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Development of magic box learning media material circulatory system Class XI SMAN 16 Bulukumba

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Abstract: The goal of teaching strategies and instructional materials is to engage students in active, imaginative learning. This research aims to: 1) Create Magic Box learning materials for class XI circulatory system content at SMAN 16 Bulukumba by employing the ADDIE model; 2) Determine the level of validity of Magic Box learning materials for class XI circulatory system content at SMAN 16 Bulukumba; 3) Be aware of the practicality of Magic Box learning materials for class XI circulatory system content at SMAN 16 Bulukumba; and 4) Be aware of the level of validity of Magic Box learning materials for class XI circulatory system content. The ADDIE (analysis, design, development, implementation, and evaluation) development model is utilized in this type of research and development. Validity, practicality, and effectiveness were evaluated throughout the product development process. Twenty two (22) XI SMAN 16 Bulukumba students served as the subjects. The product's validity was assessed using a media validation sheet, the product's practicality was assessed using responses from students and educators, and the product's efficacy was assessed using a learning outcomes test. The validity level of the data was 3.8, which means it is very valid. The practicality level of the responses was 3.7, which means it is very practical. Students who took the Magic Box learning outcomes test scored 82%, which means it is very effective. According to the findings of the research, Magic Box learning materials should be used because they meet the requirements of being valid, useful, and effective.

Keywords: learning media, magic box, research and development

Abstrak: Metode pengajaran dan perangkat pembelajaran bertujuan untuk menjadikan siswa aktif, kreatif, dan menyukai suatu pelajaran. Penelitian ini bertujuan untuk: 1) Memahami tingkat validitas media pembelajaran Kotak Ajaib pada materi sistem peredaran darah kelas XI di SMAN 16 Bulukumba, 2) Memahami tingkat kepraktisan media pembelajaran Kotak Ajaib untuk materi sistem peredaran darah kelas XI di SMAN 16 Bulukumba, dan 4) Memahami tingkat validitas materi media pembelajaran Kotak Ajaib sistem peredaran darah kelas XI di SMAN 16 Bulukumba. Model pengembangan ADDIE (Analisis, Desain, Pengembangan, Implementasi, dan Evaluasi) digunakan dalam penelitian ini. Uji validitas, kepraktisan, dan keefektifan semuanya digunakan dalam pengembangan produk. Penelitian ini mengikutsertakan 22 siswa kelas XI SMAN 16 Bulukumba. Instrumen penelitian terdiri dari butir tes, lembar validasi media untuk mengumpulkan data keefektifan produk, angket respon siswa dan pendidik terhadap mengumpulkan data kepraktisan produk, dan soal tes untuk mengumpulkan data validitas produk. Berdasarkan evaluasi tanggapan pendidik dan siswa, media yang dikembangkan memiliki tingkat validitas 3,8 (sangat valid), tingkat kepraktisan 3,7 (sangat praktis), dan tes hasil belajar siswa yang menggunakan media pembelajaran Kotak Ajaib mencapai 82% (sangat efisien), sehingga media pembelajaran Kotak Ajaib dapat digunakan karena memenuhi persyaratan yang valid, berguna, dan efisien.

Kata Kunci: *magic box*, media pembelajaran, penelitian dan pengembangan

Introduction

Education is a process to mature humans. Through education, humans can grow and develop naturally and perfectly so that they can carry out their duties as humans and have good self-respect. (Nurdin & Imam, 2017). In addition, at the individual level Education helps students learn and can assist educators in teaching (Nurkholis, 2019). Learning is an effort marked by a change in a person as a result of the learning process that can be used as a form of adding knowledge, understanding, attitudes, behavior, skills, skills, and abilities that exist in each individual or student (Dimyanti & Mudjiono, 2002).

Teaching is an activity of educators in an effort to educate, increase knowledge, and as learning material so that it creates a very effective learning process for students. (Agung & Sri, 2013). Learning

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tools and teaching methods will determine the success of educators. Teaching methods and learning tools aim to make students active, creative and like a lesson (Alwi, 2013).

Learning media is media that aims to convey messages and contains the aim of giving lessons to someone. So that the learning process is more fun, effective, and efficient (Wibawanto, 2017). One of the fun, effective and efficient learning media is the Magic Box learning media. Magic Box learning media is a learning media in the form of a box or cube in which there is a picture card on each side, each of which has a different color with a number of questions related to the picture. In addition, in the box there is still a small box that is divided into four parts containing questions in the form of cards. Based on research conducted by Dyani (2019) which states that the Magic Box learning media can increase students' interest in learning.

