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Development of a Geography Module with a Disaster Mitigation Learning Model Based on the Concept of Local Wisdom in Disaster Preparedness

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ABSTRACT
Ternate City is one of the areas that has a high level of disaster vulnerability in Indonesia. In addition, the level of public awareness and knowledge about disaster experiences the highest level of vulnerability to local disasters, such as landslides, earthquakes, volcanic eruptions. as for the purpose of this research is). Developing a disaster mitigation learning model based on the concept of local wisdom in disaster preparedness?. And designing disaster mitigation lessons based on the concept of local wisdom in disaster preparedness? . The 4-d model consists of four stages, namely: definition, design, development, and deployment. Researchers have developed a disaster mitigation geography learning module based on the concept of local wisdom in disaster preparedness, especially at State Senior High School 5 Ternate City. The results of the development of learning modules can be seen from the aspect of content 82.23% with proper qualifications, the aspect of the science and technology community model 85% with very decent qualifications, the aspect of format 82% with very decent qualifications, the language aspect 93% with very good qualifications. proper qualifications and presentation aspects of 80% with proper qualifications. While the average value of the validator results is 85.5%. in addition to disaster mitigation learning materials, namely, types of disaster characteristics and disaster management cycles, distribution of disaster-prone areas in Indonesia, disaster management through education, local wisdom and use of technology and the role of society in natural disaster mitigation. In addition, the subjects at State Senior High School 5 Kota Ternate showed that the assessment results of highly qualified students were 75%, and the assessment of students with very high qualifications was 8.33%, while those with high qualifications were moderate student assessment qualifications of 16%. It can be concluded that teacher learning teaches students to understand learning material well, both from learning modules and community technology science models that are applied in learning

INTRODUCTION

A disaster is a series of events that threaten and disrupt the regular life order of the community, causing many losses to lives, property and buildings (Marincioni, 2007; Shi et al., 2020; Fatmawati et al., 2021). Disasters are also part of natural processes that occur beyond their usual frequency and cause "abnormal problems for humans," resulting in significant damage to the (Rahiem & Widiastuti, 2020). According to Law Number 24 of 2007 concerning Disaster Management, a disaster is an incident or suite of events that threaten and disrupt the lives and livelihoods of the community caused, either by natural factors and non-natural Factors or human factors resulting in

human casualties, damage to the environment, loss of property and psychological impacts (Pahleviannur, 2019). So conceptually, the most essential thing about the results of analysis and evaluation related to several consequences of disasters is a) physical assets that have needed something to repair or rebuild, (b) they cannot function as everything before getting the related return handling in the form of repair or rebuild, and (c) Many members of society who have experienced trauma or disruption need to get exceptional help so that they can get back to living life in a good and standard way.

According to the Disaster Management Agency (BNPB), 5,402 disaster events occurred in Indonesia during 2021. Disaster events and 99.5% of events throughout 2021 were hydrometeorological disasters. The dominant events included 1,794 floods, 1,577 extreme weather, 1321 landslides, 579 forest and land fires, 91 tidal waves and abrasion, 24 earthquakes, 15 droughts and one volcanic eruption. The impact of the incident was that 728 people died, 87 people were missing, 14,915 were injured, 7,630,692 suffered and were displaced, 158,658 houses were damaged, 4,445 public facilities were damaged, 664 offices were damaged, and 505 bridges were broken. This is in line with the disaster events that occurred in North Maluku Province; based on data released by the BPBD of North Maluku Province, the number of disaster events throughout 2021 was 13 events, including floods occurring six times, tidal waves, abrasion occurring three times, tornadoes occurring two times and earthquakes once. The problem occurs because the province of North Maluku is one of the regions that often experiences a massive level of disaster vulnerability seen from the geographical location of North Maluku at Coordinates 3^{o} 40' South Latitude - 3^{o} 0' South Latitude 123^{o} 50' - 129^{o} 50'. Meanwhile, based on data released by BPBD, Ternate City was recorded throughout 2021 with four occurrences in the form of Mount Eruptions, landslides, and earthquakes.

