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DEVELOPMENT OF ELECTRONIC-BASED LEARNING MEDIA APPLICATIONS ON THEME 6 "HEAT AND ITS TRANSFER" FOR CLASS V IN ELEMENTARY SCHOOL

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ABSTRACT

Learning media is needed in helping students understand a material. This study aims to see how the application of electronic-based learning media in terms of material validation, media validation and testing to students. The method used is development research using the ADDIE model. From the results obtained thatThe level of material validity obtained from the material validator is 4.0 with the Very Valid category and the media validity validator obtained is 5.0 with the Very Valid category. The practical stage of the application of electronic-based learning media on the theme of 6 sub-themes of heat and its transfer was obtained from the teacher's response questionnaire and student responses. The teacher's response got a score with an average of 4.8 and 4.9 respectively in the Very Practical category, student responses got a percentage of 86% in the very practical category.

1. Introduction

Education is an important thing in life and life. Education is a conscious and planned effort to create a learning atmosphere and learning process so that students actively develop their potential. In addition, education is also a very important process to improve intelligence, skills, enhance character, strengthen personality, and strengthen the spirit of togetherness so that we can build ourselves and together build the nation. In addition, education is an important issue for humans, because education concerns human survival [1].

The learning process is one of the important aspects in the implementation of education. This is because the learning process will have an impact on student knowledge, and become a benchmark for the success of the education provided. Therefore, the learning system in the world of education must be done as well as possible so that all students can obtain useful knowledge.

The implementation of the learning process certainly requires a learning media that acts as a means or distribution aid used by teachers and acts as a facilitator in the learning process to deliver learning materials to students. According to [2] learning media is a component that has an important role in supporting the success of learning.

So far, teachers usually use learning media such as books, worksheets or teaching aids in schools. However, since the development of technology in the world of education, many schools have started using electronic-based learning media to deliver material. The use of electronic-based media must also be in accordance with the abilities and needs of students so that learning success can be achieved [3].

Electronic-based media that are widely used by teachers to deliver material during online learning are also diverse, some use applications, blogs, videos, YouTube, zoom meetings, google meetings, podcasts and other electronic media according to the abilities of teachers and students [4]. Although there are many

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choices of electronic media that can be used by teachers to deliver material, teachers still have to choose the right media so that students are able to understand the material presented. This is because the use of electronic media in learning does not only require the understanding of educators, but it is preferable for students to understand the material presented in the media.

This is according to opinion [5] that electronic learning media is used as a tool to improve the efficiency and effectiveness of learning, so that both educators and students must have a good understanding. Next [6] also stated that the selection of electronic media must be done properly so that the material or content is conveyed properly.

Development efforts in utilizing electronic learning media also need to be carried out, so that the media used is always appropriate and based on the learning curriculum. The 2013 curriculum demands student-centered learning, and students in this case are required to be active in learning in the classroom and outside the classroom, where learning outside the classroom can be done using electronic learning media.

However, the problem that often occurs is that the learning process using electronic media often experiences problems, especially in terms of student motivation and activity. Students often find it difficult to understand the material being taught so that they become less active because the teacher is the only source of material and students only listen [7]. In addition, the limited time in learning using electronic media is also an obstacle for teachers to deliver learning materials so that teachers lack time to control learning. Therefore, teachers must have many innovations in developing the electronic learning media used [8].

In existing research and development, the existing learning media are only limited to pictures and writing. Here the author will develop the application by adding animated videos along with audio and making the menu even more interesting. The research and development carried out by researchers was to determine the process of developing electronic-based learning media applications and to determine the feasibility of using electronic-based learning media applications designed using the Android Studio Ide application program.

The function of this media development is to provide a learning experience that is meaningful, active, and fun, fulfills the criteria for media edutainment, which carries the concept of learning while playing, designing flexible, practical and efficient media. Therefore, through this final project, the author is motivated to make "Development of Electronic-Based Learning Media Applications on Theme 6 "Heat and Its Transfer" for Class V in Elementary Schools".

