

The Development of Food Production Teaching Materials for Class III Elementary School Students

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ABSTRACT

Abstract: This study aims to obtain contextual-based thematic teaching materials that are suitable and easy for teachers and students to learn. Teaching materials must meet the requirements of validity, practicality, and effectiveness. The teaching material chosen is thematic learning, with the sub-theme of developing food production technology. The contents and contents focus on the food potential of the Tulungagung area. The research method used in the development of teaching materials is Dick & Carey. The result showed that the teaching materials met very valid criteria based on material expert and learning designs, practical criteria based on teacher and student responses, and effective based on improving student learning outcomes.

The 2013 curriculum explains that the implementation of the set of subjects taught in educational institutions, especially in the scope of basic education, applies integrated thematic learning. According to (Asriani, Sa'dijah & Akbar, 2017), integrated thematic learning has a definitive goal, namely changing the quality of education significantly through cognitive, affective, and psychomotor aspects. According to (Sa'dijah, Sepharyanto, Djatmika, 2017), the purpose of thematic learning is to provide opportunities for teachers to provide meaningful learning for students. The age of Elementary school students are in the concrete operational stage, so that integrated thematic learning emphasizes the learning process with concrete and contextual objects. In line with the development of scientific progress, it requires teachers to be active in realizing optimal learning for students. According to (Ahmad & Lestari, 2010), the impact of these advances is enriched by learning resources and media, such as teaching materials, modules, videos, films, web, and so on. The important response of the teacher in teaching students concretely and contextually is through the procurement of teaching materials that support students in learning meaningfully.

According to (Agustina, 2018) explains the importance of procuring teaching materials has an important position on learning in helping students achieve optimal learning outcomes. According to (Pratiwi, 2015), teaching materials at least have a lesson substance that is clearly and systematically arranged, and displays a complete figure of competence that will be understood by students in learning. According to (Aydin & Aytakin, 2018), teaching materials are one of the important tools in systematically compiling materials, as well as fully displaying the competencies that will be mastered by students in learning activities. According to (Prastowo, 2015), teaching materials have an important meaning as all materials that are arranged in a systematic and planned manner, and display a complete figure of competencies that will be mastered by students in accordance with the learning objectives that have been set. This is confirmed by research (Adalikwu & Iorkpilgh, 2013), that teaching materials have a function as a channel between teachers and students in providing instructions. The essence of systematic and as a guide, in the process of preparing teaching materials lies in the concept of teachers in designing and developing teaching materials that are in accordance with instructional rules and are able to fulfill objects. Based on the results of research (Prastitasari, Sa'dijah & Qohar, 2018), in the preparation of quality teaching materials, it is characterized by several things, including being relevant to Basic Competencies, arranged hierarchically, delivered to students comprehensively and completely, relevant to the level of development of students' thinking, interesting and can stimulate student learning activities, and is contextual in accordance with the student's learning environment.

According to (Rodis & Locsin, 2019), in the era of global education, teachers must be able to create active learning activities by providing a distinctive style according to their respective regions. This distinctive style is suitable to be implemented with contextual learning. According to (Perwitasari, Wahjoedi & Akbar, 2018) revealed that with contextual learning, the learning process has goals to be achieved well and are more meaningful. Based on the opinion (Sears, 2003), with a contextual approach the teacher will be helped in learning activities that have been designed based on real situations so as to encourage students to apply them in their lives. This is suitable with research (Sihotang & Sibuea, 2015) that the application of contextual learning at

the elementary school level can help students relate the material studied to the real conditions of an area and encourage them to make connections between their knowledge and its application in social life. This is emphasized by research (Nilasari, Adrian & Susanto, 2018), the importance of applying contextual learning in thematic learning is the learning concept displayed by the teacher by presenting the real world in the classroom and encouraging students to form links between knowledge and students' daily lives. Contextual learning is said to be important to be implemented in learning, because the learning process emphasizes the active involvement of students in learning and transferring knowledge. Real practice in implementing concrete and contextual learning is the preparation and procurement of interesting teaching materials that contain unique facts found in an area around the student's environment. According to (Wijiningsih, Wahjoedi & Sumarmi, 2017), the preparation of interesting and meaningful teaching materials is at least able to utilize the environment around students as the main source of learning.

