

## Development of poster learning media using Pictorial Riddle method on the structure and function of plant tissue in SMA Negeri 3 Sinjai

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**Abstract:** Better learning media can encourage students to think critically and focus on learning materials. This study aims to (1) find out how to develop poster learning media with the Pictorial Riddle method on the structure and function of plant tissue; (2) find out the validity of poster learning media with the Pictorial Riddle method on plant tissue structure and function; (3) find out the practicality Poster learning media using the Pictorial Riddle method on the structure and function of plant tissue; and (4) knowing the effectiveness of Poster learning media with the Pictorial Riddle method on the structure and function of plant tissue. This research method is development research (Research and Development) which refers to the ADDIE development model which consists of 5 stages, namely: (1) Analysis; (2) Design; (3) Development; (4) Implementation; and (5) Evaluation. Product development is tested through validity test, practicality test, and effectiveness test. The subjects in this study were 26 students of class XI MIPA 2 SMA Negeri 3 Sinjai. The research instrument was a media validation sheet to determine product validity data, student response questionnaires and educator response questionnaires to obtain product practicality data, as well as test items to obtain product effectiveness data. The results showed that the developed media had a level of validity, namely 3.78 (very valid), the level of practicality was based on an assessment the response of educators and students is 3.6 (very practical), and the test of student learning outcomes using poster learning media with the Pictorial Riddle method reaches 100% with an average value of 88 (very effective). So that the poster learning media with the pictorial riddle method is feasible to use because it has met the valid, practical, and effective criteria.

**Keywords:** development, learning media, Pictorial Riddle

**Abstrak:** Media pembelajaran yang lebih baik dapat mendorong siswa untuk berpikir kritis dan fokus pada materi pembelajaran. Penelitian ini bertujuan untuk (1) mengetahui cara mengembangkan media pembelajaran poster dengan metode Pictorial Riddle pada struktur dan fungsi jaringan tumbuhan; (2) mengetahui validitas media pembelajaran poster dengan metode Pictorial Riddle pada struktur jaringan tumbuhan dan fungsi; (3) mengetahui kepraktisan media pembelajaran poster dengan metode Pictorial Riddle pada struktur dan fungsi jaringan tumbuhan; dan (4) mengetahui keefektifan media pembelajaran Poster dengan metode Pictorial Riddle terhadap struktur dan fungsi jaringan tumbuhan. Metode penelitian ini merupakan penelitian pengembangan (*Research and Development*) yang mengacu pada model pengembangan ADDIE yang terdiri dari 5 tahap, yaitu: (1) *Analysis*; (2) *Design*; (3) *Development*; (4) *Implementation*; dan (5) *Evaluation*. Pengembangan produk diuji melalui uji validitas, uji kepraktisan, dan uji keefektifan. Subjek dalam penelitian ini adalah 26 siswa kelas XI MIPA 2 SMA Negeri 3 Sinjai. Instrumen penelitian berupa lembar validasi media untuk mengetahui data validitas produk, angket respon siswa dan angket respon pendidik untuk mendapatkan data kepraktisan produk, serta soal tes untuk mendapatkan data keefektifan produk. Hasil penelitian menunjukkan bahwa media yang dikembangkan memiliki tingkat validitas yaitu 3,78 (sangat valid), tingkat kepraktisan berdasarkan penilaian respon pendidik dan siswa sebesar 3,6 (sangat praktis), dan tes hasil belajar siswa menggunakan media pembelajaran poster dengan metode Pictorial Riddle mencapai 100% dengan nilai rata-rata 88 (sangat efektif). Sehingga media pembelajaran poster dengan metode Pictorial Riddle layak digunakan karena telah memenuhi kriteria valid, praktis, dan efektif.