Disaster education integrates disaster material education into formal education so that students can build the knowledge, skills, and attitudes necessary to prepare for and cope with disasters and help student participants and communities return to everyday life after a disaster (Mustafa, 2020; Junaidin et al., 2023). In addition, disaster education aims to build a safety culture in the context of the community, community schools, government, and other stakeholders' interests. The expected efforts of the partnership are sustainable and based on this government policy (Puspitawati & Pei Ze, 2023). The task of the government is to compile applicable norms, standards, and procedures held by relevant stakeholders The current condition of disaster education in Indonesia is: (1) Minimum knowledge and understanding of teachers about disaster risk knowledge reduction; (2) Minimally distributed and accessible guides, syllabi, and teaching materials accessed by teachers and education actors, thus causing weak capacity and expertise of teachers in integrating DRR, or Disaster Risk Reduction, into the curriculum; and (4) The condition of physical vulnerability, facilities, and school infrastructure to disasters (Rahmad, 2019; Arif &; Maryani, 2023).

With the rampant disasters that occur in Indonesia still often, especially in the city of Ternate at this time, of course, what is needed is teaching materials about disaster education in schools, which still needs to be improved. Therefore, teachers must be ready to apply disaster materials in learning activities (Palupi et al., 2019). Based on the material, teacher readiness needs to be improved, especially in the preparation of disaster learning mitigation tools for the Senior High School level, as a form of implementation carried out in this study is learning local disaster-based wisdom mitigation in disaster preparedness and implemented in an integrated manner in geography subjects through local wisdom that has represented the entire system of value systems and norms that exist are compiled, adopted, and applied to the community based on understanding and experience as well as interacting and

interacting with the surrounding environment.

Several studies show how vital disaster education is to learning. Research results (Hamid, 2020) Describe the importance of disaster education in the community because the community is a direct object that can become a victim due to disaster risk. However, the community can also be used as subjects who can adapt to disasters. Disaster education is essential not only for the community but also for students in the world of education. (Hafida, 2018) For example, he describes the results of his research, which is focused on the importance of disaster education for students to become disaster-resilient people—internalisation of appreciative values of local wisdom in disaster preparedness. In addition, disaster education, local education and preparedness have been integrated into the public science and technology-based learning model, which is a learning model that connects science and technology and its benefits to the community. (Rasidi et al., 2023) In line with that, the community Science and technology learning model is designed based on local wisdom in social preparedness (Azmi & Elfayetti, 2017; Amali et al., 2019). Seeing the above phenomenon, researchers can formulate the objectives of this study, namely: 1) For the development of learning modules for mitigation of local Disaster-based wisdom in disaster preparedness. 2) Designing a learning model for local disaster-based wisdom mitigation in disaster preparedness.

RESEARCH METHODS

This research was conducted at State High School 5 Ternate City, on Jalan Batu Angus Dufa, Dufa Dufa, Kec. North Ternate City, Ternate City, North Maluku (figure 1), and this research approach uses quantitative research with a Research and Development (R&D) development study type, which refers to the ADDIE development model adopted from Branch (2009) which has components consisting of from the development steps (analysis, design, development, implementation, & evaluation)(Alwan, 2017). This research was carried out in several stages of the 4-D development model, namely a learning device development model with development stages, namely definition (defence), design (design), development (develop) and dissemination (disseminate). Study This use approach is quantitative with type study Research and Development (R&D) development, which refers to the adopted ADDIE development model of Branch (2009), which has the components consisting of steps development (analysis design, development, implementation, and evaluation).

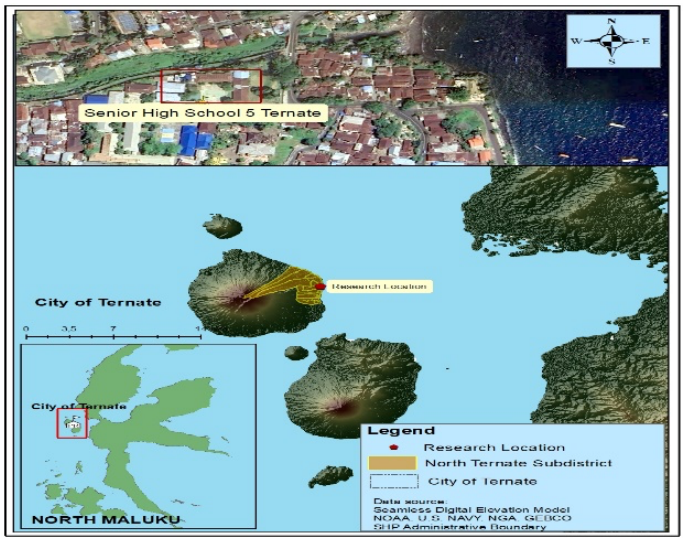

Figure 1: Map of research location (Source: Data Analysis, 2023)

