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How To Development of Pop Up Book Media To Improve Literacy In Tsunami Disaster Mitigation For Elementary School Students?

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Abstract: This research aims to create a Pop Up book about disasters and assess how good and useful it is as a learning tool. This type of research is Research and Development (R&D), using a five-stage ADDIE development model, namely analysis, design, development, implementation, and evaluation. The method used in this study used interview methods, questionnaires. The data collection instruments used are questionnaire sheets, and multiple choice tests. The validation assessments for the Pop Up Book media involved experts, with the media expert assessment at 69.4, considered "Good." Material validators rated it 88.8, classifying it as "Excellent." The assessment by learners and language validators scored 82.1 and 90 respectively, both falling into the "Excellent" category. Additionally, the grade 3 homeroom teacher's questionnaire scored 88.6, while the principal's assessment reached 86.3, both categorized as "Excellent." The pre-test average was 51.6, increasing to 80.3 in the posttest. Soit can be concluded that the Pop Up Book media for tsunami disaster mitigation is suitable for use in learning in elementary schools

Keywords: disaster response school; pop up book; tsunami disaster mitigation

Introduction

Looking at the condition of the Indonesian territory which is almost completely surrounded by the sea so that it is very potentially prone to earthquake and tsunami disasters (Agustina et al. 2021; Regional Disaster Management Agency 2021) so disaster mitigation education is needed to provide an understanding of the tsunami disaster red zone area that must not be erected buildings in permanent, semi-permanent and non-permanent forms (Kano et al., 2020; Nurrahim et al., 2018). Areas that occupy coastal locations or on the banks of rivers are used as an option as a place for people to live because people can be close to their livelihoods as fishermen to meet their survival(Ayub et al., 2019; Murdiyanto, 2022) In addition, it will indirectly give birth to strong cultural ties so that residents choose or deliberately live and settle in disaster-prone areas, especially tsunami waves (Furumura et al., 2019; Suhardjo, 2015).

A sense of vigilance is very important considering that the victims of the tsunami wave disaster that occurred in Aceh on December 26, 2004, cost many victims ranging from property that was not counted as losses and many casualties. The death toll reached 230,000 people and 318 people were injured, The tsunami wave resulted in 4,129 houses being heavily damaged, 10,219 houses being lightly damaged, 294 educational facilities damaged, and 30 health facilities damaged. In addition, the city of Yogyakarta has the potential for a tsunami wave disaster specifically in the southern coastal area (Regional Disaster Management Agency 2021).

The large number of victims due to the tsunami wave disaster is due to the limited understanding of disaster risks around them, which results in the absence of preparedness in facing disasters. Among the many

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casualties due to natural disasters, the most victims are aged 5-12 years(Liu et al., 2021; Orland-Barak & Wang, 2021; Yulianto et al., 2021). Some of them are students at the elementary school level, so that care is needed in disaster preparedness education from an early age starting from information about procedures or self-rescue plans for elementary school students.(Hidayati et al., 2020; Nurrahim et al., 2018; Putri, 2022).

Education is a means as a suitable place to introduce disaster mitigation from an early age to students, especially in elementary schools. This effort is to create an active learning atmosphere so that they can achieve learning goals and develop potential in students (Habe & Ahiruddin, 2017; Khomarudin, 2021; "Peraturan Presiden Republik Indonesia Tentang Rencana Induk Penanggulangan Bencana Tahun 2020-2044," n.d.). Interview results first, The school is a Disaster Preparedness School. Second, The location of the school is in an area prone to tsunamis, landslides and floods. Third, Schools lack teaching media on disaster mitigation. Fourth Teachers do not innovate learning media for disaster mitigation materials. The last, In the event of a flood the school is temporarily suspended until an indeterminate time

From the results of interviews and observations at SDN parangtritis 1, researchers want to develop a companion media for student learning, namely developing Pop Up Book media on the grounds that Pop Up Book media is a medium that is practical to use and has real visuals so that students get a concrete picture. It is clear that the development of the Media Pop Up Book is a very effective and very interesting media development so that it is easy and suitable for use in introducing disaster mitigation efforts for elementary school students (Budiyono, 2020; Cahya, Herwin, et al., 2023; Kano et al., 2020).

