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The Development of Contextual Thematic Electronic Teaching Materials to Improve Environmental Care, Responsibility and Primary School Student Learning Outcomes

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ABSTRACT

The aim of this study is to develop contextual thematic electronic teaching materials to improve environmental care, responsibility, and learning outcomes in elementary schools. This research was development research referring to the ADDIE model (Analysis, Design, Development, Implementation, and Evaluation). Analysis stage, identify potentials and problems. Design stage, is the stage of designing a teaching material. In the Development phase, teaching materials were validated by material experts, media experts, and readability tests. The results of the validity, showed that the teaching materials included in the very feasible category (material experts 90.28% and media experts 90.62%). The level of readability shown a very good category (92.69%). The level of practicality shown the very practical category (teachers 88.19% and students 86.15%). The implementation phase was carried out to determine the effectiveness of teaching materials in improving environmental care attitudes, responsibility, and learning outcomes. Subjects consisted of 61 fourth grade students. SDN 2 Mayangan as the experimental class and SDN 1 Mayangan as the control class. Implementation data includes attitudes of caring for the environment, attitudes of responsibility and learning outcomes. The instruments used were environmental care attitude questionnaire sheet, environmental care attitude observation sheet, responsibility attitude questionnaire sheet, responsibility attitude observation sheet, and tests. Data analysis used quantitative and qualitative analysis. The characteristics of the teaching materials developed include independent activities, group activities, activities with parents and practice questions, which can improve environmental care, responsibility and learning outcomes. The effectiveness of contextual thematic electronic teaching materials on the attitude of caring for the environment shows the average achievement in the experimental class was 43.68%, and the control class was 34.91%. The results of the average observation of environmental care in the experimental class showed 87.76 and 80.21 in the control class. In the attitude of responsibility, the average achievement in the experimental class was 31.92% and in the control class was 26.80%. The results of the average observation of the attitude of responsibility in the experimental class showed 88.06 and the control class showed 80.83. The results of the posttest showed an average achievement of 56.08% for the experimental class and 43.41% for the control class. The Evaluation stage makes improvements based on the suggestions given. Thus, it can be concluded that contextual thematic electronic teaching materials were feasible to use, and can improve environmental care, responsibility and learning outcomes.

Keywords: Electronic Teaching Materials, Contextual, Environmental Care, Responsibility, Learning Outcomes

INTRODUCTION

Learning in elementary schools applies thematic learning whose material adapted to the themes found in daily life (Su'udiah, et al 2016). One of the conditions for the implementation of learning in elementary schools is the presence of thematic teaching materials. The teaching materials currently used in elementary schools use 2013 curriculum thematic books. However, there are still lack in the 2013 thematic books where the teaching materials used are not fully contextual in accordance with the environment in each student's area. 2013 thematic book that has been published by the government and is used basically for elementary schools throughout Indonesia. The content of the material is less specific to describe the area where each student is located, because the regional conditions of each school are certainly different (Perwitasari, et al. 2018). Connecting the material with the lives of students will grow the learning process in the classroom to be more active, students not only listening to the material can also make students responsible for learning (Susiloningsih, 2016).

The 2013 curriculum book that has been published only explained the conditions of several regions in Indonesia and is less specific in explaining each area occupied by students. This will make students less aware of their own surroundings. Whereas learning by linking the material being taught with environmental conditions will be meaningful for students. The material taught related to everyday life can motivate students' learning (Permendikbud Number 22 of 2016).

Judging from the depth of the material presented in the 2013 curriculum book, the presentation of the material is not so deep in discussion (Ernawati, 2019). To deepen the material in the 2013 curriculum book, companion teaching materials are needed. Companion teaching materials are used to deepen the material during the learning process for both teachers and students, so that the material taught is more varied and interesting for students to learn.

The results of observing the problems that existed in the fourth grade Elementary School in the Ahmad Yani Cluster, Wiradesa District, Pekalongan Regency include: (1) Teachers have never innovated or developed materials that were adapted to the environment around students, (2) it is necessary for companion teaching materials that support thematic learning to deepen the learning material, (3) the learning material taught has not been linked to the environment around the students, (4) the attitude of caring for the environment of students is still low, such as the lack of caring for the cleanliness and sustainability of the school environment, (5) the attitude of responsibility towards tasks schools are still not fulfilled, (6) The value of student learning outcomes needs to be improved to make it better.

In the middle of the current pandemic, it has had a major impact, especially in the field of education, namely the learning process has changed from face-to-face to online learning. Students only study at home without coming to school. The existence of online learning is a new thing for elementary school teachers and is a challenge to innovate learning to keep it running effectively. Learning innovations must be carried out by teachers to convey material to students. One of the innovations is by developing electronic teaching materials that can be accessed via laptops or smart phones and the content of the material is adjusted to the environmental conditions of students. Applying technology into teaching materials is a form of innovation that aims to keep pace with and keep up with the times.