Besides That, the 4-D development model is a development model of device learning. This model developed by S. Thiagarajan, Dorothy S. Semmel, and Melvyn I. Semmel (1974) in his book Instructional Development for Training Teachers of Exceptional Children, explained that There are four must stages held in development that definition (define), design (design), development (develop) and dissemination (disseminate).

Stage Definition

Stage definition can be done to define something that needs to be customised in the learning process by gathering related information about a product to be developed. In stage definition, this will be done in five steps: 1) initial analysis, 2) analysis of students, 3) analysis task, 4) analysis concept, and 5) analysis of objective learning.

Stage Planning

Problems that have been obtained from stage definition become the base main so that can be needed For do stage more design _ specific, stage planning can be done to design form module learning mitigation disaster based draft wisdom local in preparedness disaster with the model of Science Technology and society, so can be used in learning geography at school Ternate City Upper Middle School. Stage This consists of four preparation steps, among them as follows: 1) test, 2) media selection, 3) format selection and 4) design early.

Stage Development

Objective stage This is to produce a module learning mitigation disaster-based draft of wisdom local in preparedness disaster with the Science Technology and Society model, which has division through input from experts/experts from data obtained. In the stage development activity, this validation expert is done for trial in the field.

Experts or experts in the form validator section provide suggestions and input so that evaluation in module mitigation disaster based draft wisdom local in preparedness disaster with the model of Science Technology and society who have made the draft. Validators have checked and parsed module learning. There are several resulting aspects, including drafts that start from aspect content, aspects of the science model technology and society, aspects of format, aspects of language, and aspects of presentation. So that need is known as module learning mitigation disaster-based draft wisdom local in preparedness disaster worthy for applied or not. The validation result can be used as material revision For perfect A module learning to be developed.

Trial in the field needs to be done so that the process is tested module past learning and validated by experts. The objective of trials is To know the level of quality of module learning, including effectiveness and practicality. The activities carried out during the trial are doing a trial run field, analysing the test results data, and conducting revisions based on the analysis of test data results. Obtainable data collected on stage: activity data from students, the ability of teachers to manage learning, response to students to the Module Learning, motivation and results Study students.

Stage Dissemination

After trials and instruments have been revised, stage next is stage dissemination, and the purpose of this stage is to disseminate module learning that has finished being made, so there is a need for dissemination on stage end from A development. Stage dissemination will do What when we promote product development so you can accepted by the parties user Good from individual or group. Manufacturers and distributors must be selective and work similarly to pack the suitable material.

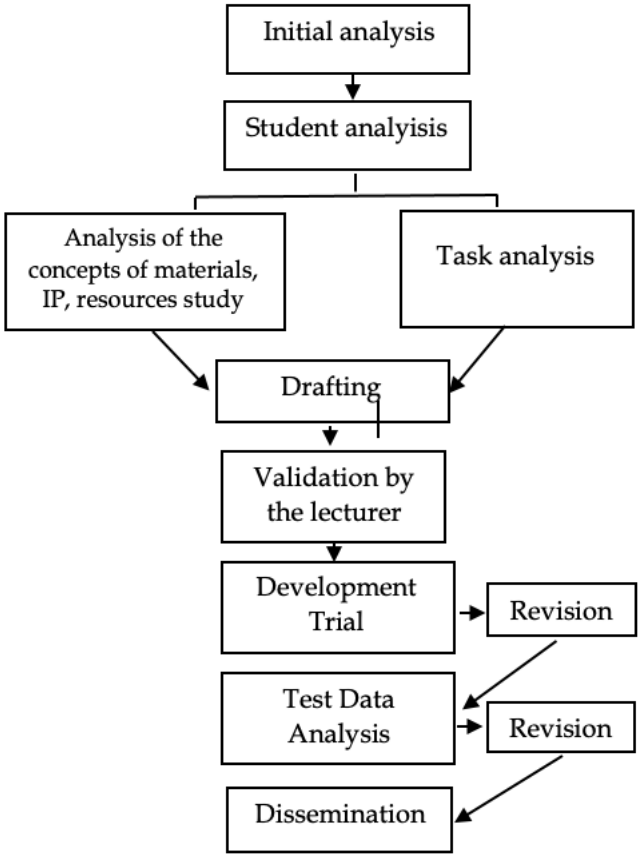

Figure 2: Stages and activities development (Source: Borg and Gall, 2003)