The specification of the selected sub-theme in the preparation of concrete and contextual teaching materials is Food Production Technology in Tulungagung area. The reason for choosing the material in the sub-theme, the researcher aims to introduce regional products that are unique and distinctive as a source of concrete learning for students. This is inseparable from Tulungagung which is known as an area of traditional culinary variety with interesting processing. Based on research (Lestari, Susilo & Setyosari, 2017) that the development of teaching materials by utilizing an area will provide contextual understanding of students. Based on research (Sa'dijah, Setiawan & Akbar, 2017), with the presentation of material arranged in contextual teaching materials will make it easier to connect the material with events in the local environment holistically. Contextual teaching materials on Food Production Technology material will provide an overview to students in the Tulungagung area, that in understanding the concept of material can be found directly and visually in supporting the teaching and learning process in the classroom. Based on research (Rohmah, Hariyono & Sudarmiatin, 2017), this is an integration of local culture into formal education, so that the teacher can use the environment around the house as the closest learning resource. This integration will provide a pedagogic concept to encourage students to recognize and appreciate the culture of their environment.

METHOD

The research and development of this teaching material uses the Dick & Carey-model. According to (Mustaji, 2020), the Dick & Carey model can be used as a benchmark in the research and development stage of educational products such as syllabus, teaching materials, textbooks, learning videos, and so on. This model was chosen based on its relevance to the needs of research and development characteristics. The research and development model of teaching materials contains systematic steps taken by researchers so that the products designed have proper standards of validity, practicality, and effectiveness. According to (Dick & Carey, 2009), the systematic steps include: (1) identifying needs and goals, (2) carrying out analysis in learning, (3) carrying out student and context analysis, (4) formulating performance goals, (5) Develop authentic assessment instruments, (6) Develop learning strategies, (7) develop and determine teaching materials, (8) Design and conduct formative evaluations of learning, (9) Revise products, and (10) design and implement summative evaluations of learning. Based on the ten stages of development described by Dick & Carey, the researcher carried out nine stages because at the tenth stage, namely designing and implementing summative tests, it was outside the systematic implementation of research and development of teaching materials, so it did not need to be carried out in-learning.

The process of developing teaching materials first starts from a preliminary study. The results of the preliminary study, the researchers then drafted the planning of teaching materials. The initial draft of teaching materials was developed and validated to 2 experts, namely material and learning design experts. The validation results are in the form of a product validity score that is developed based on suggestions and input. The product that has been validated is then revised based on suggestions and input from expert validation. The revised product is then tested in small groups. The test subjects were 6 students of SDN Waung 1, Tulungagung Regency who were selected based on different levels of ability. Small group trials were conducted to determine the practicality of the teaching materials that have been developed. Students are asked to carefully observe and work on the questions contained in the teaching materials. Then students were asked to fill out a practicality questionnaire and to give suggestions and input. After the small group trial was carried out, the product was revised again so that the quality level of the teaching materials was getting better.

The results of small group trials that have been improved by researchers, are then tested in the field. The subjects of the field trial were teachers and third grade students of SDN Waung 1, Tulungagung Regency which consisted of 14 students. The field trial aims to determine the level of practicality by filling out a practicality and effectiveness validation questionnaire by doing pre-test and post-test questions by comparing the average value between before and after using teaching materials with the Minimum Completeness Criteria of 70.

The data that has been collected in the study were analyzed descriptively quantitatively and qualitatively. Quantitative descriptive analysis was obtained from the scores and values contained in the validation questionnaire from product trials and student learning outcomes through pre-test and post-test. Qualitative analysis was obtained based on suggestions and input from validators, teachers, and students.

RESULT

The data analyzed in the study consisted of a questionnaire based on expert validation and trial data. Validation was carried out to two validation experts, namely material experts and learning design experts. Materials experts have the role of validating the content and content of the material contained in thematic learning, while learning design experts have the role of validating the validity of product designs and the physical quality of teaching materials. The trial was carried out by teachers and third grade students of SDN Waung 1 with the aim of seeing the level of practicality and effectiveness of the teaching materials developed. Product trials are carried out in two stages, namely small-scale trials and field trials. Analysis of the data used in the study used quantitative and qualitative descriptive analysis. Quantitative data consist of scores and assessments, while qualitative data consists of suggestions and input written on a questionnaire sheet.

