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## Research Article

# Development of Square and Triangle Surface Area Pocket Books as Learning Media for Junior High Schools

Fajriana\*, Mursalin, Atikah Fitriani

Department of Mathematics Education, Universitas Malikussaleh, Aceh, Indonesia

\*Corresponding Author: [fajriana@unimal.ac.id](mailto:fajriana@unimal.ac.id)

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## ABSTRACT

This study was conducted at SMP Negeri 8 Lhokseumawe about the development of rectangular and triangular pocket books against the background of the lack of availability of textbooks in schools, coupled with inadequate learning media that supports students to study independently, thus causing low learning motivation of students, and learning outcomes have not increased. The aims of this study: (1) to determine the validity of the development of rectangular and triangular surface area pocket books as learning media for junior high schools, (2) to determine the feasibility of developing square and triangular surface area pocket books as learning media for junior high schools, (3) to find out responses teachers and students on the development of rectangular and triangular surface area pocket books as learning media for junior high schools. The design of this research is research and development called Research and Development (R & D) using the Borg and Gall model modified into 7 stages according to Sugiyono. Data collection techniques using validation sheets and questionnaires. The results obtained from the validation of media experts obtained a percentage of 91.48% and material experts obtained a percentage of 83.52% with a very valid category. The results of the feasibility of pocket books obtained a percentage of 84.69% with a very decent category, and teacher responses to pocket books obtained a percentage of 89.52% in a very good category, and students' responses to pocket books obtained a percentage of 80% in a good category. So it can be concluded that pocket books can be well received at SMP Negeri 8 Lhokseumawe. Recommendations from the research are expected to schools, institutions related to educational practitioners to conduct trials on a broad group so that the level of effectiveness can be known to support learning.

**Keywords:** Development; Pocket Book; Square and Triangle; Learning Media

## 1. INTRODUCTION

According to Law no. 20 of 2003 concerning the National Education System states that education is a conscious and planned effort to create a learning atmosphere and learning process so that students actively develop their potential to have religious spirituality, self-knowledge, personality, intelligence, noble character, and the skills needed for themselves, society, nation and state. Learning is a process of interaction between teachers and students to achieve knowledge with various methods that can utilize all media to achieve learning objectives (Istiqlal, 2017:47). The realization of learning with the existence of a communication, in the communication process always involves three main components, namely the message sender component or teacher, the message recipient component or students, and the student component itself which is usually in the form of subject matter (Wati, 2016:12). However, the process of learning mathematics often occurs when there is a communication failure, meaning that the subject matter delivered by the teacher is not accepted by the students, thus communication is not optimal. Moreover, the mathematics lesson which is difficult and the concept must be understood is emphasized by Nugroho, et al. (2017:198) seriously in order to understand and understand, if you don't understand then there will be misconceptions between teachers and students.

Mathematics according to Law no. 20 of 2003 concerning National Education System Article 1 Paragraph 20 "Learning is a process of interaction between students and educators and learning resources in a learning environment". For example in learning mathematics, in addition to the interaction between educators and students, the existence of adequate learning media is also very important for students in the learning process, including in terms of learning lessons. Mathematics is one of the most important subjects, because mathematics in every educational institution is a subject that cannot be separated even in everyday life (Istiqoma, 2016: 3). Based on the sources above, it can be concluded that mathematics is a very important subject that everyone learns from elementary school to college and is always related to everyday life. However, mathematics is not enough to be learned in the classroom, repeated learning is needed outside the classroom or independent learning by students in order to understand the mathematical material (Putri and Listiyadi, 2014: 2). In this case, innovative and interesting teaching materials are needed for students.