Data collection techniques were used in the study. This is an interview for know-needs at school. For test appropriateness from module learning, the instrument used in research and development is module learning mitigation disaster-based draft wisdom local in disaster preparedness with the Science, Technology and Society model. The data analysis technique used in the research and development method is validation instrument by criteria learning instrument validation. Then, it describes the results of the data analysis. Questionnaire evaluation shows results scoring quantitatively. Criteria scoring in the questionnaire was determined based on the following table (Suwanto, 2011).

Table 1. Collection Decision Revision Module Learning

Achievement Level	Qualification	Information
81-100	Very worth it	No need revision
60-80	Worthy	No need revision
41-60	Enough worthy	Revised
21-40	Not worth it	Revised
0-20	So lacking worthy	Revised

(Source: Purnianto et al., 2021)

Invalidation of the product needs to be conducted by four background experts in the field of education, so the objective of validation is to know the level of eligibility and quality of the product before being piloted to the student. In the module learning mitigation disaster based draft wisdom local in preparedness disaster will

be revised If something acquisition evaluation from expert education ≤ 80, and trials product done on students class X Ternate City 5 State Senior High School.

RESULTS AND DISCUSSION

In this stage, a definition needs to be done to identify an existing problem at school myself because, from the results, identification problem will be made as reject the measure, not availability of teaching materials that have been supporting something eye learning _ lesson geography with topic learning mitigation disaster based draft wisdom local in preparedness disaster so at the moment teacher learning only explain the material from the book just without There is addition form module learning or other teaching materials. It makes learning ineffective, and students need help understanding the teacher's words.

After the stage definition, the next stage is planning the product beginning, which will be developed. The stage first to be developed is module learning, which makes design or early models about content module learning, that is, design module learning in a manner consistent with manufacture by the appropriate target. Besides that, in design, we can look for source information for developing module learning according to the relevant material related to natural events like mitigation disaster-based draft wisdom local. Then, appropriate illustrations and drawings with material as content support and reinforcement material module learning will be added so that material learning will be more enjoyable. The last stage is adding the components in the module learning, such as preface, table of contents, competencies base, goal learning, and bibliography.

After the draft module is finished for development, it will be validated by some experts to know the eligibility and quality of the previous product tested, module learning mitigation disaster based draft wisdom local in preparedness disaster will be revised if there is An acquisition evaluation with the mark in a manner whole from an expert below ≤ 80. Next is the result of recapitulation validation by experts to module learning mitigation disaster-based draft wisdom local in preparedness disaster in eye lesson geography.

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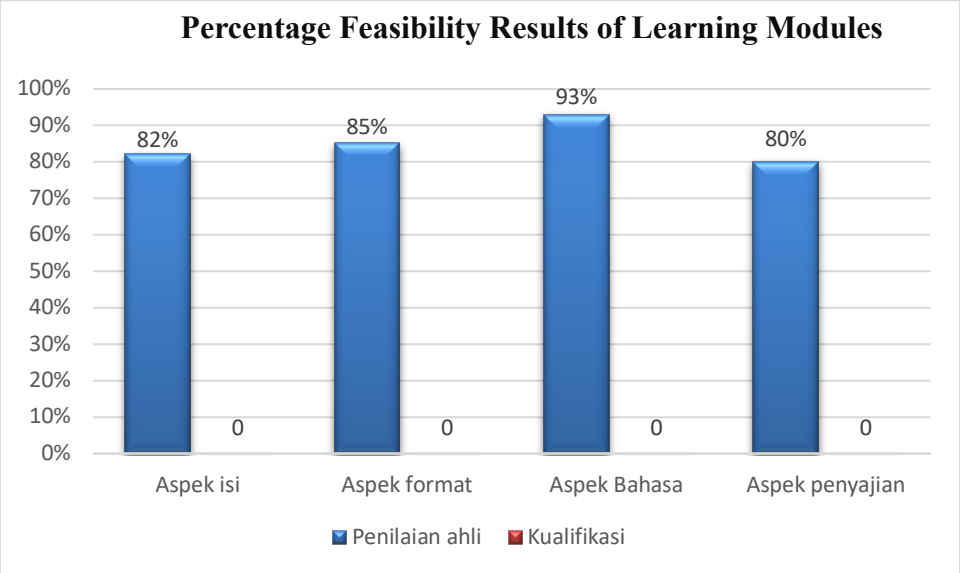

