Prototyping Phase in the Development of Character Building in Integrated Tematic of Teaching Materials Based on Discovery Learning in 4th Grade of Elementary School

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Abstract. Character building value in current teaching materials is still at the notification stage. It means that this material still doesn’t provide the opportunities for students to feel and to replicate those character values in teaching learning process. Therefore, it is necessary to develop the teaching materials that are arranged based on learning model supporting student activeness that is discovery learning. Developed teaching materials should have the good criteria such as valid, practical and effective. The purpose of this study is to determine the level of validity and practicality of teaching materials developed. This research method uses a Mc Kenney’s development model, which is devoted to stage 2, namely: prototyping phase: expert test and practice test by students and teachers. Based on the results of the validity test obtained data that teaching materials based on character building with the discovery learning model are in the category of valid with an average score of 3.7 and it is in a category very valid. Furthermore, the stage of practicality is done by giving questionnaire to teachers and students. The score of the teacher’s response 77.3% (practical) and the score of the students’ response is 85.83% (very practical).

1. Introduction

The learning process in elementary school is the cultivation of values for the students. Formal education in elementary school is the beginning in fostering the next generation of young people. Therefore, in the effort to create the character of the nation, it has been noted in the purpose of education, is to develop the ability and create the character and civilization of dignified nation in order to educate the nation’s life, aims to the development of potential students to become human beings who believe and cautious to God, be noble, healthy, knowledgeable, capable, creative, independent, and become a democratic and responsible citizen [1]. Furthermore, the government also expects teachers to apply character building in the whole series of learning process. One of the solution is development of teaching materials that match with the needs of the learning process.

Based on the results of the observations that the authors did in schools which is implementing the 2013 curriculum, it was found that: 1) teachers gave the little chance for students to become the investigators, 2) lesson learned time is shorter than planning time, and 3) at the end of the lesson, students are not involve to make conclusion of learning. Based on the above information it can be said...
that the teaching materials used have not described the two-way learning process. The developed teaching materials should refer to one of the learning models. In this case, the learning model is Discovery Learning, a learning model that can make the students more active in learning process. It is supported by Bruner, he said, that: "Discovery learning can be defined as the subject matter in the final form, but rather is required to organize it in himself" [2]. The basic idea of Bruner is the opinion of Piaget, he said that the students must be the active role in the classroom. In other words discovery learning deals with the active activities and ability of the students which focus on the searching of the knowledge and understanding in an attempt to satisfy curiosity [2]. Discovery Learning is a series of learning activities that involves the whole of the students' ability to search and investigate systematically, critically and logically so that they can find their own knowledge, attitude and skills as a form of behavior change.

In addition, to answer the social problems facing the nation today, the education in elementary school needs to be applied the character building. Based on the analysis that the author has been done, it can be said that the character building given at the school is still in the stage of providing information. This can be seen in the following image:

![Figure 1. Character building on students’ book](image)

Based on image footage above, it can be informed that the character building still in the level of notification. In this case, it only explores the students' knowledge of a character. In theory, student's book facilitate students to be able to understand the character or morale by means of cognitive value recognition. That is, the value or character makes sense to them, further facilitating them to engage in value affectively in this case facilitate them to think about what the importance of a character and what is the impact if they did not do that. Finally, it can practice this value in the real condition. So that, the teacher can provide facilities for students to practice those character.

The proper character for education consists of operative value, value in action which includes three interrelated parts of moral knowledge, moral feeling, and moral behaviour [3]. The character education is a process of giving guidance to students to become an exactly human, characterized in the dimensions of heart, mind, body, taste and intention. The character building is "earnest effort to understand, to create, keep ethical values, both for oneself and for all society or citizen as a whole". Based on some of the above opinions, it can be concluded that character building is a conscious effort in understanding, forming, maintaining, and teaching ethical values of knowledge, feelings, and behavior about morals. Three ways that can be used for the integration of character building in learning: (1) Through teaching materials, by developing teaching materials with character content, (2) through character-based learning model, and (3) through authentic assessment [6]. Based on the above opinion obtained information that one way of integrating character building, is to create a teaching material that contains character. In addition, the teaching materials used should have the valid, practical and effective criteria. Teaching materials are said to be valid if the teaching material is developed in line with the principles of scientific knowledge and developed logically. The teaching
materials are said to be practical if the teaching materials are used in line with the arrangements that have been designed and developed logically [7].