Electronic teaching materials can be interpreted as a set of material that will be mastered by students during the learning process which is packaged in interactive multimedia form, arranged in a sequential, systematic manner and according to needs and competencies (Sriwahyuni, et al. 2019). The existence of electronic teaching

materials makes the delivery of information more interesting and fun, because it can be read on computers, telephones, smartphones, gadgets and other electronic devices (Lestari & Okta, 2019). The development of electronic teaching materials is very necessary to strengthen the material as well as to support online learning according to the demands of the 21st century. The content of the material needs to be linked to the conditions of the surrounding environment in order to help students become more familiar with their own environment. Linking a material ranging from the home environment, school to the community, will make students able to receive knowledge and apply it to real life and care more about the environment (Samo, et al. 2018). Teaching materials can be tool for students to achieve competence in learning (Satriawan & Rosmiati, 2016).

At this era, schools have not developed contextual electronic teaching materials related to the environment around students. In the 2013 curriculum learning, students must be able to build their own knowledge. Therefore, a teacher must be able to design a learning process that is from a narrow scope to a broad scope and the teacher can relate it to the learning that is around the learner's environment. It is necessary to introduce knowledge about the surrounding environment, so that students' knowledge can develop and the implementation of learning will become more meaningful. Teaching materials basically have benefits and have a major influence on the success of achieving learning objectives.

Based on the information gained, a product is needed in the form of contextual thematic electronic teaching materials and learning materials that are associated with the environment around students. Electronic teaching materials are expected to attract students to be more enthusiastic when participating in the learning process and be meaningful. The presentation of the material in the teaching materials that will be developed is arranged with approach steps that linked with the 2013 curriculum. When the teacher had limited experiences in inadequate materials, it is better if a teacher can develop a teaching material whose learning materials can adapt to the uniqueness of the students' area or environment where teachers teach, which is expected to make learning efficient and effective (Tinja, et al. 2017).

Through the development of contextual thematic electronic teaching materials, it is expected to increase environmental care attitudes. Students will be able to take care of the environment properly, such as disposing of garbage in its place, maintaining the cleanliness of the classroom, and taking care of the surrounding plants on a regular basis. Learning that describes environmental conditions directly provides experience to students so that they gain knowledge and insight about the environment (Wanabuliandari & Ardianti, 2018). Building an attitude of caring for the environment is very necessary to prepare a generation that has the knowledge, skills, values, and can solve environmental problems (Fua, et al. 2018).

The development of contextual thematic electronic teaching materials can also be useful for inculcating an attitude of responsibility in schools. Students are more responsible for their obligations at school, such as completing school assignments well, participating in learning activities, and always obeying applicable regulations. The attitude of responsibility of students can be fostered through the learning provided by the teacher at school. The use of contextual thematic electronic teaching materials can affect student learning outcomes. The existence of contextual thematic electronic teaching materials in classroom learning will add variety to learning to help teachers deliver material and help students to keep learning and get better learning outcomes. Based on the background description, the development of contextual thematic electronic teaching materials will be carried out that can improve the attitude of caring for the environment around them, increase a

sense of responsibility as well as improve student learning outcomes.

To achieve the objectives of this study, the following things were carried out, knowing the validity of contextual thematic electronic teaching materials, describing the characteristics of contextual thematic electronic teaching materials and analyzing the effectiveness of teaching materials in improving environmental care attitudes, responsibility and learning outcomes in grade IV elementary school.

MATERIALS & METHODS

The research method used is the Research and Development (R&D) method. Research and development according to Sugiyono (2016: 297) is a research method used to develop and test the effectiveness of a product. This research develops contextual thematic electronic teaching materials to improve environmental care and responsibility in elementary school students. Meanwhile, the development model used is ADDIE which consists of five main phases or stages (Analysis, Design, Development, Implementation, and Evaluation).

At this stage of analysis is carried out to identify the potential and problems that cause the gap between reality and expectations. Several problems were found, including the availability of teaching materials used that were not contextual in nature in accordance with the environment where students lived. There was no innovation in electronic teaching materials that supports 21st century learning models. Students are still not aware of environmental concerns around them. The attitude of responsibility is not well embedded, student learning outcomes also need to be improved in order to obtain maximum results.

At the design stage, the information gained from the analysis stage is used as a base for designing teaching materials. The design of teaching materials that will be developed by researchers is contextual thematic electronic teaching materials that can be accessed via laptops or smartphones. The first thing the researcher did was to choose a learning theme, the theme was Caring for Living Creatures. Contextual thematic electronic teaching materials are designed to improve the attitude of caring for the environment, responsibility and student learning outcomes. Furthermore, designing parts of the content or features contained in contextual thematic electronic teaching materials,

At the stage of developing contextual thematic electronic teaching materials, it began with compiling material content, compiling practice questions and evaluations. Then proceed to design the entire teaching material starting from the cover, the use of color, the suitability of the typeface, the accuracy of the font size, the layout of the images and so on. Then an assessment is carried out by material expert validators and media experts, this validity assessment aims to determine the advantages and disadvantages of the contextual thematic electronic teaching materials developed. Furthermore, a readability test was conducted to determine the level of readability and practicality in the use of contextual thematic electronic teaching materials. The sample size used is involving 30 students. Methods of data collection using a questionnaire. The instruments used are material and media expert validation, legibility questionnaire sheets and practicality questionnaire sheets. If the contextual thematic electronic teaching materials have been declared appropriate from the results of the readability and practicality tests, the next step is to implement them into learning.