According to Suratman and Setiyaningrum (2020:306) teaching materials are all types of materials or materials used by teachers to support learning activities with attractive designs. While Prastowo (2011:17) teaching materials are all materials (both information, tools, and texts) that are arranged systematically, which displays a complete figure of competencies that will be mastered by students and used in the learning process with the aim of planning and studying the implementation of learning. For example, textbook, modules, handouts, worksheets, models or mockups, audio teaching materials, interactive teaching materials, and so on. Based on the sources above, it can be concluded that teaching materials are tools, objects, and texts that contain information that is systematically arranged to facilitate students in the learning process. According to Permana and Puspasari (2021:122), to make it easier for students to understand the material, teaching materials that can be studied anywhere and anytime have a practical nature, one of which is a pocket book. According to Eliana and Solikhah (2012:173) pocket books are small books arranged in a coherent manner with the concept of material that is more concise, clear, and dense equipped with illustrations as a supporter in understanding the material so that it is effective to carry anywhere and can be read anytime. In addition, the inner pocket book (Setyono et al., 2013: 120) says that it is a small book which contains information that can be stored in a pocket so that it is easy to carry everywhere. From this understanding, it can be concluded that a pocket book is a book that contains material that is concise, clear, has illustrations to support the material, is practical, can be placed in a pocket that is easy to carry anywhere and can be read anytime.

Based on the results of observations and interviews conducted by researchers at SMP N 8 Lhokseumawe on January 26, 2021 with the unstructured interview method with the vice principal of the curriculum section, Mrs. Hasniar, S. Ag said that most of the mathematics textbooks available at schools were inadequate because the textbooks obtained from the Ministry of National Education (MoNE) did not match the number of students in the school so that each student did not have a mathematics textbook. Package books can only be loaned to students through procedures and are not allowed to take the books home or become property, this is most likely to happen in other schools. Package books are given to students with one book at a desk or a classmate, when students who receive textbooks do not attend school, their classmates do not have textbooks, so students who do not have textbooks are lazy to study because they do not have learning resources. According to Putri and Listiyadi (2014:2) sometimes students object to bringing textbooks to school because the books are large, which is about  $25 \times 17$  cm so that it is difficult to carry anywhere and the reading descriptions on each page are relatively long. The researcher also interviewed a mathematics teacher with Mrs. Julina, S. Pd who said that the mathematics learning process only relied on textbooks without any learning media such as modules, pocket books, etc. Even hearing teaching materials such as pocket books, they do not know the form, content, of the teaching materials. To overcome this problem, one solution that can be done is to arrange learning media in the form of a pocket book.

Pocket books have characteristics according to Yaqin and Rochmawati (2013: 2), namely pocket books are able to stimulate students to be more enthusiastic in learning and be able to show interest during the learning process. The advantages of pocket books have a simple and practical form, easy to carry, attractive designs with a combination of text and images that are able to attract the attention of students. In addition, the reason underlying the selection of pocket books as a development product that will be developed by researchers is because it is seen from previous studies which show that the use of pocket books in learning activities can have a positive impact on students' interest and learning outcomes. These studies include Cahyono, et al. (2018:198) from the results of research on the use of effective pocket books to improve student learning achievement seen from the post-test results, it shows the difference in the average value of the experimental class is 86.52 and the average value of the control class is 79.97. Meanwhile, Putri and Listiyadi (2014:8) research based on the results of their research, pocket books are feasible and effective to be used in the learning process as learning media for counting.

Based on the description above, the researcher intends to develop alternative learning resources for students. The learning resource that will be developed through this research is a pocket book on the surface area of rectangles and triangles, the researchers chose the material for quadrilaterals and triangles because the students thought the material was easy because it had been studied from elementary school to high school but in fact students did not know and even forgot about it. quadrilateral and triangle formulas. In addition, when the learning process about quadrilaterals and triangles material, students do not know the shapes and formulas of quadrilaterals and triangles that are always related in everyday life, for example: doors, floor tiles, erasers, tables, diamonds, and others. This makes researchers interested in choosing quadrilateral and triangle material as learning media in the form of a pocket book.

The results of previous research conducted by Suratman and Setiyaningrum (2020:315) from the results of their research, it can be concluded that pocket books are very feasible to support teaching materials for archival subjects. This is in line with the research results of Salyani, et al. (2018:13) concluded that the validation results of the expert team in the pocket book were corrected twice, namely the first validation with 71% (good category) and the second validation with 94% (very good category). The research conducted by Masita and Wulandari (2018:81) can be concluded that the mind mapping-based pocket book on the science learning of heat material and its transfer has met the valid criteria by the validators in the aspects of feasibility, presentation, graphics, language and mind mapping. This is confirmed by research Anjelita, et al. (2018:7) concluded that the pocket book media was declared valid and could be used as a learning medium for mushroom material in class X SMA with an average total validation of 3.76.