Expert Validation

The product of contextual-based thematic teaching materials that have been tested for feasibility by material and learning design experts. Based on the results of the questionnaire material expert validation sheet and learning design, the scores obtained are very valid and suitable for use after making several improvements and revisions in accordance with the advice and input of experts. Teaching materials that have been revised and improved can then be used for product trials. The obtained expert validation results are presented in table 1.

Table 1. Recapitulation of student and teacher book validation

Validator	Percentage	
	Student book	Teacher book
Material expert	88,88%	91,66%
Learning design expert	92,18%	90%
Σ Average	90,53%	90,83%
Eligibility level	Very valid	Very valid

Based on table 1, it is known that the average value of student textbook validity from material expert validation and learning design expert validation is 90.53%, so the feasibility level is classified as very valid. While the average value of the teacher's book validity from the validation of material experts is 90.83% and the validation of learning design experts is 90.83%, so the feasibility level is classified as very valid. In general, suggestions and input on the teacher's book and student's book are feasible and can be used after making revisions according to the notes contained in the expert validation sheet.

Teaching material products that have been validated and revised based on expert validation, then tested in small groups to test the level of practicality. Based on the validation of the material experts, there are inputs in the teacher's book and student's book as follows.

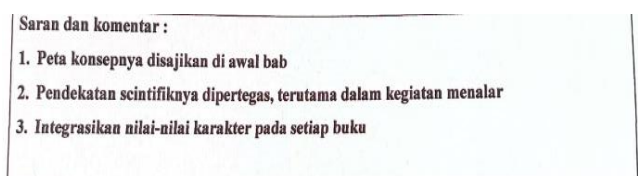
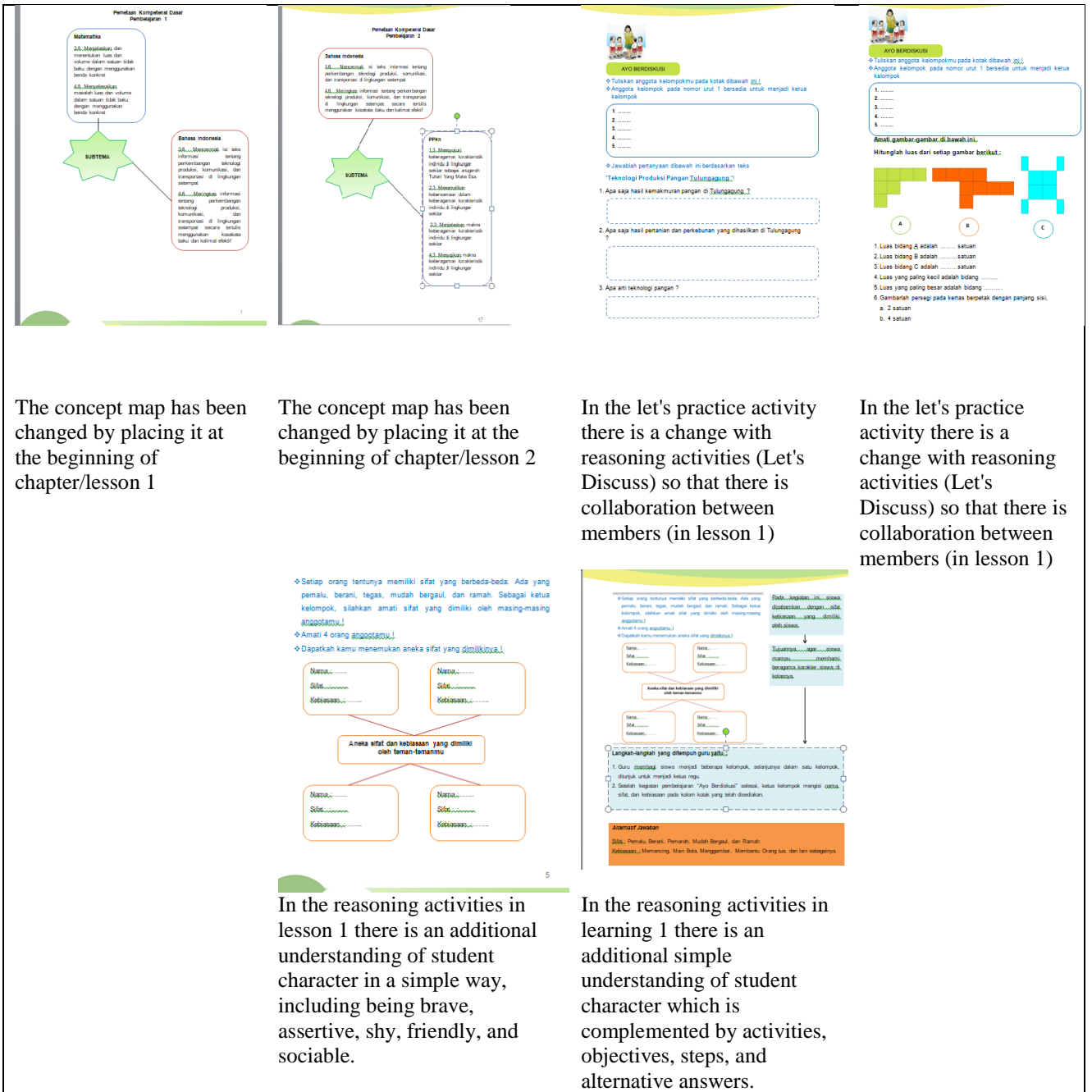


