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Evaluation of Implementation Results of Integrated Science Teaching Materials with "Weather and its Changes" Theme, to Improve Concept Understanding for Seventh Grade of Junior High School Students

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Abstract. This research is an evaluation research aims to examine the implementation results of integrated science teaching materials with Weather and Its Changes theme, to improve the concept understanding for seventh grade of Junior High School students. This teaching material was developed using the ADDIE (Analysis, Design, Development, Implementation, Evaluation) method. The research method used is Research and Development (R&D). The results of the research instrument that will be studied are the concept understanding test and the responses questionnaire for teachers and students. Data analysis techniques that will be studied more deeply are readability test, validity and reliability test of concept understanding test, students' response questionnaire, and teachers' response questionnaire analysis using CVR. This research also describes the data analysis results of the teachers' response questionnaire which contains positive assessments, criticisms, and constructive suggestions, with a CVI of 0.85 indicates that the profile of teaching material is very feasible to use. It was concluded that the profile of integrated science teaching materials with Weather and Its Changes theme was very suitable for use by seventh grade Junior High School students. So it can be said that the implementation of this teaching material is quite successful in increasing students' concepts understanding.

INTRODUCTION

The development of an integrated science learning model is highly recommended at the Junior High School education level, because it aims to increase the efficiency and effectiveness of learning, generate interest and motivation, as well as ease (time saving) in achieving basic competencies as a whole. Integrated learning should use relevant and closely related themes. The material that is combined is of course still within the scope of related study fields, in this case the science fields must include several disciplines such as Physics, Biology, Chemistry, Earth and Space Sciences [1].

Many advantages are obtained through the implementation of integrated science education. Research shows that integration provides many opportunities for students to be able to learn more about connectedness, be less detached, and stimulate more learning experiences [2]. So that students can get more meaningful learning, more motivating and involve students in the learning process [3]. The acquisition of learning integrity, as well as a unanimous view of life, the real world and life phenomena can only be reflected through integrated learning. Integrated education ensures that learning in the classroom does not only end with "knowledge in school" but is able to become the basis for solving problems encountered in the future [4].

Another fact that occurs in the field generally is that science teachers in Junior High Schools have not implemented integrated science learning. The implementation of learning in schools is still mostly done separately. The achievement of Competency Standards and Basic Competencies of subjects is still carried out in accordance with their respective fields of study. In the schools, for example, students are taught the study of Physics and Earth & Space Science at the first meeting, then students are taught the study of Biology at the second meeting, and finally

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students are taught the study of Chemistry at the third meeting, so that both teachers and students will have difficulty integrating several studies of these sciences when they want to relate it to application in everyday life. It is even more confusing if the teachers who teach some of these scientific studies are different teachers (Physics teacher, Biology teacher, and Chemistry teacher) or not a science teacher who masters the entire study cluster.

The level of difficulty, ease, depth and breadth of material contained in a teaching material is a very important to note. The selection of teaching materials must consider the psychological development and thinking level of students in general, despite the fact that there have been differences in cognitive development of each individual student [5]. Differences in students' cognitive, psychological, and thinking levels can also cause differences in students' abilities to understand a given concept or material. So, it is the duty of educators to develop material in teaching materials that are appropriate to the level of students' thinking abilities, because of course the breadth of material given to Junior High Schools will be different from the breadth and depth of material for Elementary and High School students. Because, what is doubtful about the teaching materials or books circulating in bookstores is that there is no guarantee that these books have been developed with reference to the level of cognitive development of students [6,7].

This research has succeeded in developing a good integrated science book or teaching material and has met the eligibility criteria, so that it can be used independently by seventh grade Junior High School students both at school and at home. The standard of eligibility criteria used is in accordance with the contents of the instrument from the BSNP, namely meeting the feasibility of content and integration, presentation feasibility, language feasibility and also graphic feasibility [8]. After the session of applying the teaching materials was completed, the pretest and posttest scores were obtained to measure the level of student readability and the level of understanding of students' concepts regarding weather and its changes. Then, the results of the questionnaire responses from teachers and students were also used as a consideration in the improvement and preparation of teaching materials. For this reason, this paper aims to evaluate the results of the implementation of integrated science teaching materials on the integrated model, on the theme of Weather and its Changes that have been studied by seventh grade of Junior High School students, including analysis of readability tests, validity and reliability tests of concept understanding test instruments, as well as analyzing teacher and student responses through questionnaire and interview [8].

METHOD

The research method used is Research and Development (R&D) to produce a teaching material and to test the effectiveness of this teaching material to seventh grade Junior High School students in a private school in Cibinong Regency, West Java, Indonesia. R&D of teaching materials is carried out in stages using a combined approach of qualitative and quantitative research (Mixed Method Research). R&D is used comprehensively, at the stage of collecting the initial draft of teaching materials, the stage of developing teaching materials, making up to the implementation of teaching materials. The development model used is ADDIE (Analysis, Design, Development, Implementation, Evaluation). The Analysis, Design and Development stages are the development stages that produce product designs in the form of integrated science teaching materials using integrated model with the Weather and Its Changes theme, while the Implementation and Evaluation stages are research stages to determine the effectiveness of using teaching materials to increase students' conceptual understanding [8].

