Development of Media C*rossword Puzzle* in Learning Geography of Hydrosphere Dynamics Materials

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Abstract
This research is a research on the development of instructional media. This study aims to produce learning media based on crossword puzzles on the dynamics of the hydrosphere. This study used the development research method with the ADDIE model to prepare instructional media. In this study, there are 5 (five) stages, namely the analysis stage, the design stage, the development stage, the implementation stage, and the evaluation stage. The validation results from product design experts were very valid, with a rating of 92.72%. From material/content experts, it was very valid with a rating of 84.44%, and from learning experts, in this case, the geography teacher was stated to be very valid with a rating of 89%. The average student response to learning media is 87.45%, which means it is classified as very good media. The media developed by the researcher are declared fit for use in the learning process. Future researchers can try developing crossword puzzle-based learning media for other subjects or topics, not limited to Geography or hydrosphere dynamics. This can help determine the effectiveness of this learning media in various contexts
Keywords: Media, Crossword Puzzle, Dynamics of the Hydrosphere

1. INTRODUCTION

The vision of national education is the realization of empowerment institutions so that the people of Indonesia develop into qualified people who they are able and proactive in responding to the challenges of the ever-changing times [1]. Over time, the development of IT (Information Technology) and communication for the purpose of utilizing technological media are directed at efforts to improve the quality of society and education [2]. Explains that technology is the largest, which includes most of the technical equipment for processing and conveying information. The use of software and hardware-relevant devices with precondition requirements for the implementation of effective and efficient learning. In line with increasingly advanced technological advances, to increase students' knowledge facilitated by adequate information technology, in the use of learning media such as android (smartphone). Learning is an internal process that occurs within students. Learning is an interesting process of experience that lasts a lifetime [3]and has no age limit . Learning is a conscious effort of the teacher or so that students can learn according to their needs and interests in a planned way by manipulating learning resources so that the learning

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process occurs within students. The development of the era has made the function of mobile phones also change. Currently, mobile phones are not only for communicating but can also be used to access the internet, play games, and watch videos [4].

Educational technology plays a crucial role in enhancing learning in the 21st century by offering various interactive tools and media that significantly boost student engagement and learning outcomes [5]. Educational innovations utilizing digital media face several challenges but also offer significant potential to enhance the quality of education" [6] Mobile learning applications have been proven effective in enhancing students' academic performance and engagement, making them valuable resources in the learning process [7]. [8] highlight that educational technology, including interactive media like educational games, greatly enhances student engagement and comprehension.

Through the development of education that focuses on learning by using higher-order thinking skills in line with the globalization era, education in Indonesia continues to be improved. High-level thinking as an important role in the independence of students in accordance with learning objectives. Metacognition knowledge are components that are relevant to critical thinking skills, solving problems, communicating, creating, and innovating]. Education s very important for every generation, especially the younger generation in the advancement of good education and increasing the knowledge of existing human resources in a country, especially the Unitary State of the Republic of Indonesia. Currently, technology is very advanced and sophisticated, every teacher and student is encouraged to understand technology as an effort to improve the quality of education. In learning, one of the teaching methods that is good, effective, and keeps abreast of technological developments is the existence of learning media as a reference for teaching and learning. With the existence of learning media as a tool in the teaching and learning process, it makes teachers, as well as students, apply learning by mastering new skills, creating something in the application of learning media. Science and technology are developing very rapidly, so that the learning process that utilizes information technology (IT)-based learning media makes the teacher a facilitator [2]. Students can study anywhere and anytime according to their individual learning interests without depending on the teacher's presence in class [10]

A teacher is required to be able to design learning by utilizing various types of appropriate learning media so that the learning process takes place effectively and efficiently [11] Ideal learning is known as the interaction between a teacher and students. Teachers and students are two elements that are in the learning environment and utilize existing learning resources. Regarding the interaction between teachers and students, students' responses to how a teacher's abilities when teaching and when using learning resources in the form of learning media are used as feedback on the quality of teaching and the ability of a teacher to use learning media [12]. The learning media used is expected to help students receive learning. Procurement of learning media can be done by utilizing the available equipment, one of which is a smart brain cell phone or what is often referred to as a smartphone. Today's smartphones have become a necessity, both for adults, students, or children.

