Development of a Pocket Book Based on Mind Mapping on Material Classification of Class VII Living Things

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Abstract: *The presence of learning media in teaching and learning activities has an important meaning. This study aims to develop a pocket book media based on mind mapping on class VII living things classification material. This research uses the ADDIE development model (Analysis, Design, Development, Implementation, Evaluation). Data collection was carried out using a validated questionnaire for material experts, linguists, media experts, and student response questionnaires. The results showed that the developed mind mapping-based pocket book media scored 85% for the media aspect (very feasible), 85% for the language aspect (very feasible), and 94% for the material aspect (very feasible). While the results of student responses used 2 development trials, namely small-scale trials of 90.96% (Very Positive) and large-scale trials of 92.41% (Very Positive). It can be concluded that the pocketbook media developed is very feasible and gets a very positive response from students so it can be used in learning class VII living things classification material.*

Keywords: *ADDIE, Develop, Mind Mapping, Pocket Book*

1. INTRODUCTION

Education is an effort to prepare the younger generation to welcome and face the times in the global era. Education must be carried out as well as possible to produce quality education and improve human resources. Technological developments affect the field of education. The learning process is inseparable from the media, methods, and learning outcomes. Media can be used as a means of providing educational material delivered by teachers to students (Nurrita, 2018). Learning media are all forms of communication tools that can be used to convey information from sources or teachers to students to stimulate them to participate in learning activities as a whole, and can also be used to convey certain parts of learning activities. The presence of learning media in teaching and learning activities has an important meaning. The use of instructional media can make it easier for students to understand the subject matter explained by the teacher. Broad material will be more easily accepted by students through the learning media used (Batubara, 2021).

Based on the results of interviews with science subject teachers and students at SMP Negeri 1 Ngabang, in the learning process, the teacher still uses learning media in the form of LKS, PPT, learning videos, and textbooks recommended by the government to support the learning process. Textbooks used by students and teachers are relatively large, making them difficult to carry and the reading descriptions on each page are relatively long. Most of these books use a few pictures and colors so that they have an unattractive appearance. One of the efforts to overcome this problem is the need for an innovative media that can be used by students in learning, namely learning media that is simple but of good quality so that it is more useful in

achieving learning objectives, namely pocket books based on mind mapping which is designed attractively and practically.

According to Ranintya Meikahanna and Erwin Setyo Kriswanto (2015) pocketbooks are small books that contain writing and pictures in the form of explanations that can direct or give instructions about knowledge and are easy to carry anywhere.

The size of a pocketbook in this study adapted from research by Lestari & Aman (2018) the size of a pocketbook in his study was 9 x 12cm, the reason the researcher chose this size was that the ideal size was by pocket size.

Extensive learning material will be easier for students to understand by constructing the material into an idea in the form of a mind map. Based on the research that has been done, it can be seen that the use of mind mapping can increase learning outcomes by 6.22 (Astuti et al., 2013).

Mind mapping is a way of recording learning material that makes it easier for students to learn. Mind mapping can also be categorized as a creative note-taking technique, categorized into a creative note-taking technique because making mind maps requires the use of the creator's imagination. With mind mapping, long lists of information can be turned into colorful, very organized, and easy-to-remember diagrams that work in harmony with how the brain works in doing various things (Fadhilaturrahmi, 2017).

This study aims to determine the feasibility of mind mapping-based pocketbook learning media on living things classification material and to determine student responses to mind mapping-based pocketbook learning media on living things classification material.

2. RESEARCH METHODOLOGY

The method used in this research is development research which produces learning media products in the form of pocketbooks based on mind mapping on Classification of Living Things material for science subjects in class VII.

Educational development research includes the development process, product validation, and product trials. Through development research, researchers are trying to develop a product that is effectively used in learning. The ADDIE development model consists of five stages which include analysis, design, development, implementation, and evaluation (Sugiyono, 2015).

According to the mind mapping-based pocketbook media development model, the mind mapping-based pocketbook development procedure consists of 5 stages starting from the analysis stage, the main activity is analyzing the need for developing new learning media and analyzing the feasibility and requirements for developing new learning media at the analysis stage, data obtained from interviews and observations. Furthermore, the design stage is to design and manufacture media and assessment questionnaire instruments.

After the media has been designed, then the development stage is carried out, namely product validation by the validator. Based on the results of the development stage, only then can the product be declared feasible and can proceed to the implementation stage, namely implementing the product in schools. At this stage, trials were carried out 2 times, namely, small-scale trials and large-scale trials. After being implemented in schools, the next activity is evaluation.