Pop Up Book is a medium in the form of a book that is formed in three dimensions that aims to make readers interested in reading it. Pop Up is a literacy medium that uses paper art to produce an interesting book medium if opened it will form a three-dimensional structure and is like a regular book when closed (Cahya, Pambudi, et al., 2023; Kartimi & Winarso, 2021; Latuconsina, 2022; Mahadzir, 2013; Shi & Gullett, 2018). Media Pop Up Book is a three-dimensional tool that can provide excitation to children's imagination so that it can make it easier for students to add knowledge and increase understanding in students (Khamidah & Sholichah, 2022; Wibowo, 2022). Pop Up book media as an interesting and varied learning medium so that it can make children entertained and can increase verbal-linguistic intelligence in children(Arip & Aswat, 2021; Hasanudin et al., n.d.). Benefit pop up book here is a teaching to children to better appreciate books and take good care of them and help improve the harmony of parents enjoying stories with their children (Elwarak et al., 2018; Martadireja, 2020).

Thus, the researcher described that one of the factors of lack of insight into disaster mitigation is the lack of awareness and understanding of parents regarding disaster mitigation so that it has an impact on children's ignorance of disaster mitigation(Fawzy et al., 2020). The reality is that there are still many schools that have not included disaster mitigation in their school programs, which has caused many losses in life, property and property. Based on the discourse above, researchers want to develop a learning "Pop Up Book on Tsunami Disaster Mitigation" media that is used to introduce disaster mitigation to students from an early age can add insight and aim to make later students know the symptoms of disasters, especially tsunami disasters. This research is in line with the research ("Aplikasi Smart Province 'Jogja Istimewa': Penyediaan Informasi Terintegrasi Dan Pemanfaatannya," n.d.; Prastika et al., 2023; Sumiyatun et al., 2020).

This research is important because through pop up books this book can provide a better understanding of tsunami disasters, such as how to prepare, actions to take when a tsunami occurs, and safe evacuation places. In addition, convey information visually and interactively to readers, especially children. With vivid and colorful illustrations. This is in line and explained by Fatthurrahma &; Anas (2023) and Cahya, Pambudi, et al. (2023) pop up book is an active book facility that provides facilities in the form of appearances that can be enjoyed from any side, this is able to convey visual understanding to the reader. Supporters of similar opinions Asrizal et al. (2023) and Gunada et al. (2019) that we as humans cannot prevent an event that is beyond our ability but we can anticipate to reduce the impact of disasters, with this, this research is important to be developed which will later be used to increase readers' insight into tsunami disaster mitigation

The purpose of this study is expected to know the steps for developing a pop up book media for tsunami disaster mitigation for elementary school students. Furthermore, it is hoped that m will know the quality of the pop up book media for tsunami disaster mitigation for elementary school students. The existence of this development is expected to be able to contribute in the field of education about the development of disaster mitigation media plus di hope it can be a reference in disaster mitigation teaching materials in schools. Furthermore, to provide understanding and readiness of students to become a community that is ready for disasters.

Method

This research is a research and development (R&D) using the ADDIE model. The selection of this model is based on the consideration that this model is easily understood by researchers. The ADDIE model is one of the systematic learning design models that contains solving learning problems related to learning resources that are in accordance with learning needs and characteristics (Masturah and Mahadewi 2018). The ADDIE model consists of five steps including (analysis, design, development, implementation, and evaluation) you can look on figure 1.

This Development Research uses various methods in the data collection process including interviews, questionnaires, tests, and document recording methods. That the research project consists of 4 experts (media experts, material experts, learning experts and linguists) limited trials of Pop Up Book media for tsunami disaster mitigation at SDN Parangtritis 1. Data collection instruments in the form of validation sheets for media experts, material experts, learning experts, and linguists. Questionnaires for the principal, and the homeroom teacher of grade 3 then the data obtained are processed and analyzed using descriptive analysis as material for product descriptions to make them suitable for use.

Data analysis and data processing data collection carried out in this study using observation techniques, interviews and tests, the data obtained is then presented in the form of a table of column rows. After the data is collected, data analysis uses qualitative descriptive analysis (Arikunto 2013). The results of the data presented in the column row table are analyzed using scoring and processed using the struges formula, to then be categorized according to potential classes, making it easier to find out the level of public understanding of existing disaster mitigation.

This development research uses three data analyses, namely first, qualitative descriptive analysis techniques used to process data from reviews of content experts in the field of study, media experts, linguists, learning material experts. This technique is carried out by grouping information from qualitative data in the form of inputs, responses, criticisms and suggestions for improvement available in questionnaires and interview results. The results of the analysis are then used to revise the research product developed and you can look on Table 1. After that, quantitative descriptive analysis technique this is done to process the data obtained through questionnaires in the form of scores.