The steps in using the R&D method are combined with the ADDIE development technique. Firstly, Researchers analyze the problem to be discussed (Analysis). After receiving sufficient detailed information, then the development of teaching materials begins with the Design and Development stage [8]. Then, the results of the development are re-validated in terms of design, before proceeding to the Implementation stage. The implementation of teaching materials has been successfully carried out by researchers, so the next step is to evaluate the results of this study or go to the Evaluation stage

In this study, the researcher will focus the discussion on the Evaluation stage, namely analyzing data acquisition about students' understanding levels by comparing the pretest and posttest scores, evaluating students' readability of teaching materials, analyzing responses and interview from student questionnaire, analyzing assessment questionnaire from several science teachers, and make the final revision of teaching materials which is the "Product Revision" stage in R&D. Thus, the "Final Product" of integrated science teaching materials with the theme of Weather and Its Changes was created, which has gone through step by step of R&D, so that it is feasible and effective to be used by students and teachers in schools. The combination of R&D with ADDIE teaching materials development techniques can be seen in the following figure [9]. The step of research design can be seen in the Figure 1.

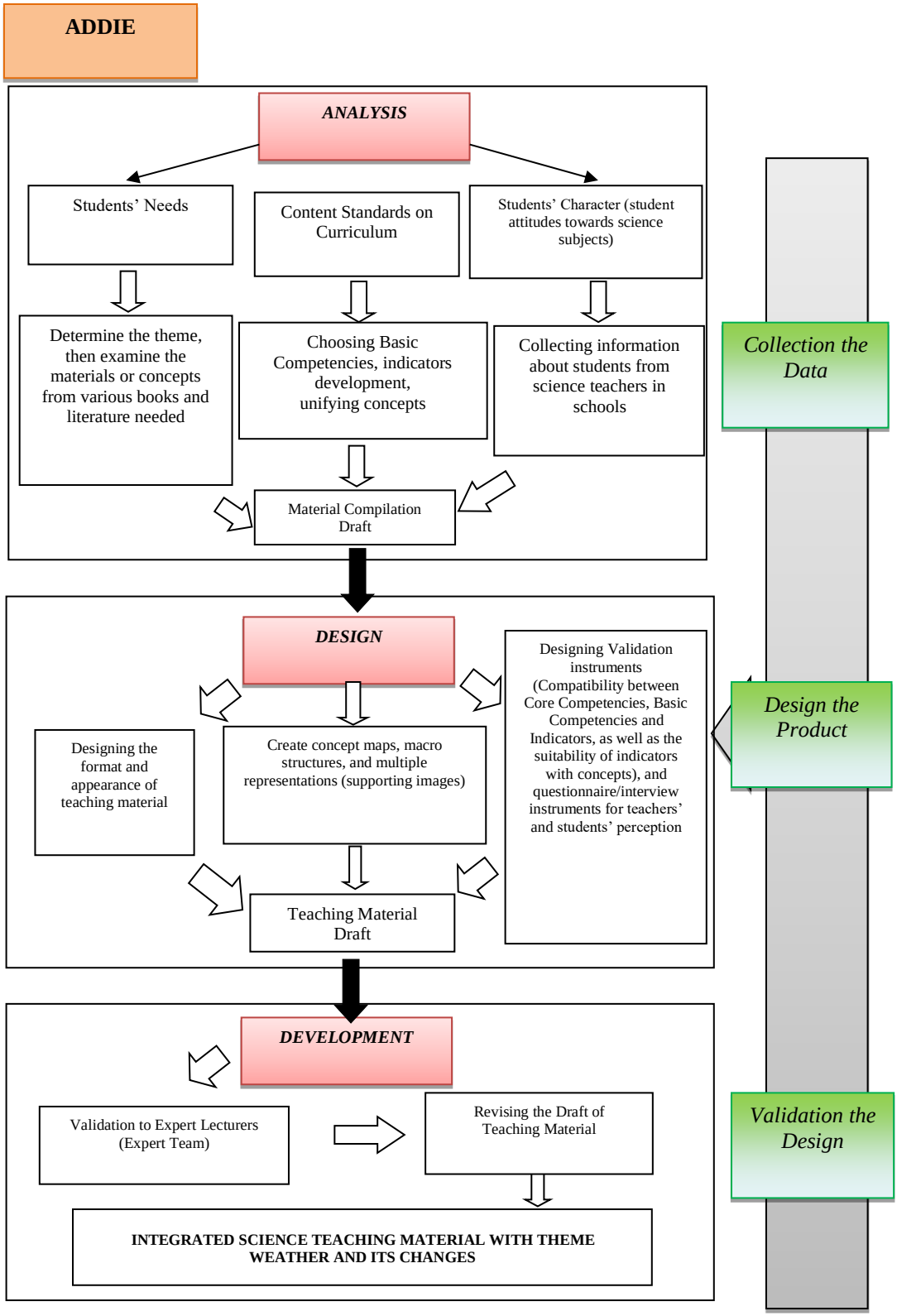

FIGURE 1. Research Design, steps for using the Development method. Research and Development (R&D) which has been adapted to ADDIE based on research needs

