance with the Aiken V table. Reliability shows a Cronbach's alpha value of 0.831 which is included in the strong reliability, while the percentage of interpretation charts for 25 items is above 67% and it can be concluded that all items are feasible to use. While the material validation was conducted by 3 teachers of grade 5 of SDIIC (Insan Cendekia Islamic Elementary School) which obtained a V value of 0.89 with a lower limit of 0.74 to an upper limit of 0.98 of the 23 items and stated valid because it was in accordance with the Aiken's V table. The reliability of 23 items with a Cronbach's Alpha value of 0.747 is included into strong reliability, while the chart of interpretation percentage for the aforementioned 23 items was above 67% and qualified to be reused. The conclusion of this study is to help improve students' learning outcomes.

Keywords: Learning Media, Thematic, Adobe Animate

I. INTRODUCTION

Education is something that should be pursued by every Indonesian citizen. It is in accordance with what is stated in the 1945 Constitution article 31 paragraph 1 which says, "Every citizen has the right to education". In reference to the mentioned basic law, the implementation of education in Indonesia must be implemented as well as possible so that the rights of Indonesian citizens are properly fulfilled, one of which is to provide a learning medium which is in accordance with the current development, including technology based.

The current technology is very influential in the world of education; some examples of the use of technology in the world of education are e-learning, e-education, e-library and so on. All the aforementioned uses of technology in the world of education all together provide convenience and comfort to the users, so that when using it, the teaching and learning process becomes different and more enjoyable. Students will also pay more attention because not all learning uses such media.

Technology is no longer an ordinary thing nowadays. Therefore, it will be very possible if technology-based learning media are applied in schools. However, there are still schools that do not provide these facilities to their students although there are also many schools giving good facilities to their students, so that the learning process becomes more effective [1].

Students' understanding of learning material is the main goal of the learning process [2] and therefore interactive learning tools that make students understand the lessons they are learning are highly needed [3], [4], [5]. The role of the media is very important in the learning process in order that the material is well-conveyed [2] In addition, the learning media can be developed in teaching and learning by utilizing good macro media flash [2].

Based on the aforementioned description, the researcher intends to design a learning media which is expected to provide feedback to students in order that they understand better and do not feel bored with the plain learning method in exploring the material delivered by teachers. The learning media that is designed contains thematic materials for grade 5 of elementary school; it contains learning material which is interactive and makes students directly participate in the material in form of animated learning media and interactive exercises that provide feedback in form of grades or scores to students after they finish working on all the questions [3], [6], [7], [8]. This media is expected to increase the students' willingness to learn.

II. METHOD

This research was conducted at SDIIC (*Sekolah Dasar Islam Insan Cendekia*—Insan Cendekia Islamic Elementary School) located in Pacitan regency using Research and Development (R&D) method [2], [3], [9]. The research development model

was designed using ADDIE (Analysis, Design, Development, Implementation, Evaluation).

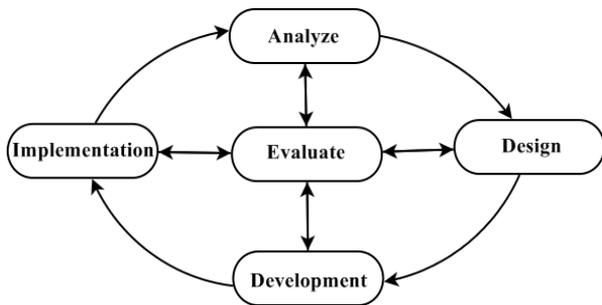


Figure 1. ADDIE Development Model

The ADDIE development model is one of systematic designs. The steps in this model are exhibited in figure 3, comprising analyze, design, development, implementation, and evaluate [10].

The research and development procedure in this study is in accordance with the ADDIE model, in which the first step is analysis; this stage is used to analyze the need to determine the right solution and measure students' competences. The second is the design stage, which is a process that starts from the goal and the instruments used to evaluate the learning outcomes using the media. Third, development stage is the realization of product design from the previous stage. The fourth is the implementation stage, which implements the developed media in actual condition, and for the recent research the media was tested in the classroom. Finally, the evaluation stage is used to measure whether the developed media is feasible to use or not.

