Analysis of learning media in the development of flood-themed teaching materials for high school students

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Abstract. Learning media is a very important learning component who use by teachers and students in the learning. The development of information, communication and technology have big contributed for teachers to develop learning media as needed by students in learning. The purpose of the research is to analyze the media used by students in high school physics learning and to determine the right media in the development of flood-themed teaching materials. This research method is descriptive qualitative approach. Descriptive method is a method used to examine the condition of the natural objective. To obtain research data used questionnaire instrument. Instrument for retrieving data in the form of a questionnaire for analysis of learning media filled in by students. Analysis results from quality of content and purpose are in good criteria with a percentage value of 72, Quality of Learning are in good criteria with a percentage value of 76, technical quality are in good criteria with a percentage value of 78, and electronic-based learning media are in good criteria with a percentage value of 78. The result of the study showed that the use of learning media based on electronic can be used in physics learning and develop flood-themed teaching materials based on electronic.

1. Introduction
Media can be defined by its technology, symbol system, and processing capabilities[1]. Media as forms of communication in print and digital form that can be a tool for delivering messages from teacher to student. Learning media helps the teacher to deliver the material so that it is easily accepted and understood by students. The benefits of using instructional media in the learning process of students according to Sudjana and Rivai that is learning will be more attractive for learners so can motivate learning, learning materials will be quite vague so that it can be understood by learners and enable it to master and achieve the learning objectives, teaching methods will be more varied, so that learners are not bored, learners can more learning activities for not only listen to the description of educators but also observed, demonstrates, plays, and others[2].

Learning media make the operations of communication in the learning activities to be more readily accepted by learners. Instructional media forms vary according to the needs of the learning process. Learning media includes physical tools that are used to convey the contents of teaching materials both printing equipment and digital equipment. In this era, digital tools are very much developed to become the main media to improve the quality of learning. Thus it can be said that the media are all forms of learning resources component containing instructional materials in the environment of the learners to stimulate learners to learn [3]. The function of learning media are delivers real object and the object to move; make a duplicate of the actual object; make abstract concepts concrete concept; providing a
common perception, overcoming the barriers of time, place, number, and spacing; presenting the information consistently; and providing a learning environment that is not depressed, relaxing, and interesting, so as to achieve the learning objectives [4].

Teaching materials is one important part of the learning process [5]. The development of teaching materials in schools needs to consider the characteristics of the needs of students [6]. Characteristics of teaching materials is self-contained, self-instructional, stand alone, user friendly, and adaptive, and [7]. In the learning, teaching materials are designed such that with regard to the nature, scope, sequence and treatment. Teaching materials is a composition on the materials collected and derived from a variety of learning resources are made systematically. According to its shape, materials can be divided into four kinds that is: printed materials, a number of materials that have been prepared in paper form for learning purposes or to convey information. Such as books, modules, handouts, sheet student work, brochures, photographs or images, and others; teaching materials hear or audio program, its learning system using radio signals, which can be played or listened to by a person or group of people. for example, tapes, radios, compact disc audio; heard of view teaching materials (audiovisual), is a combination of an audio signal with a picture move sequentially for example, a movie and a video in compact disk and interactive teaching materials[8].

Disaster is an event that occurs in nature both naturally and human intervention. Disasters can be considered a natural disaster or a non-natural disaster. Natural disasters conclude damage and losses on creatures. Natural disasters that have occurred on earth are earthquakes, tsunamis, liquefaction, volcanic eruptions, floods, hurricanes, droughts, and landslides [9]. In 2018 a total of 3,397 catastrophic events have occurred in Indonesia. Most disaster in 2018 is hurricanes with 1,113 events and the second is flood 871 events. But, for the greater impact of disasters caused by flooding [10]. Flooding is an event flooded land due to excessive water flow that can be caused naturally by nature or by human activity [11]. West Sumatra is an area prone to natural disasters where in 2018 happened 96 of disasters, where floods occurred as many as 50 events in various locations [10].

Teaching materials should be used in school with integrated environmental conditions [12]. Learning by associating material natural disasters is an effort into learning early preparation to the geographical conditions of the region[13]. The education provided to children not only develop physically and knowledge, but also to develop mentally and emotionally so kids do not panic and trauma in facing emergencies condition such as natural disasters [14].

2. Research Method

The type of research method used is descriptive research method. Descriptive method is a method for describing variables relating to the problem under study as well as exploration and clarification regarding a phenomenon or social reality [15].

To obtain research data used questionnaire instrument learning medium. The questionnaire filled out by the students to give a check in accordance with the criteria selected by the learner. Scoring answers to criteria based on such modified Likert scale 1-4 that is strongly agree = 4, agree = 3, less agree = 2, disagree= 1. Determining the highest score use the following formula:

\[
\text{the \_highest \_score} = \text{number \_of \_student} \times \text{max \_imum \_score}
\] (1)

Determine the total score of each learner by summing all the scores obtained from each of the indicators. The determination of this questionnaire in the following ways:

\[
\text{value} = 100 \times \frac{\text{total \_score}}{\text{highest \_score}}
\] (2)

Criteria for the value sobtained after processing the data can be determined using the criteria in the following table [16]:

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Table 1. Criteria of Descriptive Analysis

| No. | Category   | Value          |
|-----|------------|----------------|
| 1   | Very good  | $90 < N \leq 100$ |
| 2   | Good       | $75 < N \leq 90$ |
| 3   | Less       | $60 < N \leq 75$ |
| 4   | Very less  | $\leq 60$      |

3. Results and Discussion
This research was conducted at SMAN 5 Padang with a sample of 30 students. There are four components of media analysis that is quality of content and purpose, quality of learning, technical quality, and electronic-based learning media.