**Kata Kunci:** media pembelajaran, pengembangan, Pictorial Riddle

### Introduction

Education is defined as a structured effort carried out to encourage the growth of an individual or group in a superior direction. Therefore, education is then interpreted as a teaching and learning activity in which it involves active interaction between educators and students, in which this activity aims to enrich knowledge, train emotional and spiritual intelligence, build good self-management and optimize

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students' thinking and skills (Ridha & Nurhayati, 2020). Education must be able to provide alternatives through the application of strategies and concepts based on the use of diversity in society, such as ethnic diversity, culture, language, religion, social status, gender, ability, age and race (Hisnudin & Irwansyah, 2018).

According to the Law of the Republic of Indonesia, the purpose of education in Indonesia is contained in the Law on the National Education System, namely the Law of the Republic of Indonesia Number 20 of 2003 which states that the purpose of education is to develop the potential of students to become human beings who believe and fear God Almighty, have noble character, are healthy, knowledgeable, capable, creative, independent, and become democratic and responsible citizens. The importance of education has also been mentioned in the QS. Al-Mujadalah Verse 11.

يَا أَيُّهَا الَّذِينَ آمَنُوا إِذَا قِيلَ لَكُمْ تَفَسَّحُوا فِي الْمَجَالِسِ فَافْسَحُوا يَفْسَحِ اللَّهُ لَكُمْ وَإِذَا قِيلَ انشُرُوا فَانشُرُوا  
يَرْفَعِ اللَّهُ الَّذِينَ آمَنُوا مِنْكُمْ وَالَّذِينَ أُوتُوا الْعِلْمَ دَرَجَاتٍ وَاللَّهُ بِمَا تَعْمَلُونَ خَبِيرٌ ﴿١١﴾

Meaning:

*"O you who have believed, when you are told, "Space yourselves" in assemblies, then make space; Allah will make space for you. And when you are told, "Arise," then arise; Allah will raise those who have believed among you and those who were given knowledge, by degrees. And Allah is Acquainted with what you do."*

The quality of education in Indonesia is still categorized as low according to data collected by UNESCO. The quality of education in Indonesia is very concerning. Based on the data obtained, Indonesia is ranked 57 out of 15 countries (Fauzi et al., 2021). The decline in the quality of Indonesian education is influenced by various aspects, including the lack of interest in learning by students. This happens because education in Indonesia has not been able to function optimally. Therefore, education in Indonesia must be improved immediately in order to be able to give birth to a generation that has advantages in various fields so that the Indonesian people can compete with other nations and so that they are not left behind because of the fast-paced global currents (Fathurrochman et al., 2021). Based on interviews with Biology subject educators, they said that the learning media used were still limited, namely they still used package books, worksheets, and power points. Also, the learning method is still monotonous using the occasional lecture method as well as using Discovery Learning. According to students, the material that is difficult to understand is the material on the structure and function of plant tissue because the material contains many scientific terms that are difficult to understand, especially if the learning media used is also inappropriate.

From the description above, it is necessary to apply a better learning media so that it can encourage students to think critically and focus on the material. There are so many learning media that educators use in explaining the material taught during the learning process. Media that can be developed is poster media using the Pictorial Riddle method. Posters with the Pictorial Riddle method are educational media in the form of posters made with the intention of sharpening understanding, being able to improve student learning outcomes, and being able to solve problems contained in riddles or puzzles containing questions about the material (Alfi & Eko 2017).

Research related to posters with the pictorial riddle method has been carried out by several previous researchers, one of them by Indah Rizqi Kurnia Ningsih with the title "Development of Pictorial Riddle-Based Poster Learning Media to Increase Interest and Learning Outcomes of Physics in Class X SMA Negeri 1 Jogonalan" (Indah, 2018). The development still has limitations in terms of its products. The limitation is in the form, the research has not developed specifically for the material on the media but what is more prominent in the media is the evaluation. It is this limitation, so that researchers are interested in developing the same product, namely poster media which is combined with a discussion method in the form of a pariddle with a crossword model.