Data was obtained through validation sheet questionnaires and student response questionnaires. In the product validation stage, the questionnaire contains columns that show its level. Questionnaire answers using a Likert scale with five categories of choices, namely number 5 strongly agree, 4 means agree, number 3 means enough, number 2 means disagree, and number 1 means strongly disagree. Data analysis was carried out based on the results of the instrument assessment questionnaire with a Likert scale. The formula used to calculate the expert validation questionnaire is as follows:

$$Eligibility = \frac{\sum score\ obtained}{\sum total\ score} \times 100\%$$

The length of the interval obtained is 16% with a minimum percentage of 20% then it is obtained:

Table 1. Instrument assessment qualification level

Score In Percent(%)	Eligibility Category
20 - 36	Very Unworth It
36 - 52	Not Feasible
52 - 68	Enough
68 - 84	Worthy
84 - 100	Very Worth It

(Ahyar et al., 2020)

The student response questionnaire used in this study used a Gutman scale with 2 rating scales, namely Yes (Y) and No (T). With the condition that Yes (Y) gets a score of 1 and No (T) gets a score of 0. The formula used to calculate the student response questionnaire is as follows:

$$\text{Eligibility} = \frac{\sum score\ obtained}{\sum total\ score} \ x\ 100\%$$

Interpret the percentage of respondents' responses with the following criteria:

Table 2. Students' interpretation criteria

Score In Percent(%)	Response Category
0-20	Very Negative
21-40	Negative
41-60	Normal
61-80	Positive
81-100	Very Positive

Data was collected using a material expert validation questionnaire, a media expert validation questionnaire, a linguist validation questionnaire, and a student response questionnaire. In the following, the validation questionnaire grid and student response questionnaire grid are presented in Table 3, table 4, table 5, and Table 6.

Table 3. Material validation questionnaire grid

Indicator	Assessment item	Question number
Compatibility of Material with KI and KD	Material Completeness	1
	Breadth of material	2
Content	Encourage curiosity	8

Indicator	Assessment item	Question number
	Accuracy of notations, symbols, and icons	6
	Material breadth	2
	Material equipment	1
	The suitability of the material with biology	7
	Accuracy of concepts and definitions	3
	Accuracy of examples and illustrations	4
	accuracy of terms	5
Drive Desire	Creates the ability to ask questions	9

Table 4. Media Validation Questionnaire Grid

Indicator	Assessment item	Question number
Teaching Material Size	The appropriate size of teaching materials	1
	Appropriate size with material/content.	2
Teaching Material Cover Design	The appearance of the layout elements on the cover is consistent.	3
	The letters used are attractive and easy to read.	5
	The colors of the layout elements are self-explanatory	4
	Image layout consistency	7
	Do not use a combination of fonts.	6

Indicator	Assessment item	Question number
Instructional Material Design	Spacing between text and illustrations is appropriate	9
	The separation between types of paragraphs is clear	8
	The placement of Titles, subtitles, and illustrations is appropriate	10
	Mind mapping helps clarify content/material.	11

Table 5. Language Validation Grid

Indicator	Assessment item	Question number
Straightforward	Terms of Consistency	3
	Sentence Structure Determination	1
	Sentence Effectiveness	2
Communicative	Understanding Of Messages Or Information	4
Dialogic and Interactive	Ability to Motivate Learners	5
Compatibility With Language Rules	Grammatical Accuracy	6
Use of Symbol Terms	Consistency in Symbol Use	7

Format	Clarity of Mind Mapping, Images, and Language Used	2	1
Relevance	Usefulness And Compatibility With Student Needs	3, 6	4
Interest	Curiosity	9	-
Satisfaction	Positive feelings towards the learning experience that is carried out	10	7
Self-confident	Positive Expectations After Using Media	8	5

3. RESULTS AND DISCUSSION

This study uses research and development (R&D) methods. According to Sugiyono (2015) research and development methods are used to produce certain products and test their effectiveness of these products. The development of this mind mapping-based pocket book media is following the ADDIE development procedure developed. According to Puspasari & Suryaningsih (2019), the ADDIE model is a model that is often used for instructional development, this model can also be used for various forms of developing learning media products. Likewise with the opinion of Hadi & Agustina (2016) saying that the ADDIE model is simple in its procedures, but its implementation is systematic. The ADDIE model consists of 5 stages, namely Analysis, Design, Development, Implementation, and Evaluation.

This study aims to produce learning media in the form of mind mapping-based pocketbooks that meet the eligibility aspects and student responses. The followings are the results and

Table 6. Student Response Questionnaire Grid

Aspect	Indicator	Declaration Number	
		Positive	Negative

discussion of each stage of development that has been carried out:

Analysis Stage

Based on observations and the results of interviews conducted with biology teachers and class VII students at SMP Negeri 1 Ngabang, the media used in class are science textbooks, worksheets, videos, and power points. Students like interesting learning media, especially if there are lots of pictures, that are concise and practical.

