

The Development of Cirebon Ethnoscience-Based Thematic-Integrated Book of “Selalu Berhemat Energi”

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Abstract

This study aimed to find out the process of developing a Cirebon ethnoscience-based thematic-integrated book for primary 4 students with the theme “Selalu Berhemat Energi” along with its’ validity. This study applied development technique of ADDIE that consists of five stages: (1) analysis, (2) design, (3) develop, (4) implement, and (5) evaluate (Branch, 2010). The analysis stage was carried out by taking theoretical review and field data through questionnaires and interview conducted to teachers and principals from four schools in Cirebon which have implemented 2013 curriculum. It was found from the respondents that they have not integrated Cirebon’s culture into the learning process except Art. Thus, students have comprehension on their own culture. Prototypes of the product were then created as the basis of the product development. Through the validation process and suggestions from the validators, the product then developed into an ethnoscience-based of thematic-integrated book entitled “Selalu Berhemat Energi” with *batik mega mendung* taken as the main learning material of the developed book.

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INTRODUCTION

Along with technology development era, children's awareness on local culture is decreased based on interviews conducted to some students in Cirebon. In fact, letting children to know about the local culture since they are young is important so that they will be able to conserve it in the future. Moreover, letting children know about the local culture since they are young will foster their sense of love to their own culture.

School plays an important role in introducing local cultures to children. Knowledge about local cultures can be delivered by integrating the cultures as learning material such as in a book. Local culture that is also known as indigenous science is integrated to the learning process by changing it to ethnosience (Arfianawati, et al. 2016) in which ethnosience is the knowledge of authentic science in the society which then transformed into scientific knowledge (Rahayu & Sudarmin, 2015).

Students especially in Cirebon should be introduced to their own local culture and regional potentials. This is aimed to protect the potential local culture such as *batik mega mendung* to vanish. It is important for children to understand and comprehend their local culture because there are philosophy values attached to people in Cirebon behind their cultures. In order to achieve that goal, authentic culture of *batik mega mendung* can be transformed into ethnosience to be learning materials students can learn daily. Ethnosience-based learning has fundamental knowledge that is developed by particular culture (Fasasi, 2017).

Some research showed positive results from the implementation of ethnosience-based learning. A research showed that ethnosience-based learning was effective to enhance students' participations in the class that they got a better concept comprehension compared to those who did not implement a local culture integrated book (Atmojo, 2012; Rosyidah, et al. 2013). Another research also resulted that ethnosience-based learning is effective to be implemented on daily learning process (Nailiyah, et al. 2016).

Besides the decrease of culture's awareness, technology development also has

other negative impacts. One of them is that values in society are neglected (Şahinkayasi & Kelleci, 2013). Extracting the values of local culture is the effective step as an effort to build national character (Wagiran, 2012).

According to facts described, this study was aimed to develop a Cirebon's ethnosience-based thematic-integrated book of "*Selalu Berhemat Energi*". The developmet took part on the ethnosience from Cirebon that is *batik mega mendung*. *Batik mega mendung* was chosen due to its' characteristics which represented Cirebon's potential economic sector. In addition, a tourist site in Cirebon known as Pusat Grosir Batik Trusmi Cirebon recognized to be the biggest batik store in Indonesia where the batik makers can sell their goods here.

METHODS

This study was a research and development study since it produced a product in the end of the research. The product produced was a thematic-integrated book of "*Selalu Berhemat Energi*" that was integrated with Cirebon's ethnosience. The book developed was aimed to be used by primary four students. This study employed a development technique of ADDIE that consists of five stages: (1) analyse, (2) design, (3) development, (4) implementation, and (5) evaluation (Branch, 2010). The ADDIE technique was used for a research like this study (Prammanee, 2016).

The first stage of this study was to analyse the needs in the field. Therefore, problems existed in the fields that gave a gap between the facts and hopes can be analysed. The next stage that was design was a stage where the product was designed in accordance with the needs analysis acquired in the first stage. Development stage was a stage where product was developed which then its' validity was tested to find out product's eligibility.

Implementation stage was carried out through limited and wide scale trials. The subjects were chosen due to their characteristics. Thus, the data were homogeny. Questionnaires were given to both teachers and students. Teachers'

questionnaires consisted of 13 item which sought information on product's content, presentation, implementation, and impacts to the students. Whilst, questionnaires for students consisted of 12 items that found out information on the cover, pictures presented, usability, evaluation, and impacts of the product in the future.

