Development of the Disaster.co Website as a Digital Learning Media to Train 21st Century Students' Skills Through Geography Learning

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ABSTRACT

Technology in the 21st century is developing rapidly covering all aspects of human life, including education. The impact of technological developments in education can be seen from the increased efficiency and flexibility of the learning process. Technology plays an important role as an intermediary in the learning process. The integration of technology in education is marked by the use of digital media as a learning tool. The existence of digital media can make the learning process more interesting, so that students' interest and motivation in learning can be increased. In addition, students' understanding of the material can be mastered well because of the use of media in learning. Geography as a subject with broad and diverse material requires the use of media, so students will find it easier to understand the concept of the material being taught. This study aims to design and develop technology-based or digital learning media as a medium that can be used as an alternative in geography learning in the classroom. The method used in this study is the research and development method with data collection involving observation method and questionnaire distribution. This study adopts two types of data analysis, namely qualitative and quantitative. Qualitative data is presented as a form of elaboration of media needs analysis and quantitative data is presented as a form of assessment of the feasibility of digital learning media developed in this study. Based on the results of the study, the existence of learning media is clearly needed as a tool/device in geography learning. Students' understanding of disasters and mitigation cannot be achieved well if only presented with theory. Therefore, it is necessary to use media that displays many disaster visualizations both in theory and data, so that students' understanding can be achieved well and trigger students to be more active in class. Based on the development results, the Disaster. Co website received a high score and is worthy as a digital learning media in geography learning for disaster and disaster mitigation materials.

Keywords: Technology, digital learning media, 21st century student skills, geography learning.

INTRODUCTION

The 21st century is marked by a process of change, in this case a change towards a more modern direction. Life in the 21st century is very popular with the influence of the rapid development of science and technology (*IPTEK*) [1]. Several major innovations and trends in technology such as the development of the internet and digital communications, artificial intelligence, big data, and others continue to penetrate various aspects of

human life. Technological development emphasizes the process of progress and improvement of existing technology through various types of research and innovation (https://www.igi-global.com/ , 2022).

The advancement of science and technology in the 21st century is coupled with the phenomenon of globalization, where every individual has the freedom to obtain information. The development of technology in the era of globalization can provide information from various countries with a very easy level of access [2]. The advancement of technology in the era of globalization makes human life more practical to be done.

For the field of education, the rapid development of science and technology in the era of globalization has its own impact. Education as one of the important aspects to increase the potential of quality human resources is also affected by changes [3]. These impacts can be witnessed by the existence of wide accessibility, personalization of learning, increased student involvement, better collaboration and communication, efficiency of education management, and development of skills by both teachers and students. Of the several impacts of change seen in the field of education in the 21st century, technology integration is the main trigger for the emergence of these impacts of change.

Technology has played an important role in improving the efficiency, accessibility, and quality of education. Technological facilities and tools make the learning experience more interactive and affordable for students (upy.ac.id, 2023). The change in the learning paradigm in the 21st century, classical teaching has changed to technology-based teaching [4]. Technological advances as the main trigger for change have not only targeted the educational paradigm, but also targeted educators.

Teachers and students as educators are required to be able to adapt to the existence of technology integrated into learning. For students, this is not a big problem because most of them are technology users, even

technology has become a basic need for them. But for teachers, adapting to the use of technology in the learning process is a challenge. Teachers as professionals in the field of education in this era must be able to develop the knowledge and skills they have [5]. Teachers are required to be more proactive, critical, innovative, creative, and cooperative with current technological developments in order to follow existing educational trends [6].

In addition to technology integration, changes in the learning paradigm in the 21st century can be seen from the existence of good collaboration and communication in learning and skill development. Good collaboration and communication in learning are characterized by several key indicators such as active interaction between students and teachers, openness in expressing opinions, group discussions, and the use of technology to support collaboration. In line with this, 21st century learning also needs to understand a concept, namely the 4C concept, where 21st century learning is interpreted as an activity that can provide 21st century skills to students, namely collaboration, communication, critical thinking and problem solving, and creative and innovative [7]. To achieve these skills, learning needs to be supported by technology integration. Information and communication technology in this era of progress plays an important role in changing the way we learn and teach [8].

