DEVELOPMENT OF PUZZLE LEARNING MEDIA BY CROSSWORD PUZZLES

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Abstract

Learning media is a teaching and learning process that tends to be interpreted as graphical, photographic, or electronic tools to capture, process, and reconstruct visual or verbal information. Crosswords are a kind of word play. The learning media developed to facilitate teachers and students in the process of learning and teaching at Junior High School grade VIII. The purpose of this study was to prodice puzzle learning media by crossword puzzle and feasible to be developed as rearning media on human eireulatory system material. Based on the results of the observations that have been carried out, the teacher only uses descourse and less varied learning which makes students bored in learning. The method used in this study is the research and development (R & D), by ADDIE method, the researcher produced a crossword puzzle and its feasibility will be tested. The results of the study after the media were tested on the validator of media experts and material experts got a very decent category. The results of the research from the science teacher, get a very feasible assessment to be developed. The results of research on peer review get a very feasible category to be tested. And the results obtained during the trial of students with trials of small groups, middle groups and large groups led to a very decent category. To we it can be concluded that, puzzle learning media by crossword puzzles is very feasible to develop.

Keywords: *Puzzle learning media, crossword puzzles*

Introduction

The target of education is humans. Education, such as the nature of its target, namely humans, contains many aspects and is very complex in nature (Thirtarahardja and Sulo, 2005: 32). As an educator must come from experience and mind, to educate students. Broadly speaking education can be divided into 3 parts, namely, education, education, and education in the learning process (Pidarta, 2009: 2).

Learning is a process of interaction between students and teachers. In the teaching and learning process they are required to be active and motivated. Therefore, to create a learning process that can attract students' interest and learning motivation, the teacher must be able to prepare or design interesting learning media so that the learning process is not boring. Along with globalization, the implementation of learning now needs to be supported by the use of new learning media (Husna, 2017).

Learning media is a teaching and learning process that tends to be interpreted as graphical, photographic, or electronic tools to capture, process, and reconstruct visual or verbal information. And also learning media functions for the purpose of instruction where information contained in the media must involve students both in mind and in the form of tangible activities. The use of learning media in the teaching and learning process can generate new desires and interests, generate motivation and stimulation of learning activities, and even bring psychological influence to students (Arsyad, 2015).

Based on the results of observations made by researchers on biology teachers at Tembilahan 1 Junior High School, teachers only use lecture learning methods and power points. The researcher also conducted an

interview with one of the students, from the results of the interview showed that students liked biology learning because there were many related to daily life, but there were lots of memorization, also students sometimes did not understand what was explained by the teacher, and students felt bored with lecture learning because it's very boring. To overcome this problem, researchers are interested in using puzzle learning media using crossword puzzles to provide a new atmosphere and not make students easily bored in learning. The researcher hopes that the media developed wiil help student and teachers in the learning and teaching process.

Puzzle is a game consisting of pieces of pictures, boxes, letters or numbers that are arranged like in a game that finally forms a certain pattern, so that students become motivated to solve the puzzle correctly and quickly. Puzzles have several forms, one of which is a crossword puzzle (Husna et al., 2017).

Crosswords are a kind of word play. To complete a crossword puzzle, the student must accurately fill in all the empty boxes with the letters that make up the words. The words are written based on the instructions given, can be complete sentences, phrases or words. Because crosswords are usually considered a game, which must be enjoyed and tend to be fun in following the learning process. The benefits of crossword puzzles for exercising patience, make it easier for students to understand concepts, solve problems, work together with friends, and develop students' motor and cognitive skills. Besides increasing students' interest in learning, this puzzle can help students to expand their vocabulary knowledge (Orawiwatnakul, 2015).

