

## Development of Geography Learning Media with Dieng Plateau Material to Support Grade X Students' Field Introduction

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### Abstract

The 21st century demands interactive learning media that follow technological developments and student needs, but the number of interactive learning media is very limited, especially volcanism material that can support field introduction. This condition causes ineffectiveness in learning. Therefore, learning media is needed that accommodates student needs based on student learning styles, especially in field introduction. This study aims to develop Macromedia Flash-based learning media with Dieng Plateau material. The type of research used is Research and Development. The development procedure includes the stages of definition, design, development, and distribution. The data collection technique used is purposive random sampling. Data collection using a media suitability questionnaire by validation experts and product trials in schools which are divided into three stages. Data analysis techniques in this study were analyzed using qualitative assessments. Assessment data in the form of scores from media experts and students obtained through questionnaires were analyzed descriptively quantitatively with percentages and categorization. The results of the study indicate that geography learning media is suitable for use to support field introduction for grade X students. Recommendations for further research are the effectiveness of developing learning media in improving students' field introduction.

**Keywords:** Learning Media, Dieng Plateau, Field Introduction.

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### 1. Introduction

Material geography has wide coverage because basically, source Study material geography can obtained from where only, including from natural around. Outdoor learning classroom) provides opportunities for students to explore materials with different perceptions and methods (Kubat, 2017). Outdoor learning is important to make abstract

and complex concepts easy to understand and provide opportunities for students to conduct experiments and observations, this will improve the ability to think critically and creatively. Outdoor learning can have a positive impact on students in the form of better attitudes, confidence, and self-perception, providing wider communication opportunities and improving social and cooperation skills (Nisa, 2015).

Technology is a method, process, and product resulting from the utilization and application of various disciplines of science that produce value for the fulfillment of needs, sustainability, and improvement of the quality of human life. One of the benefits of learning media is to provide motivation and understanding for students in more depth. Text and audio have a less than optimal impact compared to videos that combine the two so that learning media are able to efficiently motivate students positively (Heo, 2012). The benefits of learning media are as a messenger of information so that the learning and teaching process increasingly attracts the attention and interest of students. The learning media used can vary according to learning needs (Setyorini, 2016).

The development of increasingly advanced technology influences in various aspects of life humans, including learning. Learning media is an important need in the learning process, especially in the digital era like today, educational institutions are expected to be able to facilitate students who are the millennial generation. Educational institutions are required to invest in and facilitate digital technology and design e-media for the millennial generation (Arnold, 2016). The benefits of learning media in schools are to increase the effectiveness and efficiency of students' knowledge and skills (Courville, 2011). The use of learning media makes the learning process more enjoyable and facilitates understanding of content more effectively (Fook, 2011). The use of multimedia learning has a positive impact on the results and quality of learning. The increase in results and quality can be seen from the increase in motivation, enthusiasm and also understanding of students (Rusmiyati, 2014).

The need for learning media in the world of education This Still become very thing important, interactive multimedia is a very media in accordance used in learning at school because supported video, images as well as capable voice optimize the understanding of students, so teachers are expected capable develop learning media interactive for students at school (Suciani, 2021). The availability of learning media is expected comparable with high media needs for support learning students at school. The use of technology in using learning media has not been implemented due to several factors, including the amount of learning multimedia which is still very limited, and teachers' difficulties in using learning media (Untari, 2017:). Besides that, teachers as facilitators at school experience various obstacles, one of which is not enough capable of using learning media based on technology (Nofrion, 2024). Based on the results of research, geography teachers need learning media in the learning process to support student understanding and efficiency of geography lesson time (Ayas, 2015). Learning media has important benefits in geography learning, the use of learning media can improve the quality of geography learning. Students can create stronger cognitive structures, helping students practice what they learn in everyday life so that they will become better problem solvers (Yazici, 2010)

The use of interactive multimedia in learning in the 21st century is important to encourage active student involvement and support the development of various skills, especially 21st century skills (Halimah, 2021). Today's education is required to adapt to technological advances, so teachers are required to have the ability to understand and

adapt learning media according to needs (Farida, 2019). Education in the 21st century requires innovation in the learning process, so teachers are required to continue to actively adapt to developments in the era, including utilizing technology such as interactive media and the internet as part of a learning strategy (Hanipah, 2023). The 21st century demands interactive learning media that follow technological developments and student needs, but the number of interactive learning media is very limited, especially volcanism material that can support field introduction. This condition causes ineffectiveness in learning. Therefore, learning media is needed that accommodates student needs based on student learning styles, especially in field introduction. The development of learning media based on original material from volcanic locations provides a new contribution to improving students' ability to recognize field conditions in a more realistic and contextual way.

