Perhaps a feasibility study of pocket book learning media in Newton law materials for class X Senior High School

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Abstract. The number of learning media at this time is still deemed insufficient that students can use to study independently anywhere and anytime. So we need a media companion to the main book that students can use, namely in the form of pocket books. The feasibility test was carried out by material experts, media experts, design experts and Senior High School Physics Teachers. the results of the product media expert test were quite good with a proportion of 70\%, the material expert test was declared good with a proportion of 84\%, the product design expert test was not good with a proportion of 64\% and by education practitioners namely high school physics teachers declared good with a proportion of 88\%. So that the overall feasibility of the product is 76.5\% in the good category. So it can be concluded that the pocket book of Newton's law material on Physics for class X senior high school students is in accordance with the appropriate syllabus and is suitable for use as a supporting book for learning physics.

1. Introduction

Learning is one of the factors that influence and was instrumental in the formation of the personal and individual behaviour [1]. Natural Science Learning in Senior High School and its equivalent covers three fields of science, namely biology, chemistry, and physics. One of the most important is physics. Physics is a very complex science in the science group, because in addition to understanding the basics of mathematical calculations, it also requires a good understanding of concepts [2][3]. Therefore, with the learning media, it is expected that students will have high skills in learning science in the learning process, so that students are able to apply physics lessons in their daily activities [4][5].

In school students are given student worksheets and modules but outside of that students rarely learn except when there are assignments from the teacher. Because we need a media that can be used by students to learn and as a guide when they want to learn anywhere and at any time [6][7]. One way to overcome students' lack of interest in learning is to use learning media in the form of pocket books [8]. Pocket book is a small-sized book contains information that can be stored in the pocket so as to facilitate learners to learn in any case, because the book can be taken anywhere [9]. In addition to the size of a small book, an excess of a pocket book that the contents of the book is more compact so that students can get information without wasting time to find out the core of the information. In addition, pocket books can support students' understanding of the material presented by the teacher and provide interesting learning nuances so as to provide pleasure in learning physics, which in turn is expected to
improve student learning outcomes. Pocket books can be used as supporting teaching materials to attract the attention and interests of students and can develop the potential of students to become independent learners.

Science process skills is a fundamental capability that is owned, controlled and applied with a scientific activity, so that scientists can discover something new that involves process skills intellectual skills, manual and social. These skills are seen when students use their minds, the involvement of students in the use of tools and materials and the processes of students when interacting with others [10]. Therefore, with the learning media pocket book is expected to make the students have the skills as well as an excellent understanding of the material for the pocket book contained material that is concise and easy to understand so that students can better optimize skills through the formula and the material is short, dense and clear.

Newton's law is a basic material that students must understand because the material contained in Newton's law includes basic things that occur in everyday events. The material contained in Newton's law is gravity, normal force, friction, rope force, centripetal force and gravitational force. Learning media pocket book on Newton's laws of material in high school physics class X is expected to provide maximum achievement in the understanding of the material index by learners. So that it can produce a human resources quality and competent because learners do not need to read the package as in the know have a thickness that is passable and time-consuming for students to understand the material and less interesting textbooks, because by using pocket book students are only required to understand the material in a brief and easier to understand. Therefore, with the learning media in the form of pocket book learners are expected to have high skills in studying science, especially in the matter of Newton's laws and can make reading time more efficiently so expect learners can more quickly understand the material.

2. Method
The research method used is to test the feasibility of the product that has been made. The feasibility test is carried out by sending a pocket book and assessment questionnaire via email to the expert validators. Validator feasibility expert testers comprised of subject matter experts, media experts, expert design and high school physics teacher. The average score of the overall score and aspects regarding the feasibility of the learning model will be categorized in the outcome criteria, while comments given about the product are described as improving the product. Data obtained from this study will be analyzed further. This analysis was conducted with the aim of learning media to know eligibility criteria have been developed pocket book. The results of this analysis then used as a reference in the revised media that have been made in order to obtain a good learning media and unfit for use the next stage. Data analysis techniques used in this research is descriptive analysis by calculating the percentage of the value of the results of the feasibility test pocket book.