## Materials and Methods

This research was conducted on the date of the 2022/2023 academic year and is included in the type of research and development (R&D). This development consists of several stages, namely: Analyze phase, Design phase, Development phase, Implementation phase, and Evaluation phase. The research subjects were students of class XIMIPA 2 SMA Negeri 3 Sinjai with a total of 26 students.

Data collection techniques are in the form of validation sheets to measure the level of validity of the developed media, teacher and student response questionnaires to determine the level of practicality, and learning outcomes tests consisting of 30 numbers with your choice of questions to test the effectiveness of the media.

## Result and Discussion

### A. Poster Media Development Stage with Pictorial Riddle Method

The stages of developing poster learning media with the Pictorial Riddle method based on the Robert Maribe Branch (2009) development model which consists of several stages, namely: (1) the analysis phase, (2) the design phase, (3) the development phase, (4) the implementation phase, (5) the evaluation phase.

#### 1. Analyze phase

This activity aims to identify problems faced by educators and students in learning to be given solutions. The basic problem found at SMA Negeri 3 Sinjai is the use of learning media which is still limited because at school they still use packaged book media, worksheets, and occasionally use LCDs, so that students find it difficult to understand the material, especially material on the structure and function of plant tissue. Then, the determination of learning objectives and analysis of the characteristics of students are carried out to obtain an overview of the characteristics of students in the school. Identification of the required resources aims to determine the components needed in developing this learning media. The next stage is the preparation of a development research implementation plan. At this stage, it is planned to conduct research and development.

#### 2. Design phase

The design phase is divided into several phase, viz:

##### a. Determine learning indicators

In this study, the researchers chose basic competencies (BC) on the material on the structure and function of plant tissue for class XI SMA/Equivalent covered in BC 3.3. namely Identifying the relationship between the structure of cells in plant tissues with the function of organs in plants.

##### b. Poster media design with Pictorial Riddle method

This stage contains the design of poster learning media using the pictorial riddle method. Media Poster with this riddle pictorial method there are two design frameworks, namely designs for poster media and designs for riddles or puzzles. For posters, researchers made 9 kinds of posters with different discussions. As for the riddles, the researchers made 5 pieces of riddles or puzzles according to the number of discussion groups. The riddles will be answered by each group to hone the students' abilities after being given the material through posters.

The design of the material on the poster media begins with collecting references on the material on the Structure and Function of Tissues in Plants. After that, design the material that refers to the basic competencies and objectives of the learning activities. The material is designed into 9 posters, covering discussion of: (1) Protective tissue/epidermis, (2) Basic ground tissue/parenchyma, (3) Dicot & monocot root tissue, (4) Supporting tissue, (5) Transport tissue, (6) Dicot & monocot stem tissue structure, (7) Meristem tissue, (8) Dicot & monocot leaf tissue structure, and (9) Tissue culture totipotency. This poster is designed using the Pixlab application and then printed using art paper with A4 size weighing 220 grams, after printing the poster will then be laminated so that the media is not easily damaged and its use can last a long time.

Then for crosswords or riddles the researcher designs in Chrome by typing "puzzlemaker.discoveryeducation.com" after the riddle is finished in design in chrome, move the riddle that has been designed in Microsoft Word and then edit it as desired, after editing, the riddle is then

printed using white sturo paper with A4 paper size weighing 30 grams, with the type of letter used. New Roman, font 12. Characteristics of this Sturo paper is thick so it is not easy to tear. The content of this riddle contains questions about the material structure and function of plant tissues, which students will then answer these questions by filling in the puzzle boxes that have been provided. The number of questions contained in this puzzle is 23 questions. This activity is carried out by means of group discussions. In the questions there is already information which questions for answers are decreasing and horizontal so that it is easier for students to answer questions.

c. Designing LIP (Learning Implementation Plan)