One of the fields of study that utilizes the potential of technology is geography. Geography is a subject that is closely related to the real world, so learning can be enhanced by the use of technology in this case digital learning media [9]. Various digital media such as interactive applications, learning videos, simulations, and other online learning resources can enrich students' learning experiences. The development of this technology will allow students to explore in depth various geographical phenomena, explore geospatial information, and interact with learning content in a more interesting and enjoyable way [10].

Not only that, digital learning has great potential to improve the way geography is taught and learned. With the right integration, digital learning can renew the way geography is taught and learned, making it more interesting, relevant, and accessible to all students. Several existing studies describe digital learning integrated into geography subjects as having great potential to improve the quality of geography learning in the classroom. In this case, digital learning can help students become more active in the classroom.

Although the use of digital learning media has the potential to improve the quality of geography learning, its implementation is still uneven and often experiences obstacles [11]. At the research location itself, the use of digital learning media is often constrained by the availability of projectors in the classroom. In fact, the facilities themselves have been fulfilled for each class, but sometimes the tool is reluctant to be used, as a result learning is delayed to find alternative tools. As a solution to this problem, the development of digital media in geography learning needs to be carried out with the aim that the media can be used by students or teachers without being constrained by other tools.

In this context the research will be further explored with the aim of designing and developing digital learning media for geography subjects. Based on analysis of teacher and student needs as a reference for development. In addition, analysis of student tasks, learning steps, and formulation of learning objectives are needed as a design for the plan contained in the media.

MATERIALS & METHODS

This study uses the research and development (R&D) method with development stages referring to the development of 4D learning media models by S. Thiagarajan, Dorothy S. Semmel, and Melvyn I. Semmel (1974). This development model consists of 4 stages, namely Identification (Define), Design (Design),

Development (Development), and Dissemination (Disseminate).

The define stage is the initial stage related to development requirements which contains analysis activities and information gathering to see how far development needs to be done. At this stage there are 5 activities including front-end analysis, learner analysis, task analysis, concept analysis, and specifying instructional objectives. The next stage is the product development stage or in this study, digital learning media which begins with the design, development, and finally the disseminate stages.

The subjects in this study consisted of 72 students of grade XI of SMA Negeri 52 Jakarta and one geography teacher of grade XI as a learning practitioner. The data collection method used in this study was the observation method and questionnaire in the form of a media validation instrument. Media validation was carried out by three experts, namely media experts, material experts, and learning device experts. The data analysis method used in this study was the quantitative analysis method with quantitative descriptive data analysis techniques as an elaboration of the feasibility of developing learning media that became the research product.

The feasibility assessment is calculated using the formula:

$$Xi = \frac{\Sigma S}{Smax} \text{ x } 100\%$$

Annotation:
Xi : Questionnaire feasibility value for each aspect
$\sum S$: Total score
Smax : Maximal score

Based on the calculations that have been carried out, the results are then classified into several categories of feasibility according to Arikunto, including <20% "Very unfeasible", 21% - 40% "Not feasible", 41% - 60% "Quite feasible", 61% - 80% "Feasible", and 81% - 100% "Very feasible" [12].

RESULT

The results of this study are divided into two, namely research results and development results according to the research method. The research results in this study are the results of the needs analysis that researchers obtain related to the use of learning media in geography subjects and the development results themselves are the results of media development or research products.

Research Results
Define Stage

In the 4D model development flow by S. Thiagarajan, et al. (1974) there are 5 activities in the define stage, including front-end analysis, learner analysis, task analysis, concept analysis, and specifying instructional objectives. The results of each analysis are described as follows.

1) Front-End Analysis

The first research was conducted to determine the problems and urgency of the need for learning media as a supporting tool for geography learning in the classroom. Based on the results of the study, the analysis of problems and media needs in geography learning is described as follows.

Problem Analysis:
Based on the results of observations, several problems are still often faced by both students and teachers during the geography learning process at SMA Negeri 52 Jakarta, these problems include the less than optimal use of media in geography learning. This problem is triggered by internal and external factors. Internal factors are related to the process of adaptation of geography teachers in conceptualizing geography learning in accordance with the Merdeka curriculum and the use of technology that often experiences obstacles and external factors are related to the availability of supporting learning resources.

Needs Analysis:
In accordance with the development of 21st century learning, the use of technology will certainly improve the quality of learning. Media in geography learning itself has an important role in improving students' understanding of geographic concepts and improving students' skills.