Figure 1. Suggestions and input from material experts on teaching materials

Based on Figure 1, suggestions and input for material expert validation include: (1) the concept map is presented at the beginning of the chapter, (2) the scientific approach is emphasized, especially in reasoning activities, and (3) integrating character values in each book. Furthermore, revisions and input from material expert validations that have been written. Figure 2 shows the form of revision and input based on the validation suggestions of material experts on teaching materials.



The concept map has been changed by placing it at the beginning of chapter/lesson 1

The concept map has been changed by placing it at the beginning of chapter/lesson 2

In the let's practice activity there is a change with reasoning activities (Let's Discuss) so that there is collaboration between members (in lesson 1)

In the let's practice activity there is a change with reasoning activities (Let's Discuss) so that there is collaboration between members (in lesson 1)

In the reasoning activities in lesson 1 there is an additional understanding of student character in a simple way, including being brave, assertive, shy, friendly, and sociable.

In the reasoning activities in learning 1 there is an additional simple understanding of student character which is complemented by activities, objectives, steps, and alternative answers.

Figure 2. Revision of teaching materials based on suggestions and input from material expert validation

Figure 2 shows several revisions in the form of suggestions and inputs made based on learning design experts. Suggestions and inputs from learning design expert validators include (1) it can be adjusted to A4 size, (2) sources of images/photos please include, (3) after the outer cover there is an inner cover, (4) the size of the book should be A4, and (5) use the appropriate paper standard.

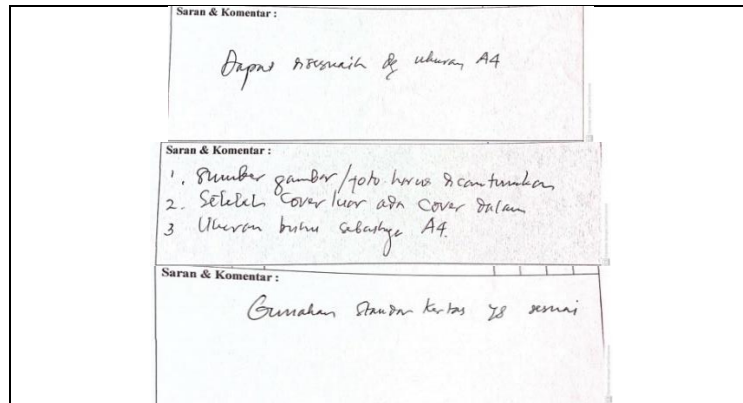


Figure 3. Suggestions and input from learning design experts on teaching materials

The form of improvement based on suggestions and input from expert validators of learning design is found in the size of the book, the source, and the cover of the book. The form of the revision based on the suggestions and input of the learning design expert validator is shown in figure 4.