2. Research Methods

Research is a type of research and development (Research and Development). The development model used in the development of this teaching material is the ADDIE Model which is one of the systematic learning design models. The test subjects in this study were students of class VA SDN 131/IV Jambi City. The types of data taken in this study are grouped into two parts, namely qualitative and quantitative. Qualitative data obtained from the stage of criticism, suggestions, and responses from the material validator and media validator. While quantitative data were obtained from material validator questionnaires and media validators, teacher and student response questionnaires. The product practicality assessment can be seen in the following table.

TABLE 1
ASSESSMENT OF PRODUCT VALIDITY AND PRACTICALITY

Range	Category Validity
1.00 – 1.99	Invalid
2.00 – 2.99	Less Valid
3.00 – 3.49	Valid
3.50 – 4.00	Very Valid

3. Results and Discussion

3.1 Result

3.1.1 Material Validation

Material expert validators evaluate the learning materials contained in the learning media application. The validation assessment is as follows:

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TABLE 2
MATERIAL VALIDATOR ASSESSMENT

No	descriptor	Validation Assessment	
		Stage I	Stage II
1.	The material presented is in accordance with the material contained in the 2013 Curriculum KD	4	4
2.	The material presented is in accordance with the learning objectives	3	4
3.	the material presented is in accordance with the level of elementary school education	4	4
4.	The concepts and definitions presented do not cause many interpretations and are in accordance with the concepts that apply in the material	4	4
5.	The facts and data presented are in accordance with reality and efficiently to improve student understanding	2	4
6.	The pictures and illustrations presented are in accordance with reality and are efficient to improve students' understanding	4	4
7.	Technical terms in accordance with the prevalence apply in the material	4	4
8.	The quiz descriptions presented encourage students to work further and foster creativity	5	5
9.	The description of the exercise encourages students to know the material further	3	3
10.	The presentation of the concept is presented in a coherent manner starting from easy to difficult	4	4
	Amount	37	40
	Average	3.7	4.0
	Category	Very Valid	Very Valid

Phase I material validation was carried out on January 4, 2022. Based on the table of results of material expert validation phase I, the average score results were:

$$R = = 3.7\frac{37}{1.10} \quad (1)$$

The results of the average score of the first stage of the validation show that the learning media application obtained a score of 3.7 with the Very Valid category. The product can be tested with revisions as suggested. The suggestions from the material validator are: the facts and data presented in the video are not in accordance with reality and are inefficient to improve students' understanding. Then the researcher revised the validation I according to the suggestions given by the validator.After the revision of validation I was held, then phase II of material validation was held. Phase II material validation was carried out on January 11, 2022. Based on the table of the results of the second stage material expert validation, the average score results are:

$$R = = 4.0\frac{40}{1.10} \quad (2)$$

The results of the average validation score of stage II show that the application of learning media has a score of 4.0 in the Very Valid category. The validator concludes that the application of learning media is worth testing without revision.

3.1.2 Media Validation

Media validation will be carried out on March 7, 2022 to March 19, 2022. The evaluation of media expert validation is as follows:

TABLE 3
ASSESSMENT OF MEDIA VALIDATORS

No	descriptor	Rating Score	
1.	The electronic-based learning media application used can be seen clearly	5	5
2.	Electronic-based learning media applications that are used neatly in layout	5	5
3.	Presentation of attractive colored electronic-based learning media applications	3	5
4.	The suitability of electronic-based learning media applications with student characteristics	1	5

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No	descriptor	Rating Score	
5.	The suitability of electronic-based learning media applications in accordance with the learning subject targets	4	5
6.	Electronic-based learning media applications used are in accordance with the topics taught	5	5
7.	The suitability of electronic-based learning media applications in accordance with learning objectives	5	5
8.	Electronic-based learning media applications are practical, flexible, and can be used repeatedly	5	5
9.	Electronic-based learning media applications have good quality	4	5
10.	Electronic-based learning media applications are easy to store	5	5
	Amount	42	50
	Average	4.2	5.0
	Category	Very Valid	Very Valid