Based on the research results, researchers obtained data on the need for learning media in geography learning through two perspectives, namely teachers and students. Research data on the need for learning media was obtained through interviews and distribution of needs questionnaires, in this case the interviews targeted grade XI geography teachers and the distribution of questionnaires targeted grade XI students who chose the geography subject package. Interview activities were carried out in a structured manner with question guidelines including:

1) Geography teachers' views and observations of students' reactions during the learning process;
2) Student learning outcomes in geography subjects;
3) Steps taken by geography teachers in conceptualizing learning when students are in a position of low motivation and interest;
4) Alternative media that can support student understanding in the geography learning process;
5) The need for learning resources to support learning process activities in all subjects;
6) The need for learning resources that can be developed as independent learning resources for students in geography subjects.

The provision of media in the process of learning geography is very much needed. Geography as a science that studies the landscape of the earth along with the activities in it is very interesting if supported by adequate media. In addition, it is also strengthened by the reaction of students when learning geography using media and not, of course the difference will be clearly visible, where students will be more active

when learning is done by utilizing media. Students' interest and motivation to learn can also be improved if learning is supported by the existence of media.

The use of media in the geography learning process in the 21st century has an important role, especially in improving students' understanding and skills in geography concepts. Based on the results of the researcher's own observations, the use of media in geography learning at the research location has been very good, the media used is already in digital form so that it makes it easier for students to obtain learning resources. However, several things are still obstacles in the learning process, one of which is the availability of learning support resources. This continues to be complained about by geography teachers, because it often hinders the learning process. Therefore, as a solution, researchers developed digital media that can be used as an alternative media when learning is hampered by the availability of facilities. This was then received positively by geography teachers at the research location, considering that the alternative media that has been used so far in geography learning is only printed books. So, the digital media developed by researchers can be a novelty in improving the quality of geography learning at the research location.

Learning media can be developed as a learning resource. It is undeniable that the need for learning resources for each subject is very necessary to improve student understanding. Responding to this statement, of course learning media needs to be developed as a learning resource that suits students' needs. In geography itself, learning resources must be able to help students achieve learning objectives, the content of learning resources must be in accordance with the material presented by the teacher, learning resources must also be adjusted to the characteristics of students as learning targets.

Based on the teacher's perspective, media development in geography learning is good to be done as a form of effort to improve the quality of geography learning in the classroom. Media development must be adjusted to the target in this case the material, learning objectives and students. The results of media development must be able to be used as an alternative media for current geography learning.

Next, the urgency of media needs in geography learning according to students' perspectives. Data on student needs analysis for learning media were obtained through distributing questionnaires to students in grades XI-1 and XI-2. The analysis of student needs was divided into 6 questions listed in the questionnaire. From the results of 15 respondents, the following results were obtained.

Table 1. Student Needs Analysis Questionnaire Results

Questions	Answers	
	Yes	No
Is geography a difficult subject?	6	9
Are you an individual who enjoys learning by only using textbooks, modules, or teaching books to understand geography material?	8	7
Have you ever studied using other media (audio, visual, or audio-visual)?	15	0
Would you be happy if Geography learning was presented using a variety of learning resources?	15	0
Have you ever seen Geography material visualized/displayed through animation or computer simulation?	15	0
Does learning Geography using media that can show how things work, pictures, or materials in more detail/real time interest you?	15	0

Source: Research result, 2024.

Based on table 1, 6 out of 15 students categorized geography as a difficult subject. This was triggered by the extensive and diverse material, abstract concepts, use of maps and spatial data, use of special terms in the material, the need for analysis and critical thinking in understanding the relationship between natural and human phenomena, the influence of external factors such as the quality of teaching and available resources. These factors can contribute to students' perceptions that geography is a difficult subject. However, if geography is studied

with the right approach, including the use of interesting learning media and contextualization of the material, learning geography becomes easier to understand and interesting for students.

The use of interesting learning media can greatly support the effectiveness of the geography teaching and learning process. Based on table 1, 15 respondents answered that learning geography using media is interesting for students. The use of media in this case is media that is able to show how things work, images, or videos that can visualize the geography material being studied. In line with the students' answers, several types of learning media can be used to enrich geography learning, including the use of interactive maps, conducting simulations and displaying animations, displaying documentary videos, linked to educational games, presenting models/replicas, using AR and VR technology, using websites or educational applications to enrich the material, and conducting field projects. In terms of research, several types of geography learning media can be used as considerations for developing learning media that can support geography learning in the classroom.