<p>AYO MEMBACA</p> <p>Siti sedang membacakan sebuah teks bacaan. Teks tersebut adalah tentang teknologi pangan yang dihasikan di daerah Tulungagung. Tahukah kamu apa arti teknologi pangan?</p> <p>Siti sedang mengajak bersama teman-temannya buku teks bacaan tentang teknologi produksi pangan!</p> <p>sumber: republika.co.id</p>	<p>Langkah-langkah dalam pembuatan tempe</p> <p>Produk Hasil Tempe yang siap dimakan</p> <p>Sumber: www.foodetik.com</p>	<p>Kain terpal A Kain terpal B</p> <p>Kemudian, Hari dan teman-temannya menghitung berapa banyak tempe yang menutupi permukaan kain terpal A dan B.</p> <p>Banyak satuan persegi yang menutupi setiap sisi pada bentuk persegi yang diwarnai.</p> <p>Luar terpal diwarnai dengan banyaknya satuan persegi yang menutupi permukaan terpal.</p> <p>Sumber: www.foodetik.com</p>	<p>Hari ini kita mau diajak kemana bu.?</p> <p>Ayo anak-anak agenda keesokan kita hari ini adalah berkunjung tempat pengolahan makanan khas Tulungagung</p> <p>Sumber: jwv.bsd.pendidik</p>																																										
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<p>AYO MENGAMATI</p> <p>Sumber: Dokumentasi langsung</p> <p>Sumber: www.foodetik.com</p> <p>Hari dan Rudi sedang membaca buku tentang pengolahan Ayam Lado. Ayam Lado merupakan makanan khas di Tulungagung. Mereka tertarik untuk melihat apa pengolahan Ayam Lado.</p> <p>Esok harinya Hari dan Rudi tertarik untuk mengunjungi salah satu warung Ayam Lado milik Ibu Wini. Mereka memiliki keinginan untuk mengetahui apa pengolahan Ayam Lado yang nikmat dan siap dihidangkan.</p> <p>Hari, Rudi, dan teman-temannya ingin melihat prosesnya. Kemudian, setelah melihat prosesnya, mereka ingin menikmati kuliner Ayam Lado. Siapa Tulungagung, siapa kesatria-senora.</p> <p>Sumber: Dokumentasi langsung</p>	<p>Sumber: www.foodetik.com</p> <p>Tuliskan daftar makanan dan bahan dasarnya pada gambar ke teknologi produksi pangan berdasarkan gambar di atas!</p> <table border="1"> <thead> <tr> <th>No</th> <th>Jenis Makanan</th> <th>Bahan Dasar</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Cimplung</td> <td>Singkong</td> </tr> <tr> <td>2</td> <td>.....</td> <td>Kulit Sapi</td> </tr> <tr> <td>3</td> <td>Kripik Singkong</td> <td>.....</td> </tr> <tr> <td>4</td> <td>.....</td> <td>Ketan Hitam</td> </tr> <tr> <td>5</td> <td>Ledre</td> <td>.....</td> </tr> <tr> <td>6</td> <td>.....</td> <td>Tepung</td> </tr> </tbody> </table>	No	Jenis Makanan	Bahan Dasar	1	Cimplung	Singkong	2	Kulit Sapi	3	Kripik Singkong	4	Ketan Hitam	5	Ledre	6	Tepung	<p>Sumber: www.foodetik.com</p> <p>Tuliskan daftar makanan dan bahan dasarnya pada gambar ke teknologi produksi pangan berdasarkan gambar di atas!</p> <table border="1"> <thead> <tr> <th>No</th> <th>Jenis Makanan</th> <th>Bahan Dasar</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Cimplung</td> <td>Singkong</td> </tr> <tr> <td>2</td> <td>.....</td> <td>Kulit Sapi</td> </tr> <tr> <td>3</td> <td>Kripik Singkong</td> <td>.....</td> </tr> <tr> <td>4</td> <td>.....</td> <td>Ketan Hitam</td> </tr> <tr> <td>5</td> <td>Ledre</td> <td>.....</td> </tr> <tr> <td>6</td> <td>.....</td> <td>Tepung</td> </tr> </tbody> </table>	No	Jenis Makanan	Bahan Dasar	1	Cimplung	Singkong	2	Kulit Sapi	3	Kripik Singkong	4	Ketan Hitam	5	Ledre	6	Tepung	<p>PERKEMBANGAN TEKNOLOGI PRODUKSI PANGAN</p> <p>Kelas 3</p>
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Figure 4. Revision of teaching materials based on suggestions and input from learning design experts