At the implementation stage, teaching materials for contextual thematic electronic teaching materials that have been declared appropriate by material experts and media experts and have been tested are then implemented in class IV thematic learning. This implementation stage is to find out how the potential of contextual thematic electronic teaching materials is developed. This implementation process was carried out in elementary schools in Wiradesa

Subdistrict, Pekalongan Regency with the research subjects being fourth grade students at SDN 2 Mayangan as an experimental class with 33 students and SDN 1 Mayangan as a control class with 28 students. The method used in this process is the Pretest-Posttest Control Group Design. The data at this implementation stage include the attitude of caring for the environment, the attitude of responsibility and learning outcomes. The instruments used were environmental care attitude questionnaire data, environmental care attitude observation sheet, responsibility attitude questionnaire, responsibility attitude observation sheet and a written test (Pre-test-Post-test) on cognitive learning outcomes. The data analysis technique used is quantitative and qualitative. Quantitative is useful for processing data obtained through questionnaires and test results, while qualitative data is useful for completing the description obtained.

This evaluation is the stage of the process to see whether the textbooks that have been prepared have met expectations or not. Improvement of contextual electronic teaching material products in accordance with the results obtained from the responses of teachers and students after using and developing. After being evaluated, the final revision of the product will be carried out which will produce final results that are suitable for use in learning.

RESULT AND DISCUSSION

The results of the research and discussion gained from the research include: 1) knowing the validity of contextual thematic electronic teaching materials, 2) describing the characteristics of contextual thematic electronic teaching materials, 3) the effectiveness of contextual thematic electronic teaching materials to improve environmental care attitudes, responsibility and learning outcomes. The following were the results and discussion of the research:

Validity of Contextual Thematic Electronic Teaching Materials

The validation process of teaching materials aims to determine the quality of the developed teaching materials. The validation assessment was carried out by two experts including material experts and media experts. The results of the assessment of the process of analyzing the validity of contextual thematic electronic teaching materials are described in Table 1.

Table 1. The results of the validation of material experts and media experts

Scoring Aspect	Score	
	Material Expert	Media Expert
Language	36	-
Delivery	50	-
Content and Material	44	-
Product Appearance	-	36
Product Completeness	-	39
Context Product	-	41
Total Score	**130**	**144**
Percentage	**90,28%**	**90,62%**
Criteria	**Very Valid**	**Very Valid**

Based on Table 1, it can be seen that the thematic contextual electronic teaching materials developed obtained an assessment score of 90.28% from material experts with very valid criteria and media experts obtained 90.62% with very valid criteria. Before being tested, the validator suggested that improvements be made according to the suggestions.

Improvements in teaching materials were carried out starting from the cover of teaching materials to the contents of teaching materials. Cover repair is done by adding the name of the supervisor and improving the writing of class identity. The instructions page section is added with an image of the navigation button along with its description. In the material content section, the presentation of images is adjusted to the character of elementary school children. The introductory part is replaced with a preface. Meanwhile, to facilitate access to electronic teaching materials, the URL link is updated to become a barcode scan. The improvement of the validator resulted in a better teaching material product than before.

Validation tests carried out by material experts and media experts are intended to get a better product. This validation stage is carried out to determine the validity of the developed electronic teaching materials (Sriwahyuni, et al. 2019). This was linked with the opinion of Zunaidah & Amin, (2016), the validation test of teaching materials is carried out to find out the advantages or disadvantages of the developed teaching material products in order to remain in accordance with the needs and characteristics of students. Teaching materials need to be validated by experts before being tested to determine their feasibility (Saputra & Faizah, 2017).

The validation of learning tools also needed to be done, namely the validation of the syllabus and lesson plans (Learning Implementation Plan) that will be used in the learning process. This validation is carried out by lecturers and teachers. Syllabus validation assessment starts from indicators, materials, learning activities, assessments, learning time and the language used. As for the lesson plans, it started from the aspect of the presentation format, the content aspect of the lesson plan and the linguistic aspect. The results of the validation assessment are presented in Table 2.

Table 2. The results of the validation of learning tools

No	Learning Tools	Percentage Score	Criteria
1	Syllabus	96,25%	Very Valid
2	RPP	90%	Very Valid

Based on the validation results in Table 2, it is known that the learning tools (syllabus and lesson plans) show a very valid category. The validity of the syllabus is measured by 10 statement items. From the results of the assessment obtained a score of 96.25% including the very valid category. In the Syllabus assessment get suggestions to be better. These improvements include KD, materials, and learning activities that must be adjusted to the lesson plans. The validity of the lesson plans is measured by 9 statement items. The results of the validation assessment gained a score of 90% including the very valid category. When assessing the lesson plans, the validator provided suggestions, namely that the learning objectives are adjusted to the competencies to be taught. In the core activity step, ice breaking activities are added to make learning more interesting, and the time allocation should be adjusted to the limited learning conditions.