The media validation phase I was carried out on March 7, 2022. Based on the table of the results of the validation of the material experts for phase I, the average score was obtained, namely:

$$R = = 4.2\frac{42}{1.10} \quad (3)$$

The results of the average score of the first stage of the validation show that the application of learning media obtained a score of 4.2 in the Very Valid category. The product is not worth testing. The suggestions from the material validator are: Background for learning materials and fonts are not fully in accordance with the characteristics of elementary school students. Then the researcher revised the validation I according to the suggestions given by the validator.After the revision of validation I was held, then phase II of material validation was held. Phase II material validation was carried out on March 19, 2022. Based on the table of the results of the second stage material expert validation, the average score results are:

$$R = = 5.0\frac{50}{1.10} \quad (4)$$

The results of the average score of the second stage of the validation show that the application of learning media obtained a score of 5.0 in the Very Valid category. The validator concludes that the application of learning media is worth testing without revision.

3.1.3 Teacher response questionnaire results

Product assessment was also carried out to teachers at SDN 131/IV Jambi City. The researcher took two teachers to give an assessment, namely the VA homeroom teacher, namely NF, and the VB class teacher, namely RS. The results of the teacher's response to the developed product can be seen in Table 3 as follows.

TABLE 4
TEACHER RESPONSE QUESTIONNAIRE RESULTS

No	descriptor	Score Score	
		VA teacher	VB teacher
1.	Presentation of material in the application of learning media in accordance with KD Curriculum 2013	5	5
2.	The material in the learning media application is in accordance with the learning objectives	5	5
3.	The clarity of the material in the application of learning media is clear and easy for students to understand	5	5
4.	The appearance of images, text, sound, and animated videos in learning media applications can encourage students' interest in learning	5	5
5.	Presentation of practical learning media applications used	5	5
6.	The menu presented in the learning media application is easy to use	5	5
7.	The evaluation presented in the learning media application is in accordance with the material	4	5
8.	Learning media applications can be used as students' independent learning media	5	4
9.	Learning media applications can provide student motivation in learning	4	4
10.	The display in the learning media application is good and attractive	5	5

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No	descriptor	Score Score	
		VA teacher	VB teacher
11.	The colors in the learning media application are appropriate and attractive	5	5
12.	Learning media applications make students more interested in learning	5	5
13.	Learning media applications can increase students' enthusiasm for learning	5	5
	Amount	64	63

The teacher's responses and assessments can be seen in Table 4, the homeroom teacher of class VA, Mrs. NF, gave a final score of 64 with a score of 4.9 which was included in the "Very Practical" category. The suggestions and comments given to researchers are: Text, images and animations are good and interesting.Furthermore, the assessment from the homeroom teacher, Mrs. RS, gave a final score of 63 with a score of 4.8 which was included in the "Very Practical" category. Suggestions and comments given to researchers are: The media is good and interesting for students.

