Analysis of disaster response attitudes of Senior High School students as the preliminary research phase in the development of Physics e-module with coastal abrasion theme

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Abstract. E-Module is an ICT-based electronic learning material that is useful as the learning media. This study is aim to describe the response attitude of the students to coastal abrasion as the preliminary research stage in developing physics e-module with coastal abrasion theme. This research uses a descriptive method. The subjects of the study were the students of SMAN 1 Ulakan Tapakis with the sample chosen by using simple random sampling technique. The data of this research are primary data obtained through a questionnaire with data collection technique using Likert scale 1-4. Data analysis techniques are in the form of descriptive statistics. The results of data analysis of response attitude obtained an average percentage of 73.03% in the less categories. Students are considered not yet fully have a coastal abrasion response attitude. Given the need for a coastal abrasion response attitude, efforts can be made is to implement the results of the analysis into physics e-module with the theme of coastal abrasion.

1. Introduction
Information and communication technology is experiencing rapid development. It develops in every aspect of life [1] including in the aspect of education. Application of information technology in learning is believed to improve students' learning ability [2]. The ease of information access makes ICT take a role in access to various learning resources. Moreover, to develop student information literacy and ICT literacy competencies, ICT integration in the learning process is needed [3]. Learning with ICT integration can be design and develop to improve the quality of learning.

Widespread Internet technology and advances in computer and information technologies, as well as networked learning, made it possible to design and utilize new generation learning environments that are realistic, authentic, and engaging [4]. This means that environmental content that useful as learning materials. Indonesia's environment is an archipelago country with the sea is wider than the mainland that makes Indonesia has a long coastline of 104,000 km [5]. However, in 2011 the coastline of Indonesia became 99,093 km [6]. Various coastal areas in several cities in Indonesia suffered severe damage caused by the existence of various natural phenomena one of them is coastal abrasion [7]. Coastal abrasion is shoreline damage due to the release of coastal material, such as sand or clay continuously concerning ocean waves or due to changes in the balance of sediment transport in coastal waters. [8]. Consequently, beach abrasion can damage coastal facilities and infrastructure such as highways, electricity poles, docks. This is worrying if there are settlements around the beach.
Globally, estimates that around 60% of the population live in coastal environments [9]. Therefore, it is necessary for the people living in a coastal environment to know the changing of coastal environment condition. The location of the shoreline and changing a position of this boundary through time are of elemental importance to coastal scientists, engineers, and managers [10]. Relief and development agencies also rely on the information of scientists and to facilitate the development of effective measures to prevent, mitigate or manage the disasters [10]. Notwithstanding in case studies around the world, coastal protection plans and conceptual designs there are discussion, mitigation of coastal abrasion responsiveness in coastal communities has not been discussing.

Attitude is a reaction or response of a person to a stimulus or object. Attitude is a readiness to react to objects in a certain environment as an appreciation of objects [11]. The response has the immediate sense of knowing the situation and paying attention to it, quickly being able to know and be aware of the symptoms that arise [12]. Attitudes can be established, resulting in the desired behavior or action [13]. Through the provision of coastal abrasion disaster materials in learning will form a coastal abrasion response attitude to learners. Coastal abrasion disaster material is a natural phenomenon that can be studied in physics subjects at high school. Physics is a science whose main purpose explains rationally natural phenomena [14]. So coastal abrasion is a natural phenomenon which is the object of study in physics.

Based on the description above, it is needed ICT-based learning materials. One of these e-modules presents learning materials in an electronic form that display information or manuscript recorded electronically using hard disks, floppy disks, CD, or flash disks and read using a computer or electronic book reader [15]. E-Module learning materials can be access from anywhere and anytime by students. A module is a set of systematically arranged media [3]. The material on the e-module is linked with links as navigation which makes students more interactive with the program, complemented by video tutorial, animation, and audio presentation to enrich the learning experience. E-module is worthy of being used as a learning media [16].

This research is a preliminary research in the development of physics e-module with coastal abrasion theme. Preliminary research: needs and context analysis, review of the literature, development of a conceptual or theoretical framework for the study [17]. The preliminary research aims to find out the basic problems needed in the development of learning tools [18]. Analysis of the basic problem of the responsiveness of the students in Senior High School 1 Ulakan Tapakis aims to be able to describe the attitude of disaster response by the students against coastal abrasion disasters. Responsiveness analysis of students at Ulakan Tapakis 1 Public High School can be used for disaster response situations of students against coastal abrasion disasters. Responsiveness was analyzed using seven indicators, namely rescue and evacuation of victims, the rescue of property, fulfillment of basic needs, frequency, management of refugees, rescue, and restoration of facilities and infrastructure [19]. The results of the analysis will be used as the material for the development of physical e-modules with the theme of coastal abrasion.

2. Method
This research uses a descriptive method. Descriptive research is a form of research that intends to describe existing phenomena. The phenomenon may be the form, activity, characteristics, changes, relationships, similarities, and differences between one phenomenon with the other phenomena [20]. Descriptive research is research that is able to describe and interpret something. Descriptive research was conducted to find out information about the status when conducting research [21]. This research through the stages that include, planning, designing and developing instruments, collecting data, data that has been collected and then analyzed and continued by describing the data that have been obtained.