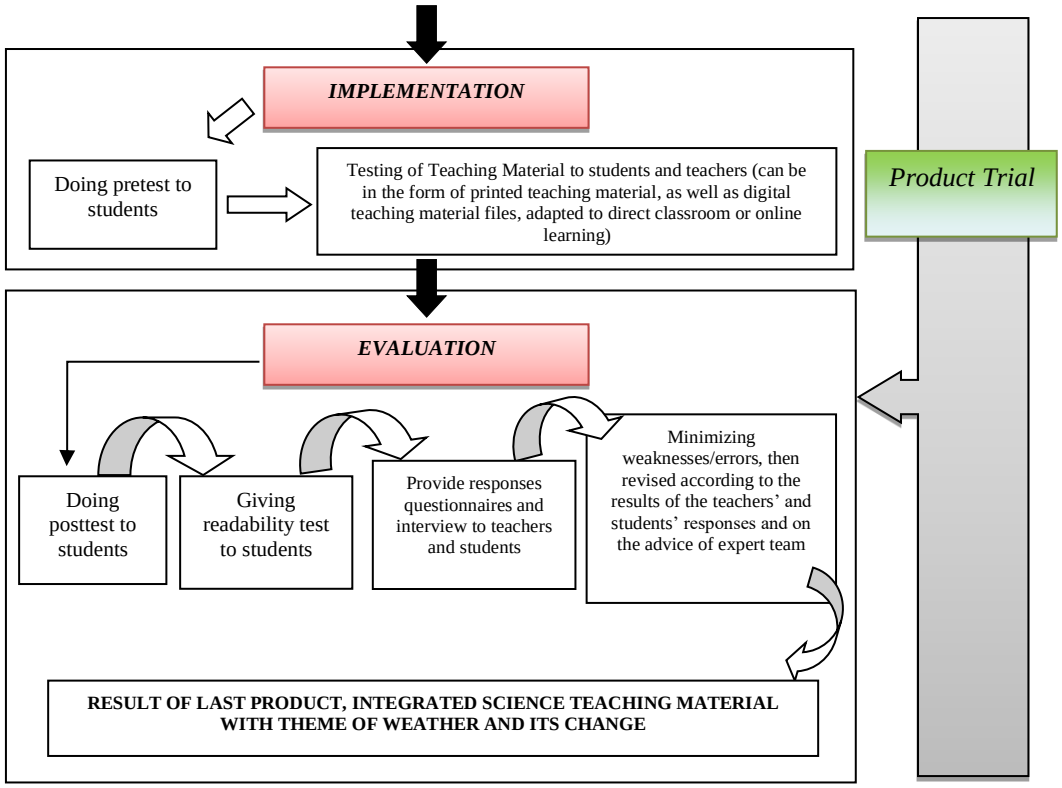

FIGURE 1. Research Design, steps for using the Development method. Research and Development (R&D) which has been adapted to ADDIE based on research needs (continued)

This research object is teaching materials with the Weather and its Changes theme, which are processed using ADDIE, while the research subject is the data source obtained in a research. The research subjects were two (2) expert teams as a validation team (validator) for the development of teaching materials, ten (9) Junior High School science teachers throughout the city of Bogor who were asked for their responses and suggestions regarding the teaching materials has been made by the researcher, and a group of seventh grade Junior High School students in one of the private Junior High Schools in Bogor Regency who went through various stages of testing or concept understanding tests after using teaching materials. These students were also asked for their responses after reading and studying the teaching materials. The sampling technique in this study used purposive sampling. Thus, researcher hopes to be able to evaluate the shortage and revise of teaching material so that it become better teaching materials in the future.

This study focuses on research instruments at the evaluation stage, the first of which is the student's readability test instrument for teaching materials. Readability of teaching materials is about being able to read the text quickly and understand easily. The readability assessment can be netted with three types of questions, namely determining the main idea, students' opinions about easy and difficult concepts, and multiple choice questions. This instrument was analyzed by categorizing the readability of the text according to Rankin and Culhane, which were classified into three levels, namely High (Independent Category), Medium (Instructional Category) and Low (Difficult Category). The second instrument is a concept understanding test instrument using questions with the theme of Weather and its Changes (validated). The concept understanding of teaching materials is more about being able to digest, understand, remember and master the contents of teaching materials. Assessment of students' conceptual understanding can be obtained by comparing the results of the initial concept understanding test (pretest) and final concept understanding test (posttest), to find out whether the teaching materials that have been developed can be effectively understood by students. To obtain good pretest and posttest questions, of course, the validity and reliability tests were carried out in advance for each item. The next data analysis used is finding the n-gain to determine the increase of concept understanding based on the pretest and posttest that have been carried out.

The third instrument is a closed questionnaire and students' interview which aim to find out students' opinions or responses to the teaching materials, they have read at home. Students' perception data was obtained from the results of processing a closed questionnaire containing the choices of SA (Strongly Agree), A (Agree), LA (Less Agree) and DA (Disagree). Next is the analysis of students' interview results which contain opinions and suggestions on the teaching material used, discussed qualitatively to support students' perceptions of the teaching material that have been developed. Then the fourth instrument is an open questionnaire for teachers which aims to find out the opinions or responses of teachers to teaching material. The opinions and suggestions for improvement obtained will become a reference in revising teaching materials, which also supports data on the feasibility of teaching material. The data analysis of the approval answers ("Yes" or "No") was processed using the Content Validity Ratio (CVR). The researcher involved ten science teachers as validators.

$$CVR = \frac{\eta e - (N/2)}{N/2} \tag{1}$$

$$CVI = \frac{CVR}{TotalComponentsofTeachingMaterial} \tag{2}$$

The categorization of the CVR and CVI calculations results is adjusted to the number of experts or validators, so that the categories "Not Appropriate", "Appropriate" or "Very Appropriate" will be obtained [10]. Similar to suggestions and opinions from students, answers in the form of suggestions and opinions from teachers will also be discussed qualitatively to support the feasibility and improvement of teaching material.