Table 1. Methods in the collection of research data

Method	Subject	Output
Interview	Principal Teacher Student	Analysis of the initial problem that is used as the background of the problem.
Questionnaire	Validation questionnaires (media experts, materials, languages, learning) Student and teacher responses	Obtain data on media validity and feasibility from validation experts and teacher and student responses
Test	Students	Get pretest and post-test data for student learning outcomes

The formula used to calculate the score of each subject is as follows.

$$\text{Score} = \frac{\Sigma n x 100\%}{N} \quad (1)$$

Note:

n= the number of questions is correct

N= number of questions

Furthermore, inferential statistical analysis (t test), this analysis technique is used to determine the level of effectiveness of the development product on the learning outcomes of IPAS grade III students at SD N Parangtritis before and after using the Pop Up Book learning media development product based on tsunami disaster mitigation. Target group trial data were collected using pretests and posttests of the subject matter being tested.

Pretest and posttest results are analyzed using the t test to determine the difference between pretest and posttest results. Hypothesis testing used t-tests correlated with manual calculations. Before conducting a hypothesis test, a prerequisite test is carried out, namely the normality test and the homogeneity test. The data normality test was performed using the Kolmogorov SMirnov test with = 0.05. All data from the study in each group were tested for normality, so that two p values were obtained in each data group compared to the level of significance = 0.05. For the test criteria, namely if the p-value > = 0.05 then the data concerned is normally distributed and vice versa (Wuryandani & Herwin, 2021)

In this study, the statistical k hypothesis is needed to perform parametric statistical analysis to test the effectiveness of pop up book media use in improving the learning outcomes of grade III students. The statistical hypothesisk in this study is outlined as follows:

H0 : $\mu 1 \geq \mu 2$

H1: : $\mu 1 < \mu 2$

$\mu 1$ is the learning outcomes of learners before the application of Pop Up Book media; $\mu 2$ is the learning outcomes of learners before the application of Pop Up Book media

Table 2. Category scale

Achievement Rate (%)	Qualification	Information
80-100	Excellent	No need to revise
60-79	Good	Revised as necessary
40-59	Enough	Pretty much revised
20-39	Less	Much revised

Result and Discussion

This research was carried out in grade III even semester at SD N Parangtritis 1. The subjects in this study were all grade III students totaling 21 students. The development of Pop Up Book learning media is adjusted to the model used as a development guideline, namely the ADDIE model which contains Analyze, Design, Development, Implementation, and Evaluation. The results showed that the development of the Pop Up Book media for tsunami disaster mitigation for elementary school students at SD N Parangtritis 1 was developed through the following stages:

Analysis

Analysis is the first step taken by researchers to obtain information from students and teachers which will be used as a reference for developing in accordance with the data and facts found. The analysis carried out by the researcher is an analysis of problems and needs, curriculum analysis, analysis of the character of students.

Table 3. Media Development Analysis

Analysis	Analysis Results
Problem and Needs Analysis	Interview with the principal and several teachers at SD N 1 Parangtritis Problem Identification: lack of knowledge of elementary school students in coastal areas about the mitiation of the Tsunami disaster limited teachers in developing materials and teaching materials on tsunami disaster mitigation Pop Up Book media has not been developed on tsunami disaster mitigation in coastal schools
Curriculum Analysis	The curriculum used at SDN Parangtritis 1 is the 2013 curriculum. Furthermore, researchers integrate learning media according to the needs of students so as to increase students' understanding of tsunami disaster mitigation. The results of the curriculum analysis will later be used as material that will be developed in the Pop Up Book for tsunami disaster mitigation.
Students Character Analysis	The results of the analysis of the character of students that at SDN Parangtritis 1 lacked teaching materials and learning media about tsunami disaster mitigation so that students lacked knowledge of saving themselves from the tsunami disaster. researchers get the idea, namely developing a Pop Up Book learning media for tsunami disaster mitigation as a supporting media or student companion media that is in accordance with the character of students so as to support the student learning process.

Design

Design is the stage where researchers compile the Pop Up Book media concept. The following is the media design stage of the Pop Up Book for tsunami disaster mitigation carried out by researchers, namely compiling a skeleton, presenting image illustrations and material illustrations, and media design planning.

Table 4. Stages of Media Design

Design Stages	Description
Drafting the Outline	creation of story boards, covers, media pages, foreword, core competencies and basic competencies, materials, bibliography, and author biography
Presentation of image illustrations and presentation of material	The presentation of material in the Pop Up Book media for tsunami disaster mitigation was obtained from several sources ranging from teacher thematic books, student thematic books, BSE books, KTSP books on science subjects, bobo magazines about nature, tsunami disaster films and short films from local disaster management agencies. Researchers provide material on the Pop Up Book media starting with determining KI and KD as well as indicators found in teacher thematic books. Researchers include mathematical KD which discusses division and multiplication, then KD Indonesian which discusses extracting information from reading texts and KD IPA discusses the impact of natural damage and tsunami disaster mitigation. Researchers make the presentation of illustrations according to the material and characteristics of students.
Media Design Planning	The first step in the preparation of media design is to determine what media is needed in the school. Based on the results of the analysis, the researcher concluded that the Pop up Book media needed by the school. next determine the title of the Pop Up Book media and based on the results of the analysis the researcher determines the media title is the Pop Up Book for tsunami disaster mitigation. The Pop Up Book media that is made is almost the same as the Pop Up Book in general, except that the media developed by researchers contains tsunami disaster mitigation material. Furthermore, the researcher designed a simple story board using coreldraw X7 by paying attention to several aspects of the media display, the colors used, the size of the animated characters, the layout of the image, the layout of the material, the type of writing, and the layout between the illustration of the image and each material so that it is interesting.