Learning Implementation Plan as a guide for researchers to carry out the learning process using Poster learning media with the Riddle Pictorial method on the material Structure and Function of Plant tissue developed. The contents of this lesson plan have determined the learning model to be used, namely the Discovery Learning model. The media that will be used is the poster learning media with the Riddle Pictorial method. The material to be taught is material on the structure and function of plant tissue using the 2013 curriculum. In the 2013 curriculum, the learning tools consist of several things including the Education Calendar, Syllabus, RPP, LKPD, assessment instruments, teaching material books, learning media and so on. In order for the learning process to run smoothly, all these elements should be able to be completed by the teacher (Marah & Wita, 2019)

d. Designing the evaluation of learning outcomes

At this stage the researcher compiled the questions after using the Poster learning media with the Riddle Pictorial method that was developed. In this case, the researcher designed an evaluation in the form of a written tester with the type of question numbered as many as thirty questions which will then enter the validation stage to determine its feasibility so that it can be used to measure student learning outcomes in determining the level of effectiveness of the media.

### 3. Development phase

The stages in the development phase include:

a. Poster creation

Poster design begins by collecting references on the structure and function of tissue in plants. After that, relate the material that refers to the basic competencies and objectives of the learning activities. In this poster contains material on the structure and function of tissues in plants where there are 9 kinds of posters designed, including: (1) Protective tissue/epidermis, (2) Basic tissue/parenchyma, (3) Dicot & monocotyledonous structure, (4) Supporting tissue, (5) Transport tissue, (6) Dicot & monocot stem tissue structure, (7) Meristem tissue, (8) Dicot & monocot leaf tissue structure, (9) Totipotent tissue culture. These nine posters for taking pictures have several sources that researchers use, namely through pinterest and several links on google to get images that have high image quality (HD). This poster was designed using the pixlab application, using a variety of clear images related to the material on the structure and function of plant tissue, to print the research poster using art paper with A4 size weighing 220 grams.

b. Making riddles or puzzles

The crossword sheet is designed in Chrome by typing "[puzzlemaker.discoveryeducation.com](http://puzzlemaker.discoveryeducation.com)" after the riddle has been designed in chrome, move the riddle that has been designed in Microsoft Word then edited as desired, after editing, the riddle is then printed using white sturo paper with A4 paper size weighing 30 grams, with the type of letter used, Times New Romance, font 12.

c. Validation stage

The next stage is the media that has been designed by the researcher and then assessed by the expert validator. The validator consisted of two lecturers from the State Islamic University of Alauddin Makassar.