Dieng Plateau is an area with high complexity and has elements of geography like formation land consequence volcanism, conditions geography as well as source Power nature that can developed become material Study for participant educate. The teaching materials obtained become more easily understood because is something that is certain and happens in nature which is source learning. Giving examples of materials learning that should be is example concrete sometimes still too general so that not enough depicted in imagination participant educate. Giving more examples of specifically expected capabilities makes participants educate become more clear and easy understand. Discussion about material lithosphere, Dieng Plateau has elements of geography such as volcanic processes that are still ongoing and active in several craters active Dieng Plateau and formation land and yield volcanology others that can utilized as material Geography For class X of high school. Dieng Plateau is an area of a volcano that is still active at the moment, there is an interesting post-volcanic activity To be studied more in a way deep such as solfatara, fumarole, and more (Priatna, 2015).

## 2. Method

The research was conducted in class X on the geography subject of material volcanism. The development model used in the study is Research and Development 4D developed by Thiagarajan (Thiagarajan, 1974). 4-D development design includes 4 stages, (1) define; (2) design; (3) develop; (4) disseminate. Trial products are done through a number of stages, namely trial validation products by media and material experts and trial products to students in a one-to-one, small group, and field group.

The research data collection was conducted using non-test techniques, conducted to see the feasibility of the trial use of media. The indicators used in material validation include the suitability of the material to the learning objectives to be achieved, simplicity, message delivery, and organization of teaching materials. The variable indicators used in material validation include images, sound, text, video and message presentations. This instrument is used to obtain data related to the assessment of product feasibility from validators (Dr. Nurul Khotimah, M.Si as material experts and Prof. Herman Dwi Surjono, Ph.D as media experts) and the response to the use of media by students. The technical analysis of data in the form of comments and suggestions in this study was analyzed using qualitative assessment. Assessment data in the form of scores from media experts and students obtained through questionnaires were analyzed descriptively quantitatively with percentages and categorization. Quantitative data conversion to qualitative data with Likert scale in Table 1.

**Table 1.** Quantitative Data Conversion to Qualitative Data with Likert scale

| Mark | Score Interval                           | Criteria   |
|------|--|------------|
| A    | $X_i + 1.8 SB_i < X$                     | Very good  |
| B    | $X_i + 0.6 SB_i < X \leq X_i + 1.8 SB_i$ | Good       |
| C    | $X_i + 0.6 SB_i < X \leq X_i + 0.6 SB_i$ | Enough     |
| D    | $X_i + 1.8 SB_i < X \leq X_i + 0.6 SB_i$ | Not enough |
| E    | $X_i \leq X_i - 1.8 SB_i$                | Very less  |

To provide a more measurable picture of the achievement of activities, assessment criteria are used which are classified into five levels. Each level reflects the extent to which the indicators have been met, both in terms of quality and quantity. The following explanation of each criterion is expected to help in objectively and consistently assessing the results achieved. Very good indicates that the Achievement shows very high quality, exceeding the established standards. All aspects have been optimally fulfilled, equipped with innovation, strong evidence, and consistency in implementation. Good indicates that the Achievement shows good quality and is in accordance with the established standards. Most aspects have been fulfilled quite well, although not yet fully innovative or comprehensive. Enough indicates that the Achievement meets the minimum standards set. Some aspects still need improvement or strengthening, but in general are already at an acceptable level. Not Enough indicates that the Achievement has not met the expected standards. There are significant deficiencies in several important aspects, so fundamental improvements need to be made. Very Less indicates that the Achievement is very far from the established standards. Most aspects are not fulfilled or not implemented, and are not supported by adequate evidence.

### 3. Results and Discussion

#### A. Result

Trials of products were done to see the eligibility products and effectiveness of products developed. The trial product is done by validation experts and test subjects. Validation media experts and material experts as well as test subjects is participant education. Multimedia evaluation is carried out to test subjects with stages one-to-one, small group, and field group evaluation.

#### 1. Validation results media and material experts

Development of the beginning of interactive media done expert assessment material and media experts. The following results evaluation from media expert on Learning Media Interactive Dieng Plateau as follows. Eligibility content on learning media interactive Dieng Plateau with evaluation as Table 2.