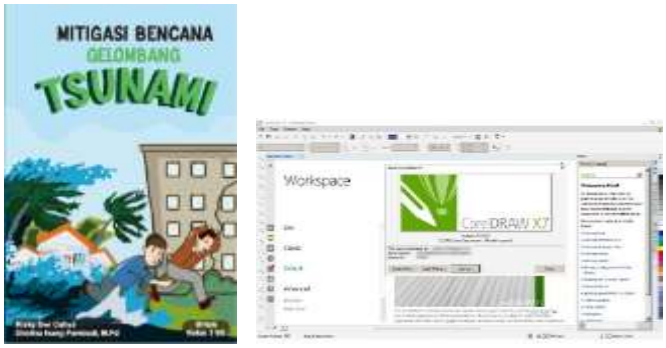

Figure 1. Design using the Corel Draw application

Development

This development stage is a validation stage used by researchers with the aim of the Pop Up Book media for tsunami disaster mitigation is suitable for use or not in accordance with standards that are directly tested by several lecturers who are competent in their respective fields, including media experts, material experts, learning experts, and linguists.

Table 5. Validation Sampling Data from expert validators

Validator	Value	Category
Media	69.4	Good
Material	88.8	Excellent
Learning	82.1	Excellent
Language	90.0	Excellent
Sum	330.3	
Average	82.5	
Criterion	Excellent	

Implementation

The implementation stage is the realization of the design and development of the Pop Up Book media for tsunami disaster mitigation. Researchers carried out product trials at SD N Parangtritis 1. The Pop Up Book media trial for tsunami disaster mitigation was carried out after revising the Pop Up Book media based on criticism, suggestions and input from media experts, material experts, and learning experts. Product trials were carried out at SD N Parangtritis 1. The trial was conducted by students, grade 3 teachers and the principal of SD N Parangtritis 1. The trial was carried out to find out the results of the development that was made

and then applied in the learning of IPAS class III SD N Parangtritis 1.

Evaluation

The evaluation stage is the final part of the ADDIE development model. Researchers conduct evaluations in the form of formative and summative evaluations. Formative evaluations are carried out to measure and assess learning media products that include expert validation, small group trials and field trials. Meanwhile, summative evaluation is carried out to determine the effectiveness of learning media developed for learning activities by conducting an effectiveness test stage.

The following is a descriptive presentation of assessment data from media experts, material experts, learning experts, linguists, and assessments of teacher responses to the media.

Material Expert Assessment

Researchers consulted with material expert Laila Fatmawati, M.Pd. The results of validation data obtained through product assessment sheets by material experts. Material experts provide assessments regarding various aspects of the feasibility of the product being developed. The categories used in judging are excellent, good, sufficient and not good. The excellent category is rated 4. The good category is scored 3. Categories are simply rated 2. The less good category is given a score of 1. The results of the material expert assessment received an average of 88.8 with a very good category.

Linguist Assessment

Based on the data above, the researcher then consulted with linguist Hanum Hanifa Sukma, M.Pd. The results of validation data obtained through product assessment sheets by linguists. Linguists provide assessments regarding various aspects of the feasibility of the developed product. The categories used in judging are excellent, good, sufficient and not good. The excellent category is rated 4. The good category is scored 3. Categories are simply rated 2. The less good category is given a score of 1. The results of the linguist's assessment got an average of 90 with excellent categories.

Learning Expert Assessment

After obtaining data from the two experts, the researchers then consulted with learning expert Dr. Fitri Indriani, M.Pd.I. . The results of validation data obtained through product assessment sheets by learning experts. Learning experts provide assessments on various aspects of the feasibility of the product being developed. The categories used in judging are excellent, good, sufficient and not good. The excellent category is rated 4. The good category is scored 3. Categories are simply rated 2. The less good category is given a score of 1. The results of the assessment of learning experts got an average of 82.1 with an excellent category.