Based on the results of observations at SMAN 16 Bulukumba school, in the implementation of the learning process carried out by teachers so far only using textbooks and worksheets, there are no other types of media that support the learning process in class, and in the learning process students often feel bored, as evidenced by students do activities outside the subject matter. Therefore, researchers are interested in developing learning media in the form of Magic Box media with the advantages described previously.

Materials and Methods

This type of research is research and development Research of development. Development research is one type of research that aims to produce a product, concept, method, program or method that can simplify the problems faced by humans. The research carried out is to develop Magic Box learning media. The research location is SMAN 16 Bulukumba. The product trial was carried out in class XI MIA as many as 22 students.

The ADDIE model is combined with a learning device development model in this study (Hanafi, 2017). There are five (five) stages in the ADDIE model: analysis, design, development, implementation, and evaluation (Arofah, 2019). The literacy sheet was used as the research instrument to create learning media.validation sheet to collect validity data from media experts and material experts on the Magic Box media that was developed. Then, educators and students responded to a questionnaire to collect data about how students and educators use Magic Box media products.The Magic Box learning media's effectiveness is evaluated using a learning outcomes test. (Saepul & Baharuddin, 2014). A validity, practicality, and effectiveness level test were used to implement the data collection strategy. The validator evaluates the validity test. Table 1 shows the category of validity.

$$Ai=\frac{\Sigma_{i}^{n}=1\ Kij}{n}$$

Information:

$\overline{Ai}$ = Average aspect-i

K_{ij} = Average for the i-th aspect

N = The number of criteria in the i-th aspect.

Table 1. Validity Criteria

Score	Criteria
V > 3.4	Very valid
2.8 ≤ V ≤ 3.4	Valid
2.2 ≤ V ≤ 2.8	Quite Valid
1.6 ≤ V ≤ 2.2	Not Valid
V ≤ 1.5	Invalid

The practicality test of the media can be measured based on the results of the questionnaire response of educators and students. The practicality category can be seen in Table 2.

$$\bar{x} = \frac{\sum_j^n = o^{Ai}}{\text{n}}$$

Information:
X = Total Average
Ai = Aspects average
N = Many aspects

Table 2. Criteria level of practicality

Score	Criteria
3.5 ≤ X ≤ 4	Very practical
2.5 ≤ X ≤ 3.5	Practical
1.5 ≤ X ≤ 2.5	Not practical
O ≤ X < 1.5	Impractical

The test of the effectiveness of the media is measured based on the test of student learning outcomes. Learning is said to be classically successful if at least 80% of students achieve a complete score. The category of effectiveness level can be seen in Table 3.

$$\text{N} = \frac{\text{B}}{n} \times 100\ \%$$

Information:
N = Values obtained by students
B = Correts number of questions
N = The number of question items

Table 3. Criteria for the level of effectiveness

Score	Criteria
> 80	Very effective
> 60-80	Effective
> 40-60	Effective enough
> 20 – 40	Less effective
≤ 20	Very less effective

Result and Discussion

Using the ADDIE model, this study aims to develop Magic Box learning materials that satisfy the valid, practical, and effective criteria for circulatory system content in class XI of SMAN 16 Bulukumba. There are five stages in the ADDIE learning model: analysis, design, development, implementation, and evaluation. The following are the outcomes of the completed development stages.

A. Stages of Analysis

The first stage of the research is this one identifying the needs of class XI SMAN 16 Bulukumba, such as the media used in the learning process, and analyzing the needs in terms of the characteristics of students is the primary activity at this stage. However, dominant students have a visual learning style in which they are interested in and enjoy diversely colored and image-rich content, and their interest in learning is enthusiastic and varied. Playing learning media can make learning more enjoyable and less monotonous, but students need learning media that are simple to use. The intended learning medium is interesting and may assist students in remaining relaxed while learning. In addition, it has the potential to increase motivation for learning and exert psychological influence over learning (Falahuddin, 2014).

After that, the needs of the researchers were looked at and interviewed by biology teachers for class XI MIA during the data collection stage. He stated that he still required educational media that could engage all students in learning activities. Furthermore, the analysis of learning objectives in accordance with basic competencies (BC) and indicators, namely the material Circulatory system BC 3.6, which is to analyze the relationship between the structure of the tissue making up organs in the circulatory system

and relate it to the bioprocess so that it can explain the mechanism of blood circulation and functional disorders that may occur in the circulatory system.