In the analysis stage, the main activities are analyzing the need for developing learning media and analyzing the feasibility and requirements for developing new learning media (Sugiyono, 2015). The analysis phase aims to identify problems that occur during the learning process. The things that are done in the analysis stage are (1) syllabus analysis, (2) analyzing learning resources, and (3) analyzing student needs.

Design Stage

The design stage aims to design learning media. This stage consists of 2 steps, namely the preparation of a research instrument in the form of a learning media validation questionnaire for material experts consisting of 3 assessment indicators containing 9 assessment items, media experts consisting of 3 assessment indicators consisting of 11 assessment items, and linguists containing 5 assessment indicators, as well as a student response questionnaire consisting of 5 indicators and containing 10 statement items.

Then the preparation of a pocket book learning media design based on mind mapping material for the classification of living things with a size of 9 x 12 cm (Lestari & Aman, 2018) and following the format of a pocket book according to (Muhammad et al., 2015). The following is a display of the developed pocketbook design:
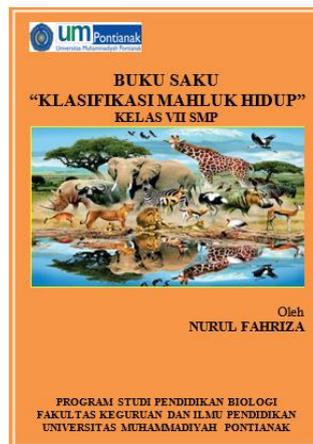

Figure 1. The developed mind mapping-based pocket book cover design.

Figure 2. Basic competencies and learning indicators will be discussed in the pocketbook learning media.
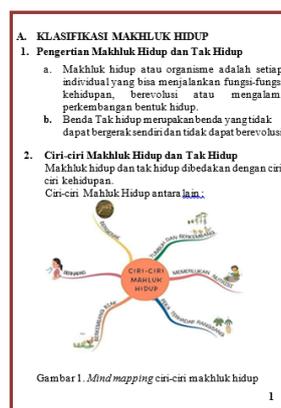

Figure 3. The main part of the pocketbook contains material on the classification of living things, which is complemented by a mind-mapping image for each sub-material.
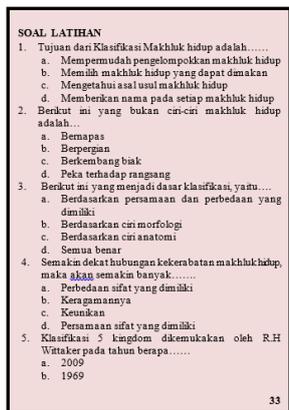
Figure 4. The back of the pocketbook is equipped with practice questions containing 10 multiple-choice questions.

Development Stage

The third stage of the ADDIE development model is the development or development stage. At this stage, learning media began to be developed according to the results of the analysis and design stages. The development stage is carried out by making media using the components, tools, and materials that have been described at the design stage. This is following Irwan, et al (2014) the development stage is the stage where all materials or components collected from both the analysis and design stages are collected together and converted into ready-to-use media.

This stage aims to see how far the feasibility of the pocketbook learning media has been designed. After obtaining a feasibility assessment, the pocketbook learning media was revised according to the validator's criticisms and suggestions. The validation of the pocketbook learning media was carried out by 9 validators consisting of 3 media experts, 3 language experts, and 3 material experts. Based on the results of the assessment given by experts, the following results were obtained:

Table 7. Expert Assessment of Mind Mapping-Based Pocket Book Media

Rating Aspects	Eligibility Average (%)	Criteria
Media	85	Very Worth It
Language	85	Very Worth It
Material	94	Very Worth It

The results of the experts' assessment show that mind mapping-based pocket book learning media is very appropriate to use. The average percentage for media aspects is 85%, language aspects are 85%, and material aspects are 94% (Table 7).

The results of the validation of mind mapping-based pocket book learning media as a whole, the experts obtained an average of 88.33% in the very decent category. A more complete explanation is as follows:

a. Media expert

Media expert validation is carried out to determine the suitability of the display of the learning resources that have been produced. According to Sofiyana, et al (2016), media expert validation will be very helpful in assessing whether the developed media is appropriate and does not need to be revised.

The results of media expert validation were carried out to determine the feasibility of the media from the media aspect. The aspects assessed are design and appearance. Feasibility from the media aspect obtains an average score of 85% in the very feasible category because it is following Sudaryono's theory (2013) which says that the acquisition of eligibility ≥ 81% can be said to be very feasible.

b. Linguist

Assessment by linguists agreed with Alwi, et al (2003) language in fiction or learning media must use standard language.