Media Member Assessment

Based on the above results, the researcher conducted a consultation with media experts. The results of validation data obtained through product assessment sheets by media experts. Media experts provide assessments regarding various aspects of the feasibility of the product being developed. The categories used in judging are excellent, good, sufficient and not good. The excellent category is rated 4. The good category is scored 3. Categories are simply rated 2. The less good category is given a score of 1. The results of the media expert assessment got an average of 69.4 with a good category.

The results of product trials on elementary school teachers and principals.

The results of the product trial were carried out in a small group of 12 students with categories of 3 (three) students with high learning outcomes, 6 (six) students with moderate learning outcomes and 3 (three) students with low-level learning outcomes. The percentage of the level of achievement of the trial results is on the criteria of "excellent" (86%). Field trials were carried out on all grade III students of SD N Parangtritis 1 which amounted to 21 (twenty-one) students. All students include criteria that have high, medium, and low learning outcomes. The percentage of achievement of field trial results is on the "excellent" criteria (82.3%) so that this Pop Up Book learning media product based on tsunami disaster mitigation does not need to be revised. The responses of the homeroom teacher 3 teacher and the principal showed an average of 87.5 with a very good category.

The effectiveness of developing Pop Up Book learning media based on tsunami disaster mitigation is carried out by a test method in the form of multiple-choice questions used to collect data on student learning outcomes before and after using Pop Up Book learning media. Before the use of Pop Up Book media is applied to students, students are first given a pretest to 21 (twenty-one) grade III students of SD N Parangtritis 1. After this is implemented, then the use of Pop Up Book learning media is carried out in learning activities. After learning using Pop Up Book media, students are given a Posttest as an assessment of final learning outcomes after the application of learning media. The average pre-test score was 51.6 and the posttest average score was 80.3. Based on the pretest and posttest values, a t-test for the correlated sample is carried out manually.

This verification aims to compare two data learning outcomes using a t-test related to that in this study there is one hypothesis that was tested, namely the effectiveness of disaster mitigation-based Pop Up Book learning media to improve student learning outcomes. If presented in the form of a statistical hypothesis, then the statistics tested in this study are H0 : μ1≥ μ2 and H1: μ1< μ2.

The statistical hypothesis of this study shows that H0 means that there is no change in disaster mitigation-based Pop Up Book learning media to improve student learning outcomes, while H1 means that there is a change in disaster mitigation-based Pop Up Book learning media to improve student learning outcomes. To test the research hypothesis requires inferential statistical analysis (t-test). The hypothesis testing criterion is to reject H0 if the P-value < 0.05and vice versa. The results of inferential statistical analysis with t-test show that the value of the coefficient t is 19.252 with df 20 and the p value is 0.00. The coefficient shows p-value<y= 0.05. Thus, it can be concluded that the test rejects H0 or accepts H1. This shows that disaster mitigation-based Pop Up Book learning media is effective for improving student learning outcomes.

The implementation that is applied to students using pop up book media is an atmosphere of learning activities that increases positively, namely students are more enthusiastic about following than learning only through other two-dimensional media. The enthusiasm and interest of students can also be seen from reading activities in class using pop up book media.

The pop up book animation used in this study is an innovation to support the learning process to be more effective and efficient. The results of this research are theoretically to gain insight knowledge about learning innovations that collaborate three-dimensional books with disaster mitigation material, namely tsunami disasters. The purpose of developing a pop up book media based on tsunami disaster mitigation is to obtain meaningful learning by linking local geographical conditions with concrete ones that are able to assist students in compiling and building their knowledge about tsunami disaster mitigation so that they have the competence to be ready and responsive to save themselves.

Through learning activities using this disaster mitigation-based pop up book media, students will gain a deep understanding of tsunamis, tsunami symptoms, and steps that must be taken in the event of a tsunami. The statement above is in line with Pambudi's research (2019) states that students' creativity and insight will increase in line with the number of reading references they have read, in addition to that with the innovation of disaster-based pop up book media, students are able to imagine with concrete images, increase interest in reading, and most importantly student literacy will increase. A similar thing was found in the research of Anggrasari & Dayu (2022) stated that pop ups are one of the innovations that can be applied and used in students, with the innovation the learning atmosphere will change to no longer boring, besides that pop ups also provide a mysterious but concrete picture so that students' interest in reading increases. In line with the research of Khamidah and Sholichah (2022) which states that pop-up books are an alternative step if there are students who are not fluent in reading, by observing three-dimensional images students are able to understand the material in the media because there are concrete visuals in the media. Therefore, the use of pop up books is very effective when applied in tsunami disaster mitigation learning for elementary school students