Small Group Trial

The small group trial was conducted with the subject of the teacher and 6 third grade students at SDN Waung 1, Tulungagung Regency. The small group trial aims to determine the practicality of contextual-based thematic teaching materials. The data collected is using teacher and student response questionnaires. The data on the results of small group trials are presented in table 2.

Table 2. Small Group Trial Data

Respondent	Percentage	
	Student book	Teacher book
Student	95%	-
Σ Average	95%	-
Eligibility level	Very Practical	-

Based on table 2, it is known that the average value is 95%, so it is classified as very practical. Suggestions and inputs during small group trials were used as the basis for revision of thematic teaching materials in field trials. There were no negative comments in the student response questionnaire. Comments from students appeared, including (1) The content is very interesting to read, (2) Overall the teaching materials are very interesting, (3) The typical foods in Tulungagung are very diverse, and (4) I am very interested in this book as a whole. content view. Although the results of student comments were quite positive in responding to the student books that had been developed, the researchers continued to re-examine the development products and made improvements. The improvements made are presented in table 3.

Table 3. Comments from the Small Group Trial

No	Part	Respondent	Before revision	After revision
1	Student book	Student	<ul style="list-style-type: none"> The writing is too tight and dense Color choice is more attention 	<ul style="list-style-type: none"> Revised Revised

Field Trial

Field trials were conducted on teachers and 14 third grade students at SDN Waung 1, Tulungagung Regency. The field trial aims to determine the practicality of contextual-based thematic teaching materials. Field trial data were obtained from the results of a questionnaire on the practicality of teaching materials based on the responses of teachers and students during the implementation of the learning process. The data are presented in table 4.

Table 4. Field Trial Data

Validator	Percentage	
	Student book	Teacher book
Student	94,64%	-
Teacher	95%	96,66%
Σ Average	94,82%	96,66%
Eligibility level	Very Practical	Very Practical

Based on Table 3. it is known that the student's book has an average value of 94.82%, so it is classified as very practical. The teacher's book has an average value of 96.66%, so it is classified as very practical. In addition to the student and teacher response questionnaires based on the average score, data were also obtained through suggestions and input from students and teachers, although almost all of them gave positive comments. The suggestions and inputs are presented in the following table 5.

Table 5. Comments from Field Trials

No	Part	Respondent	Before revision	After revision
1	Student book	Student	<ul style="list-style-type: none"> Actually the book is very interesting, but there are things that are blurry and unclear The book is quite interesting, but the writing is not clear enough 	<ul style="list-style-type: none"> - Revised - Revised
2	Student book	Teacher	<ul style="list-style-type: none"> Overall it is good and really helps students in learning, but it would be nice if it was developed again on different later themes 	-
3	Teacher book	Teacher	<ul style="list-style-type: none"> Overall it is clear, maybe it can be further developed for the next theme 	-

In addition to practicality tests, field trials also obtained the effectiveness of teaching materials obtained through learning outcomes tests. The test results were carried out between before (pre-test) and after (post-test) using contextual-based thematic teaching materials. The data will be presented in table 6.

Table 6. Recapitulation of Student Learning Score

No	Subject	Average Learning Outcomes		KKM
		Pre Tes	Post Tes	
1	Student	60	82,85	70

Based on the results of the recapitulation of student learning outcomes, the pre-test score of 60 was smaller than the post-test score of 82.85. This shows that there is a difference in the average score between students who before and after using contextual-based thematic teaching materials. The next effectiveness test is to use a Pre-Experimental-Design with the type of One Group Pre test and Post test in a single group. The difference between the pre-test and post-test scores will be calculated and the average value will be compared. A summary of the calculations will be presented in the table 7.