RESULTS AND DISCUSSION

Data Processing Results Readability Test for Science Teaching Material

Teaching materials have different characteristics tailored to their reading targets and the purpose of their constituents. When viewed from the level of difficulty, teaching materials can be divided into two types, namely teaching materials that are classified as easy and teaching materials that are classified as difficult. Teaching materials that are classified as simple, in which there are concrete and simple concepts so that easy to understand by students. While teaching materials are classified as difficult, in which there are concepts that are abstract, complex and complicated so that it becomes an obstacle for students to learn them [5].

With the classification of the concepts difficulty level, researchers can find out which concepts are classified as difficult according to students, so that as far as possible these difficult concepts can be minimized by reducing the level of difficulty, in other words, having to go through the revision stages or didactic reduction. At this stage, a readability test instrument is made to see the character or difficulty level of teaching material which consist of three types of tests, namely tests for determining the main idea, multiple choice tests and students' opinions about the difficulty or ease of a concepts.

Didactic reduction is basically an attempt to simplify. The simplification is in the form of changing a scientific explanation into a pedagogical explanation [11]. There are 8 ways that will be done to reduce the difficulty level of these teaching materials based on the needs of each material. The eight methods are: return to the qualitative stage; waiver; the use of explanations in the form of symbols, pictures, sketches and experiments; use of analogies; the use of historical development levels; generalization; particularization; and ignoring the difference in concept statements [5].

Paragraphs that are revised or reduced in difficulty level (didactic reduction) are paragraphs that have a combined score of the three types of reading tests below 68%. In Chapter I there are 10 reduced paragraphs, while in Chapter II there are 9 reduced paragraphs. The average of text readability level is in the high or independent category (60 < K 100%) because the percentage reaches 71% in Chapter 1 and 69% in Chapter II, and none of the paragraphs are included in the "low category (difficult)".

However, if one looks at each of the readability tests, namely determining the main idea of the text, multiple choice questions, and students' opinions, it will be clear in which paragraph most students have difficulty answering the main idea of the text and multiple choice questions correctly. Because, the uniqe thing is so many students answer a paragraph that is "easy" compared to answering "difficult", but is not in line with the determination of the main idea of the text and multiple choice which are mostly filled with wrong answers. There are two possibilities,

they are too confident that their answers are correct because they feel that the paragraphs or questions presented are quite easy for them, which means that so far they do not know the right way to determine the main idea of the text, or maybe because they are a bit lazy to read quite long paragraphs, means that students' reading literacy is still very low, so they cannot answer multiple choice questions correctly.

In Chapter I, from the test type to determine the main idea of the text, there are several paragraphs included into the category of low readability or difficult ($K \leq 40\%$), namely paragraph 4 (atmospheric composition), paragraph 12 (rain), paragraph 17 (mesosphere), paragraph 19 (sunlight) and paragraph 32 (moisture). Then from the type of multiple choice test, paragraph 15 (stratosphere) is also included in the category of low readability or difficult. Whereas in Chapter II, from the test type to determine the main idea of the text, there are more paragraphs included into the category of low readability or difficult, including paragraph 4 (astronomical theory), paragraph 8 (volcanoes), paragraph 10 (forest fires), paragraph 11 (air pollution), paragraph 14 (greenhouse effect) and paragraph 16 (ozone hole). Then from the type of multiple choice test, paragraph 4 (astronomical theory) is again included in the category of low readability or difficult.

In addition to the main factor, namely the category of topic which is quite difficult, another factor that causes students to have difficulty when understanding to topic is because the readability test questions contain quite long paragraphs for every questions, so they are reluctant to read to completion and in the end fill in the main idea box and answer multiple choice questions with simple or half answers. This also shows that students have very low reading interest and are reluctant to read the entire text. Another factor is because the researcher cannot coordinate the students to work on the readability test questions properly, if they do it at home instead of face-to-face in class or school .

All readability formulas consider the sentence length factor. Longer sentences tend to be more complicated than short sentences. The length and brevity of the sentence is an index that reflects the influence of memory span on readability. This means that the sentence length factor is believed to be very influential on the readability of a discourse. In addition to the length of sentences, the level of word difficulty can also affect the readability of teaching materials [12]. As explained above, when students do not have an interest in reading, it is difficult to understand the content of the topic. Therefore, in the didactic reduction section, as far as possible the researcher improves the sentence structure and adds various charts or pictures in order to help students understand and grow interest in teaching materials.

It can be concluded, the students' readability level of integrated science teaching material with the Weather and Its Changes theme is included in the "easy to understand" category because it has gone through the stages of didactic reduction according to students need. It has been explained previously that didactic reduction is a reduction in the difficult level of subject matter. The reduction is carried out by considering the pedagogical aspect, so that the subject matter that has undergone this reduction can be easily understood and taught [5]. The results of the readability test for each sub-theme are shown in Figure 2.