II.I. Application Design

In analysis stage, the researcher analyzed the background of students' understanding as users of the subject. Data were collected by interviewing the teacher and giving some questions and material to the students. The analysis stage consisted of two stages, performance analysis and need analysis.

The performance analysis stage served to find out and group problems faced in the school related to learning media. The non-functional analysis including the used system specification was Adobe Animate CC application [11], [12], [13], [14].

The need analysis stage served to determine interesting learning media to increase student learning focus. When students focus on learning delivered by the teacher, their learning outcomes in the class will increase. The functional analysis stage of this material was conducted using theme 6: heat and displacement.

Use Case in the created interactive learning media illustrated the scenario of interaction among users or between the user and the system in the aforementioned media. Use case

diagram from the media is exhibited in Figure 2. This media has four main menus, comprising simulation material, questions, setting, and exit. If the user chooses the simulation material menu, there will be a main menu option; if he/she chooses problems, it goes to the question scene; if he/she chooses setting, it will go to the learning media settings; finally, if he/she chooses exit, it will exit the system.

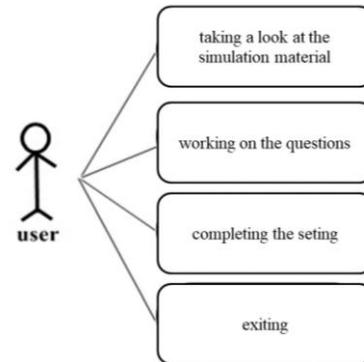


Figure 2. Use Case Diagram

Activity diagram on the interactive learning media created by the researcher illustrates the workflow for the 6th theme of thematic learning for elementary school grade 5 about heat and displacement. The following is the activity diagram of the thematic learning media:

Activity diagram displays the main menu starting with the user clicking on the thematic learning media application and the system displays the initial display with a short duration of seconds. Then, the system displays the main menu containing simulation material, learning videos, questions and an exit button from the application located at the bottom. Activity diagram displays the main menu in figure 3.

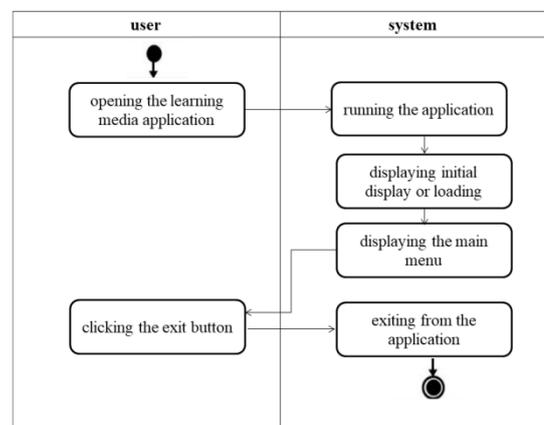


Figure 3. Activity diagram displaying the main menu

Activity diagram displays the simulation material starting with the user clicking on the simulation material menu and the

system automatically displays the simulation material. If the user would like to return to the main menu, he/she needs to click on the back button which automatically returns to the main menu. Activity diagram displaying the simulation material is exhibited in Figure 4.

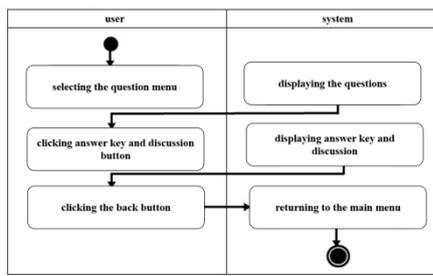
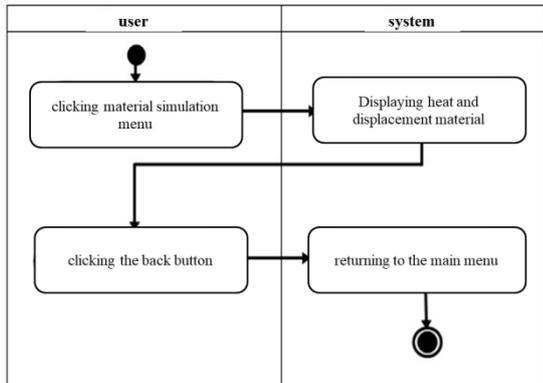


Figure 4. Activity diagram of simulation material

Activity diagram displays the questions starting with the user selecting or clicking questions on the main menu, so that the system automatically leads to the questions. When the user has answered all the questions, there is an option to choose the answer key and discussion or return to the main menu. When choosing the answer key and discussion, he/she goes to the answer key and discussion; if he/she would like to return to the main menu, there is a back button in answer key and discussion menu. The activity diagram displaying the menu is exhibited in figure 5.