Further, syllabus and lesson plans were very necessary in preparing lesson plans and references in learning. In line with Faridah's opinion, (2019) that the syllabus and lesson plans are important things made by teachers as learning directors. The benefits of compiling a syllabus were as a guide for teachers in managing learning activities in the classroom, both group learning and individual learning (Ubaidah, et al. 2020). Meanwhile, with the RPP, the learning carried out by the teacher can run properly and correctly for the achievement of predetermined learning objectives (Mawardi, 2019). The existence of RPP is also a teacher's guide in the implementation of teaching and learning activities in the classroom (Bansang, 2018). Learning planning allows teachers to prepare and determine what actions must be taken during the learning process, so that the learning process can take place effectively.

To determine the level of readability of the teaching materials developed, a readability test of the teaching materials was carried out. The results of the readability test of contextual thematic electronic teaching materials are presented in Table 3.

Table 3. Readability Results of Contextual Thematic Electronic Teaching Materials

No	Scoring Aspect	Percentage Score	Criteria
1	The type and size of the letters on the teaching materials are suitable and comfortable to read	90,00%	Very Good
2	The layout between text and images is good and ideal so it's easy to read	91,67%	Very Good
3	There are no writing errors in teaching materials	91,67%	Very Good
4	The use of spelling, words, sentences, and paragraphs is precise and clear.	91,67%	Very Good
5	The display of images and colors on interesting teaching materials	91,67%	Very Good

Table 3. To Be Continued…			
6	Illustrations can explain the material	91,67%	Very Good
7	Presentation of interesting teaching materials according to the material and age of the reader (elementary school children)	91,67%	Very Good
8	The questions in the practice are easy to understand	91,67%	Very Good
9	The density of ideas and information contained in the reading (short sentence length) is easy to understand	91,67%	Very Good
10	The language used in teaching materials is generally easy to understand	91,67%	Very Good
11	Systematic presentation of material in textbooks makes it easier for readers to understand (elementary school children)	91,67%	Very Good
12	Display of teaching materials linked with the material	91,67%	Very Good
13	Clarity of the title of teaching materials	91,67%	Very Good
Average		**92,69%**	**Very Good**

Based on Table 3, it is known that the average readability questionnaire results gained by 92.69% with very good criteria, meaning that the teaching materials developed have a very good level of readability and can be used in learning. Overall, the teaching materials developed were interesting and easy to understand. The readability test was carried out to find out whether the language, material and layout of textbooks could be used to understand the materials contained in it (Nuriana Rachmani Dewi & Arini, 2018). In line with the opinion (Wulandari, et al. 2019) teaching materials must be oriented towards learning objectives, the visuals of teaching materials must be good, legibility is clear, straightforward, easy to disseminate and should match the needs of the target and attract the interest of students. Meanwhile, according to N. R. Dewi & Arini, (2018) stated that in general the readability aspect is related to ease of reading, ease of vocabulary, sentences, paragraphs presented, written form, width of spaces, graphic or image aspects, presentation of interesting teaching materials according to interests. readers, density of ideas and information, as well as making it easier to understand the material. A good level of readability will affect the reader's interest in learning, easy to remember, and efficient when reading. In accordance with research (Romansyah, 2016) that teaching materials that have a high level of readability are teaching materials that provide easy understanding to students.

Further, an assessment of the practicality of contextual thematic electronic teaching materials was carried out. This activity was carried out by the aim of knowing the responses of teachers and students regarding the practicality of teaching materials developed when used in learning. This practicality assessment includes aspects of ease of use, aspects of usefulness, and aspects of presentation. The practicality assessment is carried out both on a small and large scale. The results of the practical response of teachers and students are in Table 4.

Table 4. Practical Response Results of Contextual Thematic Electronic Teaching Materials

No	Scoring Aspect	Percentage Score	Criteria
1	The practicality of small-scale teachers	81,81%	Very Practical
2	The practicality of large-scale teachers	88,19%	Very Practical
3	The practicality of small-scale students	91,06%	Very Practical
4	The practicality of large-scale learners	86,15%	Very Practical

Based on Table 4, it is known that the practical response of teachers and students to the teaching to whole materials developed has very practical criteria (small scale and large scale). It can be seen that contextual thematic electronic teaching materials are very practical when used in learning both teachers and students. This is in accordance with the opinion (Alwi, et al. 2020) that practicality included ease of use, attractiveness, and efficiency. Also, contextual thematic electronic teaching materials that have been developed have been able to attract the interest of students and are easy to use in learning. In line with the opinion of Asriani, et al. (2017) that

teaching materials can be said to be practical if they are interesting and easy to understand. The use of electronic teaching materials will make it easier for students to learn them anywhere using only electronic devices (Waller, 2013) and (Seso, et al. 2019).