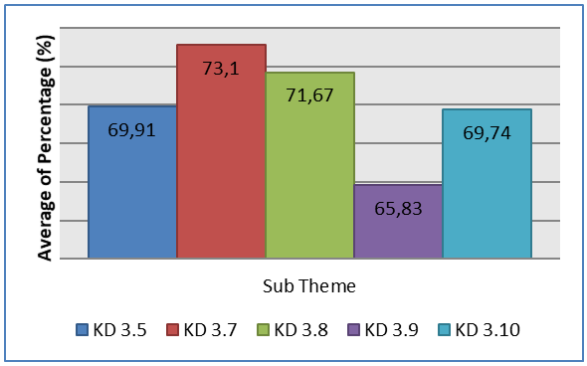

FIGURE 2. Comparison Diagram of Readability Test Results between Sub Themes

The picture above shows that the sub-theme that has the highest readability value is KD 3.7, which is about temperature and heat. Meanwhile, the lowest readability value among the five sub-themes was KD 3.9 regarding air pollution. However, all basic competencies have high readability criteria (independent). Most of the paragraphs and overall average of paragraphs for both Chapter I and Chapter II are included in the "High (Independent)" category, with the highest average percentage value of 73,10%. That is, overall the materials or topics developed in the teaching material can be well understood by students.

Data Processing Results of Improved Concept Understanding with N-Gain

To find out the students' initial abilities, the researcher gave pretest questions to the students, after that the researcher conducted a trial using teaching material to be studied by students independently at home for approximately 3 weeks. Researchers carried out full online supervision through the WhatsAp group, during the implementation of teaching material. The next step is to give posttest questions are exactly same with pretest (only the number sequence and multiple choice are different), to find out students' concepts understanding after studying teaching material at home.

One of the purposes of using this teaching material is to see the overall difference in the of students' concept understanding improvement. This can be obtained by calculating the N-Gain. The N-Gain calculation aims to determine how much the students' concepts understanding increases after using the teaching material with Weather and Changes theme as independent teaching material [13]. The highest N-Gain value was obtained by questions included in KD 3.5, namely about the substances characteristics, also physical and chemical changes in substances. In this teaching material, KD 3.5 specifically discusses about the characteristics of the atmosphere layer. While the lowest N-Gain value is KD 3.9 regarding pollution and its impact on living being. In this teaching material, KD 3.9 specifically discusses about air pollution. This means that the greatest of students' concept understanding there is in the basic competence 3.5.

The average N-Gain value for the acquisition of pretest and posttest is 0.40 or 40% and included in the medium category. The results of this study can be stated in a comparison chart of the average pretest, posttest, and N-Gain percentages for Chapter 1 and Chapter 2 as a whole in the teaching material can be seen in Figure 3.

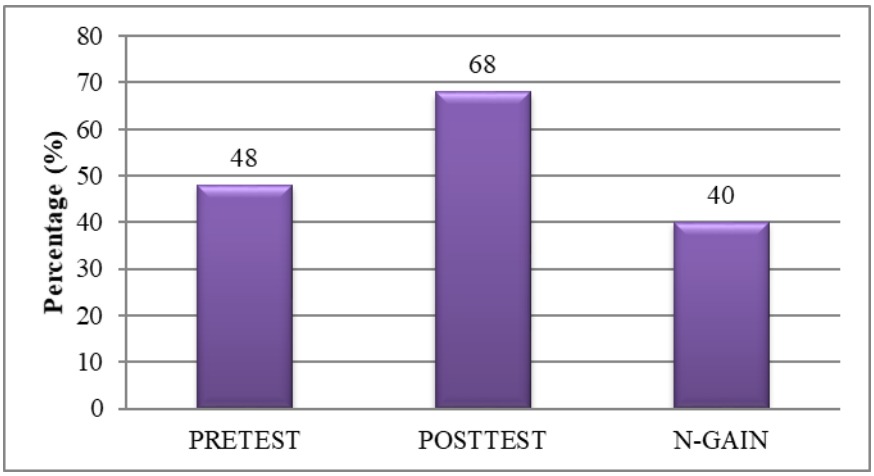

FIGURE 3. Comparison Diagram of Pretest, Post Test, and N-Gain Average Values of Students' Concept Understanding Improvement

The understanding of the concept referred to in this study is derived from the learning outcomes test involving Bloom's cognitive domain, namely 1) knowledge, 2) understanding, 3) application, 4) analysis, 5) synthesis, and 6) evaluation. However, based on the basic competencies and indicators used at the selection stage of teaching material development, concept understanding in this case is only in the realm of C1 (knowledge), C2 (understanding) and C3 (application).

When viewed from each basic competency used in the theme of Weather and its Changes, the best improvement of students' conceptual understanding is at KD 3.5 regarding the characteristics of substances, also physical and chemical changes in substances, while KD 3.9 regarding pollution and its impact on living being shows the lowest students' concepts understanding. This is in accordance with the results of readability test, where there is a teaching material readability test for determining difficult concepts, KD 3.9 is the basic competencies with the lowest readability level compared to other basic competencies. Meanwhile, KD 3.7 is basic competencies with the best readability level, although with a very thin difference with KD 3.5 and KD 3.8. This proves that although students are able to understand the reading, but some of them have not been able to apply the knowledge gained from the reading when answering the evaluation questions. This can also mean that some students have not been able to apply their knowledge to solve problems.

From the results of data processing as a whole, the average increase of students' conceptual understanding has not reached the high category yet, because there are only three students get N-Gain in the high category. The N-Gain requirement for the increase to be categorized as high is $g > 0.7$. However, after analyzing the data, the N-Gain results obtained 0.40 which means that the increase of students' conceptual understanding is in the medium category. This proves that although there is a difference or increase between the scores obtained by students before and after the provision of a teaching material, the increase in students' conceptual understanding is not too large. From the processing results of interview and students' response questionnaire, the researchers tried to explore the causes of this. Most of the students in the interview when asked about the sources or references they often use when doing assignments, prefer the internet than books. On average, students have low reading interest, so they prefer internet sources that can provide various choices of information and find them faster, without having to read a lot, simply by entering keywords in the search.