Conclusion

Tsunami disaster mitigation Pop-up media is an effort to realize a generation that is literate in disaster literacy and increase students' interest in reading by developing various aspects of child development in visual and kinesthetic form through a tsunami disaster mitigation Pop-up book. Development of the Pop Up Book media for tsunami disaster mitigation for elementary school students at SD N Parangtritis which was developed with reference to one of the development models in R&D research using the ADDIE development model which includes 5 stages of development is Analysis, Design, Development, Implementation, Evaluation. Media Pop Up Book on tsunami disaster mitigation for school students at SD N Parangtritis 1 developed by researchers based on the results of research by media experts obtained a score of 69.4 with the Good category. Based on the results of research, material experts obtained a score of 88.8 with the Excellent category. the results of the research of learning experts obtained a score of 82.1 with the category of Excellent. The results of the linguist's research obtained a score of 90 with the category of Excellent. in addition, the questionnaire assessment of the homeroom teacher of grade 3 obtained a score of 88.6 with the Excellent category and the principal questionnaire assessment obtained a score of 86.3 with the Excellent category. The average pre-test score was 51.6 and the posttest average score was 80.3. So it can be concluded that the Pop Up Book media for tsunami disaster mitigation is suitable for use in the teaching and learning process.

Author Contributions
Conceptualization Pop Up Book, Yoga Marga Mahendra Investigation Yoga Marga Mahendra and Risky Dwi Cahya, Conceptualized article, Herwin

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Conflicts of interest
The authors declare no conflict of interest.

References

Agustina, R., Sulistyowati, R., Putrianti, R., Anggraeni, G., & Dewi, F. W. R. (2021). Statistik Pendidikan 2021. In D. S. K. Rakyat (Ed.), *Badan Pusat Statistik*. Badan Pusat Statistik.

Anggrasari, L. A., & Dayu, D. P. K. (2022). The Effectiveness of Pop-Up-based Animation Book to Improve Reading Comprehension Skills of Elementary School Students. *Al Ibtida: Jurnal Pendidikan Guru*, *9*(2), 265–279. https://doi.org/10.24235/al.ibtida.snj.v9i2.9129

Aplikasi Smart Province "Jogja Istimewa": Penyediaan Informasi Terintegrasi dan Pemanfaatannya. (n.d.). *Majalah Geografi Indonesia*, *32*(1), 14. https://doi.org/10.22146/mgi.31662

Arikunto, S. (2013). *Dasar-dasar Evaluasi Pendidikan*. Bumi Aksara.

Arip, M., & Aswat, H. (2021). Media Pop Up Book Untuk Meningkatkan Hasil Belajar Siswa Pada Mata Pelajaran IPA Di Sekolah Dasar. *Edukatif : Jurnal Ilmu Pendidikan*, *3*(1), 261–268. https://doi.org/10.31004/edukatif.v3i1.329

Asrizal, A., Hikmah, N., Febriya, D., & Mawaddah, F. (2023). Impact of Science Learning Materials Integrating Natural Disasters and Disaster Mitigation on Students' Learning Outcomes: A Meta Analysis. *Jurnal Penelitian Pendidikan IPA*, *9*(9), 586–595. https://doi.org/10.29303/jppipa.v9i9.2680

Ayub, S., Makhrus, M., Gunada, I. W., & Taufik, M. (2019). Analisis Kesiapsiagaan Bencana Pada Guru Sekolah Dasar. *Jurnal Penelitian Pendidikan IPA*, *6*(1), 52. https://doi.org/10.29303/jppipa.v6i1.281

Budiyono. (2020). Inovasi Pemanfaatan Teknologi Sebagai Media Pembelajaran di Era Revolusi 4.0. *Jurnal Kependidikan: Jurnal Hasil Penelitian Dan Kajian Kepustakaan Di Bidang Pendidikan, Pengajaran Dan Pembelajaran*, *6*(2), 300. https://doi.org/10.33394/jk.v6i2.2475

Cahya, R. D., Herwin, Harsono, A. M. B., Arfika, L., & Suzana. (2023). *Stumble Guys Based Lesson Study In Improving Learning Outcomes In Mathematics Lesson In Elementary School*. *12*(2), 2688–2699. https://doi.org/http://dx.doi.org/10.24127/ajpm.v12i2.7141

Cahya, R. D., Pambudi, D. I., Febri, R., & Wahid, N. (2023). Pop-Up Book Media to Improve Disaster Literacy i n " Kurikulum Merdeka " at Elementary School. *Jurnal Inovasi Pendidikan Dan Pembelajaran Sekolah Dasar*, *7*, 372–386. https://doi.org/10.24036/jippsd.v7i2.125383

Elwarak, R., Faisal, D., & Ahdi, S. (2018). Perancangan Buku Pop-Up Mengenai Manfaat. *Jurnal Desain Komunikasi VIsual*, *8*(1). https://doi.org/10.24036/dekave.v8i1.100288

