

Research Article**Development of Media Convertible Book Based on Scientific Approach to Improve the Understanding of Environmental Care Concepts and Characters***Ariani RAHMAWATI¹  Anwar SENEN² **Abstract**

The aims of the research are (1) to develop a convertible book based on a scientific approach to improving the conceptual understanding and care-for-environmental character, (2) to reveal the effectiveness of the developed convertible book to improve the conceptual understanding and care-for-environmental character of grade IV students of elementary schools in Moga subdistrict., Pemalang Regency, Indonesian Country. The research uses Research and Development (R&D) model with reference to product development by Borg & Gall. The subject of research are students of elementary schools in Moga subdistrict. The validity of the developed convertible book was analyzed by converting to five quantitative criteria. The effectiveness of the convertible book in improving the conceptual understanding and care-for environmental character was analyzed by N-gain score, t-test, and MANOVA at the significance level of 0.05. The result of the research showed that the develop convertible book fulfilled the feasibility criteria according to the validation by material expert and media expert, teachers' responses and students' response which was in a good of very feasible category. The convertible book was effective to improve the students' conceptual understanding and care-for-environmental character. The result of the t-test at sig. 0.05 showed the effect of the use of the media and test MANOVA there is significant effect between class experiment and class control at 0.00.

Keywords: Convertible book, scientific approach, concept understanding, care-for-environmental character

1. INTRODUCTION

Curriculum 2013 is a complement to the Competency Level Curriculum (KTSP) which has been applied for 10 years. The implementation of the 2013 curriculum was first applied in 2013 in stages at every level and several schools. The results of evaluations involving teachers, lecturers and experts showed that the implementation of the 2013 curriculum still found several shortcomings. The overall lack of the 2013 curriculum states that the government is not ready to implement the 2013 curriculum (Prihantoro, 2015: 77). However, the demands of the 21st century hope that the 2013 curriculum will be implemented immediately. The government hopes that through the implementation of the 2013 curriculum, it can create quality education. So as to be able to compete with other countries, and face global demands. Global demands faced by future generations, namely students have soft skills and hard skills (Clark & Mayer, 2016: 55).

The use that is not yet comprehensive and the unfamiliarity of teachers with the 2013 curriculum is one of the obstacles in the learning process. The different components of the KTSP with the 2013 curriculum, one of which is integrative thematic use in the learning process. Through thematic integrative students are expected to be interested and active. This shows that in the 2013 curriculum, students as learning centers. So the teacher must change the mindset from the *teacher center* to the *student center*. This is reinforced by Min, Rashid, & Nazri (2012: 273) stating that "The

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systematic approach is one of teaching strategy that uses themes towards creating an active, interesting and meaningful learning".

Integrative thematic use is the development of a mindset that is principled using Piaget's theory. Piaget's theory states that elementary school children enter the concrete operational stage, see objects in a concrete way, and the child's ability to see objects as a whole or holistic (Berk, Fujiwara, & Lehoux, 2007: 568). So that the use of thematic integrative is suitable for use in elementary school age (In'am & Hajar, 2017: 55). Integrated thematic also facilitate students in learning, because it combines the material in one umbrella theme, and is divided into sub-themes (McDevitt & Ormrod, 2010: 57).

Another obstacle encountered in relation to the 2013 curriculum is the use of methods or approaches that can activate students' thinking processes. Paradigm changes the learning process model, it is expected that students are able to develop the ability of attitudes, knowledge, and skills (Lewis & Marx-Wolf, 2014: 67). Although the scientific approach is no longer the only learning model in the 2013 curriculum, many teachers still use it. This is due to the fact that through the scientific approach students are able to develop all three domains.

Needs analysis was conducted in Banyumudal 01 Public Elementary School, 02 Banyumudal Public Elementary School, 07 Banyumudal Public Elementary School and SD 01 Sima who had implemented the 2013 curriculum. The analysis was carried out by conducting interviews with classroom teachers, interviewing students, filling out questionnaires conducted by teachers and students media needs. The overall results related to the implementation of the 2013 curriculum have not yet achieved the educational objectives that have been designed. Based on observations and interviews conducted on September 23 to October 10, 2017, in several Public Elementary Schools in Moga sub-district that have implemented the 2013 curriculum for 2 years, the teacher said that the media used was not maximal, so students were not enthusiastic and less interested in the learning process. The teacher still dominates the learning process, so students do not seem active and tend to be quiet. Even though the method of discussion has been implemented, it is only dominated by smart students. In addition, students' thinking skills such as understanding have not been mastered especially in understanding the concept of learning material.