2) Learner Analysis

The effectiveness of the learning process is highly dependent on how well teachers understand the characteristics of their students. Student characteristics can be seen based on several aspects including ethnicity, culture, social status, interests, cognitive development, initial abilities, learning styles, motivation, emotional development, social development, moral and spiritual development, and motor development. In one class, of course, there are various characteristics of students.

Based on the research results, researchers did not observe detailed student characteristics in all aspects but only looked at several aspects such as social status, learning interests, cognitive development, initial abilities/knowledge, learning styles, and learning motivation. The first thing that researchers highlighted was related to students' cognitive development, because cognitive development will later affect students' interests, motivations, and learning styles.

Based on Piaget's theory of intellectual development, children are divided into 4 stages, namely 0-2 years old are in the sensorimotor stage, 2-7 years old are in the preoperational stage, 7-11 years old are in the concrete operational stage, and 11-15 years old are in the formal operational stage. Grade XI students as the target of development are aged 15 years and above, which means that students' cognitive development is already at the formal operational stage. The formal operational stage is the final stage in children's cognitive development which is marked by the ability to think abstractly, use logic to solve problems, and learn to plan something. In addition, this stage also allows children to begin to examine, assess, and evaluate their own thoughts or actions. Simply put, at this stage individuals have begun to think about something real based on their experiences. Children who are at this final stage of cognitive development need guidance so that abstract thinking can be more focused, logical thinking has a strong foundation before ending in decision making and planning can be directed maturely. In addition, individuals also need to be supported by learning related to new things as a step to add to the learning experience.

Cognitive development then affects interest and motivation to learn, individuals have begun to be able to determine something based on interest. If the individual is interested in something, then he will be very motivated to learn it. In line with this statement, the implementation of the Merdeka curriculum in schools adjusts to the stage of students' cognitive development, and this certainly helps students in choosing learning according to their interests. SMA Negeri 52 Jakarta is a school that has implemented the Merdeka curriculum as a guideline for learning and assessment. However, when viewed from the implementation of the curriculum in the

learning process, teachers still experience awkwardness, teachers still have to continue to adapt.

This can be seen from the geography learning which is still relatively rudimentary. Judging from the rudimentary geography learning, students' interest and motivation to learn are also included in the low category. Geography in the Merdeka curriculum is included in the social science subject group along with sociology and economics. As a social science subject, geography has a lot of dense material to discuss. Because of the large amount of material, students sometimes think that geography is a difficult subject. It should be noted that whether a material is difficult or not depends on the teacher's delivery method. The teacher's strategy in presenting material or conceptualizing learning will certainly greatly affect students' interest and motivation in learning. Because the geography teacher at the research location itself is still awkward in implementing the curriculum, the result is that learning still looks rudimentary, there has been no further innovation.

In addition to cognitive development, students' learning interests and motivations can be seen from their learning styles. Students in grade XI with cognitive development can sometimes have greater curiosity. For individuals who like to learn, in this cognitive development they will be very happy to find a lot of information to complete their abstract thoughts before deciding things based on logic. This student's hobby can be triggered by the way students obtain information or can be called the student's learning style. Learning styles can be grouped into three, namely visual, auditory, and kinesthetic. Visual learning style means that students will easily understand lessons if supported by visual media such as pictures, posters, diagrams, maps, videos, and other visualizations. Auditory learning style means that students like the presentation of learning materials through lectures, discussions, and story-telling. Finally, kinesthetic learning style means that students can easily understand

lessons if there is practice, students with this learning style prioritize practical activities compared to discussing theory in class. In relation to the grouping of learning styles, based on the results of the study, most of the students in grade XI of SMA Negeri 52 Jakarta are included in the group of students with a visual learning style. Judging from the geography learning so far, utilizing the visual display of PPT in presenting material supplemented with images and videos can at least increase students' enthusiasm in learning geography.

The last thing that teachers need to pay attention to before continuing learning is to check students' prior knowledge. Checking students' prior knowledge about the material to be studied can help teachers in designing learning that is in accordance with it. Geography as a subject that has a lot of discussion material will certainly confuse students in learning it, for that teachers need to conduct an analysis of prior knowledge related to things that students do not understand in previous material or in material that will be taught in the future. If you look at the way teachers check students' prior knowledge during the research, it can be said that it is very good. Students are also active in conveying things they do not understand to the teacher.