The data then collected through questionnaires, interviews, validity tests, and documentation. The questionnaires and interview data were then analysed through coding. Validity tests data was analysed quantitatively descriptively. The validity test was analysed in accordance to the categories settled as shown in Table 1.

Table 1. Validity Scores' Categories

Total score	Category	Explanation
$25 \leq x \leq 43.75$	Invalid	Can't be implemented, need more consultation
$43.75 \leq x \leq 62.5$	Less valid	Can be implemented with major revision
$62.5 \leq x \leq 81.25$	Valid	Can be implemented with minor revision
$81.25 \leq x \leq 100$	Very valid	Can be implemented without revision

RESULTS AND DISCUSSION

The product developed in this study was a Cirebon ethnosience-based thematic-integrated book of “*Selalu Berhemat Energi*” for primary four students. Teaching materials are learning equipment to help achieving the learning objectives (Rahayu & Sudarmin, 2015) that can be in the form of a material design or learning content in the form of a thing (Siddiq, et al. 2008). Moreover, teaching materials is also “all things matter (information, tools, texts) that arranged systematically to be used in the learning process to achieve the competencies objectives” (Prastowo, 2012).

The teaching material developed in this study was in the form of a book. It was developed regarding the situation in some primary schools in Cirebon where Curriculum 2013 has been implemented to primary one, two, four, and five. Thematic learning is a learning process developed from several perspectives of subjects taught in the school (Kadir & Asrohah, 2014). Specifically, the book developed was a thematic-integrated book

in which base competencies were integrated from several subjects then delivered holistically (Prastowo, 2014).

There were four subjects developed in the product namely Science, Bahasa, Social Studies, and Music and Art. *Batik mega mendung* was presented in the product as a material for students to comprehend more on the influences of energy sources during the process of making *batik mega mendung*. Some passages in related to *batik mega mendung* were given to help students finding out the main ideas in the passages. Cirebon's economic sectors such as *batik mega mendung*, shrimp paste, and *Tjampolay* syrup were also described in Social Studies. Thus, students will comprehend on the economical potential they have in Cirebon. A song in related to Cirebon's fishery sector was also given. Therefore, the materials were given thematically in which Cirebon's local culture was the main material.

Based on the conditions in SDN Pulasaren 1 and 2 Cirebon where teachers use teaching materials from the government that have similar material variations that are also used in other regions, even though the conditions and culture of each region is different. Questionnaires from the needs analysis showed that some teachers from four primary schools in Cirebon did not integrate culture into their learning activity except for Music and Art. This is in line with a study that showed teaching materials used have not had relationship between science and surrounding life (Nisa, et al. 2015).

Teachers should integrate peculiarities of each region into their learning process. Regional peculiarities are the knowledge possessed by the people on that region and are commonly referred to as ethnosience. To be integrated into learning, ethnosience must be transformed into scientific knowledge (Arfianawati, et al. 2016; Rahayu & Sudarmin, 2015). Furthermore, ethnosience that is owned by certain regions can be tested for truth and innovated into classroom learning (Khoerunnisa, et al. 2016). With ethnosience-based learning, students are able to appreciate the natural and cultural richness that develops around them so that they get the ease of learning

scientific concepts in schools (Anazifa, & Hadi, 2017).

Based on the results of the needs analysis conducted, thematic-integrated teaching materials for the theme of “*Selalu Berhemat Energi*” based on Cirebon’s ethnoscience for primary four students was developed. Teaching material developed was developed by covering aspects of content, presentation, language, and graphics (Pusparani, et al. 2017). The teaching material developed then was validated by the validators. The validity of the product developed was validated by seven validators. In addition, practitioners were also invited to have a discussion in a Forum Group Discussion. Validation results showed an average score of 95 from 100 with a value category 4 which indicated that teaching material could be used without revision

Even though the validation results have shown a value of 4, the validated teaching material was then revised according to the suggestions from the validators. Improvement of the product included front cover prints to be printed on white-colored paper so that the colors could be more striking, adding information and sources to each activity picture, improving writing or typing, and adding Cirebon specialties such as shrimp paste, *Tjampolay* syrup, and *kerupuk mlarat*.

The book developed then was tested on a limited scale. Data and information obtained in the development phase of the limited scale trial were used to revise and improve the product. Improvements were made to typing, that there were still mistyped words so improvements were needed.

Batik mega mendung was chosen as the main ethnoscience-based learning resource which then was integrated into the developed product. *Batik mega mendung* was chosen because it is a Cirebon’s batik identity that has been known globally, with its history and processes that need to be understood by students. In addition, other Cirebon peculiarities such as *Tjampolay* syrup, shrimp paste, and *kerupuk mlarat* were also used as learning resources.