3.1.4 Student Response Questionnaire Results

TABLE 5
RESULTS OF STUDENT RESPONSE QUESTIONNAIRES

No	Student's name	Item Number											Amount
		1	2	3	4	5	6	7	8	9	10	11	
1.	MAK	4	5	4	4	4	4	5	4	4	4	4	46
2.	AT	5	4	4	5	5	4	4	5	5	4	4	49
3.	US	4	5	4	5	4	4	4	4	5	4	4	47
4.	KJ	4	3	3	4	4	5	3	3	5	4	4	42
5.	COH	3	5	5	4	4	4	5	3	3	4	3	43
6.	AZA	4	5	5	5	5	5	5	5	5	4	5	53
7.	DAK	5	4	4	5	5	3	4	4	4	4	4	46
8.	STAMP	3	5	4	5	4	5	5	4	4	5	3	47
9.	RIS	5	4	4	5	4	4	3	4	5	4	4	46
10.	MFS	5	4	3	4	3	3	4	5	4	3	4	42
11.	NAP	5	4	5	4	5	5	5	4	5	4	4	50
12.	GAS	5	4	5	5	4	5	4	5	4	4	5	50
13.	MA	5	4	5	5	4	5	4	5	4	4	5	50
14.	MI	5	4	5	5	4	5	4	4	5	5	4	50
15.	CAE	5	5	5	5	5	5	5	5	5	5	5	55
16.	NRF	4	5	5	4	4	4	5	5	5	5	4	50
17.	KCS	5	5	4	4	5	5	5	4	5	4	5	51
18.	AAP	5	5	4	4	4	5	4	5	5	5	4	50
19.	MZM	5	4	5	4	5	4	5	4	5	4	5	50
20.	MAF	5	5	4	4	5	4	3	4	4	4	3	45
21.	EJ	5	4	5	4	5	4	5	4	5	4	5	50
22.	NFK	5	4	5	4	5	4	5	4	5	4	5	50
23.	JDA	5	5	5	4	4	5	4	5	5	5	4	51
24.	RZD	5	5	5	5	5	5	5	5	5	5	5	55
25.	AF	3	4	5	5	4	5	4	5	4	5	4	48
26.	O'CLOCK	5	4	5	5	5	5	5	5	3	4	4	50
27.	SM	5	5	4	4	5	5	4	4	4	4	5	49
28.	KNS	5	4	5	5	5	5	5	5	5	5	5	54
29.	AR	4	5	5	4	4	5	4	5	5	5	4	50
30.	MH	4	5	5	4	5	4	5	5	5	4	5	51
31.	A A	4	5	5	5	4	4	4	4	4	4	5	48
		TOTAL											1.476
		PERCENTAGE											86%

Then the average response of each student as a whole is calculated as follows:

Total score : 1,476 = 86%$= \frac{1.476}{1.705} x\ 100$

Based on Table 4.4 shows the results that students' responses to the application of electronic-based learning media that were developed got a total score of 1,476 and a percentage gain of 86% including the "Very Practical" category.

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3.2 Discussion

This research is a type of research and development. The process of developing the application of learning media for solar system materials is carried out using the ADDIE development model. The ADDIE model is one of the systematic learning design models that can be used in the development of a product [9]. This model is arranged systematically in an effort to solve learning problems related to learning resources. Each stage in the ADDIE model is easy to understand and implement in developing development products such as textbooks, learning modules, LKPD, learning videos, learning media, and so on [10].

The steps in the ADDIE development model consist of several stages, namely analysis, design, development, implementation, and evaluation. The first stage is analysis. This stage is based on the analysis of student characteristics, needs analysis and curriculum analysis. The second stage is design, at this stage the first thing researchers do is collect tools and materials to develop electronic-based learning media applications, tools and materials collected such as computers, Android Studio Editor applications, Power Point, and media content obtained from internet and youtube or developed by researchers themselves [11].

The third stage is the development stage, at this stage is the stage of developing research products with tools and materials that have been collected in the previous stage. At this stage, validation is also carried out by material expert validators and media expert validators to find out the shortcomings of the product developed and revised according to suggestions from the validator. Validity is a measure of what is being measured. As explained [12] that "the validity of a research instrument is nothing but the degree to which a test measures what it intends to measure". Based on the values obtained during the validation test and product testing, this product is a very valid and very practical product. If the product does not meet the assessment criteria, the product cannot be used [13].