Based on the description above, it can be emphasized that the contextual thematic electronic teaching materials developed are very valid, both in terms of material and in terms of media. The teaching materials developed also have a very good level of readability, and are practically used in learning.

Characteristics of contextual thematic electronic teaching materials

The teaching materials developed are intended for fourth grade elementary school students. The design of the teaching materials developed is in the form of contextual thematic electronic teaching materials that can be accessed via a laptop or smartphone. The choice of the learning theme taken is Theme 3 Caring for Living Creatures. The teaching materials developed are designed to improve the attitude of caring for the environment, responsibility and student learning outcomes. Furthermore, contextual thematic electronic teaching materials can add learning materials, and make it easier for students to understand learning materials.

The results of the development of contextual thematic electronic teaching materials on the theme Caring for Living Creatures consist of several subjects, namely Civil Education, Indonesian Language, Science, Social Sciences, and SBdP/art. Learning materials contain themes about the environment in everyday life and are accompanied by pictures that are in accordance with the theme being taught. The material in contextual thematic electronic teaching materials containing learning materials related to the environment can improve environmental care and responsibility. The results of the design of the content or feature sections contained in contextual thematic electronic teaching materials are presented in Table 5.

Table 5 Design of the thematic contextual electronic teaching materials section

No	Feature	Remark
1	Cover page	This section contains the title of the teaching material and pictures related to the title of the teaching material and the identity of the teaching material
2	Instructions for using electronic thematic teaching materials	In the instructional materials guide, there is how to use electronic teaching materials
3	Foreword	Foreword contains acknowledgments, background on the development of teaching materials, objectives of developing teaching materials, as well as introducing teaching materials developed by
4	Table of contents	This feature contains a list of sub-chapters and a list of pages that make it easier for students and teachers to find material from teaching materials
5	Core Competencies	This feature contains core competencies which are described into several aspects, namely aspects of attitudes, knowledge, and skills that must be learned by students at every level and subject.
6	Basic competencies	This feature contains the basic competencies that must be mastered by each student
7	Prologue theme	In the prologue, the theme tells about the description of the learning theme that will be studied
8	Material deepening	This feature contains material from the theme of caring for living things using contextual learning that students will learn
9	Let's practice	This feature contains questions related to the material to be studied. This feature can also train students' ability to think and can motivate students to be able to find answers
10	Let’s practice with your group	Let's practice with your group containing student activities to solve problems that can be done in groups
11	Let’s on ask	Let's ask questions to encourage students to be more active in asking questions and asking questions. These activities help students to be more confident to ask questions.
12	Let's talk	This feature contains things written by students from their own experience
13	Let's be creative	This feature contains the activities of students to create works of art
14	Study with parents	In this activity, students are expected to be able to discuss with their parents to deepen the material being studied
15	Material summary	This material summary contains a brief description of the material that has been studied in the teaching materials
16	Daily tests	The daily test contains practice questions as a form of daily evaluation of students after participating in learning
17	Reflection	Learning reflection places at the end of each lesson. students are given questions that are asked in the learning reflection which is about the impression of learning
18	Glosarium	The glossary contains difficult words or terms used in teaching materials
19	Bibliography	The bibliography feature contains book sources or references in making contextual electronic thematic teaching materials

Based on Table 5, it is known that the design of the teaching materials developed contains sections or features that are presented aimed at making it easier for users of electronic teaching materials to understand the contents of the teaching materials as a whole. The learning activities contained in these electronic teaching materials lead to activities carried out by students during the learning process as well as activities carried out at home with parents. The activities that exist during learning are let's practice activities, let's practice with your group, let's ask questions, tell stories and work, while for activities at home, namely and study with parents. The practice questions available in electronic teaching materials are useful to help students improve their learning outcomes. The presentation of the material contained in electronic teaching materials is adapted to everyday life so that it is easy to understand while at the same time forming an attitude of caring for the environment and an attitude of responsibility and can facilitate learning.

The presence of these contextual thematic electronic teaching materials can help in facilitating teaching and learning activities in schools. This is in accordance with the research of Riwu, et al. (2019) that the existence of electronic teaching materials can make it easier for students to learn the material, because the material in electronic teaching materials is related to the surrounding environment, meaning that the teaching materials are contextual. Presentation of the material contained in these teaching materials can make it easier for teachers to convey the material and can make it easier for students to understand the material being taught.

Teaching materials using a contextual approach can have a positive impact on improving character attitudes. Contextual learning encourages students to understand the nature, meaning, and benefits of learning, thus enabling them to be motivated to learn and even able to form self-awareness to consider and take moral action in the form of positive characters, one of which is caring for the environment (N. L. P. R. Dewi, et al. 2019). Integrative thematic teaching materials based on local wisdom have also proven effective to improve character, especially the responsible attitude of fourth grade students (Lestariningsih & Suardiman, 2017). The material in the teaching materials developed is related to the theme of the surrounding environment and is contextual in nature, can improve student learning outcomes. This is evidenced by research conducted by N. Susanti, et al. (2020) that learning using contextual-based electronic modules affects student learning outcomes.

