Development of integrated science textbooks on local potential food Bakpia for junior high school

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Abstract. This study aimed to (1) determine the feasibility of developed science textbooks by expert validators; (2) knowing the results of the readability test by junior high school teachers and student. This research was a development study used a 4D modification model which consist of define, design, develop, and disseminate. However, this development was carried out until the develop stage. The product was validated by a material expert and media expert validator. The readability test was conducted by three science teachers and fifteen junior high school students. Data were collected using a validation and readability test questionnaire. Technical analysis of data used quantitative descriptive percentage analysis. The results showed that the feasibility of the material was 81.26\% with very good criteria, the percentage of the student’s media feasibility was 89.06\% with very good criteria the percentage of the teacher’s media feasibility was 91.67\% with very good criteria. The percentage of readability test results by the science teacher was 96.35\% with very good criteria, and the percentage of readability tests by junior high school students was 85.67\% with very good criteria. As a whole the science textbook integrated the local potential of bakpia can be used in the science learning process.

1. Introduction
National education involves local potential as one of the basic principles for planning educational policies [1]. This is regulated by Law Number 20 of 2003, Government Regulation Number 32 of 2013, and Ministry of Education and Culture Regulation Number 81A of 2013 which emphasizes that education must contain potential, the learning process of that potential, and local uniqueness according to each region. Local potential is the potential of specific resources owned by an area that can be developed to build national independence[2]. Integrating local potential in learning can help students to understand concepts correctly and contextually; can hone students’ knowledge, skills and attitudes; as well as a medium for instilling a love for local wisdom in his area [3][4][5]. Learning with local potential can make students more free to explore and analyze all information related to in depth learning material with related learning resources [6].

Bakpia is a food made from a mixture of green beans with sugar wrapped in flour and baked [7][8]. Bakpia is one of the local potentials that can be integrated in science learning because raw materials and the process of making bakpia can be completed in science learning materials for substances and its characteristics class VII. The process of making bakpia consists of several stages where the process of
making there are several scientific events such as shape changes (bakpia dough before and after being mixed, then made into a circle), changes and chemical properties (in the process of soaking mung beans and bakpia roasting), changes and properties physics (in the process of grinding green beans), separation of the mixture (in the process of soaking mung beans for three days), as well as basic ingredients regarding substances and characteristics. Based on observations in schools that are close to Bakpia Centers, teachers know the local potential of bakpia around schools, but learning never utilizes this local potential because it unknow the way of integrating local potential into learning.

Local potential can be utilized in learning, both as a medium and as a source of learning [4]. The teacher can integrate local potential in learning material so that it can improve students' abilities [9]. The learning process requires teaching materials that consist of textbooks that fit the needs of students. Textbooks are a medium for students and teachers to apply learning, and are expected to improve the quality of students for the better [10]. Based on learning at SMPN 12 Yogyakarta, learning in the classroom uses learning resources from the Ministry of Education and Culture that are not necessarily suitable with schools and the students' environmental characteristics. In general, relying more on teaching materials published by publishers, both in the form of textbooks and student activity sheets [11]. Therefore we need a textbook suitable for schools, namely textbooks that integrate local potential.

Previous research on the development of integrated learning resources for local potential is the development of video and natural learning tools for the development of local potential [1] [2] [12] [13] available that have been developed integrated local textbooks. Based on the facts described above, the problem needs to be corrected by learning that uses integrated learning with local potential. One of them is through the development of textbooks that are effective, efficient, and have an attraction so that in their application they are able to direct, guide, and motivate students to continue learning and working. With the science textbooks integrated the local potential Bakpia food, students can learn firsthand the materials used in making bakpia and the process of making bakpia.

2. Methods
This research is a development study using a 4D development modification model Thiagarajan (1974) which consists of define, design, develop, and disseminate, however the disseminate stage of this study was not done. In developing the product it is validated by a material expert and media expert validator who teach science education at Universitas Negeri Yogyakarta. The readability test was conducted by three junior high school science teachers and fifteen junior high school students of SMPN 12 Yogyakarta. Data were collected using a validation questionnaire instrument, and an openness test questionnaire. Data analysis uses quantitative descriptive percentage analysis, using the following formula.

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

Table 1. Percentage Criteria Feasibility and Readability Level [14]

| Criteria     | Percentage |
|--------------|------------|
| Very good    | 80% - 100% |
| Good         | 66% - 79%  |
| Pretty good  | 56% - 65%  |
| Less good    | 40% - 55%  |
| Invalid      | 30% - 39%  |
3. Result and Discussion

3.1. Development Textbook
The products produced from this development are printed books in the form of student books and teacher books which are integrated the local potential Bakpia, Basic Competency 3.3 materials and its characteristics for seventh grade junior high school students. The developed student book has a total number of pages 49. The student book consists of covers, preface, general learning materials, instructions for using books, table of contents, concept maps, materials and their characteristics, summary, student competency test, glossary and bibliography. The teacher's book consists of covers, preface, instructions for using books, table of contents, general learning materials, suggested syllabus and lesson plans, concept maps, substance material and its characteristics integrated with local potential bakpia, summaries, discussion of student competency test, rubric of assessment, glossary, and bibliography.