3) Task Analysis

This activity is held to analyze the main tasks that students must master during or after learning related to knowledge and skills. In this regard, this study raises the theme of disasters as the learning material to be studied. The disaster material taken is in class XI of high school, if in the Merdeka curriculum this material is included in phase F material whose learning outcomes are divided into 2, namely conceptual understanding and process skills. In conceptual understanding, the learning outcomes that students need to achieve are that students are able to identify, understand, process, and analyze, as well as evaluate spatially about disasters and the

environment. In process skills, the learning outcomes that students need to achieve are that students are skilled in reading and writing about disasters and the environment, and students are able to convey, communicate ideas between each other and are able to work in groups or independently with product aids.

Phase F learning achievements are then reduced to learning objectives as a guideline for teachers in determining learning steps. The learning objectives listed in the disaster and disaster mitigation material teaching module compiled by the teacher include:

1. Students are able to explain the concepts of disaster, mitigation, and disaster adaptation.
2. Students are able to apply disaster concepts in real life.
3. Students are able to analyze the impact of disasters on economic, social, cultural and other aspects of life.
4. Students are able to design simple projects for disaster mitigation or adaptation in the surrounding environment.

4) Concept Analysis

Geography learning on disaster and disaster mitigation material is carried out face-to-face with a problem-based learning (PBL) learning model. The target students in this learning are regular/general students, who do not have difficulty in digesting and understanding the teaching materials. The facilities and infrastructure used in this learning include laptops, smartphones, wifi, LCD/Projectors, and whiteboards. Learning activities begin with opening activities by providing stimulus about disasters, then continued with dividing groups according to each disaster. The preparation of assessments in this learning is the provision of group assignments according to the previous group division, in which students are asked to find information related to the disasters of each group equipped with case examples and disaster mitigation steps. The assignment is made in the form of a power point to be presented at the next meeting.

5) Specifying Instructional Objectives

The formulation of learning objectives includes:

1. Students are able to explain the concepts of disaster, mitigation, and disaster adaptation.
2. Students are able to apply disaster concepts in real life.
3. Students are able to analyze the impact of disasters on economic, social, cultural and other aspects of life.
4. Students are able to design simple projects for disaster mitigation or adaptation in the surrounding environment.

Based on the five analysis activities, the researcher concluded that geography learning at the research location needs to be improved. The use of media that provides easy access without having to sacrifice class hours, the use of media that is comfortable to access for both teachers and students, compiling material content by utilizing GIS to enhance students' learning experience, conceptualizing learning steps to adjust to the goals to be achieved.

Based on this, so far the preparation of geography learning steps on disaster and disaster mitigation materials contained in the teaching module is very appropriate, only the researcher wants to complement the learning with flexible learning media, can still be used even without using a projector, and can still be accessed in any situation.

Development Results

Design Stage

The Disaster.co website is built using PHP and JavaScript programming languages using the CodeIgniter 3 framework. The database used is MySQL, and this website runs on PHP version 7.3. This website has two main types of users, namely teachers/admins and students.

The Disaster.co website is specifically designed as a learning resource for grade XI high school students on disaster and disaster

mitigation materials. The data used in the website includes a list of disasters, news, disaster carousels/posters, types of disasters, comments, content, quiz participants, quiz questions, users, and quiz answers. The features available in this application include the CRUD (Create, Read, Update, and Delete) function for news, content, disaster carousels/posters, types of disasters, disaster lists, quiz participants, quiz questions, and users. In addition, this application is also equipped with an interactive map that displays disaster location markers and a Choropleth Map, as well as interactive quizzes about disasters and feedback features for comments/suggestions from students. The content and news provided on the website focus on information about disasters. The design of the Disaster.co website is further described as follows.
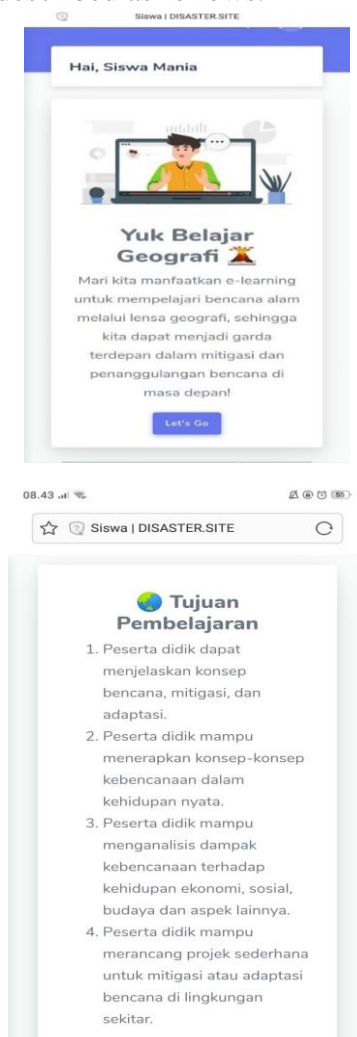
**Picture 1. Homepage of website Disaster.co**