2. Development Method

This research is classified into research and development. The development of research and development (RnD) is a study used to produce a specific product and to test the effectiveness of the product. In this study, the development model used is adapted from the McKenny Model. This model consists of three main stages: (1) preliminary research, (2) prototyping phase (stage design), and (3) assessment stage [7].

In this article, the author will describe the results of the phase of prototyping phase (design stage). The results of the preliminary research stage have been published in the previous article entitled “Preliminary Research Description in Developing Thematics Learning Materials by Using Character Building and Discovery Learning to Establish Children Aged 6-10 Years”. In the design stage of prototype, evaluation, and revision to produce instructional materials in the form of students’ books and the implementation plan of thematic learning based on discovery learning for fourth grade elementary school with high quality.

2.1 Prototype 1 (Design Proposal)

Based on the results of the analysis at the preliminary stage, it was arranged the development of teaching materials based on discovery learning integrated character building. Then, it was done the evaluation by using self-evaluation method. The indicators for measuring the validity of learning tools developed through self-evaluation are content, presentation, and language (for teacher books and student books).

2.2 Prototype 2 (Global Design)

Prototype 1 will be evaluated by experts to determine the level of validity of teaching materials. Validation of integrated thematic teaching materials of character building and discovery learning is based on two things, they are content validation and construct validation. Content validation includes suitability between teaching materials and the fourth grade thematic curriculum of elementary school. The aspects that are validated at this stage include content validation, presentation, and language. Validation results obtained in this stage can be as a reference for the revision of prototype 2.

2.3 Prototype 3 and 4 (partly detailed intervention)

Prototype 3 will be evaluated by performing the individual evaluation and small group testing. The individual evaluation is done by asking each of students to complete the student's book. While the small group test performed on 5 students. Furthermore, interviews were conducted with students about the ease of use of students’ books, whether the students’ book designed can be used by students. Aspects that can be the guideline in interview activities are the components of presentation, ease of use, time spent, legibility.

2.4 The final prototype

The final prototype was evaluated by doing field test. Field tests were conducted to determine the practicality of the developed product. Aspects of Practicality of thematic materials based on discovery learning include: presentation of teaching materials, ease of use, suitability of time used, and legibility. This aspect of practicality is seen through observation during the learning, interview process and given questionnaire.
Data obtained from various instruments are analyzed descriptively, qualitatively, and quantitatively to be able to identify the developed learning material whether it is valid, practical and effective or not.

Data analysis technique used descriptive analysis technique:

\[ R = \frac{\sum_{i=1}^{n} V_i}{n} \]

\( R \) = the average result of the validator / practicality assessment
\( V_i/P_i \) = score of the validator's validity/practicality score
\( n \) = number of validators

Then, calculated the mean of all aspects for validation and test of teaching material practicality by using the following criteria:

If the average > 3.20 is categorized very valid / very practical
If 2.40 < average ≤ 3.20 is categorized valid / very practical
If 1.60 < average ≤ 2.40 is categorized quite valid / quite practical
If 0.80 < average ≤ 1.60 is categorized less valid / less practical
If the average ≤ 0.80 is categorized invalid / impractical

3. Result and Discussion

The results of research on this prototyping stage can be made into the following sections:

3.1 Prototype 2 (Expert Review)

The following will explain the validation results for the content eligibility aspects:

| No | Rated Aspects                                      | Mean | Category       |
|----|---------------------------------------------------|------|----------------|
| 1  | Teaching material refers to the KI and KD         | 4    | Very Valid     |
| 2  | Teaching materials in line with student development | 4    | Very Valid     |
| 3  | Teaching materials in line with the needs of      | 3.67 | Very Valid     |
| 4  | The truth substance of learning materials         | 3.33 | Very Valid     |
| 5  | Teaching materials can                             | 3.33 | Very Valid     |
|    | Add students’s insight                            |      |                |
| 6  | In line with moral and social values              | 4    | Very Valid     |
| Mean|                                                  | 3.78 |                |

The validity of teaching materials for the content eligibility aspect is 3.78 with valid category. This means that the content of the teaching materials has shown the suitability of the content with KI and KD, in line with the student's development, the needs of the teaching materials, the truth of instructional material substance, enhancing students' insight and also in line with moral and social values.