B. Stages of Design

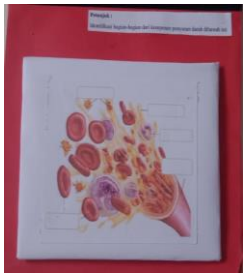
This stage is the stage for preparing learning media. The main focus is to determine learning indicators that are in accordance with the basic competencies (BC) on the material of the circulatory system. Determine the learning indicators to be achieved, design learning scenarios, design learning media, design learning materials and evaluate learning outcomes. Magic Box which is designed as a learning media using polywood. This Media Magic Box consists of two parts, namely the box section and the card section.

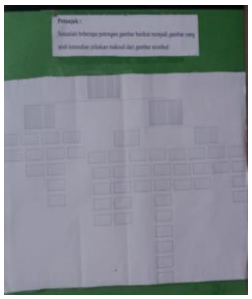
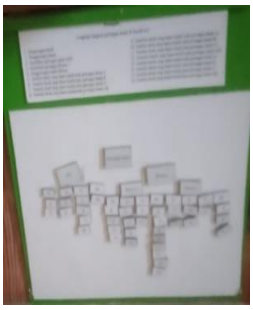
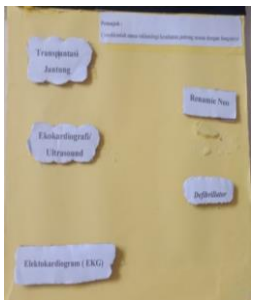
The results and discussion section contains important research findings which are described in a narrative manner. Research data need to be interpreted so that it becomes information that is easily understood by readers. The narrative in this section must cover all the variables of interest in the research. Data processing can be poured in the form of tables or images so that it is more interesting and easy to understand.

C. Stages of Development

The product in the form of prototype I was then validated by experts with the aim of assessing the developed media. Suggestions and input from the validator are then used as the basis for revising the product. After carrying out the media revision according to the suggestions, a valid prototype II was obtained to be tested. The results of the prototype I and prototype II that have been made are shown in Table 4.

Table 4. Comparison of the results of the Magic Box prototype I and prototype II

No.	Media Section	*Prototype* I (Before validation)	*Prototype* II (After validation)	Description
1.	Inside the box			There is a difference in the color arrangement of the validated Magic Box media.
2.	Red box ride			There is an image designation on the revised Magic Box media.
3.	Blue box side			There is a color difference at the edges of the revised image.

4.	Green box side			There is an adhesive and additional designation of the top corner on the revised Magic Box media.
5.	Yellow box side			There is a difference in the background color of the revised Magic Box media.
6.	Small box			There is a color difference in the center of the revised Magic Box media.

D. Implementation Stage

The fourth stage is implementation. The implementation stage of the Magic Box learning media is carried out in a large group of 22 students which then becomes 4 small groups. At this stage the Magic learning media is used as a learning medium. The implementation phase will be held on September 31, 2022, which is devoted to class XI MIA SMAN 16 Bulukumba, which is located at Ara Village, Bontobahari District, Bulukumba Regency.

Table 5 How to use Magic Box learning media

No.	Steps	Picture
1.	The rules of the game start from each group choosing a color on each side of the Magic Box.	
2.	After each group chooses a color on the side of the box then box will be opened.	

3.	After the Magic Box is opened, students are given 5 minutes to study the material on the color of the side of the box that has been selected. Then each group works together in answering the material by following the instructions at the top corne of the box.	
4.	After that, students answer the questions on the question card in the small box. This stage also involves all members of the group where each question card will be answered by one student.	

E. Evaluation Stage

The evaluation stage is a process to see if the media that has been made is in accordance with the initial expectations or not. Evaluation can occur at any of the previous stages and is called formative evaluation, because its purpose is to need revision. Meanwhile, the summative evaluation is carried out at the final stage of developing the ADDIE model. Evaluation is carried out by giving tests to students and then used as data to determine the effectiveness of the media developed by the instrument used in the form of test items. The instrument used is test items in the form of multiple choice, totaling 25 questions.

F. Media Magic Box Validity Level

The level of validity of the ADDIE development model is at the development stage because at this stage there are expert validation activities. Based on suggestions for improvement that have been given by two validators, prototype 1 is improved by referring to the suggestions for improvement and produces prototype II. Change from prototype 1 to prototype II. After making improvements to the deficiencies contained in the prototype I according to with suggestions from the validators, the resulting prototype II is then assessed by the validator. The results of the validator assessment can be seen in Table 6.

