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Pop-Up Book Media to Improve Disaster Literacy in "Kurikulum Merdeka" at Elementary School

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ABSTRACT

Understanding by Design (UBD) is a recommended learning model in the independent learning curriculum. The issue in this study is that Indonesia is a country of a million disasters so it is important to have broad insights related to disasters and their mitigation. The reality is that students still lack insight into disasters and their mitigation. The purpose of the study was to improve the disaster literacy of students using the UBD learning model with pop-up book media. Quantitative methods were used in the study. This study uses a quasi-experimental design, namely a non-equivalent Control Group Design. Data collection techniques using tests and observations Analysis used in this study using Inferential statistics of T-test test. The population in this study was SD N Percobaan Padang, West Sumatra which had a sample of 42 students divided into a control class and an experimental class. The result of the application of the UBD model is the result of statistical analysis with a t-test showing that the value of the t coefficient is 19,252 with a df of 20 and a p-value of 0.00. The coefficient is p-value<y= 0.05. Demikian, it can be concluded that the test rejects H_0 or accepts H_1. The test results have a significant influence on UBD's learning model with pop-up book media on increasing student disaster literacy. The conclusion of this study is to use the UBD learning model with pop-up book media to increase disaster literacy in elementary school students.

Keywords: *Understanding by Design, Disaster Literacy, Learning Model, Elementary School*

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1. INTRODUCTION

Responding to a country that has a lot of diversity, starting from its territory consisting of islands, many people, tribes and cultures are characteristic of the Indonesian state (Mustari et al., 2018; Prasetyo et al., 2021; Syafruddin et al., 2021). The geology of Indonesia consists of islands consisting of the tip of Sabang Aceh to Merauke South Papua and is embraced by two large continents, namely the Asian continent and the Australian continent (Manyoe et al., 2021). Indonesia not only has an island but is also surrounded by oceans that directly intersect with the large ocean, namely the Indian Ocean and the Pacific Ocean (Sciascia & Malufti, 2021). Looking at the geological condition of Indonesia, there are many risks in dealing directly with disasters, ranging from natural disasters to non-natural disasters (Hidayati et al., 2020; Pramita et al., 2022). In this case, it can be proven from the recording of annual disasters in Indonesia which tend to increase in the 2018-2020 period of approximately 3,397 events, disasters occur influenced by the tropical region of Indonesia(Rozaki et al., 2021; Sadat, 2016).

Natural conditions in Indonesia, known as tropical regions, are also very potential for disasters caused by natural damage and artificial damage to nature (Anies, 2017; Mbanda et al., 2021). Disasters that often hit Indonesia are disasters that are diverse such as droughts, earthquakes, tornadoes, volcanoes, forest fires, floods, and tsunamis. (Brown et al., 2014; Juhadi et al., 2021). Disasters are the biggest threat to mankind that affect the decline of resilience in an area such as damage to houses and buildings in the region, declining health rates, increasing mortality, declining economy, and soaring psychosocial disorders in areas where disasters occur (Ludvigson et al., 2020; Zhang et al., 2018). This is in line with disaster data from the results of the BPBD report in South Sulawesi recorded starting in 2018 the impact caused by the disaster that occurred took 2,045 people to die, the victims displaced as many as 82,775 people with a calculation of around 10% of the total victims who died were children (Syamsidik et al., 2021). According to the results of the BPBD West Nusa Tenggara (NTB) report, around 3,051 classrooms and school infrastructure were damaged, 1,460 of which were severely damaged, making them overwhelmed due to disruption of the education sector because schools were dismissed until the time it was determined (Yadnya et al., 2020).

The potential and impact of disasters that occur so that all Indonesian people must always be on standby starting from all sectors, especially the education sector (Saito et al., 2021; Suherningtyas et al., 2022). Education is one of the important sectors in acting as a facilitator in recognizing, forming and implementing attitudes that are responsive to disasters (Peraturan Presiden Nomor 87, 2020). The purpose of introducing this disaster response attitude is none other than to form educated students who have disaster preparedness competence and are ready to implement it whenever needed in society (Rachmawati et al., 2018). The direct appeal stipulated about the education p unit seeks to encourage the continuity of education services in the education unit affected by the disaster, which requires handling in emergency and post-disaster situations (Kemendikbud, 2019). It can be started and

implemented supportive policies in the education of disaster preparedness students in schools on how to save themselves in times of threatening disasters and accidents (Utama et al., 2018).