Understanding ability is used by students to move to higher cognitive abilities such as the ability to apply, analyze, evaluate, and create. One of the elementary schools in Moga sub-district that has implemented the 2013 curriculum, namely SD 01 Banyumudal. The teacher explains that the ability to understand students is still low, this is seen when students are faced with a problem. Students have not been able to solve the problem, even though the material has been delivered. Furthermore, the teacher feels difficult when making or looking for media as a supporter of learning. The teacher's opinion, the existing media is not in accordance with integrative thematic learning, if forced to make even the teacher still feel difficulties. This is because the teacher confuses what material will be highlighted in the media, this is because the learning uses thematic integrative. The media that the teacher wants is to include one sub-theme consisting of several materials such as science, social studies, Indonesian. In line with the opinions of teachers, students also argue that often they still find it difficult to understand the material presented in existing student books. In addition, students explained that they prefer picture books because it makes students more interested and fosters interest in learning.

Another finding is that teachers experience difficulties in applying character, especially the character of caring for the environment. School efforts have been made in applying the character of environmental care such as habituation to work on certain days, picket cleaning the bathroom in turn, pickets watering flowers in front of the class, and pickets cleaning the class in turns. However, the teacher explained that the development of the character of caring for the environment was not optimal, there was no formation of student awareness in maintaining the surrounding environment.

The results of the observations from September 23 to October 10, 2017, found that most of the activities in the learning process were carried out by referring to teacher and student books only. Teachers not yet using interactive media can attract student learning interest. The teacher also has not applied the scientific approach to learning, so that what is seen by the teacher still dominates. The ability to understand a concept has not been mastered by students, this can be seen when the teacher gives information in the form of images students have not been able to translate in written form. When the teacher conducts activities to conclude learning, students also have not been able to express the concepts that have been learned. Another finding during the observation was that the character of the environment was not optimal. This was evidenced by students who were ignorant when they saw the dirty class. There is paper, plastic scattered in the classroom, and on the front page. There were also abandoned flower pots beside the class. This is a special concern of researchers to make improvements to the ability to understand and character care about students' environment through learning media.

The results of the questionnaire that had been distributed to 134 public elementary school students in Moga Subdistrict, Pemalang Regency stated that 60% of students experienced difficulties in the process of integrative thematic learning. Students also explained that they had difficulty understanding the learning material. Almost all students who are respondents to the questionnaire choose learning activities using books that have lots of pictures, interesting books, and students need books like that to be used in the learning process.

Referring to the problems in Public Elementary Schools that have implemented the 2013 curriculum in Moga Subdistrict, Pemalang Regency, learning media are needed that are able to develop cognitive abilities, especially the ability to understand and also be able to instill the character of students' environmental care. Through this research, interactive integrative thematic learning media will be developed so that it is interesting and easy for students to understand. The convertible book media was adapted from foreign books, namely convertible books. The convertible book is a special storybook for children that can be transformed into 3 forms, which can be read as interesting story books, can be opened elongated and placed on the floor or on a table, and can be formed according to the contents of the example spacecraft, trains, cars and other forms that can be used by students as a medium of storytelling, role-playing or conducting experimental activities in accordance with the contents in the media. The research carried out by Suwandi and Masruri (2016: 88) found that the picture book can help to learn and improve the understanding and attitudes of fourth-grade students.

Based on the explanation above, it can be concluded that the convertible book media based on scientific approach can be used as a learning medium that will help optimize learning activities with the aim of improving students' comprehension and character skills in integrative thematic learning in Grade IV students of SD Negeri Moga Subdistrict, Pemalang Regency.