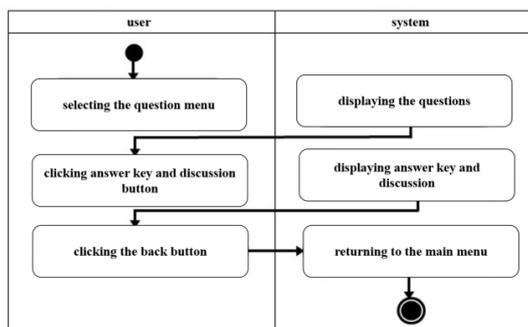


Figure 5. Activity Diagram displaying the questions

Activity diagram displays setting starting with the user selecting or clicking setting on the main menu, and therefore the system automatically directs to it. When the user has finished the setting, he/she goes back to the main menu if clicking back button. Activity diagram displaying question menu is exhibited in figure 6.

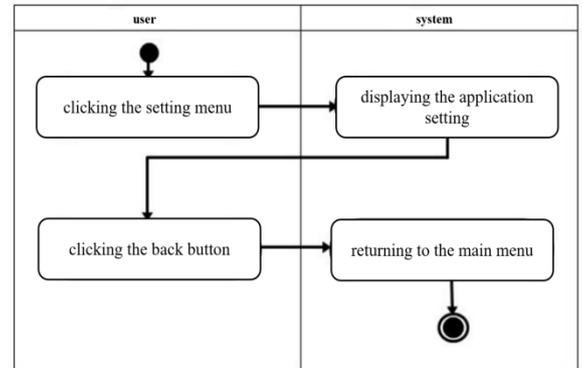


Figure 6. Activity diagram displaying setting

Wireframe is the initial design in a product manufacture. It can illustrate communication flow or the layout of images and writing placement, so that it eases product manufacture which is planned by the researcher.

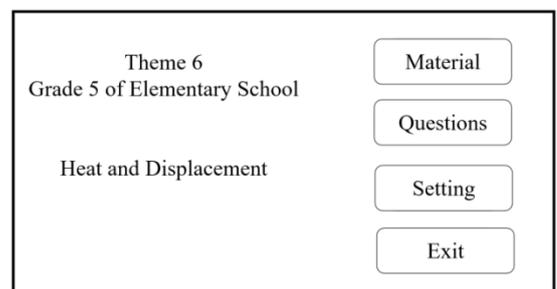


Figure 7. The main menu

Figure 7 is the main menu. There exist title at the left, and simulation material, questions, setting, and also exit button at the right side.

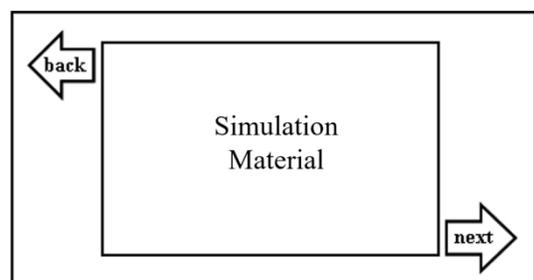


Figure 8. Simulation Material

Figure 8 is simulation material menu, in which there are two arrows, comprising back and next. The back one goes to the initial menu and the next one goes to the simulation material, and then at the middle is the simulation material.

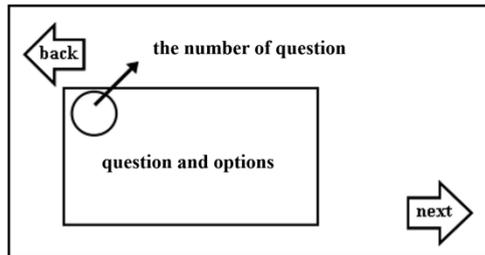


Figure 9. Questions

Figure 9 is question menu in which there are two arrows consisting of back and next. Back goes back to the previous video or questions, while next goes to the next question.