Further assessment followed by validating the teaching materials in terms of linguistic aspects. Validation results from linguistic aspects can be seen in the following table:

| No | Rated Aspects   | Mean | Category |
|----|----------------|------|----------|
| 1  | Legibility     | 3.67 | Valid    |
| 2  | Clarity of information | 3.67 | Very Valid |
3. In line with the rules of Indonesian language which is good and true
   Utilization of language by effective and efficient (clear)
   
   Mean

| No  | Rated aspect                                      | Mean | Category   |
|-----|---------------------------------------------------|------|------------|
| 3.  | In line with the rules of Indonesian language     | 3.33 | Valid      |
| 4.  | Utilization of language by effective and efficient (clear) | 3.67 | Very Valid |
|     | Mean                                              | 3.59 | Very Valid |

The validity of teaching materials for the content eligibility aspect is 3.59 with very valid category. This means that the material has met the legibility, clarity of information, in line with the rules of the Indonesian language which is good and true, and the language used is clear and concise.

Further assessment followed by validating the teaching materials in terms of presentation. Validation results from the presentation aspect can be seen in the following table:

### Table 3. Validation of Teaching Materials for a Presentation Aspect

| No  | Rated aspect                                      | Mean | Category   |
|-----|---------------------------------------------------|------|------------|
| 1.  | Clarity of formulation of achievement indicators | 3.67 | Very Valid |
| 2.  | Systematic sequence of material                   | 3.33 | Valid      |
| 3.  | The teaching materials can give Motivation and attractiveness | 4    | Very Valid |
| 4.  | Interaction (giving stimulus and response)        | 3.33 | Valid      |
| 5.  | Completeness of information                       | 4    | Very Valid |
| Mean|                                                  | 3.67 | Very Valid |

The validity of teaching materials for presentation aspect is 3.67 with very valid category. This means that teaching materials have the clear formulation of indicators that will be achieved, systematic, motivation and attractiveness, the provision of stimulus and response, and complete information.

Further assessment followed by validating the teaching materials in terms of aspects of graphics. Validation results from the presentation aspect can be seen in the following table:

### Table 4. Validation of Teaching Materials for Graphical Aspect:

| No  | Rated aspect                                      | Mean | Category   |
|-----|---------------------------------------------------|------|------------|
| 1.  | Use of font: type and size of proportional writing | 4    | Very Valid |
| 2.  | Layout well                                        | 3.67 | Valid      |
|     | Illustrations, pictures, clear photos and         | 3.33 | Valid      |
|     | Include source                                     |      |            |
|     | The design is attractive or not                    | 3.67 | Valid      |
| 4.  | Mean                                              | 3.67 | Valid      |

The average for the category of validity of teaching materials for aspects of graphical is 3.67 with valid category. This means that the developed subject material meets the type and size of a proportional text, good layout, illustrations, drawings, color photographs, and lists the source and design of attractive and non-monotonous look.
Validation results from the conformity aspects of the steps of the model discovery learning can be seen in the following table:

| No | Rated aspect                                                                 | Mean | Category   |
|----|-------------------------------------------------------------------------------|------|------------|
| 1. | Students are confronted with confusion to arouse their own desire to investigate | 4    | Very Valid |
| 2. | Students are given the opportunity to identify the problem                     | 4    | Valid      |
| 3. | Students are given the opportunity to collect as much information as possible  | 4    | Very Valid |
| 4. | Students process data based on information obtained                           | 3.67 | Very Valid |
| 5. | Students conduct a careful examination to prove the truth                      | 3.67 | Valid      |
| 6. | Students draw conclusions that emphasize mastery of learning                  | 3.67 | Very Valid |
| Mean|                                                                              | 3.84 | Very Valid |

Average for the category of validity of teaching materials for conformity aspects of discovery learning model steps is 3.84 with very valid category. This means that the developed teaching material meets the suitability of the steps of the discovery learning model.