Based on these problems, the researchers are interested in conducting research with the title "Development of a Pocket Book on Square and Triangular Surface Areas as Learning Media for Junior High Schools". Pocket books were developed to meet the needs of students as a source of independent learning and are expected to stimulate students in understanding triangle and quadrilateral material. This study has the objectives to determine: (1) To determine the validity of the development of square and triangular surface area pocket books as learning media for junior high schools; (2) Knowing the feasibility of developing square and triangular surface area pocket books as learning media for junior high schools; (3)

Knowing the responses of teachers and students to the pocket book of rectangular and triangular surface areas as learning media for junior high schools.

## 2. RESEARCH METHOD

The development model used in this study is the Borg and Gall model which has 10 stages of development. Type of research and development or Research and Development (R&D). Research and development is a research method used to produce certain products, and test the effectiveness of these products (Sugiyono, 2018: 297). According to Sugiyono (2015:35) the research and development steps of the Borg and Gall model consist of 10 stages, namely: (1) research and information collection; (2) do the planning; (3) developing initial products (preparation of learning materials, procedures/preparation of handbooks, and evaluation instruments); (4) conducting initial field trials; (5) revise the test results; (6) conduct main field trials; (7) revise the product of the field test results; (8) conduct operational field trials; (9) revise the final product; (10) disseminate and implement the product. The trial design was used to see the students' responses to the development of a pocket book based on an assessment of interest, material, and language. The trial was conducted on 20 students of class VII-1 of SMP Negeri 8 Lhokseumawe. The research was conducted at SMP Negeri 8 Lhokseumawe with the address at Jl. M. Suud Blang Pulo. This research was conducted from March 2021 to August 2021.

The types of data used are qualitative and quantitative. Qualitative data is data in the form of words, not numbers. Qualitative data is used to process data from pocket book assessments in the form of comments and suggestions for improvement by validators and respondents which are then analyzed descriptively (Susanti, 2020:48). Quantitative data is data that is carried out by analyzing in the form of numbers or numbers from the results of the questionnaire assessment by validators and respondents (Susanti, 2020:48). The instrument of this research is the validation sheet of media experts, material experts, feasibility experts and questionnaire responses to teachers and students. Media expert validation sheet to assess the feasibility aspect of pocket book graphics. Material expert validation sheet to assess the content feasibility aspect, presentation aspect, and linguistic aspect of the pocket book. Expert of eligibility to assess presentation, graphics, content and language of pocket books. The teacher and student response questionnaire sheets were used to see the responses of teachers and students regarding pocket books. The validator assessment is carried out using a Likert scale can see in

Table 1.

Table 1. Validity Assessment Weight

Question	Score
Strongly agree	4
Agree	3
Do not agree	2
Strongly Disagree	1

Source: Gitnita, et al. (2018:156)

Table 2. Classification of Validity

Score	Validity Level
81-100	Very Valid
61-80	Valid
41-60	Quite Valid
21-40	Less Valid
0-20	Invalid

Source: Gitnita, et al. (2018:156)

The percentage analysis of feasibility experts is categorized into the following criteria:

Table 3. Weights of Pocket Book Eligibility Assessment

Question	Score
Strongly agree	4
Agree	3
Do not agree	2
Strongly Disagree	1

Source: Sugiyono (2018:93)

Table 4. Classification of Pocket Book Eligibility

Score %	Validity level
81-100	Very Worthy
61-80	Worthy
41-60	Decent enough
21-40	less worthy
0-20	Not feasible

Source: Gitnita, et al. (2018:156)

Then for the analysis of the percentage of teacher and student responses, it is categorized into the following criteria:

**Table 5.** Weight of Respondents' Assessment

Information	Weight
Strongly agree	4
Agree	3
Do not agree	2
Strongly Disagree	1

Source: Sugiyono (2018:93)