Table 7. Summary of pre-test and post-test data analysis

t-hitung	t-tabel	Sig. (2-tailed)	Taraf signifikan	Conclusion
3,661	2,160	0.003	0,05	There is a difference

The summary of pre-test and post-test data analysis shows that the t-count value of 3.661 is greater than the t-table of 2.160. In addition, the value of Sig. (2-tailed) is 0.003 smaller than the 0.05 (5%) guideline level of significance. So it can be concluded that there is a significant difference between the pre-test and post-test scores, so that the teaching materials developed by the researchers are effectively used in thematic learning at the elementary school level.

DISCUSSION

This research and development were carried out with the aim of producing contextual-based teaching materials as a strategy to improve the quality of learning. The results of research conducted by (Sa'dijah, 2013) explains that by providing teaching materials contextually, students' activities will be meaningful in seeking, discovering, and building their own knowledge, so that it will be a meaningful experience. The selected sub-theme in the development of teaching materials is the development of food production technology typical of the Tulungagung region in the form of teacher books and student books in grade III Elementary School. The assessment of teaching materials is obtained from the level of validity based on expert validation, the level of practicality based on teacher and student responses, and the level of effectiveness based on student learning outcomes.

Based on the results of the material expert validation tests, the percentage value of 88.88% for student books and 91.66% for teacher books, so that the results obtained are classified as very valid. The results of the validation tests of learning design experts showed a value of 92.18% for student books and 90% for teacher books, so the results obtained were classified as very valid. Universally, if the material expert validation expert and learning design expert have very valid information, then the product that has been developed is feasible and can be used in learning. It is based on opinion (Akbar, 2013) that in developing thematic learning products-showing valid results to achieve-learning objectives.

The product of teaching materials is then tested in small groups and field trials to see the level of practicality. The subjects of the small group trial were 6 students, with different abilities. The results of the small group trial obtained a percentage value of 95%. The percentage value indicates that the teaching materials are classified as very practical. After conducting small group trials, the next step was field trials with 14 third grade students at SDN 01 Waung, Tulungagung Regency. Field trial data seen the level of practicality based on teacher and student response questionnaires. The results of student responses to student books are 94.64%, teacher responses to student books are 96.66%, and teacher responses to teacher books are 95%. The overall average value shows the results of 95.32%, so that the teaching materials are categorized as very practical and interesting to use in learning. Based on the results of research by (Ogaga, Igori & Egbodo, 2016) explained that practical and interesting teaching materials are teaching materials that have improvised methods to make learning fun and concistent.

Field trial data also obtained from the effectiveness of teaching materials based on student learning outcomes. The results of the acquisition of the effectiveness of teaching materials obtained from the pre-test and post-test scores. The average result of the pre-test score is 60 and the post-test score is 82.25, so there is a difference between students before and after using teaching materials. The criteria for the effectiveness of teaching materials are also seen from the paired sample t-test value and the t-count gain of 3.661 which is superior to the t-table of 2.160 (df; 13), and the value of Sig. (2-tailed) of 0.003 <0.05 (level of significance). Based on the results of calculations on the t-test and the significance value proves that the thematic teaching materials on the sub-theme of the development of food production technology are effectively used. This is supported by the opinion (Su'udiah, Degeng

& Kuswandi, 2016) that student learning outcomes by applying a contextual-based approach is quite effective compared to conventional approaches. Based on a series of stages and steps that have been carried out, it can be known that contextual-based thematic teaching materials on the sub-theme of food production technology development for third grade elementary school students have met the valid, practical, and effective criteria. This is reinforced by the opinion Santi & Santosa (2016) which states that a good learning tool at least full fill the quality criteria of being valid, practical, and effective.

CONCLUSIONS

This research produces a product of contextual-based teaching materials on material for the development of food production technology for third grade elementary school students. The teaching materials consist of teacher books and student books. The teacher's book is a book that is used as a teacher's guide in carrying out the thematic learning process for grade III elementary school students. Student books are books used by students as thematic learning materials to make it easier for students to master the material in accordance with the learning objectives that have been agreed. The teaching materials that have been researched and developed can be used as references and supporting books in thematic learning on food production technology material contextually for third grade elementary school students. This contextual learning that has been researched and developed is expected to facilitate students in learning optimally.

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