The main activity of this teaching material trial is reading the science teaching materials with the Weather and its Changes theme that have been developed. Nambiar states that reading is one of the learning tools that can influence students effectively in improving learning process and thinking. By reading, students can understand and evaluate something they read [13]. In addition, reading is also a very important cognitive process for students to have. Reading is not an easy process, but rather a complicated process that involves various things and activities, including visual, metacognitive, thinking, psycholinguistics [14]. Therefore, the ability to understand reading and students' reading interest play an important role in mastering a concept in science teaching material.

Increased concepts understanding shows that students have experienced the ability to think in understanding various concepts contained in the teaching material presented. Although the increase was not that big, overall students experienced an increase in concept understanding after studying the teaching material. In the research results obtained by Umam, A. N., proved that students' concept understanding can be improved by providing learning that can improve thinking skills. Concept understanding is closely related to students' thinking skill because the concept understanding process is strongly influenced by intellectual mentality [15]. This thinking skill can be honed by studying teaching material.

By understanding a concept, students can more easily understand or explain the characteristics of other concepts [16]. So that to gain a concept understanding, it takes the seriousness of students in studying the teaching material or book they are studying. Unfortunately, students admitted in interview conducted by the researcher, that reading activities made them bored and they were not too interested in reading texts in textbook.

The low reading interest is also known from students' answers about what kind of books they want. Most students want books with pictures that dominate over text. They admitted that they could not read books for long time, because they were dizzy with the topics or materials presented. The existence of images with various shapes and colors helps them focus in studying the teaching material. Therefore, the researcher made improvements to teaching material by increasing the number of illustrations and pictures that were relevant to the topic being discussed, but without drastically reducing the amount of text that was still considered necessary to explain each concept.

In this study was also found that the increase in concepts understanding for science teaching material was still in the medium category. When viewed from the thickness of the book, Chapter II (Weather and Climate Changes) is somewhat less than Chapter I (Atmosphere and Weather). Chapter I consists of 77 pages, while Chapter II consists of 71 pages, but it is balanced because at the end of Chapter II there are pages of glossary and bibliography. Getting a thicker book will usually affect students' desire to read the book seriously from beginning to end.

The existence of the reasons above is the main reason why the N-Gain obtained by students is only in the "Medium" category. Teaching material in the form of book will not be able to provide maximum results if students are lazy to just read seriously.

Science Teachers' Responses about Teaching Material Based on the Processing Results of Teachers' Response Questionnaire

In addition to the feasibility test of teaching material validated by expert lecturers, there is also an open questionnaire involving ten science teachers to answer eleven approval questions with answers of "Yes" or "No" equipped with suggestions and comments that support each answer. This questionnaire was given to science teachers to find out their assessment of teaching material as well as revision material at the final stage of product manufacture in form of textbook

Data analysis of approval answers can be processed using CVR and CVI, this is because the number of respondents involved has exceeded the minimum limit (more than five expert respondents) required to obtain the minimum CVR value. Data processing uses CVR and CVI, so that the processed data results are more accurate. Meanwhile, the respondents' answers in the form of opinions and suggestions will be used as feasibility support material of improving teaching material will be discussed qualitatively. The results of the science Teacher's responses can be seen in the Table 1.

TABLE 1. Analysis Results of the Science Teachers' Response Questionnaire about Teaching Material

No.	Questions	TOTAL ANSWERS 10 SCIENCE TEACHERS		CVR
		YES	NO	
1.	Are you motivated to read further after reading the first part of this textbook?	10	0	1
2.	Are you able to understand the meaning of each illustration (either drawing or modeling)? If not, on what page you can't understand and why can't you understand that part?	9	1	0.8
3.	Is there a concept that contradicts with the concept that you know so far? If there is a conflict, what page is the concept on?	9	1	0.8
4.	Do you think that the presentation in teaching material is done from easy to difficult; simple to complex; and from the concrete to the abstract?	10	0	1
5.	Are the illustrations (pictures or modeling) in the teaching material presented in an attractive manner?	9	1	0.8
6.	Can the illustrations (pictures or modeling) presented help improve students' concepts understanding?	10	0	1
7.	Can the practice questions given help students in understand the concept?	10	0	1
8.	Is the language used can be understood by students?	10	0	1
9.	Have you found anything new in this teaching material with the theme of Weather and Its Changes? If so, on which page?	7	3	0.4
10.	Do you think that the presentation of descriptions in the form of local or regional phenomena in this teaching material can help students to understand the concept?	10	0	1
11.	Do you think that the presentation of descriptions or explanations in these teaching material has shown the value of God and social?	8	2	0.6
	CVI	**0.85 (Very Appropriate)**		

Of the eleven questions in teachers' questionnaire, almost all were answered "Yes" by the science teachers. However, there are still "No" answers to questions number 9 and number 11. The answers "No" of the two questions are each amount 3 respondents and 2 respondents. Researchers have tried to provide new things or concepts in teaching material, as evidenced by the positive comments from several science teachers who stated that some of them discovered new concepts such as the "Theory of Climate Change" and "there is a relationship between Climate Change and the Presence of the Covid-19 virus". The other six questions were answered "Yes" by all respondents, while the other three questions were still considered reasonable, because there was 1 respondent who answered "No". From the processing results of the teacher's response questionnaire, a CVI value of 0.85 or 85% was obtained with the "Very Appropriate" category, which means that the teacher's response to the integrated science teaching materials with the theme of Weather and Its Changes is very suitable or appropriate to be used as independent textbook by seventh grade Junior High School students at school and home.