Figure 1. Basic tissue/ parenchyma



Figure 2. Tissue structure of stems of dicots & monocots



Figure 3. Dicot & monocot leaf tissue



Figure 4. Dicot & monocot root structure



Figure 5. Protective tissue/ epidermis



Figure 6. Transport tissue

# Jaringan Meristem

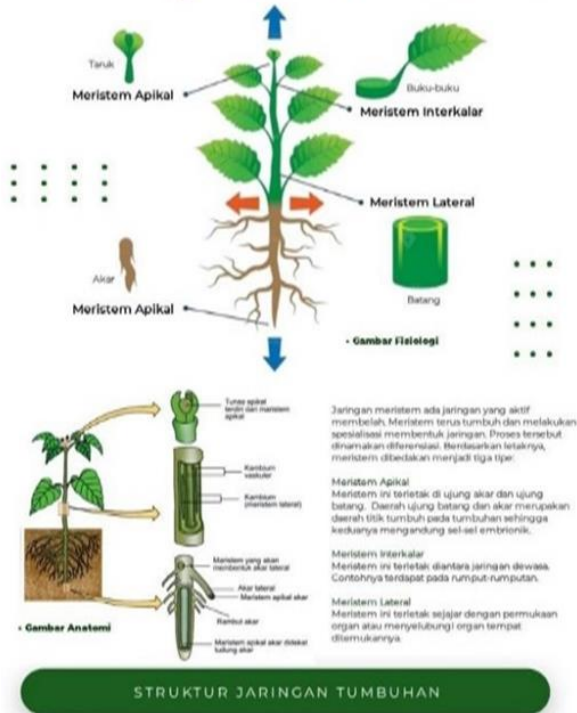


Figure 7. Meristem tissue

# Jaringan Penyokong

Jaringan penyokong adalah jaringan tumbuhan yang berfungsi untuk menyokong tubuh tumbuhan. Jaringan penyokong memberikan bentuk dan stabilitas pada tumbuhan. Jaringan penyokong membuat tumbuhan memiliki bentuk dan mempertahankan bentuknya walau terjadi gangguan dari lingkungan luar.

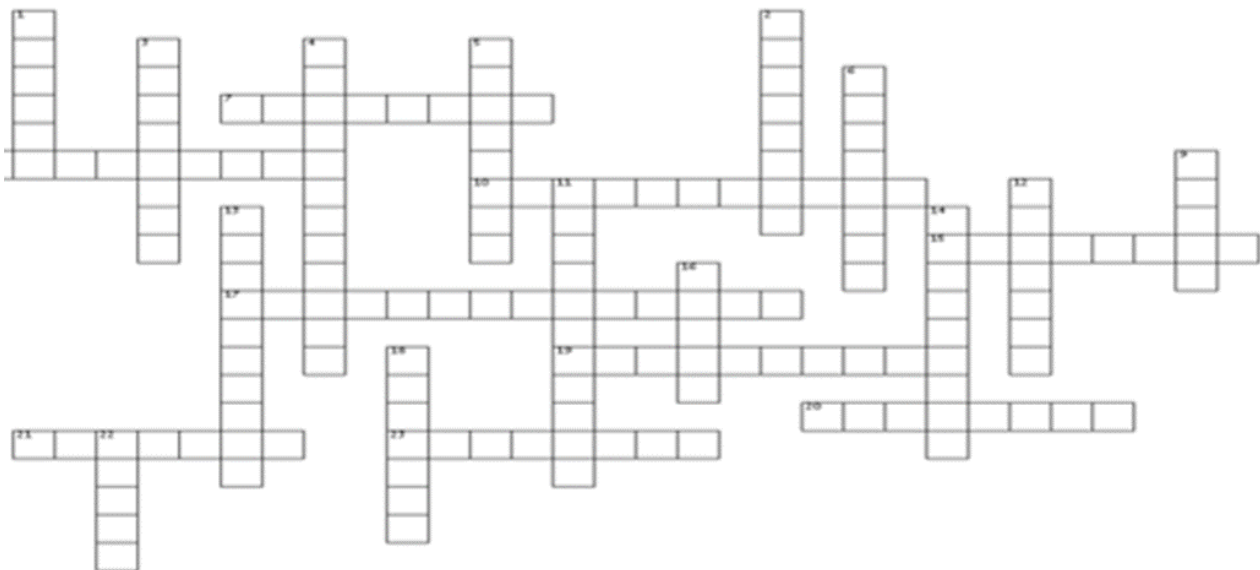


Figure 8. Supporting tissue



Figure 9. Totipotency

| **TEKA TEKI SILANG BIOLOGI**  
**MATERI STRUKTUR DAN FUNGSI JARINGAN TUMBUHAN**



**MENDATAR**

7. Lapisan pelindung pada seluruh sistem tajuk (bagian tumbuhan yang berada di atas tanah) tumbuhan herba
8. Bagian dari plastid yang mengandung klorofil
10. Kemampuan sel atau jaringan untuk tumbuh menjadi individu baru
15. Lapisan sel yang tepat berada di dalam lapisan endodermis
17. Pengangkutan yang terjadi di luar berkas pembuluh
19. Jaringan meristem yang terletak di tiap buku tumbuhan
20. Kumpulan sel disebut
21. Jaringan yang ditemukan di bagian dalam daun, tersusun dari sel parenkim fotosintetik, yang disebut sel klorenkim
23. Jaringan yang masih aktif membelah