![Figure 1. Display of science textbooks integrated with local potential bakpia food](image)

3.2. Validation by Expert
The purpose of validation by expert lecturers is to assess the feasibility of developed textbook products and obtain suggestions that can be used to improve the product. Assessments by media experts include aspects of presentation, aspects of language, aspects of graphics, and characteristics of textbooks developed. The results of student book assessments by media experts can be seen in Table 2.

| No. | Aspects   | Percentage (%) | Criteria |
|-----|-----------|----------------|----------|
| 1.  | Presentation | 100            | Very good|
| 2.  | Language   | 100            | Very good|
| 3.  | Graphics   | 81.25          | Very good|
| 4.  | Characteristics | 75             | Good     |
|     | **Average** | **89.06**      | **Very good** |
The results of teacher’s book evaluation by media experts can be seen in Table 3.

**Table 3. Results of the teacher's media feasibility assessment**

| No. | Aspects   | Percentage (%) | Criteria   |
|-----|-----------|----------------|------------|
| 1.  | Presentation | 100            | Very good  |
| 2.  | Language    | 100            | Very good  |
| 3.  | Graphics    | 81.25          | Very good  |
| 4.  | Characteristics | 100      | Very good  |
|     | Average     | 91.67          | Very good  |

Based on Table 2, the student textbook integrated local potentials bakpia was included in the very good criteria with a percentage of 88.89%. Based on Table 3, the teacher textbook integrated local potential bakpia that was developed included in the very good category with a percentage of 91.67%.

The assessment by the material experts includes aspects of content feasibility, aspects of presentation, aspects of language, and aspects of product characteristics. The results of the textbook assessment by material experts can be seen in Table 4.

**Table 4. Results of Book Material Feasibility Assessment**

| No. | Aspects   | Percentage (%) | Criteria   |
|-----|-----------|----------------|------------|
| 1.  | Content   | 83.33          | Very good  |
| 2.  | Presentation | 83.33         | Very good  |
| 3.  | Language  | 75             | Good       |
| 4.  | Characteristics | 87.5       | Very good  |
|     | Average   | 81.25          | Very good  |

Based on the percentage criteria feasibility and readability level table, the feasibility content of the science textbook integrated local potential bakpia that was developed was included in the very good criteria with a percentage of 81.25%.

**3.3. readability test by teachers and students**

The results of the revision of the advice of expert lecturers, then do a readability test on the developed textbooks. The results of the teacher's readability test for junior high school teachers can be seen in Table 5. The results of the readability test for students’ books by junior high school students can be seen in Table 6.

**Table 5. Results of the teacher's readability test**

| No. | Aspects   | Percentage (%) | Criteria   |
|-----|-----------|----------------|------------|
| 1.  | Content   | 100            | Very good  |
| 2.  | Presentation | 93.75         | Very good  |
| 3.  | Language  | 93.75          | Very good  |
| 4.  | Graphics  | 95.83          | Very good  |
| 5.  | Characteristics | 100       | Very good  |
|     | Average   | 96.35          | Very good  |
Table 6. Result of the student’s readability test

| No. | Aspects    | Percentage (%) | Criteria |
|-----|------------|----------------|----------|
| 1.  | Language   | 80             | Very good|
| 2.  | Graphics   | 89.33          | Very good|
| 3.  | Presentation | 83.33        | Very good|
|     | **Average** | **85.67**     | **Very good** |

Based on Table 5 and Table 6, teacher books and student books integrated the local potential bakpia food that were developed, including very good categories, each with a percentage of 96.35% and 85.67%.

The developed product criteria are declared feasible for use in learning if they have a good score. Assessment is based on the validators, teachers, and students. The validation process is carried out by one lecturer as a material expert and one lecturer as a media expert. The results of the validation and the feasibility of the teacher's book and the student book as a whole were rated by very good categories. The results of this validation indicate that the integrated science textbook product of bakpia's local potential that is developed is ready to be tested in the next stage, namely the readability test by the junior high school science teacher and junior high school students.

Readability test is conducted after the revision process of the validator of media expert lecturers and material expert lecturers. Based on the readability test of a teacher's book by a junior high school science teacher, the product developed scores with the "very good" category. Based on the readability test of student books by junior high school students, the products developed get a score with the category of "very good". The results of this readability test show that the integrated science textbook product of bakpia's local potential that was developed is ready to be tested in the learning process.

Based on the research results, the product developed has very good value so that the product is feasible for use in learning. The results of this research and development are supported by the results of research conducted by previous researchers that local potential can be integrated in science learning [15] [16] [9]. Local potential can be integrated in science learning and can improve students' critical thinking. Students who are not encouraged to think critically will lack the ability to communicate the results of their work to their peers, family, and community. In addition, local potential provides opportunities for teachers to make it easy to associate new knowledge to be conveyed to students.

4. Conclusion

Science textbooks integrated the local potential bakpia food are feasible for use in learning science in very good criteria. The results showed that the feasibility of the material was 89.06% with very good criteria, the percentage of feasibility for teacher books was 91.67% with very good criteria, and the feasibility of student books was 88.89% with very good criteria. The results of the readability test by the science teacher were 96.35% with very good criteria, and the percentage of readability tests by junior high school students was 85.67% with very good criteria.

Science textbook integrated the potential local bakpia food that has been developed is feasible to be used and used as an alternative to teachers and students in learning science. Suggestions for utilization are further research in order to find out the effectiveness of the products that have been developed.

5. References

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