The things that are considered appropriate from this teaching material are; the early part of the textbook discussion motivates the reader to complete the entire reading; can understand the meaning of each illustration (either drawing or modeling) of textbook; does not conflict with other concepts or sources of knowledge, the presentation in textbook is carried out starting from easy to difficult, simple to complex, and from concrete to abstract; illustrations (drawings or modeling) are presented in an attractive manner; illustrations (pictures or modeling) presented can help improved students' concept understanding; the practice questions given can help students to understand the concept; the language used can be understood by students; find new things or concepts in textbook; presentation of descriptions in the form of local or regional phenomena in this textbook can help students to understand the concepts; and the presentation of descriptions or explanations in these textbook has shown divine and social values.

Students' Perceptions About Teaching Material Based on The Processing Results of Students' Responses Questionnaire and Interview

Closed questionnaire given to students contained various statements consisting of aspects of understanding, presenting, writing and using language that easy to understand, also students' interest and motivation as outlined in 18 statements. If students choose the option "agree / strongly agree" it means that students agree with the statement contained in the questionnaire after reading integrated science teaching material on the theme of Weather and Its Changes.

Based on the processing results of the responses questionnaire from 20 students, there were 34.2% of students who strongly agreed (SA), 61.4% of students agreed (A), 4.4% of students said they less agreed (LA) and none of the students disagreed (DA). The highest percentage, namely 61.4% of students who stated that they agreed with the statements in the questionnaire. So, it can be concluded that all students who filled out the questionnaire liked to study this integrated science teaching material with the theme of Weather and Its Changes. Students' responses can be seen in the Table 2.

TABLE 2. Recapitulation of Students' Responses regarding Teaching Materials

NO.	STATEMENTS	SA	A	LA	DA
1	Science textbook with the theme of "Weather and Its Change" are very interesting.	10	10	0	0
2	This textbook helps me in studying about Weather and Its Change	12	8	0	0
3	The use of sentences and language used in textbook can be understood easily	8	10	2	0
4	By using this textbook, I can study independently at home and at school	8	12	0	0
5	Science textbook with the theme of Weather and Its Change can interest me to study	5	15	0	0
6	The use of images, symbols and writing in textbook is quite balance and not excessive	3	17	0	0
7	This textbook can answer my questions about various phenomena of Weather and Its Changes	8	12	0	0
8	This textbook raises problems and phenomena that occur in the surrounding environment or often raised in various newspapers and TV	5	11	4	0
9	The presentation of the material in this textbook is sequential, starting from the easy to the most difficult material	5	11	4	0
10	I learned a lot of new things after reading this textbook	11	9	0	0
11	The various phenomena of Weather and Its Changes contained in this textbook are able to encourage me to think further about the weather	7	13	0	0
12	Various materials in this textbook can be an interesting discussion material with teachers and friends	9	11	0	0
13	The competency test questions in this textbook make it easy for me to find out how much knowledge I know about Weather and Its Changes	9	11	0	0
14	The size and type of font used makes it easier for me to read the textbook	4	14	2	0
15	The display of this textbook is quite interesting	5	14	1	0
16	With this textbook, I realized that studying the Weather and Its changes is quite fun	4	16	0	0
17	I can understand the pictures and symbols contained in the textbook	4	14	2	0
18	The summary of the material in this textbook helps me understand the whole material	6	13	1	0
	Total	**123**	**221**	**16**	**0**
	The Highest Score	**360**	**360**	**360**	**360**
	Percentage (%)	**34.2**	**61.4**	**4.4**	**0**

Statements number 2, 4, 18, 7, 10 and 13 show whether students understand the teaching material they are studying, the results show that these teaching material are sufficient to meet the main requirements needed by a textbook, which is can help students understand the subject matter independently based on the theme was raised. Understanding is a psychological domain that combines the will and feeling that are centered on the brain and each student has different understanding abilities [16]. This also shows results that are in line with the purpose of making this teaching material, which is to help students learn science either with or without the help of teachers at school.

Creating teaching material that can be studied independently is a challenge in itself because this teaching material must act as a teacher substitute which offer detailed explanations of the various concepts contained on it.

In teaching material, researchers have discussed weather phenomena (such as hail, tornadoes, hurricanes, halos and so on) to be included in teaching material. Some of it is only in the form of brief information because the material that is included in the teaching material must be sorted according to the collected material at the analysis stage. This teaching material is also equipped with unique information on the “Did you know” feature and the “General Knowledge” feature to help students gain new knowledge that is usually not widely discussed. In addition, there are twenty competency test questions that are considered to represent the entire material contained in each chapter to measure how far the students' ability to understand the chapter. This is in accordance with the characteristics of teaching material, namely adaptive, which means having a high adaptability to the development of science and technology [17]. The adaptability used in the developed teaching material seeks to see phenomena that are quite interesting so that students gain new knowledge after studying it.