The development stage involves learning media development based on the constructed design. In the stage, the researcher did some activities, comprising 1) making learning media design using Adobe Animate CC, 2) finding out learning media validation under the help of media and material experts team, and 3) improving the learning media referring to the advice given by the media and material experts.

II.II. Tryout

Table 1. Blackbox

No	Item	Case and tryout result	
		Scenario	The expected output
Main Menu			
1.	Material menu	Material button	Moving to material scene
2.	Question menu	Question button	Moving to question scene
3.	Setting menu	Setting button	Moving to setting scene
4.	Exit	Exit button	Exiting from the learning media
Simulation Material			
6.	Back arrow	Back button	Moving to the main scene
7.	Next arrow	Next button	Moving to the next material scene

Question menu			
8.	Back arrow	Back button	Moving to the previous question
9.	Next arrow	Next button	Moving to the next question scene
Setting menu			
14.	Next arrow	Next button	Moving to the main menu scene

Last but not least is evaluation stage of the learning media by concerning on students' learning outcome without using the learning media compared to that of using the aforementioned media. Then, both are compared to find out the better students' learning outcome.

Data collection in this research was conducted using control class and experiment class design. The experimental method was employed to prove whether or not there was influence of using the media made by the researcher. The method was conducted by giving pre-test and post-test; pre-test was managed before using the media or before conducting treatment, and post-test was managed after using the media or conventional method or lectures. Meanwhile, the control class was organized by giving pre-test and post-test; pre-test was given before using the learning method, and post-test using lectures. At the same time, the experimental class was managed by giving pre-test and post-test in which the pretest was given before using the learning method, and the other one after using the thematic learning media.

III. FINDINGS AND DISCUSSION

The aforementioned interactive learning media is the media employed in the class. The media discusses thematic material for grade 5 theme 6, consisting of heat and displacement. The media was developed using Adobe Animate 2019 with the support of other softwares, such as Adobe Illustrator CS6 and PhotoScape. The media was developed in order that the students do not feel bored with the material conveyed using lecturing or conventional method by teachers at school, so that they become more active and independent. The media includes some audio material, the material organized by interesting animation, pictures, and questions together with the score the students get, so that they are challenged with the mentioned features.

The targets of the media are grade 5 students of SDIIC located in Pacitan regency. Before conducting the research to the students, the researcher first observed them and interviewed one of the grade 5 class teachers related to the thematic subject. It turns out that the students very rarely used such interactive learning media and tended to use conventional method or lecturing more. Another observation conducted by interviewing one of grade 5 teachers reveals that the students

need interesting learning media to increase their interest and learning outcomes.

The thematic learning media was validated by media and material experts before tried out to the students. The media experts were 3 lecturers of Informatics Engineering Education of Muhammadiyah University of Surakarta (UMS—*Universitas Muhammadiyah Surakarta*), while the material experts were 3 teachers of SDIIC.

The research data were obtained from questionnaires completed by the media experts, material experts, and students. The results were then analyzed and used to test the media feasibility. In addition, data were also obtained from students' pre-test and post-test result.

The product design was based on the prepared wireframe. Here is the result of learning media product design made by the researcher:



Figure 10. The main menu display

Figure 10 is the main menu display from the media. There are the words of heat and displacement written on the left, while on the right there are menus which go to their respective destinations. There are the words of material that leads to the learning material, questions that direct to questions containing 15 questions and the score, setting that directs to the audio setting, and exit that leads to the option whether the user would like to leave or not. On the top right there is a user button which go to the profile of the media creator.

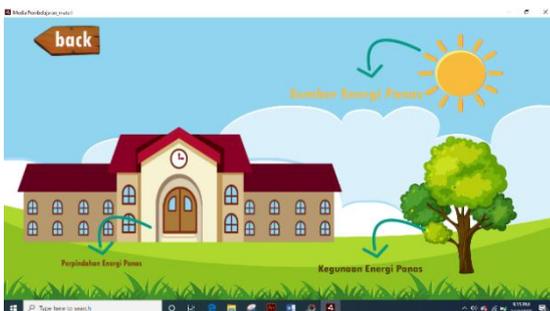


Figure 11. Material menu display

Figure 11 is the material menu display; there are 4 buttons leading to different directions. The back button leads to the main menu, the sun button leads to thermal energy source, the tree button leads to the use of thermal energy, and finally the

doors which are opened when they are clicked lead to heat displacement in which there are other options at them.