The data in this study were obtained from material expert validators, media expert validators, teachers and students. There are two data obtained in this study, namely quantitative and qualitative. The data in this study is data in the form of a questionnaire along with comments and suggestions from material expert validators, media experts, teachers and students. This study uses positive statements with a given score, namely strongly agree (SS) with a score of 5, agree (S) with a score of 4, disagree (KS) with a score of 3, disagree (TS) with a score of 2, and strongly disagree. (STS) with a score of 1. The scores obtained are then averaged and a percentage to see the validity and practicality of electronic-based learning media applications,

After the product is declared feasible to be tested by material expert validators and media expert validators, the next stage is implementation. According to [14] One of the criteria for the media to be said to be good is that the media must be practical, flexible, and resistant. The implementation phase was carried out to determine the level of practicality of the product developed by looking at the results of the assessment given by the test subjects in this study, namely teachers and students of class VA SDN 131/IV Jambi City. In this study, the implementation phase of the developed product consisted of small group trials and group tests. The small group trial was carried out by 9 people who were chosen randomly and the small group trial was carried out by all 31 students of class VA as well as two teachers of class VA and a teacher of class VB. The results obtained from small group trials know what obstacles are experienced by students before large group trials are carried out [15]. In the results of the study, it has been stated that the results of large group trials are that the product is considered very practical. This is based on the results of the assessment given by the teacher and students through a questionnaire after using an electronic-based learning media application.

From the results of the data obtained at each validation stage, seen in the validation of the material in stage I, the percentage value of 3.7 is included in the category "Very Valid"therefore researchers can conduct trials with revisions in accordance with the advice given by the material expert validator. In stage II validation, the percentage value of 4.0 is included in the "Very Valid" category.

Furthermore, media validation was carried out in two stages by obtaining a percentage value of 4.2 which was included in the "Very Valid" category and the media was not worthy of being tested and the researchers revised according to the suggestions and comments given. In the second stage of validation, the percentage value of 5.0 is included in the "Very Valid" category.

The next stage is to test the product that has been validated, to see the level of practicality of the product being developed. The level of practicality of electronic-based learning media applications obtained from teacher responses and student responses obtained the "Very Practical" category with the acquisition of teacher response scores of 4.9 and 4.8, respectively, and an average student score of 86%.

4. Conclusion

Based on the research and development of electronic-based learning media applications on the theme of 6 sub-themes of heat and its transfer in elementary schools, it can be concluded that the procedure for developing electronic-based learning media applications on the theme of 6 sub-themes of heat and its transfer uses the ADDIE model with the following stages: Analysis stage) includes analysis of student characteristics, needs analysis and curriculum analysis, initial design design phase, Development phase includes product validation and product testing, product implementation phase, and product evaluation evaluation phase.

The level of material validity obtained from the material validator is 4.0 with the Very Valid category and the media validity validator obtained is 5.0 with the Very Valid category. The practical stage of the application of electronic-based learning media on the theme of 6 sub-themes of heat and its transfer was obtained from the teacher's response questionnaire and student responses. The teacher's response got a score with an average of 4.8 and 4.9 respectively in the Very Practical category, student responses got a percentage of 86% in the very practical category.

References

[1] Ibrohim, *Pengembangan Elekonik Modul Menggunakan Aplikasi 3d Page Flip Profesional Pada Tema Ekisistem Untuk Kelas V Sd / Mi Pengembangan Elektronik Modul Menggunakan Aplikasi 3d Page Flip Profesional Pada Tema Ekisistem Untuk Kelas V Sd / Mi*. Universitas Negeri Lampung, 2019.

[2] Koderi, "Pengembangan Modul Elektronik Berbasis Savi Untuk Pembelajaran Bahasa Arab," *J. Teknol. Pendidik.*, Vol. 19, No. 3, Pp. 206–223, 2017, Doi: Https://Doi.Org/10.21009/Jtp1903.4.

[3] T. Aprilia, Sunardi, And Djono, "Pemanfaatan Media Buku Digital Berbasis Kontekstual Dalam Pembelajaran Ipa," *Pemanfaat. Smartphone Untuk Literasi Produktif Menjadi Guru Hebat Dengan Smartphone*, 2017.