### 3.2 Final prototype

Practicality teaching materials that are developed can be seen from the results of questionnaire analysis of the students by the students and teachers. The results of practicality measurement of instructional devices can be presented in the following graphs:

| No | Rated Aspects                                                                 | Score |
|----|-------------------------------------------------------------------------------|-------|
| 1. | The language used in teaching materials in line with EYD (standard spelling)  | 3     |
| 2. | The instruction on the teaching materials makes it easy for the teacher to convey the purpose and objectives of the various activities to the students | 3     |
| 3. | Presentation of sentences easily understood by teachers                      | 3     |
| 4. | Pictures of teaching materials make it easier for teachers to attract students' interest in learning | 3     |
| 5. | The instruction on the teaching materials makes it easy for the teacher to show the purpose of learning | 4     |
| 6. | Students are given stimulus                                                  | 3     |
| 7. | Students are given the opportunity to identify problems to be faced           | 3     |
| 8. | Students are given the opportunity to collect data                           | 3     |
| 9. | Students are given the opportunity to process their own data                 | 3     |
| 10.| Student proves the truth of the answer                                       | 3     |
| 11.| Students draw conclusions                                                    | 3     |
| Scores gained |                                                                         | 34    |
| Percentage of Practicality |                                                       | 77.3% |

The result of questionnaire of teacher response is in the practical category with the percentage of practicality 77.3%. Thus, it can be concluded that the thematic teaching materials based on a teacher questionnaire are categorized as practical.
The questionnaire response of students filled with 6 students at the end of the trial. The following describes briefly the results of the students' practicality sheet after using the teaching materials developed in the following table.

| No | Aspects are Scored                                                                 | Score |
|----|-----------------------------------------------------------------------------------|-------|
| 1  | The display of teaching materials attracts attention                              | 92    |
| 2  | Language in teaching material is easy to understand                                | 79    |
| 3  | The use of color and image writing on teaching materials makes it easy for me to understand the lesson | 83    |
| 4  | Learning materials on teaching materials have relevance to everyday life           | 88    |
| 5  | I am interested in using this resource                                           | 83    |
| 6  | The instructions on teaching materials can be understood easily                    | 88    |
| 7  | I actively participate in using teaching materials                                 | 92    |
| 8  | I found learning problems by myself                                               | 92    |
| 9  | Worksheets on teaching materials make it easy for me to collect data and processing data | 75    |
| 10 | The existing reading on the teaching materials helped me in processing the data    | 100   |
| 11 | I checked the correct answers to the data I had found                              | 79    |
| 12 | I make conclusions based on the answers that have been                            | 79    |

Based on the table above, it can be seen the percentage of practicality from the questionnaire of the students’ response is 85.83%. Thus it can be concluded that the thematic teaching materials based on discovery learning model is categorized very practical.

4. Conclusions and Suggestions
Prototyping Phase is the stage where measuring the quality of teaching materials is developed. Based on the results of validity test obtained data that thematic teaching materials based on character building with the discovery learning model is in the valid category with an average score of 3.7 and it is in the very valid category. Furthermore, the stage of practicability is done by giving the questionnaire to teachers and students. In the teacher’s response are obtained a score of 77.3% (practical) and the students’ response is obtained a score of 85.83%.

References
[1] Kemendikbud. 2013. *Panduan Teknis Kurikulum2013 di SD*. Jakarta: Kemendikbud.
[2] Nurdin, Syafruddin dan Adriantoni. 2016. *Kurikulum dan Pembelajaran*. Jakarta: Raja Grafindo Persada.
[3] Lickona, Thomas. *Educating for Character*. Terjemahan oleh Juma AbduWamaungo. 2012. Jakarta: Bumi Aksara. Wiyani (2013:27
[4] Wiyani, Novan Ardy. 2013. *Membunikan Pendidikan karakter di SD*. Yogyakarta: Ar-Ruzz Media.
[5] Zubaedi. 2012. *Desain Pendidikan Karakter*. Jakarta: Kencana.
[6] Abidin, Yunus. 2012. *Pembelajaran Bahasa Berbasis Pendidikan Karakter*. Bandung: Refika Aditama.
[7] Plomp dan Nieveen. 2007. *An Introduction to Educational Design Research*. China: SLO.