Practicalities in the development of integrated science textbook of junior high school drought theme using problem based learning

C Arman, A Fauzi* and H Rifai
Department of Physics, Faculty of Mathematics and Natural Sciences, Universitas Negeri Padang, Padang 25131, Indonesia

*afz_id@yahoo.com

Abstract. Practicalities refers to the degree that the user or other experts consider interventions can be used and preferred under normal conditions. The purpose of this study was to investigate the practicality of a textbook. The practicality test was conducted with one to one evaluation (3 learners), small group test (8 learners), and field test (30 learners) and 2 teachers using questionnaires. This type of data is primary data. Practical questionnaire prepared for learners with easily understood aspect, attractive, and efficient through the evaluation one by one, with the result of 80.21; 83.33 category of very practical, and 70.83 practical categories. Then, to test the response of learners in small groups, with the result of 81.39; 84.24 category of very practical, and 72.82 practical categories. At the end of the study conducted field tests on the response of learners with the result 82.19; 85.00; 80.00 categories very practical. After that the teacher's response questionnaire, with the result 87.50; 90.62; 85.00 categories very practical.

The practical implication is that textbook is used in the learning process and the learning process using textbook is done.

1. Introduction
Textbook are very important in the world of Education. Textbook give a great contribution in teaching learning process both to the teachers and to learners. They offer a framework of guidance and orientation [1]. The textbook is a book used as a standard source of information for the formal study of a subject and an instrument for teaching and learning [2]. The theoretical framework for the 2010 review of the National Curriculum [3] saw approved textbook as part of the instruments for explicating the content of a National Curriculum and essential for international comparative work on the form and content of national curricula in other jurisdictions [4]. National Education Standards in Indonesia explains that the achievement of core competencies and basic competencies is covered by textbook [5].

One of the textbook used is science textbook. Science textbook aimed at enhancing the scientific ability of learners should display visual studies that have dynamic properties, not just a collection of facts and terms. Scientific process skills should be used in the preparation of textbook to build the basic science that learners need to experience. Learners need to experience science by doing science (learning science, learning about science, doing science) [6]. Curriculum Development Guideline 2013 mentions that science lesson in junior high school level is implemented based on integrity. So that textbook of science lesson junior high school based on curriculum 2013 that is thematic integrated

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science textbook. The integrated science lesson textbook is a composite of the unification of Physics, Biology, and Chemistry subjects in a theme-based book. Meanwhile, according to the rules of the Ministry of Education and Culture No. 79 of 2014 that the need for local context into the learning materials through learning resources, learning resources used here is a textbook. So in the city of Padang the need for integrated natural science textbook [7]. One of them is by integrating drought material into science learning, so that this drought can be used as a theme in Science textbook. Drought is the consequence of a natural reduction in the amount of precipitation received over an extended period of time, usually a season or more in length, although other climatic factors (such as high temperatures, high winds, and low relative humidity) are often associated with it's aggravate the severity of the event [8]. In the textbook also needs to apply a model of learning that can encourage learners to think critically in learning. In accordance with the rules of the Ministry of Education and Culture No. 59 of 2014, it is advisable to use Problem Based Learning [9]. Problem Based Learning includes key success learning components such as critical thinking, collaborative problem solving, and independent learning [10]. Problem Based Learning shows improved performance, critical thinking skills in applying learned knowledge, as well as excellent understanding [11].

Based on government regulations demanding that textbook of natural science should have a theme and aided learning model, the necessity of doing research and development on textbook in circulation today. The advantages of this textbook development include: for using the particular textbook we had chosen was that the books made it possible for learners who, for various reasons, had missed lessons to catch up and for using the textbook we had selected for the course was their appearance and the quality of their presentation [12]. In the development of the necessary practicality test to see the practical products that we develop.

Practicality is an integral part of the concept of test usefulness and affects many different aspects of an examination. It can be defined as the extent to which an examination is practicable in terms of the resources necessary to produce and administer it in its intended context and use. A practical examination is one that does not place an unreasonable demand on available resources [13]. It refers to the economy of time, effort and money in testing. In other words, a test should be easy to design, easy to administer, easy to mark, and easy to interpret the results [14]. The test that is practical it needs to be within the means of financial limitations, appropriate time constraints, easy to administrator, score, and interpret [15].