**Table 6.** Respondents Value Criteria

Value	Category
$0 \leq \text{Value} < 20$	Not very good
$20 \leq \text{Value} < 40$	Not good
$40 \leq \text{Value} < 60$	Pretty good
$60 \leq \text{Value} < 80$	Well
$80 \leq \text{Value} \leq 100$	Very good

Source: Assma, et al. (2018:45)

According to Riduwan (2016:14) how to calculate the value of validity, feasibility and to see respondents' responses can be done using the formula:

$$P = (\sum x) / (\sum xi) \times 100\%$$

Information:

P = rating percentage

x = total score obtained

xi = maximum score

### 3. RESULTS AND DISCUSSION

The product developed in this research is a pocket book learning media on quadrilateral and triangle material using the Borg and Gall development model. The model used in this study uses the Borg and Gall development model which has been modified by Sugiyono and the researcher limits it to seven stages of research and development, namely: (1) Research and initial information gathering; (2) Planning; (3) Development of initial product format; (4) Initial trial; (5) Product revision; (6) Field trials; (7) Product revision. Researchers limited to seven research steps because researchers only tested the quality of pocket books and at stage 7 they were able to answer the results of research and development. Data from the validation results of rectangular and triangular flat shapes pocket books were obtained from several validators, namely: 2 media expert lecturers, 2 material expert lecturers, and 2 mathematics subject teachers. The data obtained in the form of qualitative data and quantitative data. Qualitative data in the form of comments and suggestions/improvements by validators and respondents which were then analyzed descriptively against rectangular and triangular flat-shaped pocket books. Quantitative data in the form of numbers or numbers from the results of the questionnaire assessment by validators and respondents on pocket books of rectangular and triangular data. Quantitative data were analyzed based on a Likert scale with a rating weight of 1,2,3,4 then the values of the 6 validators were added up according to the aspects of each assessment and getting the average value of each aspect would be converted into a percentage to obtain the final assessment.

Based on the research that the researcher has carried out, the researcher gives a pocket book that has been designed along with a validation sheet to 2 media expert lecturers, 2 material expert lecturers. The percentage of media expert validation results is 93.23% with the "very valid" category and material expert is 83.53% with the "very valid" category so that the rectangular and triangular flat shape pocket book is very valid and feasible to use. Then The results of the response to the rectangular and triangular flat shape pocket book to teachers and students received a positive response. This can be proven based on the teacher's response questionnaire, which obtained a percentage of 89.52% in the "very good" category which was assessed from several aspects. For the response of class VII-1 students to the pocket book of rectangular and triangular shapes, the percentage is 80% in the "good" category which is assessed from several aspects so that the pocket book developed by the researcher can be used for learning media in mathematics learning, especially quadrilateral and triangle material.

The development of rectangular and triangular flat-shaped pocket books is intended to help teachers deliver material and make it easier for students to understand concepts that were originally abstract to be integrated according to the needs or interests of students and read pocket books at their own pace because they are packaged with concise and interesting material. so that students will be motivated to learn and can be used as teaching materials. Thus, the procedure for developing the Borg and Gall model has been carried out from stage 1 to stage 7. At stage 4, namely an initial trial on a limited scale used by providing validation questionnaires to validators of media experts and material experts. In each validation questionnaire there are suggestions or comments to improve the pocket book and improve the quality of the pocket book so that it can be known whether the pocket book is valid or not valid for learning mathematics. For suggestions and comments from validators, see Appendix B.2. The feasibility of pocket books carried out by means of field trials is stage 6 in the development process that involves teachers to see the feasibility and responses of teachers and students to see

reader responses to the pocket books that researchers have developed.