Thus, it can be emphasized that the thematic contextual electronic teaching materials developed have the characteristics of the material presented in accordance with everyday life so that they are easy to understand. There are activities carried out by students during the learning process as well as activities carried out at home with parents. The activities that exist during learning are let's practice activities, let's practice with your group, let's ask questions, tell stories and work, while for activities at home, namely and study with parents. There are practice questions that are useful to help students improve their learning outcomes.

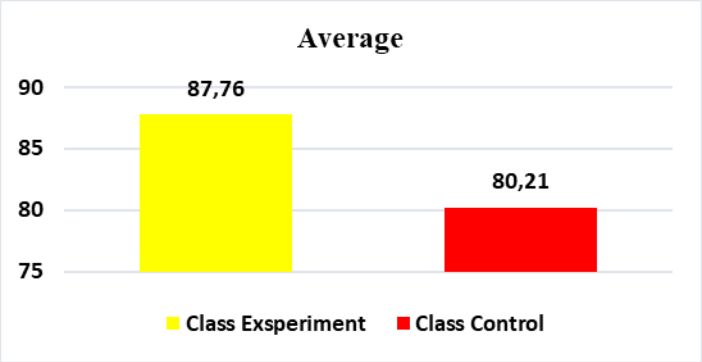
The effectiveness of contextual thematic electronic teaching materials to improve environmental care attitudes, responsibility and learning outcomes in elementary school students

The effectiveness of the first contextual thematic electronic teaching materials was to increase students' environmental care attitudes. The instruments used in measuring the environmental care attitude of students were using questionnaires and observation sheets. The results of the students' environmental care attitude questionnaire are presented in Table 6.

Table 6. Results of Students' Environmental Care Attitude Questionnaire

No	Class	Pre-test Score	Category	Post-test Score	Category	Increase
1	Experiment	56,30	Poor	81,25	Very Good	43.68%
2	Control	47,06	Poor	63,49	Good	34,91%

Table 6 shown that the attitude of caring for the environment in the experimental class and control class students experienced a different increase. The experimental class students experienced a greater increase than the control class students. The results of the observation of students' environmental care attitudes during the implementation of the learning process are presented in Figure 1.



Picture 1 Achievement of Environmental Care Attitudes of Students in Experiment Class and Control Class

Picture 1 shown that the students' environmental care attitude when learning in the experimental class obtained an average score of 87.76, while the control class obtained a score of 80.21. Then, the increase in the environmental care attitude of the experimental class students was higher than the control class.

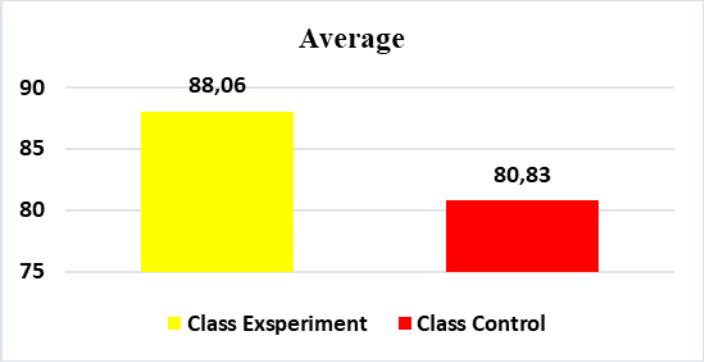
The increase in environmental care attitudes achieved shown that learning using contextual thematic electronic teaching materials was better than other teaching materials. This walinked with the opinion of Dewi, et al. (2019) which stated that contextual-based teaching materials can have a good effect on students' attitudes and participation, as well as increase the student's culture of concern for the environment. Teaching materials that present material about environmental problems can make it easier for students to understand, increase learning independence, and instil a caring character for the environment (Rachmadyanti, 2017).

The effectiveness of the second contextual thematic electronic teaching materials was to increase the attitude of responsibility. The instruments used in measuring questionnaires and observation sheets. The results of the student responsibility attitude questionnaire are presented in Table 7.

Table 7. Results of Students' Responsibility Attitude

No	Class	Pre test Score	Category	Post-test Score	Category	Increase
1	Experiment	61,52	Poor	81,16	Very Good	31.92%
2	Control	52,02	Poor	65,96	Good	26,80%

Table 7 shown that the attitude of responsibility of students in the experimental class and control class has increased differently. The experimental class students experienced a greater increase than the control class. The results of the observation of the attitude of responsibility of students during the implementation of the learning process are presented in picture 2.



Picture 2 Achievement of Students' Responsibilities in Experiment Class and Control Class

Picture 2 shown the attitude of responsibility of students when learning in the experimental class obtained an average score of 88.06, while the control class obtained a score of 80.83. From the results that have been described that the results of the attitude of responsibility in the experimental class are better and the control class.