Practical testing of textbook has been done by Elma Rafika [16] with the title of Physics textbook integrated drought-based inductive approach to the learning model of Reasoning and Problem Solving. The result of the development that has been done by Elma shows that Physics textbook integrated drought-based materials inductive approach with learning model is Reasoning and Problem Solving practically used in Physics learning process. However, the practicality test on science textbook Drought theme using Problem Based Learning has never been done. For that the author is interested in developing integrated science textbook theme of drought using Problem Based Learning to see practicalities on learning process Natural science.

2. Method
The study was a research and development (R&D). Research and Development (R & D) is the term commonly used to describe the activities undertaken by firms and other entities in order to create new or improved products and processes [17]. The development model used in developing this textbook is a development model adapted from Plomp. To find the practicality of the textbook is at the phase prototyping phase. The test design is a one-to-one test of practicality to 3 learners, small group to 8 learners, large group to 2 teachers and 30 learners in 12 Junior High School Padang. Practicality data obtained from the results of a limited trial in the field regarding the practicality of products developed.

Test of practicality in this research using data collecting instrument in the form of questionnaire. Practicality test instruments consist of teacher response questionnaires and student response questionnaires. Questionnaire responses of teachers and learners will be given after teachers and learners see and use textbook science junior high school theme drought using Problem Based
Learning. The questionnaire is provided for individual evaluation, small group evaluation and field trials (large groups).

A product is said to be practical if teachers and learners can use the product in practical and efficient learning. The practicality of the product is analyzed based on a questionnaire that has been filled by teachers and learners. Data analysis of questionnaires practicalities based on teacher and learners questionnaire with the following steps:

a. Provide score for each item of answer strongly agree (4), agree (3), disagree (2) and strongly disagree (1).

b. Sums up the total score of each validator for all indicators.

c. Giving practicality value by using the formula:

\[ P = \frac{f}{N} \times 100\% \]  

The final value, \( f \) is the score, and \( N \) is the maximum score. The category of practicality can be seen in Table 1. Based on Table 1 it can be seen that textbook were developed practically when scored at intervals of 61-80 [18].

| No. | Value | Criteria |
|-----|-------|----------|
| 1   | 80% <x ≤ 100% | Very practical |
| 2   | 60% <x ≤ 80% | Practical |
| 3   | 40% <x ≤ 60% | Practical enough |
| 4   | 20% <x ≤ 40% | Less practical |
| 5   | 0% <x ≤ 20% | Practical |

### 3. Results

#### 3.1. Evaluation One To One

Test practicality of a textbook evaluation one by one using the questionnaire responses of learners. The number of learners we can use in one-on-one evaluations is no standard that two or three learners are sufficient [19]. This evaluation is done with two or three learners individually. Thus, it can be concluded that two or three learners are considered sufficient to obtain revision information, and this one-by-one evaluation, conducted interchangeably [20]. The subject matter that needs to be considered is not related to the number of learners, but what kind of student characteristics can we choose for this one-on-one evaluation. Learners are drawn not randomly or taken in the most intelligent, but learners who can represent the characteristics of the target population. Selection of learners was taken a moderate (average), one above moderate, and one capable under moderate.

Questionnaires practicality of textbook include the following: (1) easy to understand from the concept map, the material contained in textbook, drought material, sample questions, exercises, worksheets, evaluation, and assessment, (2) interesting in terms of composition color textbook, motivated in the lesson, and completeness of the material, (3) efficient in terms of time not long in understanding the textbook and can train the independence of learners if the teacher does not exist.

Textbook were given to 3 learners of class VII 12 junior high school Padang with different capabilities. Learners are required to read the textbook without being taught first by the teacher. The results of the practicality tests that have been implemented are shown in Table 2.

| No. | Statement     | Value  | Category      |
|-----|---------------|--------|---------------|
| 1   | Easy to understand | 80.21  | Very practical |
| 2   | Attractive    | 83.33  | Very practical |
| 3   | Efficient     | 70.83  | Practical     |

Averages 78.12

Categories Practical
Based on Table 2 it is seen that the highest practicality level of textbook is in an interesting statement with a value of 83.33 with very practical and lowest category on an efficient statement with a value of 70.83 with practical category. Learners state that the time required to understand textbook is not enough, this is due to the limited time in each evaluation. This is because the contents of the book have been described in a clear and detailed. Textbook according to learners can be used, although there is no teacher, because the material is quite clear.

3.2. Small Group Evaluation

3.2.1. Practicality of Education Participant Response Small Group

Test practicality textbook of respondents small group of learners using the questionnaire responses of learners. Small group evaluation is done after evaluation one to one. Associated with the number of learners required in this evaluation is only 8-20 people.