3.1. Analysis from Quality of Content and Purpose
Analysis results from quality of content and purpose shown in Table 2.

Table 2. Quality of Content and Purpose

| No. | Statement                                                                 | Value | Criteria |
|-----|---------------------------------------------------------------------------|-------|----------|
| 1   | Media used are in accordance with the material                           | 78    | Good     |
| 2   | Drawings, graphs and charts used in the media are in accordance with the material | 80    | Good     |
| 3   | Media used are in accordance with the purpose of learning                | 78    | Good     |
| 4   | Drawings, graphs and charts used in the media is in conformity with the purpose of learning | 75    | Good     |
| 5   | The media used can be understood clearly                                 | 63    | Less     |
| 6   | Pictures, charts and diagrams that are used on the print media can be understood clearly | 74    | Less     |
| 7   | Pictures, charts and diagrams that are used on the print media can be clearly understood is complete | 54    | Less     |
| 8   | The composition of the media is balanced with the material               | 75    | Good     |

Table 2 shows that quality of content and purpose still not good with value 72, especially in the part of using Pictures, charts and diagrams that are used on the print media can be clearly understood is complete that got the lowest score. Physics is one of the sciences that requires media because of the limitations of space, time, cost, and facilities available at school. Therefore, the media has an important role in helping students understand physics material properly and correctly, so that learning objectives can be achieved. However, students still find it difficult to understand the media used in the form of images, graphs and diagrams. The Pictures, charts and diagrams must be made clear and easy for students to understand. But, there are 5 items that got good criteria based on this, quality of content and purpose needs to improve in the media.
3.2. **Analysis from Quality of Learning**

Analysis results from quality of learning in the study are shown in Table 3.

**Table 3. Quality of Learning**

| No. | Statement                                                                 | Value | criteria |
|-----|---------------------------------------------------------------------------|-------|----------|
| 1   | Learning Media help my growing interest in learning physics               | 79    | Good     |
| 2   | The media used in teaching physics motivated me to learn                  | 80    | Good     |
| 3   | Drawings, photographs, charts or diagrams on attractive media for me     | 78    | Good     |
| 4   | The media used in teaching physics add my insights in learning           | 78    | Good     |
| 5   | The media used in teaching physics helped me to understand the learning material | 66    | Less     |
|     | Total                                                                     | 76    | Good     |

Table 3 shows that the quality of learning got the value 76 with good criteria. The use of media in learning can increase interest and motivate students to learn physics and help students to understand physics learning materials. But, there is one problem used media in learning that is the media used in teaching physics helped me to understand the learning material scored 66 with less criteria. It’s mean that media used in learning just a little help the students to understanding the learning material. Quality of learning still needs to be improved to get maximum results.

3.3. **Analysis from Technical Quality**

Analysis results from technical quality of the media used in the learning are shown in Table 4.

**Table 4. Technical Quality**

| No. | Statement                                      | Value | criteria |
|-----|------------------------------------------------|-------|----------|
| 1   | Images that are on the media to show the true state | 80    | Good     |
| 2   | Charts and graphs contained in a clear structured media | 76    | Good     |
|     | Total                                          | 78    | Good     |

Table 4 shows that the Technical quality scored 78 with good criteria. In learning physics, pictures are an important part to show objects, events or natural phenomena. The images presented must be in accordance with the actual circumstances, must be clear, and easily observed by students. The images presented on the learning media used by students are in good criteria with a value of 80. Diagrams and graphs in Physics learning materials can be used to see changes in value in a quantity or value comparison. The arrangement of diagrams and graphs must be clear so that they can be understood by students properly. Although the pictures and graphics are clearly arranged with good criteria. Technical quality of learning media still needs to be improved to get maximum results.

3.4. **Analysis from Electronic-based learning media**

Analysis results from electronic-based learning media in the study are shown in Table 5. Table 5 shows that electronic-based learning media is good with scored 78. Physics Education assisted by electronic media very suitable and preferred by students than print media. Android and computer can be used by students to access learning material. Limitations of space and time can be overcome with the help of technology to help display natural phenomena in the form of animation or video. In addition, the development of electronic-based teaching materials as one way to conserve the use of paper can be accessed through computers and other electronic media. The electronic media are used in learning
process help students understand the subject matter quickly still less. Android devices can be used to develop physics learning media. The existence of an android device, students can access learning material wherever and whenever.

Table 5. Electronic-based learning media

| No. | Statement                                                                 | Value | Criteria |
|-----|---------------------------------------------------------------------------|-------|----------|
| 1   | The electronic media are used in schools to help me understand the subject matter quickly | 71    | Less     |
| 2   | The electronic media are used in schools can help me in improving the thinking skills | 75    | Good     |
| 3   | Computers are always available whenever I wanted to use it at school      | 71    | Less     |
| 4   | Physics Education assisted by electronic media                           | 80    | Good     |
| 5   | I love to learn physics in the classroom use of electronic media in the print media | 88    | Good     |
| 6   | I enjoy learning physics in the classroom if more use of electronic media | 93    | Very good|
| 7   | Media physics equipped with video, animation, etc.                       | 77    | Good     |
| 8   | Physics of electronic media used in connection with the local context and related to everyday life | 68    | Less     |
| 9   | Electronic media physics using hardware such as computers and laptops    | 77    | Good     |
| 10  | Electronic media used physics-based android                              | 79    | Good     |

Total 78 Good

4. Conclusion

The conclusion of this research is the learning media need to improve in all indicators. Analysis results from quality of content and purpose are in good criteria with a percentage value of 72, quality of learning are in good criteria with a percentage value of 76, technical quality are in good criteria with a percentage value of 78, and electronic-based learning media are in good criteria with a percentage value of 78. The result of the study showed that the use of learning media based on electronic can be used in physics learning and develop flood-themed teaching materials based on electronic.

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