Method

In this study, researchers used research and development (R & D) methods in the field of education that had been carried out at Tembilahan 1 Public Middle School. This type of research (R & D) consists of 5 stages including analysis (analysis), planning (design), development (development), implementation (implementation), and testing (evaluation), but researchers only carry out until the stage of development (development), because of limited time and costs. The three steps of ADDIE development research in this study can be seen in Figure 1.
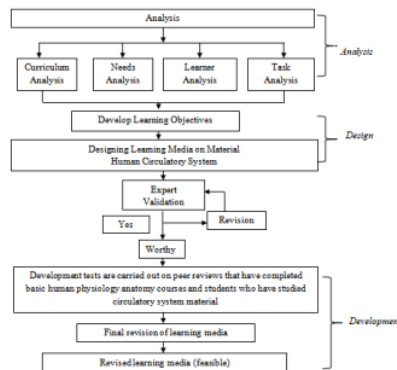

Figure 1. Steps ADDIE (*Analysis*, to the point *Development*)
Source : Suryani, (2016)

The next learning media will be validated by 5 validators consisting of 1 material expert, 1 media expert, and 3 science teachers. Then the media will be tested on students. Before being tested on students the learning media will be tested on peer review. The goal is before the media is introduced to students, it should be introduced to peers or fellow students to ask for opinions and suggestions so that the media is better.

After that the media will be tested on students, this is done with the aim to determine the assessment and response of students to the learning media. The trial of puzzle learning media by using crossword puzzles on circulatory system material in humans is carried out by the following steps:

1) Small group test

Small group test were used to determine the validity of the product after being improved based on suggestions from the validator and peer review. With the data from the response questionnaire, the improved product can be used as a product basis to proceed to the next trial,

2) Medium group test

Middle group trials are used to find out the shortcomings of the results of small group products that have been implemented to be revised again and tested on the next stage,

3) large group test

A large group trial was conducted to find out whether there were still deficiencies

based on the revised results of the revised small and medium group trials. If there are no shortcomings, the product is declared to be feasible as a puzzle learning media product by using crossword puzzles on circulatory system material in humans. The design of the test from this study foldable in figure 2.
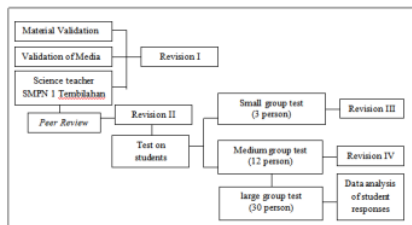

Figure 2. Test Design. Source: Harahap dkk., (2015) modified

The research instrument was divided into 2, namely the validation sheet which will be filled by media experts, material experts, and science teachers, then the response questionnaire that will be filled by peer review and students from the small group of 3 people, middle group 12 people, and large group tests 30 people. In this study, the percentage of the feasibility of learning media will be calculated based on media assessment consisting of aspects of the media, aspects of learning design, aspects of content quality, construct quality aspects. The calculation of the percentage level of learning media feasibility uses the method exemplified by Akbar (2013,158), with the formula as follows:

$$V_{ma} = \frac{TSe}{TSh} \times 100\%$$
$$V_{me} = \frac{TSe}{TSh} \times 100\%$$
$$V_{pr} = \frac{TSe}{TSh} \times 100\%$$
$$V_g = \frac{TSe}{TSh} \times 100\%$$
$$V_s = \frac{TSe}{TSh} \times 100\%$$

Information:
V_{ma} = Validation of eligibility of material
V_{me} = Validation of eligibility from the media
V_{pr} = Validation of eligibility from peer review
V_g = Validation of eligibility from the teacher
V_s = Student validation
TSh = Expected maximum total score
Tse = Total empirical score (results of the feasibility test from the validator)

Calculation of percentage of eligibility is obtained from media experts, material experts, teachers, peer reviewers and students. The results of the validity of each validator can be matched with the validity criteria in table 1 and table 2.

Table 1. Eligibility Criteria According to Validator Assessment

Eligibility Criteria	Level of eligibility
85,01% - 100 %	Very feasible, can be used without revision
70,01 - 85 %	Quite decent, can be used but needs minor revisions
50,01 – 70 %	Less feasible, it is recommended not to be used because it needs major revisions.
50,01 – 70 %	Not feasible, or may not be used
1,00 – 50 %	Not feasible, or may not be used

Source: Akbar (2013:158)

Table 2. Categories of student calculation responses

Achievement Criteria	Category
86%-100%	Very good
76%-85%	Good
60%-75%	Enough
55%-59%	Less
≤54%	very less

Source: Purwanto (2016: 103) modified

Results and Discussion

An assessment by experts on puzzle learning media using crossword puzzles developed into the category of very feasible. The following are some of the assessments of media experts, material experts, science teachers, and peer reviews of the media developed can be seen in the table 3,4,5 and 6.