The use of contextual thematic electronic teaching materials can have a good effect on the attitude of responsibility compared to other teaching materials. In line with the research of Lestariningsih & Suardiman, (2017) that thematic teaching materials that were integrated with the surrounding environment can effectively improve the character of caring and responsibility and encourage students to be applied in everyday life. The use of thematic teaching materials whose material was related to the environment can provide knowledge about responsibility (Ariyani & Wangid, 2016).

The effectiveness of the third contextual thematic electronic teaching materials was to improve students' cognitive learning outcomes. The instrument used to measure was a of pre-test and post-test. The results of the pretest and posttest scores were analyzed to determine the improvement, classical completeness and the results of the N-Gain test. Students' cognitive learning outcomes are presented in Table 8.

Table 8 Result of Cognitive Learning Outcomes

No	Class	Pre-test *Score*	*Post-test Score*	Percentage Increase *Pre-test- Post-test*	KKM/Minimum Score	Class Percentage Completeness	N-Gain	
							Score	Criteria
1	Experiment	57,27	87,39	56,08 %	70	100 %	0,70	High
2	Control	55,93	80,21	43.41 %.	70	92,25 %	0,54	Medium

Table 8 shown that the percentage increase in Pre-test-Post-test, the percentage of class completeness, and N-Gain from cognitive learning outcomes, the experimental class obtained better results than the control class. This shows that the thematic electronic teaching materials developed can improve students' cognitive learning outcomes compared to using 2013 thematic teaching materials.

For the difference in the average of two different classes, namely the control and experimental classes, a two-way ANOVA hypothesis test will be carried out. The results of the two-way ANOVA hypothesis test that have been carried out show that Fcount is 2.254 or greater than FTable 1.429. It can be concluded that there are differences in student learning outcomes using contextual thematic electronic teaching materials with 2013 thematic books. As for the differences in thematic learning outcomes between students who care about the environment, responsibility and cognitive outcomes, the Fcount value of 18.116 is greater than FTable 3.071. Then, it can be concluded that there was a difference in the average of students who use contextual thematic electronic teaching materials with thematic books in 2013 seen from the attitude of caring for the

environment, responsibility and cognitive outcomes.

The learning process was also observed by observing the implementation of learning activities. Observations were made to measure the effectiveness of teaching materials in learning carried out starting from preliminary activities, core activities and closing activities. The results of the recapitulation of the implementation of learning using contextual thematic electronic teaching materials are presented in Table 9.

Table 9 Implementation Results of Teaching Material Learning

No	Class	Percentage Average	Category
1	Experiment	92,36%	Very Good
2	Control	80,32%	Good

Table 9 shown that the learning activities in the experimental class obtained an average percentage of 91.85 which was better than the control class which obtained an average percentage of 80.32%. This shown that learning activities using contextual thematic electronic teaching materials are very effectively applied in learning.

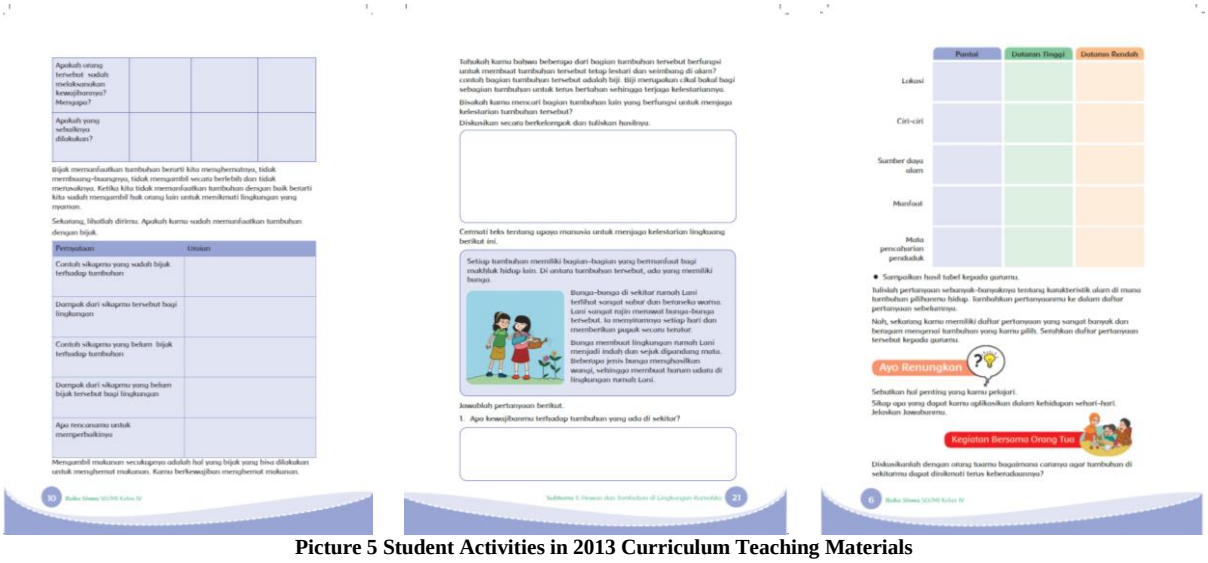
The implementation of the learning process using contextual thematic electronic teaching materials that have been carried out in the experimental class generally has a positive impact. In contextual thematic electronic teaching materials, there are activities that invite students to use used items or trash that are no longer used to be used as works of art. The items in question were shredded paper, used cardboard, used books, tree branches, and dried tree leaves around the school environment and at home. In group and individual activities, students can participate actively in doing assignments. Students can ask each other with their friends by preparing questions in advance so that it fosters an attitude of responsibility during learning. At the end of the lesson or meeting there was a daily evaluation that is useful for measuring the ability of students to understand the material being taught. The following are some examples of activities that exist in contextual thematic electronic teaching materials developed in Picture 3.