The subjects of the study are the students who are in the school area of the coast with the risk of coastal abrasion disaster that is the student population in Senior High School 1 Ulakan Tapakis Kabupaten Padang Pariaman, West Sumatera Province. The sample is part of a representative population. Sampling using probability sampling techniques. It is a sampling technique that provides
equal opportunity for each member of the population to be selected to be a sample [22]. The probability sampling technique used is simple random sampling which is a random sample member taking.

The data used in this study is the primary data obtained through questionnaires. The questionnaire is a method of data collection that is done by giving a set of questions or written statements to respondents to be answered. The technique of collecting questionnaire data is in the form of a Likert scale. It is the scale used to measure the attitudes, opinions, and perceptions of a person or group of social phenomena [22]. The Likert scale procedure is to determine the scores on each question in a distributed questionnaire [23]. Respondents' answers consist of the following four assessment categories: 1= never; 2= sometimes; 3= often; and 4= always.

Data analysis technique used is the quantitative technique by using descriptive statistic. Descriptive statistics are statistics used to analyze data by describing or describing data that has been collected as it is without intending to make conclusions that apply to the public or generalization [22]. The questionnaire results from calculating the score of each indicator given by the respondent. The calculation of the value in each indicator using the formula:

\[
P = \frac{f}{N} \times 100\%
\]

Where: \( P \) is the final value, \( f \) is the score gain and \( N \) is the maximum score.

To determine the types of categories from each indicator then performed data analysis using the provisions in Table 1.

| Interval | Category   |
|---------|------------|
| \( \leq 60 \) | Very Less |
| 60 < value \( \leq 75 \) | Less |
| 75 < value \( \leq 90 \) | Good |
| 90 < value \( \leq 100 \) | Very Good |

3. Results and Discussion

The data obtained from this study is the percentage of data onto student’s responsiveness towards coastal abrasion disasters which will be implemented in the development of physics e-modules with the theme of coastal abrasion. Therefore, observations are made in Senior High School (SMAN) 1 Ulakan Tapakis in the coastal area. Generally, students and the community living around the beach. According to interviews with students, that there are frequent coastal abrasion disasters in this area. The effect can cause the houses are threatened by the impact on coastal abrasion disasters. Furthermore, from the results of the interviews, the local government has attempted to mitigate disasters by installing dikes and constructing breakwater dikes with sustainable projects to reduce the impact on coastal abrasion. Moreover, it is necessary for students to apply coastal abrasion disaster response to reduce material losses and loss of life. Based on the questionnaire by students, the questionnaire consists of seven indicators, the results of each indicator to see how far the response attitude of students. The results of the analysis of students' responsiveness to coastal abrasion disasters in Figure 1.
Based on Figure 1, the results of the students' response attitude analysis on seven indicators, with an average percentage of 72.99% included in the less category. From the analysis of each indicator, there are still many who are in the less category in this coastal abrasion response attitude. The results of the students' responsiveness analysis of SMAN 1 Ulakan Tapakis shows that students have not been fully responsive to coastal abrasion disasters.

Analysis of students' responsiveness to some indicators in the good category, such as rescue and evacuation of 78.32% victims, 80.47% for rescue of property, 76.37% for refugee’s treatment and 77.6% rescue. This means that the responsible attitude of students is good in the rescue and evacuation activities against coastal abrasion disasters. Furthermore, from the interviews, most of the students have helped and provided help on the circumstances of the coastal abrasion, as well as saving valuable possessions.

The analysis of responsiveness to other indicators in the category less. In the indicator of the fulfillment of basic needs obtaining the average percentage of 67.2% in the category less. Basic human needs are the elements that humans need to sustain their lives. One of the basic human needs is the need for safety and security [24]. It is important for students to meet the need for safety and security by knowing the symptoms and impact of disasters through socialization and sharing of information that will reduce the impact of disasters.

On the protection's indicator obtained an average percentage of 64.76% are in the category less. Based on the description of indicators of students still rarely do the protection when a coastal abrasion disaster occurs. Through the interviews, the researcher found that the students quickly aware of the coastal abrasion disaster but less aware of the dangers of the symptoms that arise, so it is still safe to pass the beach affected by landslides due to coastal abrasion. However, the students should stay away from the coastal area to avoid the effect of the beach abrasion.

In the indicator of recovery of facilities and infrastructure obtained an average percentage of 66.2%. It also belongs in the less category. Students are less responsive to the improvement of facilities and infrastructure damaged by coastal abrasion. The damages need improvement to normalize all aspects of the community activities. In the improvement activities, the people not only as the victims of disaster but they also as the active actors in improvement activities.

4. Conclusion
The result of attitude response analysis of the students obtained the percentage of 72.99% which are in less category. Responsiveness on some indicators in the good category, such as rescue and evacuation of victim 78.32%, the rescue of property 80.47%, refugees management 76.37%, and rescue 77.6%. However, the analysis of other indicators is in the less category, such as 67.2% the fulfillment of basic needs indicators, 64.76% protection, and 66.2% recovery of facilities and infrastructure. This means that the learner is not yet fully expected to respond. The rapid progress of ICT led to the importance of
ICT-based learning materials is e-modules. To improve the attitude of disaster response to the students, one of the efforts is to implement e-module physics coastal abrasion theme to improve responsiveness at SMAN 1 Ulakan Tapakis Kabupaten Padang Pariaman, West Sumatera Province.

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