**MENURUN**

1. Jaringan meristem yang terletak di ujung akar dan batang
2. Jaringan pengangkut yang terdiri dari floem dan xylem
3. Keadaan jaringan tumbuhan pada daun yang mengalami kerusakan dalam pembentukan klorofil
4. Suatu proses biokimia pembentukan karbohidrat dari bahan anorganik yang dilakukan oleh tumbuhan
5. Tudung pelindung ujung akar untuk menembus tanah
6. Jaringan mesofil yang banyak mengandung klorofil
9. Pembuluh angkut air dan mineral
11. Proses pernafasan dalam tumbuhan
12. Bagian terluar dari batang atau akar tumbuhan yang dibatasi di bagian luar oleh epidermis dan di bagian dalam oleh endodermis.
13. Jaringan penguat yang dinding selnya mengalami penebalan dari zat kayu (lignin)
14. Jaringan yang berfungsi melindungi jaringan yang lainnya
16. Pembuluh angkut hasil fotosintesis
18. Tempat pertukaran gas
22. Tabung inti dalam batang dan akar

Figure 10. Crossword (riddle)

4. Implementation phase

Learning media that have been developed are then implemented in real situations, namely in the classroom. The implementation phase was carried out on August 29, 2022 which was devoted to class XI MIPA 2 SMA Negeri 3 Sinjai, precisely in Kampala Village, East Sinjai District, Sinjai Regency with a total of 26 students.

5. Evaluation phase

Evaluation is the process of seeing the media that has been made according to initial expectations or not. Evaluation usually occurs at each previous stage and is called formative evaluation, because its purpose is to need revision. Meanwhile, the summative evaluation was carried out at the final stage of

the development of the ADDIE model. Evaluation is carried out by giving learning outcomes tests to students in order to determine the level of effectiveness of the developed learning media. The instrument used at the evaluation stage is in the form of learning outcomes. The test used is a multiple choice test which consists of 30 questions.

### B. Validity of Media Poster with Pictorial Riddle Method

Media Poster with the Pictorial Riddle method developed is categorized as very valid in terms of several aspects such as the appearance of the media, the content of the media according to the learning objectives, technical quality, size, and suitability of the use of the term.

Table1. Analysis results of media poster validity with Pictorial Riddle method

Assessment Aspect	Rating Result	Category
Appearance	3.65	Very valid
Contents of media poster with Pictorial Riddle method	3.75	Very valid
Technical quality	4	Very valid
Size	3.75	Very valid
Appropriate use of the term	3.75	Very valid
<b>Average</b>	<b>3.78</b>	<b>Very valid</b>

Validation is carried out to determine the feasibility level of the learning media to be applied. After learning media Poster with pictorial riddle method on the material structure and function of plant tissue. the next step is to be validated by the validator to find out the level of feasibility of the media. The assessment includes aspects of appearance and aspects of language. During the validation process, many inputs are given by the validator as product improvement.

Based on the description of the results of the analysis, the average value of the total validity of the Poster learning media with the Pictorial Riddle method is 3.78. In accordance with the validity criteria, the learning media developed is included in the Very Valid category, namely when  $X > 3.4$  according to the Likert scale. A valid product means that the product is suitable for use by students and educators because it can help in the learning process. As stated by Haviz that the learning product is concluded to be valid if it is developed with adequate theory and all components of the learning product are related to each other consistently.

### C. Practicality of Media Poster with Pictorial Riddle Method

The level of practicality of the media is known at the preliminary trial stage by providing a questionnaire/questionnaire for the responses of educators and students before the media is actually applied to real situations, namely in actual learning.