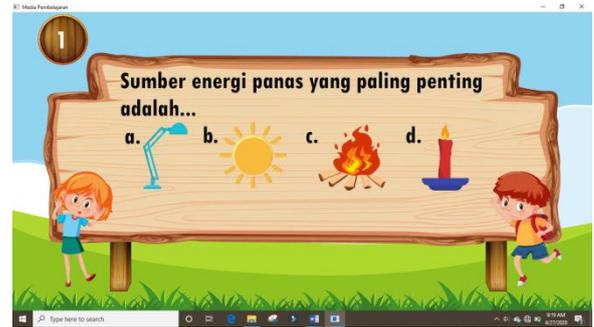


Figure 12. The question display

Figure 12 is the question display; the number is at the left side, while the question is at the middle. There is also next button which leads to the next question.

The next stage comprises development stage, including tryout stage conducted by media experts, material experts, and students. This stage aims at finding out the feasibility of the designed product. Criticism and suggestion obtained from the material experts, media experts, and students are used by the researcher to complete the media. The next stage is product evaluation. It is obtained from the result of assessment given by media experts, material experts, and students.

III.I. Media expert validation

Media expert validation was obtained from three lecturer respondents from UMS, including Diaz Aziz Pramudita, Ryan Rizki Ahisa, and Hardika Dwi Hermanwan. The validation result of the media is reported as follows:

Average score = $\frac{\text{the number of V scores}}{\text{the number of items}}$

Average score = $\frac{21.15}{25} = 0.84$

The aforementioned data are the result of media validation explaining that there are 3 respondents who access the media, coefficient result per item, and the average score from the respondents. The assessment of each item reveals the results of V coefficient which are almost similar.

The limit of Aiken's V of 25 items is determined by the lower limit of 0.64 and the upper limit of 0.93, or V value of 0.83. The aforementioned result shows that 25 items have V value of 0.84. Therefore, the obtained content validation is valid since it is in accordance with the Aiken limit table.

Reliability test was also conducted by 3 lecturer respondents from UMS, including Diaz Aziz Pramudita, Ryan Rizki Ahisa, and Hardika Dwi Hermawan. The result of the test is exhibited in table 2.

Table 2. Statistics of Media Expert Reliability

Cronbach's Alpha	N of Items
.831	25

Table 2 is the reliability statistics; it is recognized that there are N items, or the number of items, or the questionnaire's question items of 25 items with the Cronbach's Alpha of 0.831. Since the value of 0.831 is value range from $0.7 \leq \alpha < 0.9$, as the basis of decision making, it is concluded that all the 25 items of questionnaire questions have strong reliability. Rating result uses interpretation percentage. The percentage result of item 1 to item 24 is exhibited in figure 13.

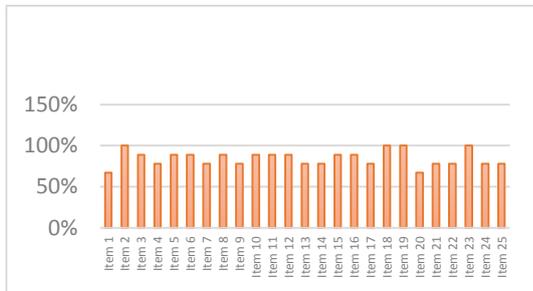


Figure 13. The percentage chart of media expert interpretation

Figure 13 shows the percentage chart of media expert interpretation for the aforementioned 25 items. The interpretation percentage of them is above 67%, and therefore it can be concluded that all items are qualified to be reused as instruments.

III.II. The Validation of Material Experts

Expert validation was conducted by three respondents, comprising class teachers of SDIIC. The result of the validation is shown as follows:

Average score = $\frac{\text{the number of V value}}{\text{the number of items}}$

$$\text{Average score} = \frac{20.47}{23} = 0.89$$

The aforementioned data are the assessment result of material validation explaining that there are 3 respondents, the coefficient result per item, and average of the 3 respondents. The assessment of each item shows almost similar V coefficient result.

The limit of Aiken's V table of 23 items is determined by the lower limit of 0.74 to the upper limit of 0.98, or the V value is 0.92. The result shows that the 23 items have V value of 0.89. Therefore, the obtained content validity is valid since it is in accordance with Aiken limit table.