1.1. Aims of the Study

This study aims to find out the needs of teachers and students towards media convertible book - based scientific approach for fourth-grade students. As well as providing an overview of the appearance of a convertible book based on a scientific approach to make it more interesting. The content and material are in accordance with the learning in the 2013 curriculum. The results of this analysis are expected to make reference for teachers, principals and other researchers in making integrative thematic media based on scientific approaches that match the needs of students and teachers in supporting the learning process.

2. METHOD

This study was conducted in August 2017 until May 2018. This study uses methods research and development that refer to Gall, Gall, & Borg (2003). There are 10 steps in developing a convertible book based on a scientific approach. These steps are research and information, planning, developing a preliminary form of product, preliminary product fields, playing product revision, playing field testing, operational product revision, final product revision, dissemination, and implementation.

Before the experiment was carried out as a trial of the effectiveness of the media, media feasibility was assessed by material experts and media experts. Next is the initial field trial, main field trials, and operational field to see the effectiveness of media convertible book based on a scientific approach in improving understanding of concepts and character of environmental care.

The research subjects were fourth-grade students in Moga District, Pemalang District, Central Java who had used the 2013 curriculum. The total number of samples was 134 students with details of 27 students as initial trials, 36 students as the main trial trials and 71 students as operational trials. Data retrieval is done using instruments, interviews, observations, questionnaires for student needs, questionnaires to care for students' environment. The instrument has been validated by the instrument validator. Data analysis techniques are using independent t-test and MANOVA.

3. FINDINGS

This study developed a media convertible book based on a scientific approach in enhancing the understanding of concepts and character of environmental care with the theme “Love My Country” and the sub-theme “Utilization of Natural Property in Indonesia”.

The researcher validated material experts and media experts to assess the feasibility of the product being developed. The media validation instrument is a scoring rubric that shows quantitative results. The range of scores and qualitative literacy for expert validation scales are as follows (Azwar, 2011: 148).

153

Table 1. Categorization questionnaire expert validation

Score Range Quantitative	Validation Expert Matter		Validation Matter Expert	
	Score Range Empirical	Qualitative criteria	Score Range Empirical	Qualitative criteria
$X \geq (\underline{x}_t + 1.5 \sigma)$	$X \geq 65$	Very Decent	$X \geq 56,25$	Very Decent
$(\underline{x}_t + 0.5 \sigma) \leq X < (\underline{x}_t + 1.5 \sigma)$	$55 \leq X < 65$	Worth	$43.75 \leq X < 56.25$	Eligible
$(\underline{x}_t - 0.5 \sigma) \leq X < (\underline{x}_t \sigma)$	$+0.545 \leq X < 55$	Fairly Worth	$31.25 \leq X < 43.75$	Fairly Worth
$(\underline{x}_t - 1.5 \sigma) \leq X < (\underline{x}_t - 0.5 \sigma)$	$35 \leq X < 45$	Not Eligible	$18.75 \leq X < 31.25$	Not Worth
$X < (\underline{x}_t + 1.5 \sigma)$	$X < 45$	Very Not Worthy	$X < 18.75$	Very Not Worthy

Validation is done by two experts, namely material experts and media experts this aims to determine the feasibility of a media *convertible book* based on a *scientific approach* in improving the understanding of concepts and character of environmental care with the theme “Love My Country” and the sub-theme “Utilization of Natural Property in Indonesia” before being tested. The following are the results of validations carried out by material experts.

Table 2. Conversion of scale material assessment scores four

Aspects of	Score
Conformity of material with objectives	14
Conformity of material coverage	28
Clarity of material and language in the media	33
Total Score	75

Table 2 above shows that the total score of the material expert scores 75, and if converted into categories the questionnaire is included in the criteria is very feasible to use in the next step is the initial trial.

Table 3. Results of media expert validation

Aspect	Score
Display	36
Use of text	16
Presentations (arrangements)	28
Effectiveness	20
Total Scores	100

Table 3 above shows the total score scoring by media experts gets a total score of 100, and if converted into questionnaire categories it is very feasible for use in learning.