Picture 3 Student Activities on Contextual Thematic Electronic Teaching Materials

Based on Picture 3, it seen that the application of electronic teaching materials in the learning process has been appropriate in learning activities and students have a better understanding of utilizing used goods or garbage into works of art around the school environment and always maintain cleanliness after learning activities are completed. In the process of independent activities or groups of students, they looked more active in discussing, asking questions and presenting the results of their work, this shows a sense of responsibility towards school assignments carried out well.

Improved learning outcomes after the learning process with the developed teaching materials obtained post-test results have improved better. Students have carried out appropriate activities on contextual thematic electronic teaching materials, students were used to being active in conducting discussions with their friends in groups, even students using internet media to seek knowledge related to the basic competencies being studied.

Further, In the process of implementing learning in the control class using the thematic materials of the 2013 curriculum, it did not look good. In one of the activities, students were less able to explain the material about "how to use plants properly". In group activities, students still seem passive when discussing and less than optimal when working. Here are some examples of activities that exist in the 2013 curriculum teaching materials were presented in Picture 5.



Picture 5 Student Activities in 2013 Curriculum Teaching Materials

Based on Picture 4, it seen that the learning process using thematic teaching materials for the 2013 curriculum of students has not been implemented properly. When the learning process took place, there were still some students who are less precise in explaining how to use plants properly. At the end of the lesson, there were still some students who did not keep the class clean. When doing independent activities, students were less than optimal because they have not been able to manage time so that the task collection process was still delayed. In group activities, there are still students who look passive in discussions and lack confidence when presenting results, this was an attitude of responsibility towards school assignments that is not carried out properly. For learning outcomes after completing learning with thematic teaching materials for the 2013 curriculum, the post-test results showed a slight increase.

Based on the results of the effectiveness that contextual thematic electronic teaching materials can contribute to learning, especially in increasing environmental care attitudes, responsibility and learning outcomes. Contextual thematic electronic teaching materials are fully packaged so that teaching materials can be used by teachers in achieving learning objectives. In line with research (Yulaika, et al. 2020) electronic teaching materials can convey information in the form of text or images, were interactive and can be adapted to the needs of students. The use of electronic teaching materials will make it easier for students to learn them anywhere using only electronic devices (Waller, 2013) (Seso et al., 2019).

The content of teaching materials that were integrated with the environment will affect

the character of students. Contextual-based teaching materials can have a positive effect on the attitudes and participation of students, as well as increase the culture of students' concern for the environment (Dewi, et al. 2019). This was linked with the opinion of Wanabuliandari & Ardianti, (2018) which states that learning that relates material to the surrounding environment and involves students directly in the environment makes it easier for teachers to build character education, especially the character of caring for the environment and responsibility. The development of technology at this time is very possible for teachers to be able to improve the achievement and character of students, one of which was the development of contextual teaching materials that are proven to be effective in improving character education (Susanti, et al. 2020). Contextual-based teaching materials can also improve learning outcomes (N. Susanti, et al. 2020). After the research conducted by Riwu, et al. (2019) stated that the development of electronic teaching materials refers to materials related to the surrounding environment that can improve learning outcomes. The development of these electronic teaching materials is as a learning support in improving student learning outcomes during the development of technology. This was linked with the research of Yulaika, et al. (2020) that the development of electronic teaching materials is effective as a learning tool in the 4.0 era and is able to improve learning outcomes and student activities.

The existence of teaching materials that contain contextual content can be used as an alternative for teachers in overcoming learning limitations, especially in delivering material, providing knowledge about environmental concerns while providing opportunities for students to be more independent and responsible for completing tasks given during learning (Ariyani & Wangid, 2016) (Zulhelmi, 2021). Thus, it can be emphasized that contextual thematic electronic teaching materials were effectively used in learning to improve environmental care attitudes, responsibility, and student learning outcomes compared to using other teaching materials.

CONCLUSION

The development of contextual thematic electronic teaching materials that were developed was declared valid and practical to use in the learning process. The characteristics of contextual thematic electronic teaching materials have materials that are adapted to everyday life so that they were easy to understand. There were activities carried out by students during the learning process as well as activities carried out at home with parents. Contextual thematic electronic teaching materials were effectively used in learning to improve environmental care, responsibility, and student learning outcomes.

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