According to [13], learning media can be used as a learning tool in schools aiming to improve the quality of education. Media is a means that can be used as an intermediary to increase effectiveness and efficiency in achieving goals. Based on this opinion, the use of media in learning provides benefits for teachers and students. Learning components that play an important role in achieving learning objectives are learning media, which are a vehicle for delivering information or learning messages to students. The existence of media in the teaching and learning process is expected to be able to assist teachers in conveying learning material to students, which has an impact on increasing student achievement. "Therefore, teachers should present media in each learning process in order to achieve learning goals and students are more active in the teaching and learning process" [14] In the teaching and learning process, the important role of educational technology is very important to support learning [15]. In conveying material to help learning requires media. The media used must be relevant to the latest curriculum, the curriculum is in accordance with the Industrial Revolution 4.0 where the creativity of learning media is needed. Digital technology can provide benefits in the learning process, learning media that utilize digital technology, one of which is using software/ Adobe Flash Professional CS6 is software that has various uses.

The dominance of the teacher causes ignorance of students in understanding geographical material that is considered difficult, tends not to be understood causing students to be more inactive and become indifferent so that they wait more for the teacher's presentation and are not motivated to find new knowledge, causing students' understanding of the material being taught does not meet the minimum completeness criteria which result in decreased enthusiasm for learning. To overcome this, educators must have strategies and use learning methods that can awaken students' enthusiasm for learning. The reality found in the field shows that the student learning process is still dominant in using print media. This fact is experienced by students who cause them to get bored and lack the enthusiasm of students to learn so that it has an impact on student learning outcomes. Based on observations made at SMA Negeri 1 Tilango related to the use of media and the use of media is still lacking. Therefore teachers still use the media minimally. The media that is still often used by teachers is print media and is supported by simple tools that are often used in other schools, such as blackboards/whiteboards and chalk/markers. Audio and visual media and electronic media (computer, internet, TV-Out (LCD), have not often been used intensively and put to good use. Lack of students' understanding of the material contained in the textbook, which is the handbook for teachers and students. As well as face, time face-to-face between the teacher and students is limited, while there is a lot of material to be conveyed, especially in geography learning. This causes the learning process not to go as expected. These learning activities tend to make students bored. Therefore there is a need for innovative learning media that are practical in accordance with the development of science and technology.

Remembering, memorizing and understanding geography material and its application is not easy. We need tools in the form of media that are designed in such a way as to stimulate students to learn and have fun. One of the media that can be used

to overcome this problem is crossword puzzle media which is already in the form of an application as a tool in the learning process so that students will find it easier to understand and remember easily, and they don't feel bored in following learning, and it will be easier to remember the material that has been studied.Remembering, memorizing and understanding geography material and its application is not easy, we need tools in the form of media that are designed in such a way as to stimulate students to learn and have fun. One of the media that can be used to overcome this problem is *crossword puzzle media* which is already in the form of an application as a tool in the learning process, so that students will find it easier to understand and remember easily and they don't feel bored in following learning and it will be easier to remember the material that has been studied.

Crossword Puzzle is media in the form of boxes consisting of two lines, namely horizontal (a collection of boxes in the form of rows and columns), and vertical (boxes in the form of columns and rows). In completing this game, students must answer and fill in the boxes provided. [16]. [17] explained Crossword Puzzle is a medium that allows students to be more creative in thinking about putting letters into long words that have been provided. The advantages of the Crossword Puzzle media developed by researchers are a more attractive appearance, including audio, material, video. opportunities Crossword Puzzle learning media can provide assistance to students to be more active in the learning process because they learn while playing, so they don't feel bored during learning and can help support a more effective and efficient learning process in accordance with technological developments. According to research conducted by [18] that interactive crossword puzzles can help motivate learning.

2. METHODS

2.1. Location and time of research

The location that will be used as a trial is SMA Negeri 1 Tilango which is located in Ilotidea Village, Kec. Tilango, Kab. Gorontalo. The time of research was carried out in approximately 6 months, from the preparation stage to the final results.

2.2. Types of research

The type of research that will be used in this research is development research which is usually called development-based research R&D (research and development). According to [19] Research and development is research that is used to produce certain products and test their effectiveness of these products. Media development in this study uses

2.3. Research procedures

This research procedure adapts the ADDIE development model , which is a development model consisting of several stages which include analysis, design, development, implementation, and evaluation. The ADDIE development model was put forward by Dick and Carry, who designed the

learning system [20] The stages of developing crossword puzzle learning media using the ADDIE model can be seen as follows.

1. Analysis Phase (Analysis)

   The analysis phase is an activity carried out to analyze the needs and characteristics of students, to find out the need for new media development, to overcome problems that occur in the geography learning process.