Table 6. Validator assessment results on developed media

Assessment Aspect	Rating Result	Category
Appearance	3.75	Very valid
Contents of Media *Magic Box*	3.75	Very valid
Technical quality	3.5	Very valid
Size	4	Very valid
Communicative language	3.87	Very valid
The suitability of the use of the term	3.87	Very valid
Average	**3.79**	**Very valid**

Based on Table 6, the average value of the total validity of the Magic Box learning media is 3.79 which is in the very valid category. Media Magic Box is said to be very valid because it is in accordance with Sujana's theory that if the average value of validity is in the range of 3.5 V 4. A valid product means if the learning device reflects the consistency between the parts of the learning device, the material and the assessment that will be given. In addition, the learning media is said to be valid if the learning media reflects the consistency between the parts of the learning media that are prepared and the suitability

between the learning objectives, materials and assessments that will be given (Rajib et al., 2015). A valid product means that the product is suitable for use by students and educators because it can help in the learning process.

G. The Practical Level of Magic Box Learning Media

The level of practicality of the Magic Box media can be seen from the results of student response questionnaires and educator response questionnaires. The results of the overall response can be seen in Table 7.

Table 7. Questionnaire responses of students and educators overall response results

No	Assessment type	Average	Category
1.	Students response	3.6	Very practical
2.	Educator response	3.8	Very practical
	Total average	3.7	
	Assessment criteria	Very practical	

Based on Table 7, it can be concluded that the assessment category obtained from the questionnaire responses of educators and students shows an average of 3.7 which is a very practical category. Magic Box learning media includes practical media because the use of this media can be implemented easily in the learning process. The developed learning media is said to be easy to implement because it does not require special skills in its use. The above opinion is also reinforced by the theory put forward by Irawan & Rahman (2017) which states that learning media is said to be practical if educators and students consider the media to be used so that the material is easy to understand and in accordance with the research plan.

H. The Effectiveness of Magic Box Learning Media

Data on the effectiveness of learning media can be measured from the level of student mastery of the material that has been taught. The instrument used is test items in the form of a written test with 25 multiple choice questions and 22 research subjects. The percentage of learning outcomes can be seen in Table 8.

Table 8. Completeness percentage of biology learning outcomes for class XI MIA Students of SMAN 16 Bulukumba

No.	Score	Frequeny	Percentage (%)
1.	0-74	4	18
2.	75-100	18	82
	Amount		**100**

Based on Table 8, it is known that there are 4 students who score between 0 to 74, and 18 students get a score of 75 to 100. Data on the effectiveness of the media can be measured from the level of student mastery of the material being taught. The percentage of students' completeness obtained by class XI MIA SMAN 16 Bulukumba is 82%. Based on the data above, it can be concluded that the Magic Box learning media is very effectively used in the learning process.

Based on the results obtained, the results show that the Magic Box media that has been developed by the researcher meets the very effective category. The effectiveness of using Magic Box learning media can be seen from the enthusiasm and enthusiasm of students in using learning media to answer the circulatory system quiz material. This is because the development of the Magic Box learning media that was developed contains information on the material of the circulatory system and pictures that are made simple so that it is easy for students to understand. This is in accordance with the opinion of Van and Akker in Haviz (2013) which states that product development is said to be effective if it provides results that are in accordance with the learning objectives shown by the student learning outcomes test. In addition, the media is said to be effective because it can be applied to all subjects being taught (Ikta et al., 2020). This theory is also in accordance with the opinion of Fitrah & Maksun (2021), which states that if

80% of students get scores above the KKM (Minimum Completeness Criteria) then the media is considered very good and effective to be applied in the learning process.

Based on this, it can be concluded that the effectiveness of the media developed on the circulatory system material is influenced by the Magic Box learning media which can explain learning materials in a systematic order and assist in presenting interesting materials and colors and presented in the form of games. This affects student learning outcomes because it is able to increase students' motivation and interest in learning so that they can think and analyze the subject matter provided by education well with fun learning situations and can understand lessons easily.

Conclusion

The conclusion of this research is the Magic Box learning media which was developed using ADDIE development which includes the stages of analysis, design, development, implementation, and evaluation. The level of validity of the Magic Box learning media reached an average value of 3.79 so it was categorized as very valid. The level of practicality of the Magic Box learning media reached a total average value of 3.8 so it was categorized as very practical. The level of effectiveness of the Magic Box learning media with complete learning outcomes is 82% so it is categorized as very effective.

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