Figure 3. Percentage Results of the Learning Module Feasibility Test
(Source: Data Analysis, 2023)

Based on the results analysis to validation data, the expert obtained the average percentage For aspect fill 82.23% with qualifications feasible, aspect of the science model technology society 85% with qualification is very feasible, format aspect

82% with very decent qualification, aspect language 93 % with very decent qualifications and aspects serving 80% with qualification worth. Based on the results, data analysis of the validator shows that from the fourth validated aspect, there are three aspects with excellent qualifications: format aspect, aspect language and aspects contents. At the same time, only one aspect of the presentation qualifies as worthwhile. If seen from carried out the percentage by experts in amount average level _ whole with the level presentation of due diligence by the validator viz amount by 85.5%, This includes in very worthy qualification. So, it is a module learning mitigation disaster-based draft wisdom local in eye lesson geography for school medium on class XI on learning mitigation disaster nature.

Learning Disaster Mitigation

Kindly no direct researcher has developed learning models for mitigation disaster-based wisdom local in preparedness disaster, which is where this model will interrogated in the eye lesson geography, especially at school medium in class XI, besides the device learning to be done in very successful development For done expert judgment geography at school medium on as well as in trials, trials done stage First that is plan implementation learning with approach education society, like see results appraiser, which has rated like quality. The second is teaching materials and sheets. Work with students on Disaster Education-based wisdom. Local in-draft disaster preparedness and results evaluation will be done at the trial stage, such as with sheet work students. That Is easy to understand and will be implemented in each learning process. Stages third will be done, like things to be determined from material or events and impacts happening in disasters that have been obtained through results integration with source obtained. Meanwhile, for results evaluation, the results are considered insufficient, which needs more development. The fourth instrument will be developed through stage instrument test results through a questionnaire.

In the learning model, Science Technology Society is one science that is very bound reluctantly knowledge, which is very giving something understanding about integration between education and society, as well As practising something sensitive between evaluation students and impact environment part from development child That alone. The approach is relevant to learning models mitigation disaster in knowledge knowledge social at school medium first (Maryani, 2016). Besides, learning models society is one part of some approaches before finally being modelled after a long process through research results, theses, and dissertations. Based on the analysis of the results, it will look at stages or steps to be carried out in learning activities in class. Important thing No Can be removed so just that is How will be done A more concept early, cause that will demand something from a teacher to prevent If happen misconception. With That approach, learning public worth is called a model (Poedjadi, 2005).

Step Science Technology Learning Public Model

In the learning model mitigation disaster based draft wisdom local in disaster preparedness with scientific model approach technology community, which is where this model is most likely student more role active in matter activity learning so that can display significant role important, especially in science technology public did life every day. In education, science usually emphasises a draft science only, but also paranan science, technology and society so that everything involved in solving problems or issues existing related to learning (Fatkhurrohman et al., 2013). In implementation learning mitigation disaster with scientific model approach technology society, which has held in study This can be outlined among others:

1. In the introduction, this is the beginning of A stages material or An incident

disaster as well as the impact of the disaster on the life of the existing society. Stage This need is mentioned as stages initiate or regular, inviting students to focus on daily life and learning. Apperception in life can also do things, i.e., hook incident disasters that have known students with material to be discussed, so continuity knowledge exists.