The results of linguist validation were carried out to determine the feasibility of the language used in mind mapping-based pocket book learning media. Feasibility from the language aspect obtained an average score of 85% with a very decent category, according to Muna, et al (2017) the results of the percentage of each item are said to be valid if the results obtained are in the range of 81% -100%, 61% -80%, or the range 41-60%, namely on very valid criteria.

c. Material expert

The purpose of material expert validation is to determine the suitability and suitability of the content aspects of the material content of the product being developed whether it is by learning needs or not.

The results of the material expert validation were carried out to determine the feasibility of the material in terms of the

concept of the material and conformity with the Competency Standards. Feasibility from the material aspect obtains an average value of 95% with a very feasible category. According to Bintiningtyas and Luffi (2016), media is said to be valid if it is in the range of ≥ 61%.

Implementation Stage

The implementation stage is a step to apply learning media that has been developed and arranged in such a way that it can be implemented to the target (Budiarta, 2016). After being deemed feasible, the pocketbook that was developed was then tested to find out student responses to mind mapping-based pocketbook learning media.

To find out the results of student responses to learning media can be seen through the responses of the trial subjects filling out student response questionnaires. Product trials were carried out 2 times, namely small-scale trials and large-scale trials. According to Mulyatiningsih (2012), it is important to do a small-scale trial first to anticipate errors that can occur during the actual implementation of the model, as well as to analyze the constraints that may be encountered and try to reduce these constraints when implementing the next model.

According to Prayitno (2017), small-scale trials were carried out using 20% of the number of students, namely 48 class VII students out of a total of 240 students, and large-scale trials using 50% of the number of students, namely 120 class VII students out of a total of 240 students.

Table 8. Small-Scale Trial Results

Indicator	Respons (%)	Criteria
Clarity of mind mapping, images, and language used	95,83	Very Positive
The usefulness of pocketbooks based on mind mapping and compatibility with students' needs	94,44	Very Positive
Curiosity about the material contained in the pocketbook	79,16	Positive
Positive feelings about the learning experience carried	93,75	Very Positive

Indicator	Respons (%)	Criteria
out using a pocketbook		
Positive expectations after using Pocketbook media	91,66	Very Positive
Average	**90,96**	**Very Positive**

Table 9. Results of Large-Scale Trials

Indicator	Respons (%)	Criteria
Clarity of mind mapping, images, and language used	95	Very Positive
The usefulness of pocketbooks based on mind mapping and compatibility with students' needs	89,16	Very Positive
Curiosity about the material contained in the pocketbook	91,66	Very Positive
Positive feelings about the learning experience carried out using a pocketbook	92,5	Very Positive
Positive expectations after using Pocketbook media	93,75	Very Positive
Average	**92,41**	**Very Positive**

Student responses in small-scale trials to mind mapping-based pocket book learning media obtained an average score of 90.96 (very positive) (table 8) and student responses in large-scale trials to mind mapping-based pocket book learning media obtained an average score average 92.41% (very positive) (table 9), meaning that mind mapping-based pocket books received a very positive response from students according to Riduwan's theory (2013).

Evaluation Stage

Evaluation is the final stage of the ADDIE development stage. After the implementation stage was carried out, it was known that students' responses to the mind mapping-based pocket book learning media that had been developed, were then evaluated if there were deficiencies in the learning media (Safri, 2017).

Evaluation results are used to provide feedback on the development of teaching materials. Then revisions are made by the evaluation results or needs that have not been met by the objectives of developing teaching materials (Hari, 2019). From the implementation results, it is known that student responses to mind mapping-based pocket book learning media are in a very positive category, so no evaluation or improvement is needed, because according to Pawana, et al (2014) what is done at the evaluation stage is product improvement based on the results of the implementation of learning media developed.

CONCLUSION

Based on the research and development results, several conclusions were obtained, namely, the mind mapping-based pocket book learning media fulfilled the eligibility aspect on the media aspect of 85% (Very Worth it), the language feasibility aspect obtained an average score of 85% (Very Worth it), and the material aspect received an average score -average 94% (Very Worth it). Data was obtained which stated that the validator gave a very appropriate response to the development of mind mapping-based pocket book learning media. And student responses to mind mapping-based pocket book learning media obtained results in small-scale trials with an average value of 90.96% (Very Positive). In large-scale trials, an average value of 92.41% (Very Positive) was obtained. From the data obtained, it can be stated that the respondents gave a very positive response to the mind mapping-based pocket book learning media.

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