2. Planning (Design) Stage

   The planning stage is the design or design stage of Crossword Puzzle Learning Media which includes:Making the overall media design/design (storyboard) so that you can see the design of learning media and preparation of material, questions, and answers that will be loaded in learning media. The material and questions contained in this learning media are compiled from various references.

3. Development Stage (Development)

   In making learning media, all the components that existed before were assembled into one unit of learning media. Material Expert and Media Expert Validation and Revision. Validation 1 was carried out by material experts and media experts. The results are in the form of suggestions, comments, and input that can be used as a basis for conducting revision 1 of the developed learning media.Material Expert and Media Expert Validation and Revision

   1) Validation 1 was carried out by material experts and media experts. The results are in the form of suggestions, comments, and input that can be used as a basis for conducting revision 1 of the developed learning media
   2) Validation II was carried out by geography learning practitioners, namely Geography Subject teachers at school, using the instruments that had been prepared. The results are in the form of suggestions, comments, and input which will be used as a basis for revising the developed media. Suggestions and input from geography learning practitioners (teachers) will be used to implement them for students.

4. Implementation Stage (trial)

   At the implementation stage, learning media was tested on class X students of SMA Negeri 1 Tilango. At this stage, questionnaires were distributed to determine the feasibility and student assessment of *Crossword Puzzle* Learning Media for learning geography on the dynamics of the hydrosphere.

5. Evaluation Stage (Evaluation)

The results of the research stage trials on products developed through questionnaires will be used as material for evaluating the improvement of learning media so that they can be said to be feasible to be utilized in learning activities.

2.4. Data Collection Techniques

[19] states that data collection techniques are steps used by researchers to collect data. Data collection techniques in this study were in the form of observation and questionnaires. Observation is a research conducted directly in the field. To observe how the learning process is carried out by the teacher and what skills students have and do not have when participating in learning. Questionnaire is a data collection technique. This is done by giving a set of written statements to the respondent to answer. The questionnaire used in this analysis is a closed questionnaire in the form of *a checklist* .

2.5. Data Analysis Techniques

According to [21], data analysis is the process of searching for and compiling data obtained from interviews, field notes, and documentation systematically, then being put into categories, elaborating into units, synthesizing, compiling into patterns, selecting things important things and draw conclusions so that they can be understood by themselves and others more easily. [22] states that data analysis is an activity carried out after data from all respondents or other data sources has been collected. The research data can be analyzed qualitatively with the following explanation. Qualitative data is data obtained from interviews with teachers and students. In addition, the research obtained suggestions/comments put forward by validation from a team of experts from material experts, media experts, linguists, and geography teacher experts who were analyzed qualitatively.

3. RESULTS AND DISCUSSION

3.1. Analysis Stage

1. Need Analysis

Based on the results of a needs analysis using direct interview techniques with students and also a geography teacher at SMA Negeri 1 Tilango. The results of the analysis of the use of learning media materials for the dynamics of the hydrosphere in the Geography Subject, which were carried out by conducting direct interviews, obtained information that the use of this media in the learning process at SMA Negeri 1 Tilango is very much needed because, during the learning process, they still stick to using printed books as a medium. Learning.

2. Learning Processes and Methods

Geography learning in class X IPS at SMA Negeri 1 Tilango has held 2 meetings in 1 week. When the learning process takes place. The teacher conducts learning based on the lesson plan guide, which contains the opening, core and closing activities. Before learning begins, the teacher will provide reinforcement and motivation to students and ask again what material was previously learned. In the core activities, geography learning still uses the lecture method and still uses textbooks. This makes students less enthusiastic about participating in learning because students easily feel bored or bored when the learning process is just done. Teachers also sometimes only give assignments to students, such as making a summary of material from textbooks so students often feel bored. Based on some of the problems above, it is necessary to have learning media that supports students in the learning process and also in achieving learning goals so that they can encourage students to follow the learning process properly.

3. Learning Facilities

Based on the results of observations made by researchers at Tilango 1 Public High School, learning facilities or the availability of learning media used are sufficient, such as geography textbooks, LCD, computers and even WIFI can also be accessed at the school. The teaching and learning process at this school still uses printed books because of the limited number of LCDs, so you have to alternate with other teachers to use them. Based on these problems, it is necessary to develop learning media in Geography Subjects, the material on the dynamics of the hydrosphere. The choice of this material was considered because it was seen that the material was not understood by students without the help of using the media because this material contained information about the hydrological cycle and the use of inland waters. Therefore, the researchers developed learning media based on crossword puzzles in the subject of Geography on the dynamics of the hydrosphere so that students could easily understand the material, both in-person and online learning.