This is in line with previous research by Susanti (2020) with the title "Design and Trial of Pocket Books Containing Science Generic Skills in Reaction Rate Materials" using the Borg and Gall development model which includes 5 stages of development, namely: 1) research and collection initial information, 2) planning, 3) product development, 4) limited trial, 5) product revision. The results of the data obtained for the pocket book containing science generic skills are very suitable to be used as learning media. This is reinforced by the research of Muslimah, M., Fadila, A., and Farida (2018) based on their research, a transformation geometry pocket book with Indonesian batik motifs has been developed using the Borg and Gall model modified by Sugiyono. Then the validation was carried out by material experts and media experts to obtain an average score with very good criteria. Students' responses to the pocket book obtained an average score of 3.53 and 3.41, respectively, with very interesting criteria. Seen from the results of the assessment of the experts and the responses of the students were very satisfactory, the resulting transformation geometry pocket book was considered suitable for use in learning mathematics.

The researcher presents the front cover, layout, and back cover of the rectangular and triangular shape pocket book as learning media for SMP that was developed. First, the cover of the front cover of a rectangular and triangular pocket book as a medium of learning for junior high school students.

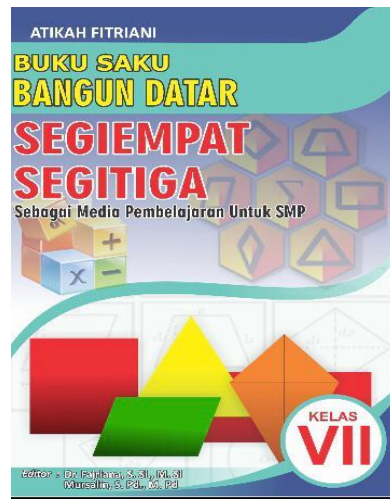


Figure 1. Front cover of Student textbook  
Source: Researcher Documentation (2021)

Second, the layout of the pocket book description, basic competencies, learning objectives, and concept maps

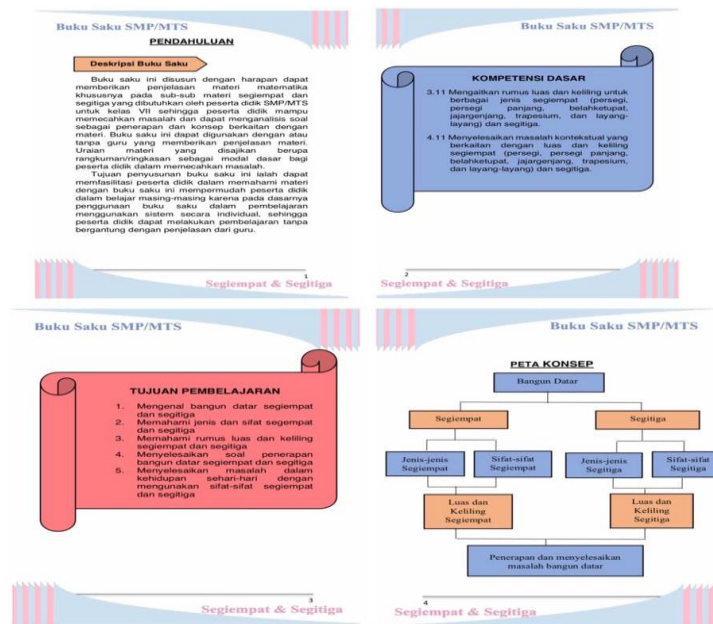


Figure 2. Results before and after revision  
Source: Researcher Documentation (2021)

Third, the back cover of a rectangular and triangular pocket book as a medium of learning for junior high school students.



Figure 3. Back cover of Student textbook

## 4. CONCLUSION

The conclusions in this study are: (1) the level of validity of the rectangular and triangular pocket book based on the assessment of media experts obtained a percentage of 91, 48% and the assessment of material experts obtained a percentage of 88.52% with a very valid category; (2) the level of feasibility of rectangular and triangular flat-shaped pocket books based on the teacher's assessment obtained a percentage of 84.69% with a very decent category; (3) the teacher's response to the rectangular and triangular shape pocket book is very good with a percentage gain of 89.52% and the student's response to the rectangular and triangular flat shape pocket book is good with a percentage gain of 80%.

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## AUTHOR'S CONTRIBUTIONS

The authors discussed the results and contributed to from the start to final manuscript.

## CONFLICT OF INTEREST

There are no conflicts of interest declared by the author.

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