2. Stage second This, of course, needs to emphasise that science model technology public is a process or formation of something concept, so learning to be done started with explanation draft essential, then will next with charging sheet Work students so they can decipher something concept to end with results discussion or group activity this is for students more role active For push student more enterprising For learn. In-use sheet Work student This aligns with the statement that a sheet question will push students further in following activity learning, so sheet questions also have lots to help integrate science, technology, and society. For sheet work, students present how polluted it is so that the concept of the wisdom of the local public can mitigate disaster.
3. Application Draft in Learning. With an armed understanding of correct concepts, students analyse issues or settlements called problems with " application draft in life ". The concepts that students have understood can be applied in life every day. During the forming process concept, solution problem and analysis issue, teachers need to straighten If There is a misconception during activity Study. Activity This is also called the enhancement concept. Suppose that during the forming process draft, some misconceptions occur among students and after-end analysis issues and problem solutions. In that case, the permanent teacher needs to do a stabilisation draft by emphasising essential concepts known in the material study.
4. In rating on stage end, there is learning mitigation disaster with based draft wisdom local with scientific models technology public will keep going implemented so that every results evaluation to learning will keep going done. Evaluation to students will use the instrument that will piloted through distributed questionnaires.

Assessment Results Student

The evaluation of the results during research can be seen in Table 2, which includes the results of study students.

Table 2. Presentation of Student Assessment Results

Amount Student	Presentation	Qualifications Results Study Student
0	0%	Very low
0	0%	Very low
10	16%	Currently
45	75%	Tall
5	8.33%	Very high

(Source: Results Data Analysis, 2023)

The material contained learning like payload local, which is mitigation-based disaster draft wisdom local in preparedness for disaster. Matter, this is very important. It needs to be learned because we remember many things that happened during the disaster in Indonesia. Study: This researcher has studied knowledge and understanding of disaster environments, beginning with the introduction of material learning about disasters and how the students can know the methods to mitigate them by approaching and drafting wisdom locally in preparedness for disaster.

Mitigation disaster-based draft wisdom is local in preparedness developed disaster through the science and technology learning model society. Study results show that students are included in qualification tall because excess sources are very well worth studying, so students need more lots To understand what is learned. Besides that, developed module learning is accompanied by exciting sources and information that interest students more. For learning, curiosity makes students more Lots active in studying, so that matters. This is proven with results appraisal of students in a manner consistently high, and students are also more Lots finished practice questions given by the teacher alone, fine form in module learning. Besides that thing that goes along with results studied earlier, effective learning can increase results. Study students with module learning in an independent manner. This is a capable repair method for studying students, that alone. Module learning can also serve interested students so that they know what to do and students are thrilled to learn. If students feel like such matters, the same holds for impact results in studies in the future (Tyasning & Nurhayati, 2012).

CONCLUSION

In the study, This researcher succeeded in developing a draft module learning mitigation disaster-based draft wisdom local in preparedness disasters and, after That so will be done validation products that are by experts to know the appropriateness of the quality of previous products _ piloted. Module learning mitigation disaster based draft wisdom local in preparedness disaster will be revised If there is An acquisition evaluation with a mark in a manner whole from Expert below ≤ 80. Based on the results of due diligence assessment from experts, i.e. the average percentage For aspect fill is 82.23% with qualification feasible; for the aspect of the science model technology society, 85% with qualification is very feasible, format aspect 82% with very decent qualification, aspect language 93 % with very decent qualifications and aspects serving 80% with qualification worth.

Based on the results, data analysis of the validator shows that from the fourth validated aspect, there are three aspects with excellent qualifications: format aspect, aspect language and aspects contents. However, only one aspect of the presentation qualifies as worth it. Suppose seen from the percentage carried out by experts in amount average level whole with the level presentation of due diligence by the validator viz amount by 85.5%. This includes a very worthy qualification. So that can conclude that it is a module learning mitigation disaster based draft wisdom local in eye lesson geography For school medium on class XI on the topic learning mitigation disaster nature, Material learner Mitigation disaster based draft wisdom local in preparedness developed disaster _ through the science and technology learning model society. Study results show that students are included in qualification tall because excess sources are very well worth studying, so students need more lots To understand what is learned. Besides that, developed module learning is also accompanied by exciting sources and information so that students are more interested in learning, and curiosity makes students more active in their study, which matters. This is proven by the results appraisal of students in a manner practical consistently high. The teacher gives students many practice questions, an acceptable form of module learning.