Table 3. Learning Media Validation Results by Media Experts

Aspect	Feasibility Presentation (%)	Feasibility Level
Learning Media Design	92,85	Very decent
Construction Quality	87,5	Very decent
Average media validation	91,66	Very decent

From the results of the validation stated that the learning media developed is very feasible, with a percentage of 91.66%. On the

assessment of design media aspects of learning get a percentage of 92.85% and the constructive aspect gets a percentage of 87.5% with a very feasible category.

Table 4. Learning Media Validation Results by Material Experts

Aspek	Feasibility Presentation (%)	Feasibility Level
Content Quality	100,00	Very decent
TTS quality	100,00	Very decent
Average media validation	100,00	Very decent

The results of the validation above state that the learning media developed get a very decent category, with a percentage of 100.00%. Assessment of aspects of the quality of content and quality of TTS together get a percentage of 100.00%.

Table 5. Validation Results of Learning Media by Science Teachers

Aspek	Feasibility Presentation			Percentage Average	Feasibility Level
	YR	H	HM		
Learning Media Design	96,42	96,42	96,42	94,42	Very decent
Construction Quality	100,00	100,00	100,00	100,00	Very decent
Content Quality	100,00	100,00	100,00	100,00	Very decent
TTS quality	100,00	100,00	100,00	100,00	Very decent
Average media validation	98,33	98,33	98,33	98,33	Very decent

From the results of the validation above, it states that the learning media developed get a very decent category. From the results of the assessment of 3 science teachers, getting a percentage of 98.33 with a very decent category.

Tabel 6. Product trial by *Peer Review*

Aspek	Feasibility Presentation		Percentage Average	Feasibility Level
	KH	NJ		
Learning Media Design	100,00	100,00	100,00	Very decent
Construction Quality	100,00	87,5	93,75	Very decent
Content Quality	100,00	91,66	95,83	Very decent
TTS quality	100,00	100,00	100,00	Very decent
Average media validation	100,00	96,66	97,39	Very decent

From the results of the trial above stated that the learning media developed had a very decent category. And from the results of peer review 2 peer reviews, get a percentage of 100.00% and 96.66% with very decent categories.

The results of validation by media experts on puzzle learning media by crossword puzzles can be seen in table 7.

Table 7. Results of validation by media experts

No	Before Revision	After Revision
1.	The validator suggests that the display on the cover color is further clarified, especially in red in the background.	The display results on the cover after being revised.

puzzle learning media by crossword puzzles consist of horizontal and vertical boxes and TTS questions can be seen in table 8.

Table 8. Design puzzle learning media by crossword puzzles

Media Design Learning puzzles using crosswords
Crossword puzzle   **Cross Puzzle Questions**

The results of the study indicate that the average response of students to puzzle learning media using crossword puzzles was developed to get a very good response. Based on the results of the assessment by media experts, material experts, and science teachers, peer reviews, and female students, it can be concluded that the learning media developed are suitable for use as learning media in junior high school.

This research is also in line with the research of Husna et al. (2017) who developed a medium for learning SMP material. The results show that the learning media developed

in the category are very feasible. Furthermore, Wasgitu and Wayan (2015) and Orawiwatnakul (2015) also concluded that the crossword learning media get very feasible criteria and get a positive response from teachers and students. And research from Febrina. (2015) and Pradanti. (2017) who developed puzzles at the elementary school level. The results show that the learning media developed are categorized as very feasible and able to motivate teachers in designing instructional media in order to help students in learning.

Conclusion

From this study it can be concluded that the puzzle learning media using crossword puzzles that are developed get a very decent category. And it is expected that the learning media will be implemented to assist the learning and teaching process in circulatory system material.

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