Based on the analysis of the adequacy of the material in which *batik mega mendung* was chosen as an ethnoscience-based learning material and also remembering that the theme of the material developed was “*Selalu Berhemat Energi*”, then the page template in the developed teaching material took both concepts as shown in Figure 1.

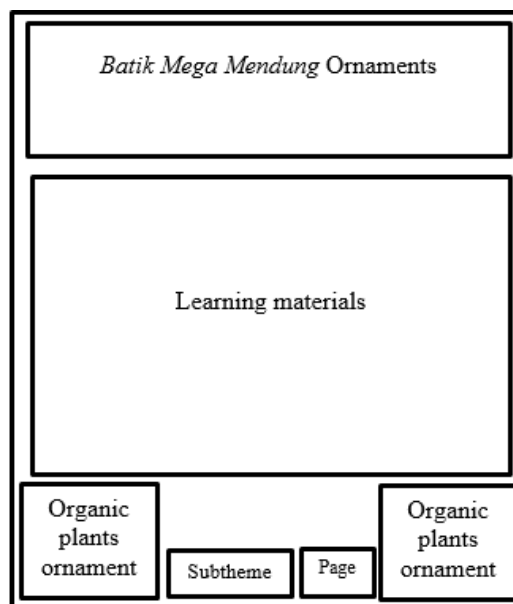


Figure 1. Page Layout Prototype

The page layout prototype then was developed as presented in Figure 2.



Figure 2. Page Template

Prototypes of the product were made with a draft sub-chapter containing learning activities. There were 8 types of activity sub-chapters

designed. The eight sub-chapters were "Round Table", "Let's Try", "Let's Read", "Let's Sing", "Look Around You", "Let's Write", "Reflect Yourself", and "Let's Learn With Parents" displayed by following the prototype guide created as in Figure 3.

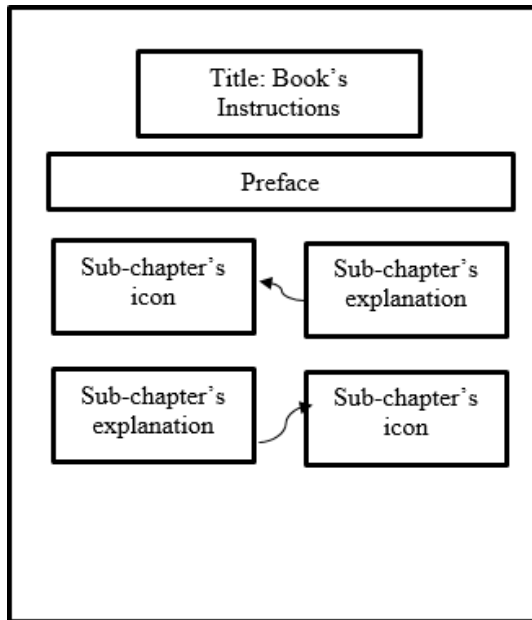


Figure 3. Book's Instructions Prototype

Book's instructions prototype then was developed. It can be seen in Figure 4.



Figure 4. Book's Instruction

In addition, prototypes were also made for the opening pages of each lesson. Figure 5 shows the prototype of opening page of the Lesson 1.

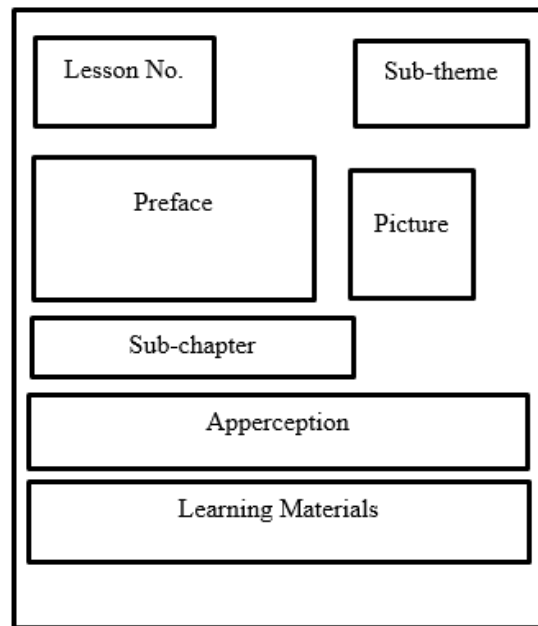


Figure 5. Prototype of Lesson 1's Opening Page

The prototype of lesson's 1 opening page then was developed that can be seen in Figure 6.