Table2. Results of the analysis of the responses of educators and students to the media

No	Appraisal Type	Average
1.	Student response	3.5
2.	Educator response	3.7
<b>Total Average</b>		<b>3.6</b>
<b>Assessment criteria</b>		<b>Very practical</b>

Based on the results of the practicality test data analysis, a score of 3.5 was obtained for the results of the student questionnaire and 3.7 for the results of the educator response questionnaire. If all the assessments of the questionnaire are averaged, then an assessment result of 3.6 is obtained which is stated in the very practical category. The practicality of poster learning media with the Pictorial Riddle method on the material Structure and Function of Plant Networks developed is supported by the ease of using the media, this can be seen from the response sheets of educators and students as a result of the practicality of the media. Practicality can be said that the learning media is high because the average is in the interval (3.5 Xi 4) according to the Likert scale (Made Ni, 2017)



The factors that cause Poster learning media with the Pictorial Riddle method are categorized as having high practicality, namely: (1) In the aspect of appearance: The sharpness of color in the media is clear enough so that students have no difficulty seeing it, the writing contained in the media is unique and interesting to look at; (2) In the aspect of convenience: the material presented on the media is organized/structured so that it makes it easier for students to answer questions in the media. with the Pictorial Riddle method, the use of crosswords contained in the media makes it easier for students to understand the material, and the use of sentences on the [oster learning media with the Pictorial Riddle method makes it easier for students to understand the material; and (3) On the aspect of benefit, the Poster learning media with the Pictorial Riddle method makes student learning outcomes increase and with the existence of learning media Media helps students answer questions more thoroughly.

The learning media developed can be said to be practical if the learning media can be implemented easily in the learning process, so that learning can be meaningful and fun for students. The developed learning media is said to be easy to implement because it does not require special expertise in its use. This is in accordance with Sadiman's research, which states that media is given to students to make it easier for them to follow the learning process. The use of teaching aids can increase students' learning motivation so that students' attention to the subject matter can be increased (Sadiman, 2006).

#### D. Effectiveness of Media Poster with Pictorial Riddle Method

The level of effectiveness was measured by the researcher by giving questions to the students to determine the level of effectiveness of the poster media using the pictorial riddle method. Data on the effectiveness of the media can be measured from the level of mastery of students on the material that has been taught.

Table3. Percentage of student learning outcomes

No	Score	Category	Frequency	Percentage (%)
1	0 – 75	Not Complete	0	0%
2	76 – 100	Complete	26	100%
<b>Amount</b>				<b>100</b>

Based on the data on Table 3, it can be concluded that 26 students scored above the KKM with a percentage of 100% or the completeness category was above the minimum number of mastery learning outcomes, namely 80%. Based on the data, the Karambi learning media meets the criteria for being very effective as a learning medium. Poster learning media with the Pictorial Riddle method is declared effective because the use of poster learning media with the pictorial riddle method makes students more enthusiastic, even happy to participate in learning activities marked by the active interaction of students with educators. In addition, students easily understand the material and was able to answer the questions given. The use of learning media in the learning process has a major influence on the understanding of the subject matter, logically it can be stated that using learning media will further ensure a better understanding of students so that this can affect the spirit of learning and more active learning conditions, which will lead to an increase in student understanding (Erna, 2013) This is in accordance with the opinion of Van and Akker in Haviz, stating that a development product is said to be effective if it provides results that are in accordance with the learning objectives shown by the student learning outcomes test (Hafiz, 2013)

#### Conclusion

Poster learning media with the Pictorial Riddle method was developed using the Robert Maribe Branch (2009) development model which consists of several stages, namely: (1) Analyze phase, (2) Design phase, (3) Development phase, (4) Implementation phase, and (5) Evaluation phase. The validity level of poster media using the Pictorial Riddle method after being revised is in the very valid category with a total score of 3.78 so it is feasible to use. The level of practicality of the poster media with the Pictorial Riddle method is included in the very practical category with an average score of 3.6. While the level of

effectiveness of the poster media with the Pictorial Riddle method developed is in the very effective category with a percentage of 100% completeness value.

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