$$\text{percentage} = \frac{\text{Score obtained}}{\text{Maximum Score}} \times 100\%$$ (1)

3. Result and Discussion
From this research produced a pocket book learning support that is expected to help the students learn physics with easy and fun. The stages of product feasibility resulting pocket book is as follows:

3.1. Analysis
The analysis stage underlies the design of the product. A needs analysis conducted by researchers at the time of observation. In this stage, there are several activities including:
1) Analysis of the need for a medium of learning physics. After the observations were made, the researcher could find out that students needed learning media that was more attractive, practical, effective to support the needs of students 'learning media, and increased interest in students' learning independence.
2) Class X physics curriculum analysis. This analysis is used as a basis for development of Learning media. This analysis was conducted to determine the basis for the development of learning media.
In teaching and learning activities, this development is expected to be able to assist in delivering material. In addition, the development of learning media in the form of a physics pocket book is expected to be able to help students make it easier to apply concepts, understand concepts, and analyze concepts through several tricks and concise methods in the pocket book. This curriculum analysis includes material in accordance with the applicable syllabus, in physics class X semester II the material taught is: Newton's Laws, Newton's Law of Gravity, Work and Energy, Momentum and Impulses, and Harmonious Vibrations. These materials require practical explanation and practice questions. Pocket Book material adjustments are made to the context of learning that directs students to be more independent and confident in their abilities.

3.2. Design
In this second phase create processes underlying the draft Pocket Book. The results of the analysis are used as a reference in preparing a content framework for the learning media program. Program content framework to describe the overall content of the material, including:

1) Analyzing the material to be displayed. The material section is the part that contains the subjects contained in the physics material for class X in the second semester. It includes subject matter being taught, such as mechanics motion (Newton's law), Newton's Law of Gravity, Enterprise and Energy, Momentum and Impulse, Harmonious Vibrations. Based on the first stage of analysis, the following pocket book designs and designs are obtained:

| No. | Design | explanation |
|-----|--------|-------------|
| 1.  | Physical shape | Book with A6 size and color print |
| 2.  | Theory | Newton's laws, Newton's laws and gravity, work and energy, momentum and impulses, harmonic vibrations. |
| 3.  | Language | Indonesian |
| 4.  | Part | a. Introduction: foreword, table of contents b. Content Section: Presentation of material, sample questions, practice questions, tricks, and flash info. c. Closing: said the author, bibliography |
| 5.  | Function | As an independent learning medium both in class and outside the classroom. |

2) In the second stage, the Pocket Book was created in the following stages:
   a) Material and questions in the pocket book are summarized from several reference books.
   b) Researchers compile material to be presented in a pocket book using Microsoft Word.
   c) The final stage of preparing the pocket book is converting it into PDF format.
   d) Pocket book assessment using the validation method through several experts.
   e) Revise the results of the expert judgment.
   f) Print a pocket book.

| Competency Standards | Theory |
|----------------------|--------|
| 1.1 Analyze the interaction of force and the relationship between force, mass and straight motion of objects and their application in everyday life. | Newton's Law: • Newton's laws of motion • Application of Newton's Laws in everyday occurrences |
| 2.1 Analyze the regularity of motion of the planets and satellites in their solar system based on Newton's laws. | Newton's laws of gravity: • The gravitational force between particles • Strong gravitational field and gravitational acceleration Keppler's Law |

Table 1. Learning media design in the form of a pocket book

Table 2. The composition of the pocket book material for class X high school physics
3.1 Analyze the concepts of energy, work (work), business relationships (work) and energy changes, the law of conservation of energy, and their application in daily events.