REFERENCE LIST

Alwan, M. (2017). Development of blended learning models using the Edmodo application for high school geography subjects. Journal of Educational Technology Innovation, 4(1), 65. https://doi.org/10.21831/jitp.v4i1.10505

Amali, K., Kurniawati, Y., &; Zulhiddah, Z. (2019). Development of Community Science-Technology-Based Student Worksheets on Science Subjects in Elementary Schools. Journal of Natural Sciences and Integration, 2(2), 70.

https://doi.org/10.24014/jnsi.v2i2.8151

Arif, M., &; Maryani, E. (2023). Analysis of Environmental Literacy Profile of Indonesian Students at STKIP Pesisir Selatan, West Sumatra. Jurnal Geografi, 15(2), 259. https://doi.org/10.24114/jg.v15i2.47745

Atmojo, S. E. (2021). Natural Disaster Mitigation in Primary School Teachers: Knowledge, Attitudes, and Practices. JPI (Indonesian Journal of Education), 10(1), 12. https://doi.org/10.23887/jpi-undiksha.v10i1.25060

Azmi, F., & Elfayetti, E. (2017). Analysis of students' environmental care attitudes through the Adiwiyata program at SMA Negeri 1 Medan. Jurnal Geografi, 9(2), 125. https://doi.org/10.24114/jg.v9i2.6901

Destya Dwi M., D. S, U. A., Hermawan, R., S., A. A., &; Utami, R. D. (2021). Disaster Awareness Education Through Disaster Socialization to Improve Student Preparedness MI Muhammadiyah Bulakrejo. Campus Teaching Scientific Journals, 1–11. https://doi.org/10.56972/jikm.v1i1.1

Erianjoni, E. (2018). Development Of Sociology Teaching Materials On Disaster Mitigation Based On Local Wisdom In Padang City. Journal of Socius: Journal of Sociology Research and Education, 4(2), 96. https://doi.org/10.24036/scs.v4i2.24

Fatmawati, L., Irawati, P., Inang Pambudi, D., Purwadi, P., &; Santoso, B. (2021). Development of LKPD Based on Local Wisdom on Natural Disaster Materials for Class I Elementary School Students. Social Science Proceedings Series &; Humanities, 1, 76–83. https://doi.org/10.30595/pssh.v1i.77

Ferawati, F., &; Rusilowati, A. (2012). The Effectiveness Of Natural Disaster Learning With Vision Sets Is Integrated In Science With Animation Media And Question Sheets.

Hafida, S. H. N. (2018). The Urgency Of Disaster Education For Students As An Effort To Realize A Disaster-Resilient Generation. 28.

Hamid, N. (2020). The urgency of disaster education to the community. Equilibrium: Journal of Education, 8(2), 232–239. https://doi.org/10.26618/equilibrium.v8i2.3444

Hidayat, Z., &; Yatminiwati, M. (2023). The role of disaster-based local wisdom education and training through education levels in disaster-prone areas. International Journal of Accounting and Management Research, 4(1), 1–8. https://doi.org/10.30741/ijamr.v4i1.991

Junaidin, J., Sanisa, S., Herianto, A., &; Prasad, R. R. (2023). The Role of Geography Education Lecturers in Measuring the Basic Literacy and Numeracy Skills of Students at SDN Pujut District, Central Lombok Regency. Jurnal Geografi, 15(1). https://doi.org/10.24114/jg.v15i1.42453

Marincioni, F. (2007). Information technology and disaster knowledge sharing: The important role of professional culture. Catastrophe, 31(4), 459–476. https://doi.org/10.1111/j.1467-7717.2007.01019.x

Maryani, E. (2016). Learning Model Of Disaster Mitigation In Social Sciences In Junior High School. Gea Jurnal Geografi, 10(1). https://doi.org/10.17509/gea.v10i1.1664

Pahleviannur, M. R. (2019). Disaster Awareness Education Through Disaster Socialization As An Effort To Increase Students' Knowledge Of Disaster Mitigation. Journal of Social Science Education, 29(1), 49–55. https://doi.org/10.23917/jpis.v29i1.8203