Fatthurrahma, W. M., & Anas, N. (2023). The Influence of Pop Up Book Learning Media on Students' HOTS Ability in Natural Science Materials in MI. *Jurnal Penelitian Pendidikan IPA*, *9*(6), 4465–4471. https://doi.org/10.29303/jppipa.v9i6.3822

Fawzy, S., Osman, A. I., Doran, J., & Rooney, D. W. (2020). Strategies for mitigation of climate change: a review. *Environmental Chemistry Letters*, *18*(6), 2069–2094. https://doi.org/10.1007/s10311-020-01059-w

Furumura, T., Maeda, T., & Oba, A. (2019). Early Forecast of Long-Period Ground Motions via Data Assimilation of Observed Ground Motions and Wave Propagation Simulations. *Geophysical Research Letters*, *46*(1), 138–147. https://doi.org/https://doi.org/10.1029/2018GL081163

Gunada, I. W., Ayub, S., Doyan, A., Taufik, M., & Kosim, K. (2019). Development of Disaster Mitigation Learning Structures. *Jurnal Penelitian Pendidikan IPA*, *6*(1), 69. https://doi.org/10.29303/jppipa.v6i1.324

Habe, H., & Ahiruddin, A. (2017). Sistem Pendidikan Nasional. *Ekombis Sains: Jurnal Ekonomi, Keuangan Dan Bisnis*, *2*(1), 39–45. https://doi.org/10.24967/ekombis.v2i1.48

Hasanudin, C., Mayasari, N., Saddhono, K., & Prabowo, R. A. (n.d.). IbisPaint X Apps in Creating Collaborative 3D Learning media of Pop-Up and Movable Books. *Journal of Physics: Conference Series*, *1764*(1). https://doi.org/10.1088/1742-6596/1764/1/012131

Hidayati, H., Rahmaniah, R., Hudri, M., Irwandi, I., & Bafadal, M. F. (2020). Disaster Mitigation Training (Pelatihan Mitigasi Bencana) Untuk Anak Usia Dini Di Muhammadiyah Boarding School Sang Surya, Kota Mataram. *SELAPARANG Jurnal Pengabdian Masyarakat Berkemajuan*, *3*(2), 211. https://doi.org/10.31764/jpmb.v3i2.2195

Kano, M., Miyazaki, S., Ishikawa, Y., & Hirahara, K. (2020). Adjoint-based direct data assimilation of GNSS time series for optimizing frictional parameters and predicting postseismic

deformation following the 2003 Tokachi-oki earthquake. *Earth, Planets and Space*, *72*(1). https://doi.org/10.1186/s40623-020-01293-0

Kartimi, K., & Winarso, W. (2021). Enhancing Students' Science Literacy Skills; Implications for Scientific Approach in Elementary School. *Al Ibtida: Jurnal Pendidikan Guru MI*, *8*(2), 161. https://doi.org/10.24235/al.ibtida.snj.v8i2.9175

Khamidah, A., & Sholichah, N. I. (2022). Digital Pop Up Learning Media for Early Childhood Cognitive. *Indonesian Journal of Early Childhood Education Research*, *1*(1), 11–19. https://doi.org/10.31958/ijecer.v1i1.5833

Khomarudin, M. R. (2021). *Iptek Penginderaan Jauh Untuk Meningkatkan Kualitas Deteksipermasalahan Lingkungan Dalam Mendukung Mitigasi Bencana Di Indonesia*. https://doi.org/10.55981/brin.488

Latuconsina, A. (2022). Exploring the Students' Reading, Writing, and Numeracy Skills in Southeast Maluku Regency Coastal Elementary Schools Anasufi Banawi. *Al Ibtida: Jurnal Pendidikan Guru MI,* 9(2), 252-264. http://dx.doi.org/10.24235/al.ibtida.snj.v9i2.10189

Liu, F., Zhu, G., & Wang, F. (2021). Report on the 19th international symposium on geo-disaster reduction/high-level academic forum on disaster mitigation and integrated risk defense on the Plateau, 12–15 July 2021, Xining, China. *Geoenvironmental Disasters*, *8*(1). https://doi.org/10.1186/s40677-021-00197-9

Mahadzir, N. N. N. (2013). The Use of Augmented Reality Pop-Up Book to Increase Motivation in English Language Learning For National Primary School. *IOSR Journal of Research & Method in Education (IOSRJRME)*, *1*(1), 26–38. https://doi.org/10.9790/7388-0112638

Martadireja, S. (2020). Manfaat Pemisahan Sampah Organik dan Anorganik Melalui Media Buku Ilustrasi Anak. *Besaung : Jurnal Seni Desain Dan Budaya*, *5*(1), 48–53. https://doi.org/10.36982/jsdb.v5i3.1141

Masturah, E. D., & Mahadewi, L. P. P. (n.d.). Pengembangan Media Pembelajaran Pop-Up Book pada Mata Pelajaran IPA Kelas III Sekolah Dasar. *Jurnal EDUTECH Univrsitas Pendidikan Ganesha*, *6*(2), 212–221. Retrieved from https://ejournal.undiksha.ac.id/index.php/JEU/article/view/20294

Murdiyanto. (n.d.). *Bencana Alam dan Penanggulangannya*. Yogyakarta: Citra Media.