3.2. Planning Stage

The program framework is used in the form of an overview and also the overall scope of the preparation of learning media based on *Crossword Puzzle* on the dynamics of the hydrosphere.

3.3. Development Stage

The learning media created have been designed and packaged based on the specified stages, so as to produce a product in the form of Crossword Puzzle- based learning media which can now be accessed at any time without any space and time restrictions. Media Crossword Puzzles in their use is very easy for students to use without having to have special skills to operate it. The first time students open the application, they will immediately display how many menus there are menus of teaching materials, crossword

questions and videos. In the crossword puzzle media, there is an explanatory video related to the dynamics of the hydrosphere.

On the first page of this material there are KD and Learning Objectives and continued with material/content that has been packaged as attractively as possible, so that students can learn and understand the learning material. The material contained in learning is complemented by images, text that supports the content of the related material. On this question page there are 23 questions which are divided into three crossword puzzles, which must be answered by students who are given by the teacher. For each question, of course, it is taken from the material that has been studied during the learning process.

3.4. Implementation

Puzzle -based learning media on Hydrosphere Dynamics material has been developed through several stages, such as the validation and revision stages, as one of the legal requirements for scientific work. The Crossword Puzzle learning media that has been developed has been validated by media design experts, material experts and learning experts.

3.5. Evaluation

Crossword Puzzle- based learning media was developed through the product revision stage. The product revision stage is the stage where the validation produces input and suggestions, as well as the final results of the trials that have been carried out. In product revision, the researcher considers the existence of input from the validator for product improvements so that, based on input and suggestions from the validator, it produces a product that is suitable for use.

3.6. Validation Result

The development of this media is a research that aims to produce learning products based on Crossword Puzzle with the material Dynamics of the hydrosphere implemented at SMA Negeri 1 Tilango using the ADDIE development model, which has the following development stages: 1) analysis stage, at the analysis stage the researcher conducts a needs analysis using interview techniques with students and teachers in the school, 2) the planning stage, after getting the results of the analysis then the planning or design stage of the Crossword Puzzle learning media is carried out, by making the overall media design/design and compiling the material, questions, and answers that will be loaded in learning media. 3) development stage, at this stage, the researcher makes learning media, all components in the previous stage are assembled into a single unit of learning media and validated by material experts, media experts and geography learning practitioners, namely Geography Subject teachers, the results of this stage are used at , 4) the implementation stage, the learning media was tested on students, at this stage questionnaires were distributed to find out the feasibility and student assessment of Crossword Fuzzle Learning Media in geography learning. and 5) the evaluation stage, the results of product trials developed through questionnaires will then be used as material for

evaluating the improvement of learning media so that they can be said to be feasible for use in learning

The learning media developed by researchers is learning media based on a Crossword Puzzle which has gone through several assessments for maximum results, namely starting from the product design expert's assessment which was assessed directly by the media expert with the results 98.72% means that it is in a very valid qualification, followed by a material/content validation test assessed with a result of 84.44% based on the validity scale conservation table, the percentage level of achievement in valid qualifications and finally subject assessment by learning experts assessed by geography teacher at SMA Negeri 1 Tilango, with a result of 89% when viewed from the validity table which means it is included in the very valid category, followed by response analysis Research students distributed questionnaires containing questions about the development of Crossword Puzzle- based learning media. Test assessed with a result of 84.44% based on the validity scale conservation table, the percentage level of achievement in valid qualifications and finally subject assessment by learning experts assessed by geography teacher at SMA Negeri 1 Tilango, with a result of 89% when viewed from the validity table which means it is included in the very valid category, followed by response analysis Research students distributed questionnaires containing questions about the development of *Crossword Puzzle- based learning media* .

The results of student responses to this learning media were tested 1 time. The purpose of this trial is to find out students' responses to learning media, the ease of understanding the material in the media and also the language used in this learning media to get very good results with an overall average score of the Percentage of student responses of 87.45%, which means included in the very feasible category so that this media can be used in schools to be used as learning material.

4. CONCLUSION

Based on the results of the research and discussion, the learning media based on the Crossword Puzzle in the Geography subject on the dynamics of the hydrosphere at Tilango 1 Public High School was declared eligible (Good) or suitable for use. The validation value of the product design expert gets 92.75% with a very valid validity level, followed by material/content expert validation with a percentage value of 84.44% in the very valid category, while the subject expert validation score gets 89%, meaning it is classified in the very valid category and the average value of 87.45% of student responses is included in the very valid category. So it can be concluded that the development of learning media based on the Crossword Puzzle is feasible for use in the learning process.

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