Table 4. Recapitulation of student responses on media convertible book

Aspect	Amount of Indicators	Early	Trial Main	Trial Operational
		Number of average scores		
Display	1	3.33	3.56	3.76
Usefulness	4	13.67	14.17	14.50
Clarity	4	14, 11	14.17	14.54
Sustainability	1	3	3.67	3.87
Total score		31.11	35.56	36.67

Table 4 above is a recapitulation of student responses to media convertible book based on a scientific approach. At the initial trial stage, 27 students received a total score of 31,11 so that when consulted the categorization table was in a good category. Furthermore, the main field testing phase was carried out on 36 students with a total score of 35,56 so that if consulted on the categorization table it would fall into a very good category. The next step is the trial of the operational field of 45 students getting a total score of 36,67 and consulted on the categorization table in the very good category.

The effectiveness of media convertible book based on scientific approach concept comprehension ability is carried out by using tests on two experimental classes and one control class with 71 students. Assumption tests were carried out using SPSS 21 through the Independent Sample T-Test and MANOVA tests. The following is the recapitulation of the results of different test independent sample t-tests for students' conceptual comprehension abilities.

Table 5. Recapitulation of the results of independent sample t-test understanding the concept of

Class	Condition	Sig. (2-tailed)	Results	Information
Experiment 1 Control	After	0.003	Ho rejected (0.003 <0.05)	There is the influence of
Experimental2 Control	After	0.027	Ho rejected (0.027 <0.05)	There is the influence of

Table 5 above shows that the media convertible book based on the scientific approach has an effect on students' conceptual comprehension abilities in the experimental classes 1 and 2 with a significance level of 0.05.

Table 6. Recapitulation of results of independent sample t-test for environmental care

Class	Condition	Sig. (2-tailed)	Results	Information
Experiment 1 Control	After	0,000	Ho rejected (0,000 <0,05)	There is the influence of
Experimental2 Control	After	0,000	Ho rejected (0,000 <0,00)	There is the influence of

Table 6 above shows that the media convertible book based on the scientific approach has an effect on students' ability to understand concepts in the experimental classes 1 and 2 with a significance level of 0.05.

Furthermore, with the MANOVA test, the results are 0.00 with a significance level of 0.05 so that the significance value is <0.05 so that Ho is rejected. Thus it can be concluded that there is a significant influence in the use of media convertible book based on the scientific approach to the ability to understand concepts and the character of environmental care for grade IV elementary school students in Moga Subdistrict.

4. DISCUSSION and CONCLUSION

Based on the findings of the research results, it can be said that the media convertible book based on the scientific approach can improve the ability to understand concepts and character of students' environmental care. This is reinforced by the results of research conducted by Faizah (2009) study also shows that the use of pictorial stories with the content of value education is more appropriate to be applied than learning that only relies on textbooks as the only source of learning. Almerico (2014: 1) also suggests that students can learn about various noble characters through quality books. Through quality, books can be used as a medium that is effective in improving the cognitive abilities and character of students. Related to this research is the type of media used in the form of books. In the development of media convertible book based on a scientific approach developed from a picture book.

In line with these opinions, the benefits of using media are "The use of instructional media in teaching stimulates learning because students become more attentive. It also includes students' interest and enhances their participation in class activities (Chukwudi, & Monday, 4: 6). The explanation can be interpreted that the benefits of media in learning can attract students' attention in learning. In addition, learning media can increase students' interest and participation in their learning activities.

Another opinion is that there is research on the development of audio-visual media and teaching aids in improving the understanding of concepts and problem solving by (Nomleni, 2018: 45), because relevant to this research where media can improve students' understanding of concepts. So that the

media was the convertible book -based scientific approach declared effective to improve the ability to understand the concept and character of the environmental care of fourth-grade students of elementary schools in Moga District.

Based on the results of expert validation of materials and media experts as well as students' response to convertible book media-based scientific approach entitled "My Country Rich' with the sub-theme" Utilization of Natural Resources in Indonesia "for fourth-grade students to be eligible for use in the learning process. In addition, from the results of calculations using the Independent Sample t-Test and MANOVA test it can be said that the media convertible book -based scientific approach can improve the ability to understand concepts and character care for the environment of grade IV elementary school students in Moga Subdistrict.

Suggestions from research: for teachers to develop innovative media in accordance with 2013 curriculum learning and student development; For students: need to improve understanding of concepts and develop character caring for the environment; For other researchers: the need for further research and other themes so as to be able to help develop quality media and improve the quality of education in Indonesia.

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