Figure 6. Lesson 1's Opening Page

The design of the product was then developed into a thematic-integrated teaching material theme "Selalu Berhemat Energi" based on Cirebon's ethnoscience consisting of three sub-themes, namely "Energy Sources", "Energy Benefits", and "Alternative Energy". Each sub-theme consists of 6 lessons with the development carried out on science teaching materials, Bahasa

Indonesia, Social Studies, and Music and Art. From all 18 lessons, there were 15 lessons developed. Three lessons containing Moral Lesson's material were not developed due to incompatibility of material with the ethnoscience.

After the development of the product that was referred to as Draft 1, the validation stage was carried out. Table 2 shows the results of the validity test recapitulation conducted by the validators.

Table 2. Recapitulation of Validity Test

Validator	Total	Score	Category
Validator 1	98	4	Very valid
Validator 2	97	4	Very valid
Validator 3	95	4	Very valid
Validator 4	97	4	Very valid
Validator 5	100	4	Very valid
Validator 6	88	4	Very valid
Validator 7	93	4	Very valid
Average	95	4	Very valid

Validity test results showed that teaching material was valid to use. However, teaching material was improved by considering the input from the validators. Improvements made include front cover, addition of sources to the image, improvement of typing, and addition of Cirebon's specialties. In addition, lesson plans and syllabus were also validated by validators. Lesson plan's validation test and syllabus showed an average score of 94.3 for syllabus validation and 96.1 for lesson plan validation.

Furthermore, teaching material was tested in limited and wide scale trials. The limited scale trial was conducted on 10 primary four students of SDN Pulasaren 3. A wide scale trial was conducted on 62 primary four students from SDN Pulasaren 1 and 2 Cirebon. After the product implementation, students and teachers who used development teaching materials gave their responses which later became the material for research product evaluation.

The teachers' questionnaires were distributed to three teachers who implemented the product during the research. Teacher response questionnaire consisted of 13 statements with the criteria of "Strongly Agree" worth 4, "Agree" is 3, "Less Agree" is worth 2, and "Disagree" is worth 1. The maximum value that can be obtained from this questionnaire was 52

with a percentage of 100 %. The following is Table 3 which shows the results of the recapitulation of the calculation of the teacher's questionnaire responses.

Table 3. Recapitulation of Teachers' Questionnaires

Name	Score	Percentage (%)
Teacher 1	49	94.2
Teacher 2	50	96.2
Teacher 3	48	92.3
Average	49.25	94.7

Questionnaires were also given to 10 students with a random selection method who used the product during a large-scale trial. The student response questionnaire consisted of 12 statements with the criteria of "Yes/No" as measured by the value of the answer "Yes" with a value of 1 and "No" with a value of 0. The maximum value that can be obtained from the student's questionnaire responses was 12. The following is Table 4 which shows recapitulation results of student questionnaire calculation.

Table 4. Recapitulation of Students' Questionnaires

Name	Score	Percentage (%)
Student 1	12	100
Student 5	12	100
Student 16	12	100
Student 28	12	100
Student 32	10	100
Student 7	11	91.7
Student 19	11	91.7
Student 20	11	91.7
Student 25	10	83.3
Student 31	9	75
Average	11.2	93.3

The results of this study were in line with a study in which ethnoscience-based learning elevate local culture increased students' understanding of their own culture which has become a source of local livelihood and integrated into life (Lia, et al. 2016). In addition, ethnoscience-based learning was included in innovative learning because students' experience were associated with the material conveyed by connecting academic subjects with the student's life context in terms of personal, social, and cultural (Sarwi, et al. 2013).

The integration of ethnoscience into teaching material is an effective way to improve students' character. Extracting the values of local culture is a strategic step in efforts to build the character of the nation (Wagiran, 2012). Furthermore, ethnoscience-based learning will be able to guide students to have a national character because ethnically based learning has a knowledge base developed by a particular culture (Fasasi, 2017).

CONCLUSION

Based on the results of research conducted on the development of Cirebon's ethnoscience-based thematic-integrated teaching material with the theme of "Selalu Berhemat Energi", after being analyzed and discussed in accordance with relevant theories, it can be concluded that the products developed was valid and equipped with learning tools in the form of syllabus and lesson plans. This was shown through the validity test results with an average score of 4 with the meaning that the teaching material was valid for use. Some improvements were also made to the development by considering the inputs obtained from the validators.

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