4.1 Applying the concepts of momentum and impulse, as well as the law of conservation of momentum in everyday life.

5.1 Analyze the relationship between force and vibration in everyday life.

Work (work) and energy:
- Kinetic energy and potential energy (gravity and spring)
- The concept of business (work)
- The relationship of effort (work) and kinetic energy
- Business relationship (work) with potential energy
- The law of conservation of mechanical energy

Momentum and Impulse:
- Momentum,
- Impulses,
- The collision is perfectly resilient, partially resilient, and not resilient

Harmonious Vibration:
- Characteristics of harmonic vibrations (deviation, velocity, acceleration, and restoration force, mechanical energy conservation law) in pendulum swings and spring vibrations
- Equations of deviation, velocity and acceleration

3.3. Validation

Is the realization of design activity in the manufacturing of pocket media. After Pocket book has been created the next step is to test the feasibility. In this feasibility test phase products are assessed by experts. In the validation study media distributed to expert assessment consists of three lecturers and two high school teachers. The results of the expert validation are as follows:

| No | Validator          | Value | Criteria |
|----|-------------------|-------|----------|
| 1. | Material Expert   | 84%   | Good     |
| 2. | Media Expert      | 70%   | Enough   |
| 3. | Designers         | 64%   | Less     |
| 4. | High School I Teachers | 88% | Good     |

This research has resulted in physics teaching media in the form of print media for teacher in X class senior high school the second semester. In the learning process, education must be carried out as
well as possible to obtain maximum results. The use of teaching materials is very limited, only used during the teaching and learning process. This is because the availability of books does not match the number of students. The use of worksheets in the learning process makes students feel bored with a very unattractive and boring appearance. Therefore, researchers developed a pocket book learning media that was formed in such a way as to a practical appearance that made it easier for students to study anywhere. With this pocket book, students can understand the material presented and can motivate and foster students’ interest in the physics learning process. Pocket book is a pocket book that has a small size, light weight, practical to carry anywhere, and can be read anytime. Through the Pocket Book learning media, it is hoped that it can be a way out so that the learning process is getting better and students can easily understand the material presented.

Learning using a pocket book is better because students can quickly understand and reason questions through sample questions and discussions that are presented briefly, practically, and efficiently. In addition, learning using a pocket book can be a solution for students so they don't have to carry thick and boring textbooks, because the pocket book which is designed with an attractive design is expected to attract students to learn in a more attractive and attractive way exciting. This research has several stages, which are described in the next paragraph.

In this early stage, the researcher needs to analyze students' learning media, analyze students' memory, analyze students' independence in learning, and analyze the material determined based on the 2013 curriculum. At this stage has been carried out by observation in the form of interviews with students and teachers to get information from various sources of existing problems to be hypothesized. The next stage is the design stage, at this stage the researcher compiles the products and content of learning media which, and language can be easily applied by students. This stage is done by creating material, sample questions, practice questions and information about physics. Then, it is evaluated first stage of materials expert and techniques to determine the feasibility of such products to be validated. The next stage, learning media products are tested for validation by expert lecturers and physics teachers at schools to determine the feasibility percentage range of the product (pocket book). Suggestions and comments on the results of the validation is used as reference in improving instructional media product.

The feasibility test of this pocket book learning media is examined by experts both in the fields of physics, design, and education practitioners (senior high school physics teachers). The results of the feasibility test that have been carried out by the acquisition of scores from media experts are 70% with details of a score of 35 out of 50, and the material is 84% with details of a score of 21 out of 25, then design experts are 64% with details of a score of 16 out of 25, while high school physics teachers get the acquisition of a proportion of 88% with a detailed score of 22 out of 25. In the validation results, it can be seen that the average expert has given his opinion about the product made so that the level of validation of the physics pocketbook learning media in total shows an average of 76.5% and is interpreted properly for realized in students.

4. Conclusion
Based on the discussion of the research results, the results of the product media expert test were quite good with a proportion of 70%, the material expert test was declared good with a proportion of 84%, the product design expert test was not good with a proportion of 64% and by education practitioners namely high school physics teachers declared good with a proportion of 88%. So that the overall feasibility of the product is 76.5% in the good category. So it can be concluded that the pocket book of Newton's law material on Physics for class X senior high school students is in accordance with the appropriate syllabus and is suitable for use as a supporting book for learning Physics.

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