[4] S. A. Harahap, D. Dimyati, And E. Purwanta, "Problematika Pembelajaran Daring Dan Luring Anak Usia Dini Bagi Guru Dan Orang Tua Di Masa Pandemi Covid 19," *J. Obs. J. Pendidik. Anak Usia Dini*, Vol. 5, No. 2, Pp. 1825–1836, 2021, Doi: 10.31004/Obsesi.V5i2.1013.

[5] D. Y. Agustina, "Pengembangan Bahan Ajar Interaktif Sebagai Pendukung Implementasi Pembelajaran Berbasis Scientific Approach Pada Materi Jurnal Penyesuaian Siklus Akuntansi Perusahaan Jasa Di Smk Negeri 1 Jombang," *J. Pendidik. Akunt.*, No. 1, Pp. 1–4, 2013.

[6] N. Yunaini, *Model Pembelajaran Anak Berkebutuhan Khusus Dalam Setting Pendidikan Inklusi*. 2021.

[7] E. W. Wulansari, S. Kantun, And P. Suharso, "Pengembangan E-Modul Pembelajaran Ekonomi Materi Pasar Modal Untuk Siswa Kelas Xi Ips Man 1 Jember Tahun Ajaran 2016/2017," *J. Pendidik. Ekon. J. Ilm. Ilmu Pendidikan, Ilmu Ekon. Dan Ilmu Sos.*, Vol. 12, No. 1, P. 1, 2018, Doi: 10.19184/Jpe.V12i1.6463.

[8] Suryatiningsih, "Pengaruh Penggunaan E-Modul Interaktif Terhadap Hasil Belajar Mahasiswa Pada Materi Kesehatan Dan Keselamatan Kerja," *J. Ilm. Pendidik. Tek. Elektro*, 2017.

[9] E. F. Susari, A. Suryadi, And D. Wicaksono, "Pengembangan Model Pelatihan Peningkatan Kompetensi Guru Sd Berbasis Aplikasi Edmodo," *J. Instr.*, Vol. 2, No. 1, Pp. 17–26, 2019.

[10] Y. I. Aini, "Pemanfaatan Media Pembelajaran Quizizz Untuk Pembelajaran Jenjang Pendidikan Dasar Dan Menengah Di Bengkulu," *J. Kependidikan*, Vol. 2, No. 25, Pp. 1–6, 2019.

[11] K. A. Imania And S. K. Bariah, "Rancangan Pengembangan Instrumen Penilaian Pembelajaran Berbasis Daring," *J. Petik*, Vol. 5, No. 1, Pp. 31–47, 2019, Doi: 10.31980/Jpetik.V5i1.445.

[12] Susanti, *Pengembangan E – Modul Dengan Aplikasi Kvisoft Flipbook Maker Pada Pokok Bahasan Fluida Statis Untuk Peserta Didik Sma/Ma Kelas X*. Uin Sunan Kalijaga, 2015.

[13] D. Patiung, "Membaca Sebagai Sumber Pengembangan Intelektual," *Al Daulah J. Huk. Pidana Dan Ketatanegaraan*, Vol. 5, No. 2, Pp. 352–376, 2016, Doi: 10.24252/Ad.V5i2.4854.

[14] F. A. Perdana, S. Sarwanto, S. Sukarmin, And I. Sujadi, "Development Of E-Module Combining Science Process Skills And Dynamics Motion Material To Increasing Critical Thinking Skills And Improve Student Learning Motivation Senior High School," *Int. J. Sci. Appl. Sci. Conf. Ser.*, Vol. 1, No. 1, P. 45, 2017, Doi: 10.20961/Ijsascs.V1i1.5112.

[15] H. Djidu And J. Jailani, "Developing Problem Based Calculus Learning Model," *J. Kependidikan Penelit. Inov. Pembelajaran*, Vol. 2, No. 1, P. 68, 2018, Doi: 10.21831/Jk.V2i1.12689.