The homepage of the Disaster.co website as shown in Picture 1 contains an invitation to use the website as a source of learning about disaster and disaster mitigation materials. The next side, the front page of the Disaster.co website is also equipped with learning objectives according to what has been formulated as a reference for the achievements that must be aimed for during learning.
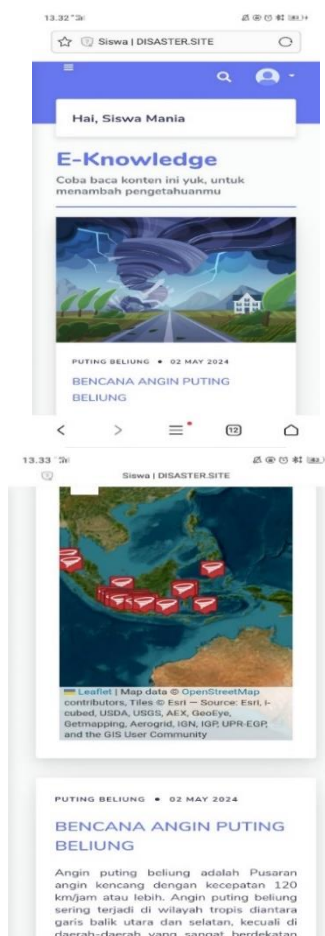
Picture 2. Disaster.co website content page

The content page on the Disaster.co website as shown in Figure 2, displays E-Knowledge content which means knowledge. This page contains explanations related to natural disasters and their disaster mitigation. The display of E-Knowledge content as shown in the figure on the right, an explanation of the tornado natural disaster accompanied by a digital map showing the location of the tornado disaster in Indonesia. The descriptive text presented can help students understand related disasters as well as the causal factors and mitigation measures, the

existence of the digital map is useful for increasing students' knowledge about the distribution of related disasters assisted by a description of the incident.
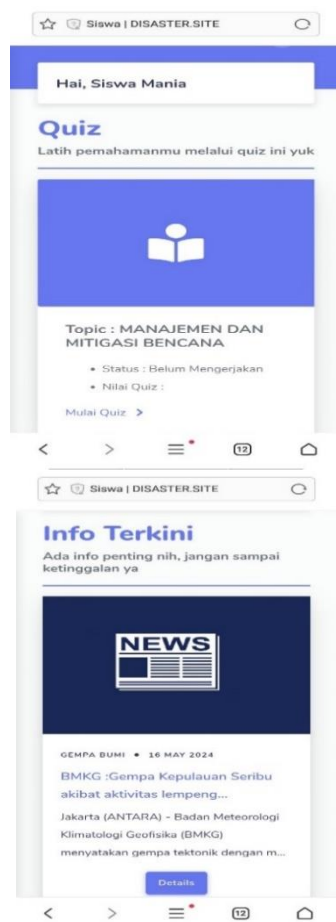

Picture 3. Disaster.co website Quiz and News page

The quiz page on the Disaster.co website as shown in Figure 3, contains student practice questions. Practice questions are made based on topics as shown in the figure, one topic can contain one or more questions in essay form. The quiz page is set up so that students can immediately provide answers on the page.