Nurrahim, A. E. P., Sanjoto, T. B., & Sriyanto. (2018). Pendidikan Mitigasi Bencana Tsunami dengan Menggunakan Media Pembelajaran Buku Saku Pada Masyarakat Pesisir Desa Karanggadung Kecamatan Petanahan Kabupaten Kebumen. *Edu Geography*, *6*(1), 72–79. Retrieved from https://journal.unnes.ac.id/sju/index.php/edugeo/article/view/23594

Orland-Barak, L., & Wang, J. (2021). Teacher Mentoring in Service of Preservice Teachers' Learning to Teach: Conceptual Bases, Characteristics, and Challenges for Teacher Education Reform. *Journal of Teacher Education*, *72*(1), 86–99. Retrievd frohttps://doi.org/10.1177/0022487119894230

Pambudi, D. I. (2019). Pengembangan Media Pop Up Book Sebagai Edukasi Mitigasi Bencana Bagi Siswa Sekolah Dasar. In *Seminar Nasional AVoER XI 2019 Palembang* (pp. 23–24). Retrieved from Retrieved from http://ejournal.ft.unsri.ac.id/index.php/avoer/article/view/1181

Peraturan Presiden Republik Indonesia tentang Rencana Induk Penanggulangan Bencana Tahun 2020-2044. (2024). *Database Peraturan BPK RI*, *87*, 1–31. https://peraturan.bpk.go.id/Home/Details/146481/perpres-no-87-tahun-2020

Prastika, B. A., Senen, A., & Cahya, R. D. (2023). Immersive Pop-Up Books: Enhancing Disaster Awareness in the Merdeka Curriculum. *Jurnal Prima Edukasia*, *11*(2), 186–196. https://doi.org/10.21831/jpe.v11i2.57723

Putri, A. (2022). Mitigasi Bencana Berbasis Kearifan Lokal (Local Knowledge, Local Wisdom, dan Local Genius). *Geodika: Jurnal Kajian Ilmu Dan Pendidikan Geografi*, *6*(1), 89–98. https://doi.org/https://doi.org/10.29408/geodika.v6i1.5417

Shi, Y., & Gullett, W. (2018). International regulation on low-carbon shipping for climate change mitigation: Development, challenges, and prospects. *Ocean Development and International Law*, *49*(2), 134–156. https://doi.org/10.1080/00908320.2018.1442178

Suhardjo, D. (2015). Arti Penting Pendidikan Mitigasi Bencana Dalam Mengurangi Resiko Bencana. *Jurnal Cakrawala Pendidikan*, *2*, 174–188. https://doi.org/10.21831/cp.v0i2.4226

Sumiyatun, S., Kuswono, K., & Femia, R. (2020). Design of Pop Up Scrapbook Media to Strengthen History Comprehension Ability in SMA Negeri 1 Pekalongan, Lampung, Indonesia. *International Journal of Research and Review*, *7*(June), 440–446. Retrieved from Retrieved from https://www.academia.edu/download/63815757/IJRR005820200703-16232-y1uvxt.pdf

Wibowo, A. M. (2022). Changing the Concept of Prospective Primary Education Teachers through Ethnoscience-based Critical Thinking. *Jurnal*

Pendidikan Guru MI, *9*, 382–391.Retrieved from https://www.syekhnurjati.ac.id/jurnal/index.php/ibtida/article/view/10273

Wuryandani, W., & Herwin. (2021). The Effect of The Think–Pair–Share Model on Learning Outcomes of Civics in Elementary School Students. *Cypriot Journal of Educational Sciences*, *16*(2), 627–640. https://doi.org/https://doi.org/10.18844/cjes.v16i2.5640

Yulianto, A., Yuliyanto, A., Hamdu, G., Nur, L., Fitriani, D., & Hamzah, N. (2021). Disclosure of Student Ability in Working on Higher-Order Thinking Skills Questions through Rasch Modeling. *Al Ibtida: Jurnal Pendidikan Guru MI*, *8*(1), 130. https://doi.org/10.24235/al.ibtida.snj.v8i1.7865