Statements number 1, 9 and 15 are related to the presentation of teaching material. According to Hamalik the first step needs to be taken if you want to develop a module (in this case teaching material), is to define design and manufacturing processes. Design and manufacturing processes are the principle components in the development of teaching material. Teaching material need to be designed and developed by looking at various elements such as format, organization, attractiveness, consistency, etc [18]. The results of the three statements are according to students about the presentation of teaching material, starting from the cover, layout, pictures, illustrations and presentation of the material has met the standards they want. Presenting interesting teaching material for Junior High School students is quite important because at that age, most students are not interested in reading boring books with too many texts. They need something that can interest them, such as unique information, clear pictures and illustrations and conceptual material, close to their lives. This is evidenced by the results of direct interview with several students.

Statements number 3, 6, 14 and 17 show students' opinions about how to write and whether the use of language in teaching material is easy to understand or vice versa. For the four statements, it can be concluded that the use of sentences and language, the use of pictures and symbols, the size and type of letters in the developed teaching material are good enough to make it easier for students to understand the contents of the teaching material. Statements number 5, 8, 11, 12 and 16 show students' opinions about teaching material in terms of how much students’ interest and motivation to learn after reading teaching material. Teaching material has several functions, one of which is to increase students’ motivation [17]. The facts shown from the five statements, students have a high enough interest in this teaching material and are motivated to study it more deeply.

The opinions of each student in the questionnaire were processed based on their positive or negative perceptions of the teaching material [19]. The ideal score of all statements in the questionnaire is 72, while the minimum score is 18. A student's perception is said to be positive if he/she gets a score of more than half the ideal score (score > 36). The score obtained is between 51-72, so it can be concluded that all students have a positive perception of the teaching material distributed. In addition to closed questionnaire containing an assessment of teaching material, there is also a comment box at the bottom of the questionnaire which aims to find out students' opinions about teaching material in general. The comments given by students are quite diverse. Starting from suggestions on improving teaching material to what kind of science textbook they would like to have and can make them interested in learning it.

From these comments, the researcher can conclude that the teaching material reads by the students are interesting enough so that it is quite easy to understand. Moreover, the teaching material discusses the Weather and Its Changes, a conceptual theme that is close to their daily lives. They also argue that the science textbook must have complete materials because they usually only have one type of science textbook. The textbook should have an attractive appearance, a balanced amount of text and pictures, there are simple experimental activities (with simple props), accompanied by explanations using clear and easy sentences for them to understand. In addition, there is a summary of material that can help them recall the material contained in each chapter. They are not very interested in reading textbooks that use too many symbols that are not familiar and if they have to be used, there must be an explanation of the symbols. Various opinions and suggestions have been followed up by revising some parts of the teaching material.

After giving the questionnaire, the researcher also conducted interview with several students to strengthen the results of the questionnaire, then summarized the two of them. Researchers found various things related to teaching material that had been developed and what kind of textbooks students wanted to learn. Most students want a balanced portion of pictures and texts in a book. There are still one or two students who think that this teaching material is still quite difficult to understand because of the standard language and the terms contained in it. There are

still words that they don't understand and certain pictures that are not clear. However, almost all of the students admitted that the teaching material they read were easy to understand, good enough because it discussed weather phenomena and its changes, had more complete and summarized material, and had interesting pictures. They are also interested in the chapter on weather changes and the things that cause them.

Some of these things are considered by researchers in revising teaching material. It is hoped that this teaching material are designed to be studied by students independently, in accordance with the characteristics of teaching material according to the Ministry of National Education in 2003 (in Lestari, 2013), namely self-instructional, which means that students can teach themselves. Therefore, teaching material must be complete and pay attention to detail things that can help students understand a concept. Researchers try to fulfill students' wishes regarding the teaching material they want without reducing the essence of science and the composition of important material that must be included at textbook, in order to match with indicators and basic competencies.

After the teachers' assessment questionnaire data was analyzed, the researcher tried to summarize all the comments of the science teachers on the development of the developed teaching material, then classified them into "Positive Comments" and "Suggestions for Improvement". Overall, the researcher can conclude that the materials, examples, illustrations and language used are good enough, so that will help students understand the teaching material. The presentation of teaching material is sufficient to support the achievement of the values contained in the teaching material, although there are still some that are implied or have not appeared clearly. In addition, phenomena about the weather and its changes that are included in the teaching material are considered to be able to help students to understand the concept. The illustrations have been presented in an attractive manner, to explain concrete and abstract concepts. The suggestions for improvement in the form of typos, clarity of images and strengthening the value of God have been fulfilled in the revision of teaching material.

CONCLUSION

The implementation of the teaching material developed by the researcher gave positive results to foster reading interest and increase concept understanding for seventh grade of Junior High School students. The average of text readability level is in the high category (independent), because the percentage reaches 71% in Chapter I and 69% in Chapter II, and it is not seen at all that there are paragraphs that included into the "low (difficult)" category. In general, the increase in concepts understanding that compares the acquisition data of pretest and posttest is 0.40 or 40%, it included in the "medium" category based on the N-Gain calculation.

Science teachers' responses to teaching material reached 85% with the "Very Appropriate" category was calculated using CVR and CVI through an open questionnaire, which means that the teacher's assessment of integrated science teaching material with the theme of Weather and Its Changes is very suitable and appropriate to be used as independent teaching material by seventh grade of Junior High School students at school and at home. Meanwhile, students' responses to the teaching material collected through closed questionnaire reached 61% who stated "Strongly Agree" and reached 34.2% who stated "Agree". All students also gave positive perceptions of teaching material through questionnaire and interview. This shows that the integrated science teaching material with model integrated on the theme of "Weather and its Changes" can be used well and is favored by the seventh grade Junior High School students.

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