The news page on the Disaster.co website contains a collection of the latest information about the latest disaster events, namely the 2022-2024 time span. The collection of information is obtained from trusted news articles such as Detik.com, Kompas, and other platforms. The news feature is held to train students' literacy in the latest disaster news, in addition, the news listed in the feature can be used as an example of a

disaster case, so that students' understanding of disasters is more concrete.
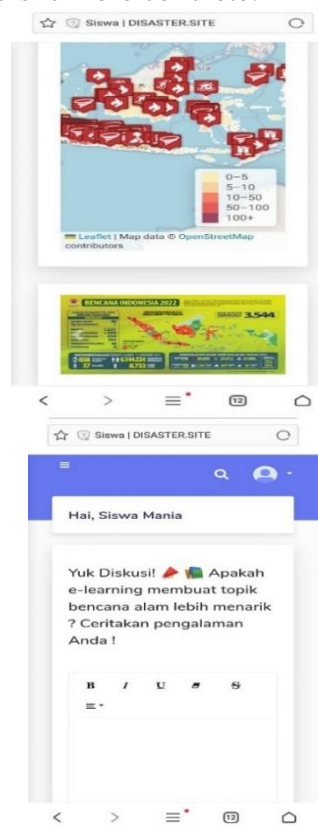
Picture 4. Distribution Page and Comments Column of Disaster.co website

Next, the distribution page available on the Disaster.co website in Figure 4, presents the distribution of disaster locations including floods, forest fires, tornadoes, volcanic eruptions, and earthquakes. The distribution content is complemented by a digital map showing the locations of the five disasters spread across Indonesia. In addition, the designated disaster locations are also equipped with information on fatalities and damage caused by the disaster. The display of this disaster distribution map is presented like the in a risk map, but this map has simpler data. The existence of this digital map helps students understand the potential distribution of disasters that most often hit Indonesia.

Finally, the comments column page is intended as a place for students to provide suggestions or assessments of the Disaster.co website after using it in learning disaster and disaster mitigation materials.

Development Stage

At this stage, after the Disaster.co website has gone through the design and creation process, it is then continued to the assessment or validation stage before being tested on research subjects. The assessment is carried out by experts, in this study media experts, material experts and learning device experts. The three experts who carried out the assessment are Lecturers of Geography at Semarang State University. The results of the assessment from each expert will be described as follows.

Table 2. Expert Assessment Results

Expert Assessment	Total Score	Feasibility Percentage
Media	66	88
Material	59	79
Learning device	107	93

Source: Research result, 2024.

1) Media Expert Validation Results

The results of the media expert validation were used to assess the suitability of the Disaster.co website display as a learning media developed in the study. The media expert who assessed the Disaster.co website was a Geography Lecturer at Semarang State University, namely Dr. Muh. Sholeh, S.Pd. M.Pd. The assessment by the media expert covered three aspects, namely linguistic aspects, software engineering, and visual media display. Based on table 2, the total score of the media expert assessment got a total score of 66 out of a perfect score of 75. The results of the feasibility calculation on the media were already in the very feasible criteria with a percentage value of 88%. Based on these data, over all the assessment of the Disaster.co website was good as a learning media developed in this study to help students understand disaster and disaster mitigation lessons, it's just that some components still need to be improved in order to produce a much better learning website in the future.

2) Material Expert Validation Results

The results of the validation by material experts were used to assess the suitability of the content of the material on the Disaster.co website developed in the study. The material expert who assessed the Disaster.co website was a Geography Lecturer at Semarang State University, namely Dr. Andi Irwan Benardi, S.Pd., M.Pd. The assessment by the material expert covered three aspects, namely the suitability of the content of the material, the arrangement of the material and the scope of the content of the material. Based on table 2, the total assessment score by the material expert was 59 out of a perfect score of 75. The results of the calculation of the feasibility of the material that is the content of the Disaster.co website have shown a feasible-criteria with a percentage value of 79%. Based on these data, the material contained in the Disaster.co website is generally good, it's just that there are still some things that need to be improved and added, especially in the presentation of updated data on digital maps and also the neatness of the writing. However, the material expert has stated that the material included in the Disaster.co website is suitable for use in learning.

3) Learning Device Expert Validation Results

The results of the validation of learning device experts are used to assess the suitability of learning devices and the accuracy of the Disaster.co media as a learning media developed in research on future learning. The learning device expert who served as the assessor was Dr. Edi Kurniawan, S.Pd., M.Pd., as a Lecturer in Geography at Semarang State University. The assessment by the learning device expert covers eight aspects consisting of subject identity, suitability of the formulation of objectives and achievement indicators, selection of materials, selection of learning methods, planning of learning activities, selection of learning resources, preparation of assessments, and language. The assessment aspects of learning devices are

divided into 23 indicators with a total score of 107 out of a perfect score of 115. The percentage results of the feasibility of learning devices are already in the very feasible criteria with a score of 93%. Based on these data, in general the learning devices are complete and very good with the existence of RPP or teaching modules and the use of the Disaster.co website in learning geography on disaster and disaster mitigation materials.