**Table 2.** Media Expert Assessment of Dieng Plateau Media

| No | Aspect Evaluation         | Score |
|----|---------------------------|-------|
| 1  | Proportion picture        | 4     |
| 2  | Contrast picture          | 5     |
| 3  | Election color            | 4     |
| 4  | Clarity Voice             | 4     |
| 5  | Compliance Election Voice | 4     |

|               |                                |           |
|---------------|--------------------------------|-----------|
| 6             | Election letter                | 4         |
| 7             | Contrast letter                | 5         |
| 8             | Size letter                    | 4         |
| 9             | Video compliance with material | 4         |
| 10            | Video Quality                  | 4         |
| 11            | Proportion presentation text   | 4         |
| Total Score   |                                | 46        |
| Average Score |                                | 4.18      |
| Category      |                                | Very Good |

Based on the amount value on aspect Media assessment by media experts obtained an average score of 4.18. The table average score conversion shows that the score entered in the category was very good. Assessment results from media experts show media can used for trial with repair according to the advice given by media experts. After improvements and changes in accordance with the suggestions given by the validator, the media can used for testing to participant educate. Eligibility material on learning media Dieng Plateau interactive assessed by material experts with evaluation seen in Table 3.

**Table 3.** Expert Assessment of Material on Dieng Plateau Media

| No            | Aspect Evaluation                                | Score     |
|---------------|--|-----------|
| 1             | Compliance with SK and KD                        | 5         |
| 2             | Development Indicator                            | 5         |
| 3             | Compliance practice / test with indicator        | 4         |
| 4             | Clarity language used                            | 5         |
| 5             | Compliance Language with target user             | 5         |
| 6             | Clarity information on the illustration picture  | 4         |
| 7             | Clarity information on video illustration        | 4         |
| 8             | Structure organization / order Contents material | 5         |
| 9             | Clarity Contents material                        | 4         |
| 10            | Clarity instruction usage                        | 5         |
| Total Score   |  | 46        |
| Average Score |  | 4.6       |
| Category      |  | Very Good |

Based on the amount value on aspect evaluation content material by material experts obtained an average score result of 4.6. In the table average score conversion shows that score results validation enters in category of very Good. The assessment results obtained from expert material namely the media can used for trial with repair according to the advice given by material experts. After the done repair in accordance with the advice given, the media can used for testing participants. Several revisions provided by material experts and media experts can be seen in the following Figure 1:

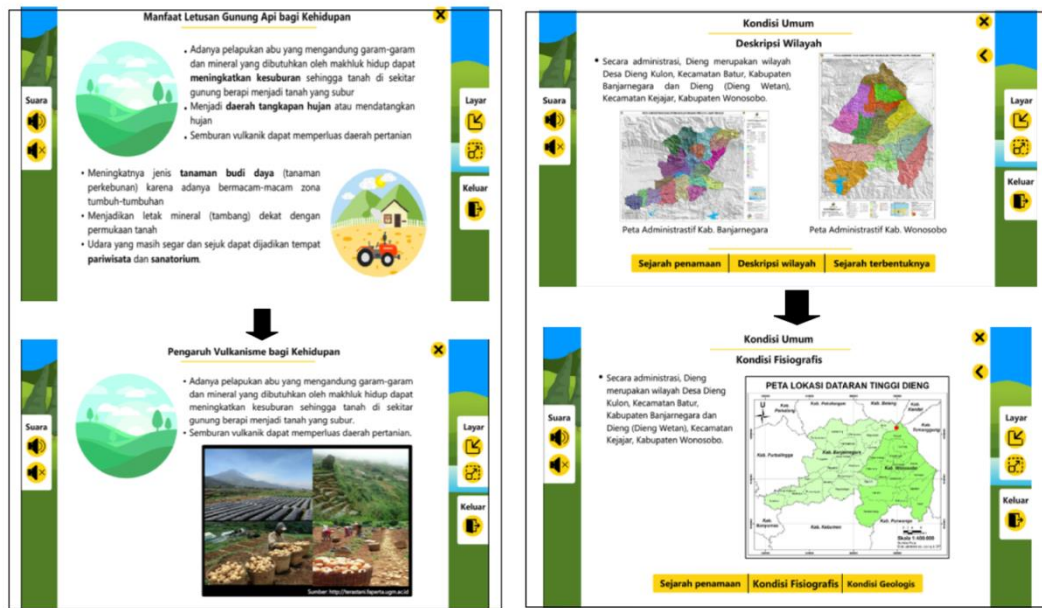


Figure 1. Media revision on the impact of volcanism on life

## 2. Multimedia Learning Trial

Multimedia Learning Trial was conducted on grade X high school students. Evaluation of participant education is assessments made by participants educated towards learning media Dieng Plateau interactive. Media trials on participant educate done in three stages, the first is a trial individual (one-to-one test), the second is a trial group small (small group test) and the last one is a trial group large / field test (field group). The following This is test results for an individual, trial group small, and trial group big. Trial of learning media Dieng Plateau interactively individual done to 3 participants educate. The categorization results of trial assessment individuals can be seen in Table 4.

Table 4. Distribution Trial Assessment Individual (One to One)

| No | Interval    | Criteria   | Trials Individual |       |
|----|-------------|------------|-------------------|-------|
|    |             |            | F                 | %     |
| 1  | 5 > 4.22    | Very Good  | 1                 | 33.33 |
| 2  | 4.21 – 3.41 | Good       | 2                 | 66.67 |
| 3  | 3.40 – 2.61 | Enough     | -                 | -     |
| 4  | 2.60 – 1.79 | Not enough | -                 | -     |
| 5  | < 1.79      | Very less  | -                 | -     |

Description: a. F is Frequency b. % is percentage

Analysis of results response participant educate on trial individual obtained results with category very Good with a percentage of 33.33% and category Good with a percentage of 66.67%. Trial results can conclude that the learning media Dieng Plateau interactive is already Good However still must done revision for media refinement so that expected learning media can used in the learning process.

Trial of learning media Dieng Plateau interactive group small done to 12 participants Educate. The questionnaire given to students is a questionnaire with a scale likert categorization results trial assessment group can be seen in Table 5.

**Table 5.** Distribution Trial Assessment Small Group

| No | Interval      | Criteria   | Trials Small Group |    |
|----|---------------|------------|--------------------|----|
|    |               |            | F                  | %  |
| 1  | $5 > 4.22$    | Very Good  | 3                  | 25 |
| 2  | $4.21 - 3.41$ | Good       | 9                  | 75 |
| 3  | $3.40 - 2.61$ | Enough     | -                  | -  |
| 4  | $2.60 - 1.79$ | Not enough | -                  | -  |
| 5  | $< 1.79$      | Very less  | -                  | -  |

Description: a. F is Frequency b. % is percentage

Analysis of results response participant educate on trial group small obtained results with category very Good with a percentage of 25% and category Good with a percentage of 75%. Can concluded that learning media Dieng Plateau interactive is already Good However still must done revision for media refinement so that the expected learning media can used in the learning process. Trial of learning media Dieng Plateau interactive group big or trial field done to 22 participants educate. Categorization results trial assessment group can be seen in Table 6.

**Table 6.** Distribution Trial Assessment Field (Field Group)

| No | Interval      | Criteria   | Trials Group big |       |
|----|---------------|------------|------------------|-------|
|    |               |            | F                | %     |
| 1  | $5 > 4.22$    | Very Good  | 15               | 68.18 |
| 2  | $4.21 - 3.41$ | Good       | 7                | 31.82 |
| 3  | $3.40 - 2.61$ | Enough     | -                | -     |
| 4  | $2.60 - 1.79$ | Not enough | -                | -     |
| 5  | $< 1.79$      | Very less  | -                | -     |

Description: a. F = Frequency b. % = percentage

Analysis of results response participant educates on trial group big obtained results with category very Good with a percentage of 68.18% and category Good with a percentage of 31.82%. Can concluded that the learning media Dieng Plateau interactive is already very Good However still must be revised for media refinement so that expected learning media can used in the learning process and provide maximum understanding to participants. Some documentation of the implementation of media trials for students can be seen in Figure 2.

**Figure 2.** Implementation of media trials for students

### *B. Discussion*

Development of learning media Geography with a focus on the material volcanism in the Dieng Plateau succeeded become an alternative innovative support introduction field for students in Grade X High School. Implementation learning designed in the field gives holistic, transformative, and contextual experience (Indayanti, 2021). This media is designed as a response to limited access to students to visit direct-to-location tourism, with the objective of giving contextual, visual, and scientific learning.