Palupi, H. S., Masution, M. W., Rida, P. A., &; Meliyani, M. (2019). Analysis of the Level of Teacher Readiness in Applying Disaster Material to the Learning Process in Klaten Regency. Geodika: Journal of Geographic Science and

Education Studies, 3(2), 48. https://doi.org/10.29408/geodika.v3i2.1751

Elementary School Teacher Education Study Program, Faculty of Teacher Training and Education, Slamet Riyadi University, Surakarta, Indonesia, &; Mustofa, M. (2020). Disaster education based on local wisdom in strengthening the character of disaster preparedness. Geodika: Journal of Geographic Science and Education Studies, 4(2), 200–209. https://doi.org/10.29408/geodika.v4i2.2776

Purnianto, R., Haryudo, S. I., Joko, J., & Fransisca, Y. (2021). Keefektifan Dan Kepraktisan Modul Pembelajaran Instalasi Penerangan Listrik 1 Fasa Berorientasi Pada Pembelajaran Abad 21 Untuk Kelas Xi Titl Smk Rajasa Surabaya. Jurnal Pendidikan Teknik Elektro, 11(01), 107–115. https://doi.org/10.26740/jpte.v11n01.p107-115

Puspitawati, P., &; Pei Ze (Taiwan), I. L. (2023). Analysis of Local Wisdom of Mendale Village Fishermen in the Fishing Process. Jurnal Geografi, 15(2), 145. https://doi.org/10.24114/jg.v15i2.45997

Rahiem, M. D. H., & Widiastuti, F. (2020). Learning Earthquake Natural Disaster Mitigation for Early Childhood through Picture Reading Books. Journal of Obsession : Journal of Early Childhood Education, 5(1), 36. https://doi.org/10.31004/obsesi.v5i1.519

Rahmad, R. (2019). Vulnerability Assessment and Tsunami Disaster Preparedness in Sadeng Coast, Gunungkidul. Jurnal Geografi, 11(2). https://doi.org/10.24114/jg.v11i2.11475

Rasidi, Ghufron, A., Wangid, M. N., &; Istiningsih, G. (2023). Volcanic Eruption Response: A Model to Help Children Learn in Indonesia's Refugee Camps. In Z. B. Pambuko, C. B. Edhita Praja, L. Muliawanti, V. S. Dewi, M. Setiyo, F. Yuliastuti, &; A. Setiawan (Eds.), Proceedings of the 3rd Borobudur International Symposium on Humanities and Social Sciences 2021 (BIS-HSS 2021) (pp. 954–965). Atlantis Press SARL. https://doi.org/10.2991/978-2-494069-49-7_161

Selby, D. (2010). Sustainability Limits. Journal of Education for Sustainable Development, 4(1), 131–133. https://doi.org/10.1177/097340820900400118

Septikasari, Z., &; Ayriza, Y. (2018). Disaster Education Integration Strategy in Optimizing Community Resilience to Face Mount Merapi Eruption Disaster. Journal of National Resilience, 24(1), 47. https://doi.org/10.22146/jkn.33142

Shi, P., Ye, T., Wang, Y., Zhou, T., Xu, W., Du, J., Wang, J., Li, N., Huang, C., Liu, L., Chen, B., Su, Y., Fang, W., Wang, M., Hu, X., Wu, J., He, C., Zhang, Q., Ye, Q., ... Okada, N. (2020). Disaster Risk Science: Geographical Perspectives and Research Frameworks. International Journal of Disaster Risk Science, 11(4), 426–440. https://doi.org/10.1007/s13753-020-00296-5

Tyasning, DM, &; Nurhayati, ND (2012). The Application Of The Tgt (Teams Games Tournaments) Learning Model Is Equipped With Lks To Improve Activities And Learning Outcomes Of Petroleum Material In Grade X-4 Students Of Sma Batik 1 Surakarta Academic Year 2011/2012. 1(1).

Wibowo, B., Vebrianti, I., Pertiwi, N. R., Widiyatmoko, Y., &; Nursa'ban, M. (2017). Disaster Mitigation Pop-Up Book As A Learning Medium For Disaster Mitigation Based On Local Wisdom For Elementary School Students. Geomedia: Geographic Scientific and Information Magazine, 15(1). https://doi.org/10.21831/gm.v15i1.16236