Questionnaires practicality of textbook include the following: (1) easy to understand from the concept map, the material contained in textbook, drought material, sample questions, exercises, worksheets, evaluation, and assessment, (2) interesting in terms of composition color textbook, motivated in the lesson, and completeness of the material, (3) efficient in terms of time not long in understanding the textbook and can train the independence of learners if the teacher does not exist. Indicators for the practicality of the response of learners there are 14 indicators. The results of the practicality test that has been implemented is shown in Table 3.

| No | Statement of | Value | Category      |
|----|--------------|-------|---------------|
| 1  | Easy to understand | 80.86 | Very practical |
| 2  | Attractive    | 84.38 | Very practical |
| 3  | Efficient     | 73.44 | Practical     |
| Averages |           | 79.56 |               |

Based on Table 3 shows that the highest practical level text books are at an interesting statement with a value of 84.38 with the lowest category of very practical and efficient in a statement to the value of 73.44 with a practical category.

Furthermore, based on the results of practical responses of learners to small group testing is done revision, that is on the aspect of a dark color composition. Color composition was modified so that more clearly and interesting, thus making learners motivated in learning science.

3.3. Field Test

The results of the small group revision followed by field trials field trials (large group test) in grade VIIa SMPN 12 Padang. The results of field trials on the practicalities of textbook, in detail obtained as follows.

3.3.1. Practicality of Field Teacher Response Test of

Textbook practicality of teacher response using teacher's response questionnaire. Questionnaires practicality of textbook include the following: (a) easy to understand, (b) interesting, and (c) efficient. Indicators for the practicality of teacher response are 17 indicators. The test results practicality for textbook of each statement is presented in Table 4. Based on Table 4, it appears that the practicality of textbook in categories is very practical. The highest average score is in the attractive category of 90.62. While the lowest value is in the efficient category that is 85.00.
Table 4. Response Teacher Field Test against Textbook

| No. | Statement      | Value | Category       |
|-----|---------------|-------|----------------|
| 1   | Easy to understand | 87.50 | Very Practical |
| 2   | Interest       | 90.62 | Very Practical |
| 3   | Efficient      | 85.00 | Very Practical |
| Averages |               | 87.71 |                |

3.3.2. Practicality of Response of Learners Field.

Test Practical test of textbook of the learners' responses using a questionnaire response of learners. The test results of learners in response practicality field tests (large group) of each statement is presented in Table 5.

Table 5. Responses to the Field Test Learners Textbook

| No. | Statement      | Value | Category       |
|-----|---------------|-------|----------------|
| 1   | Easy to understand | 82.19 | Very Practical |
| 2   | Interest       | 85.00 | Very Practical |
| 3   | Efficient      | 80.00 | Very Practical |
| Averages |               | 82.60 |                |

Based on Table 5, it appears that, the practicality level of textbook on easy-to-understand categories statement is very practical with a value of 82.19. The highest score is in an interesting statement that is 85.00. While the lowest value is in the efficient category that is 80.00.

4. Discussion

The textbook practicality test is done by teachers and learners. Obtaining practical data obtained from the questionnaire of practicality filled by learners and teachers. The practicality of textbook is seen from the easy to understand, interesting, and efficient textbook. The degree of practicality is seen from whether teachers (and other experts) consider that material is easy and can be used by teachers and learners. The practicality test is done through three stages: one-to-one evaluation stage, small group evaluation, and field test [21].

The results at the evaluation stage are one by one and the small group is in the practical category. The product is practical if the measurement of the instrument is at a value of 60% < x ≤ 80%. This suggests that textbook is easy to understand and look interesting, but they are inefficient because of the limited time in their use.

The results at the field test stage are in very practical category. The product is practical if the measurement of the instrument is at the value of 80% < x ≤ 100%. Field trials are conducted by teachers and learners. This indicates that the material in the textbook has been easily understood, interesting, and efficient from the use of time for teachers and learners. This is in accordance with the statement Rafika that, textbook can be used to facilitate teacher and learners in the learning process which means very practical in carrying out learning.

Based on the results of field tests of the aspects of easy to understand, interesting, and efficient conducted in 12 junior high school Padang can be concluded integrated science textbook drought theme using Problem Based Learning very practical.

5. Conclusion

A one-on-one evaluation and a test of the learners' responses on small-group tests found that the developed textbook was in the practical category. Furthermore, the textbook practicality test results in the large group test (field test) in different classes in the category are very practical and the textbook practicality test based on the teacher's response is in very practical category. This means that
integrated science textbook for junior high school Drought theme using Problem Based Learning has practical criteria used in the learning process of science.

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