**Instructional Media** This utilizes technology interactive digital, which includes animation of volcanic processes, materials, and rocks Volcanic found in the Dieng Plateau Area as well as visual documentation of activities geothermal in the Dieng area, such as Sikidang crater, Lake color, and the phenomenon of toxic gas (toxic gas CO<sub>2</sub> in the area Timbang Crater). Dieng Plateau Material can enrich the understanding of students and bridge students' knowledge more near natural as laboratory geography. Learning in geography is learning that is not as natural as laboratory geography (Citra, 2016).

Field learning can facilitate participants to learn know material in a way more complex as well as produce 4C skills (critical thinking, creativity, collaboration, and communication) (Gadeng, 2022). The use of media with Dieng Plateau material in class has had a impact positive to understanding students regarding the process of volcanism, the forms that result activity volcanic, as well as its influence on the environment and society around it. Through visual and simulative approaches, students are capable imagine and analyzing complex geology in a way more real. This is in a way No direct build readiness cognitive and skills observation before they carry out introduction field in a way directly. This confirms that learning in the field Not only focuses on aspects of cognitive students but also includes the development of skills and experience directly in the field (Sejati, 2023).

The Dieng Plateau is an area of volcanic activity that has various phenomena in geology, such as craters, hot springs, and activity fumarole. This makes it a very good location representative for teaching draft volcanism in a way real and contextual. Linking material lessons with the location of real things that exist in Indonesia increases the involvement of emotional and cognitive students Because they can connect material studied with possible place Already they hear or even visit. This strengthens learning based on contextual teaching and learning (CTL).

**Instructional Media** is interactive such as animated videos, 3D simulations, infographics, digital quizzes, and interactive maps. This allows students for can see the process of formation of mountain fire visually, observe the characteristics and morphology of volcanic areas as well, and interact directly with the material through exploration independently. Interactive media can increase the quality of learning geography Because it is informative, interesting, and easy to understand nature accessed (Arsyad, 2019). This matter very help student class X which is still at in stage operational formal according to Piaget, where they start can think abstractly, but still need help visualization for understand draft complex like volcanism.

Interactive media facilitate multi-modal learning, namely learning that involves more from One sense. This contributes directly to the improvement of Power remembering and retention of information, Understanding draft cause and effect like the connection between magma activity and formation crater as well as Understanding spatial and temporal, for example How position tectonic influences emergence area volcanic. Students who study using interactive media based on geospatial results Study more tall



compared to students who only use book text (Sari, 2020). The use of technology geospatial in learning geography can increase the understanding of students with results study showing that 85.6% of students' own level of understanding tall to the material presented through technology geospatial (Sejati, 2021).

Evaluation learning shows that students who use learning media interactive with Dieng Plateau material show improvement significant in understanding draft volcanism and the capability to hook between theory and reality geography Field. Learning based on the environment's real role is important for students, namely so that students understand the relatedness between concepts and conditions (Sutarto, 2017). Besides that, this media also fosters a sense of curiosity, critical thinking skills, and awareness of the potential and risks of disaster geology in volcanic areas like Dieng. Learning Media give a chance to student for can explore the learning process in accordance with their needs and adjust to the speed of learning of each student (Herliza, 2023). Learning media This is expected to be integrated into learning Geography based on the project and also as the main tool in an activity relevant to virtual field trips with development technology education and the spirit of Independent Learning.

#### 4. Conclusion

Based on the results of research and discussion, the conclusion feasibility of learning media interactive based on results validation expert and trial field obtained results as following:

- a. Evaluation media expert on aspects Multimedia Learning Display and Program Interactive Dieng Plateau obtains the average value of 4.18 with category good. Assessment material by material experts to obtain an average value of 4.6 with the category very good Material after validation Then fixed according to the advice given.
- b. Learning Multimedia Dieng Plateau Interactive was trialed through three trial phases. At the end trial meeting done evaluation for see the responses of participants educated about multimedia learning interactive, then obtained results evaluation as follows: (1) Average test results individual stated in category good (2) Average test results group small stated in category good (3) Average test results group big stated in category very good. Assessment media test results stated that the media in the category was very good and properly used in the learning process.
- c. Evaluation learning shows that students who use learning media interactive with Dieng Plateau material show improvement significant in understanding draft volcanism and the capability to hook between theory and reality geography Field. Media also fosters a sense of curiosity, critical thinking skills, and awareness of the potential and risks of disaster geology in volcanic areas like Dieng. Learning media This is expected to be integrated into learning Geography based on the project and also as the main tool in an activity relevant to *virtual field* trips with development technology education and the spirit of Independent Learning.

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