DISCUSSION

Teachers' and students' perceptions of the use of digital learning media in geography learning may differ [13]. But besides that, it is clear that both need media to help the learning process. Based on the results of the needs analysis, for teachers, learning media in geography subjects is a complement. Geography as a science that studies the earth's landscape and its activities is very interesting if supported by adequate media. In addition, learning geography using media can increase student involvement in learning. For students themselves, learning with the help of media makes learning more interesting. Geography as a subject that has extensive and diverse material is often considered a difficult and boring subject, this is due to the lack of support for the learning that is carried out. However, learning geography using media can shift students' stereotypes about geography being difficult to geography being fun to learn. Based on the results of the needs analysis, students agree that geography learning is presented with varied media. Geography as a subject that has extensive material, students hope that the learning media presented can visualize the material being discussed, coupled with lots of pictures, videos, geographic data, and so on. This is intended so that students understand better, students' spatial abilities can also be more developed.

Disaster.co is a product (digital learning media) developed in this study. Disaster.co was developed as a digital learning media in geography subjects with discussions around disaster and disaster mitigation materials.

Disaster.co was developed in the form of a website with data used including a list of disasters, news, disaster carousels/posters, types of disasters, comments, content, quiz participants, quiz questions, users, and quiz answers. The Disaster.co website is also equipped with an interactive map that displays disaster location markers and a Choropleth Map. Based on the results of expert validation, the Disaster.co website received a high score and can be said to be worthy as a digital learning media that specifically discusses disasters and disaster mitigation. This assessment certainly does not escape from notes of improvement, in terms of the appearance of the website it is very adequate supported by the appropriate font and basic color. In terms of content/material, some still need to be added, disaster data and news displayed must follow the latest line. In terms of devices, the Disaster.co website is very suitable for use as a supporting tool for the geography learning process. This is supported by the opinion of geography teachers, the Disaster.co website provides convenience in using both teachers and students, considering the problem of learning tool facilities, the presence of the Disaster.co website is a solution and alternative as well as an innovation in learning media in geography learning in the classroom. Based on its application during the research period, the presence of the Disaster.co website received a positive response from students. Learning with the website is very time-saving. The discussion of the material carried out by the teacher also became clear thanks to the features presented by the website, namely images, posters, simulation videos, and interactive maps.

Learning media in the form of websites is the choice because of the ease of access offered. Learning media in the form of websites can be accessed without being limited by time and place and can be used via smartphones so that it is more practical [14]. Technological advances have an impact on the use of smartphones/gadgets to solve academic problems with the ease of accessing various information [15]

In relation to this, several previous studies have conducted the same development, namely geography learning media in the form of websites, including research by Rizaldy & Aji (2022), namely developing learning media in the form of a website called geoeduvid. Based on the results of their research, the geoeduvid website is considered effective as a learning medium compared to conventional forms. The geoeduvid website is also successful in encouraging student motivation in studying natural disaster mitigation material, thus affecting students' spatial intelligence. In addition, website-based learning media that is connected to the internet makes it easy for students to acquire knowledge. Websites that connect to various information on the internet can increase students' interest in mastering new knowledge.

In line with this research, innovation in the development of learning media in the form of a website was also carried out by Zamroh et al (2022), namely developing the geohepi website as an interactive media for learning flood mitigation. Based on this research, the geohepi website was declared successful as an interactive learning media to improve students' understanding of flood mitigation measures. The existence of the geohepi website in the learning process has also succeeded in increasing students' interest and motivation in studying geography.

Based on the discussion description, the Disaster.co website that has gone through the development stage can be used as a digital media in geography learning in class well. The existence of the Disaster.co website is also expected to increase student involvement in the learning process, so that collaboration and communication in learning are getting better and learning objectives can be achieved.

CONCLUSION

The development and implementation of the Disaster.co website as a digital learning medium for geography subjects has shown promising results, increasing student engagement and understanding of complex topics such as disasters and disaster mitigation. This innovative approach not only addresses the various needs of teachers and students, but also changes the perception of geography from a difficult subject to an interesting and accessible subject.

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