The reliability test was conducted by three grade 5 class teachers of SDIIC. The reliability result of the material experts is exhibited in table 3.

Table 3. The Statistics of Material Expert Reliability

Cronbach's Alpha	N of Items
.747	23

Table 3 is reliability statistics, in which it is known that there are N items or the number of items, or there are 23

questionnaire questions with the Cronbach's Alpha value of 0.747. Since the value of 0.747 is included in the range of $0.7 \leq \alpha < 0.9$, as well as the decision making basis in the reliability test, it can be concluded that all the 23 or all items of questionnaire questions have strong reliability. The rating result uses interpretation percentage. The percentage result of item 1 to 23 can be seen in figure 14.

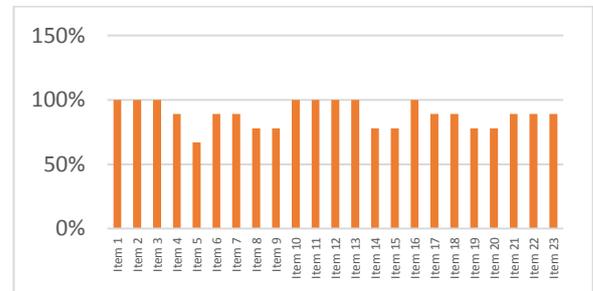


Figure 14. The Chart of Material Expert Interpretation Percentage

Figure 14 shows the chart of material expert interpretation percentage for the mentioned 23 items. The items have interpretation above 67%, and therefore it can be concluded that all items are qualified to be reused as instruments.

III.III. The User Validation

User validation was conducted by 32 grade 5 students of SDIIC in Pacitan. The average value is calculated using the following equation:

$$\text{Average score} = \sum_{i=1}^n \frac{X_i}{N}$$

Explanation:

X_i = respondent's scores

N = the number of respondents

Therefore:

$$\text{Average score} = \frac{2367.5}{32} = 73.98$$

The aforementioned data are the average score of students' questionnaire completed by 32 grade 5 students of SDIIC. The average score of 73.98 is obtained using SUS (System Usability Scale) calculation, comprising 10 questions that need to be answered by the media users, involving the mentioned grade 5 students.

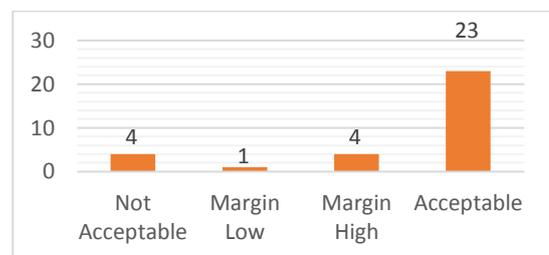


Figure 15. The chart of students' data using SUS

Figure 15 is the chart of students' data obtained from SUS calculation. It can be concluded that there are 4 students

whose scores are under 50 that can be referred as not acceptable, a student whose score is between 51-62 that can be referred as low margin, 4 students with high margin whose SUS scores are between 62-70, and 23 students categorized as acceptable since they have score above 71.

IV. CONCLUSION

Referring to thematic learning media design for elementary school students, it can be concluded that:

1. The product developed by the researcher is thematic learning media for Curriculum 2013 especially theme 6 of grade 5 about heat and displacement. The media contains material about conduction, convection, and radiation. The features contained in the media are organized using interesting animations, questions and the score, and setting. The media was tried out to grade 5 students of SDIIC in Pacitan regency with the aim at improving their learning outcome.
2. Referring to the calculation result of the questionnaire given to the material experts, media experts, and students or users, it can be concluded that: 1) the average of V coefficient from the media experts is 0.84 which is stated valid. The result of reliability test of media experts is 0.831 and noticed to be valid. 2) The average of V coefficient from the material experts is 0.89 and stated to be valid. The result of reliability test is 0.747 and stated having strong reliability. 3) The average of students or users' questionnaire is 73.98 in SUS criteria, 4 of which not acceptable, a student low margin, 4 students high margin, and 23 students acceptable.
3. Based on the analysis result and data validation, it can be concluded that the thematic learning media improves students' learning outcome compared to conventional learning method or lecturing on the thematic subject of SDIIC grade 5.

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