The policy is a form of support for a formally formulated program so that the government can act out its function well (Santika, 2021). The policy in the school is led by the principal and then the principal gives an appeal to the teacher and the teacher implements the appeal given and applies it in the lesson so that there is a regular linkage top-down (Arifin et al., 2021; Arman et al., 2016; Hoa et al., 2021). Ironically, the findings in the field that the implementation of the policies advocated by the government in the education disaster preparedness for students in schools are not carried out properly as evidenced by the level of disaster literacy in disaster education in formal education and the community is still small, low awareness so that it has not prioritized disaster literacy in schools as a means of disaster awareness and prevention. In line with that, the low literacy of disaster mitigation such as the lack of monitoring and evaluation of the programs implemented and the lack of trained teachers in providing disaster education materials. This finding is in line with several previous studies that some of the problems that exist in the non-implementation of government policies will form behaviour that is not in accordance with expectations (W. N. S. W. Ali & Abdullah, 2021; Hirmer et al., 2021; Kano et al., 2020; Nurrahim et al., 2018)

Based on the problems raised earlier, researchers made direct observations at SD N Percobaan Padang to see the problems that exist in elementary school students. The interesting thing about this school is that one of the disaster preparedness schools the name KOGAMI (Komunitas Siaga Tsunami). Although part of KOGAMI found problems including low-grade students who have not received an introduction to the dangers of a tsunami, this is evidenced based on the results of interviews with several low-grade students regarding tsunami hazards. In addition, in learning activities in the classroom and extracurricular activities, there are no activities that contain disaster mitigation learning, this is evidenced by the observations of researchers in schools. Another fact found is the development of media that contains tsunami disaster material and tsunami disaster mitigation is very minimal and only in the form of a 2D book.

This condition indicates the need to consider innovative treatment given in improving disaster literacy in students. Hosseini et al., (2019) stated that there are many learning Approaches that should be regarded in drafting a learning plan such as strategies, models, methods, and learning techniques that involve the conditions of the learners. The practices of feature learning strategies in the grade are very crucial to apply so that students get an insight so that learning is more meaningful (Shi & Gullett, 2018; Suryaman, 2020). Choosing the right learning strategy has a close relationship with student motivation which will later have an impact on student learning outcomes (B. Ali & Poerwanto, 2017; Suwandi, 2020). This is in line with the idea that the improvement practices by the teacher must be able to steer students to achieve knowledge and insight as well as an understanding of learning through the understanding by design (UBD) learning model (Hosseini et al., 2019; Ruslanjari et al., 2019; Suwandi,

2020). The UBD learning model is very suitable for teachers to apply disaster literacy activities to students because teachers are given the flexibility to design learning activities that adapt to the character of students, this is a strong factor in maximizing and increasing the motivation of students to become disaster-literate students. (Anderson, 2022; Gamal Ahmed Labib al-Tonsi, 2019; Yurtseven & Altun, 2017). In addition to innovative learning models, teachers must also determine the right learning media to support the ideal learning process (Budiyono, 2020; Rifa Hanifa Mardhiyah et al., 2021). The use of appropriate learning media will have a positive impact on its users this is in line with the statement (Martadireja, 2020; Soleha et al., 2022). The advantages of Pop-up Book media include helping students get visuals that look real because they have dimensions, moving images and textures like the original in addition to having real textures and changing changes will provoke the enthusiasm of readers (Anggrasari & Dayu, 2022; Masturah & Mahadewi, 2018). This statement is in line with (Warsita, 2017) that learning models and media are a unit that is in line to improve skills and abilities.

2. METHOD

This study used a Quasi-experimental design because the use classes as research samples were taken from existing classes. The design used in this study is a non-equivalent control group design, the pattern of this study is to involve two groups, namely the experimental group and the control group with the same environment. The control group was a group that was not given special treatment ranging from pretest to posttest, while the experimental class was given special treatment with the UBD learning model with Pop-up Book media. This study aims to find out an overview of the influence of the UBD model with media Pop-up Book to improve the disaster literacy ability of students of SD Negeri Percobaan Padang, West Sumatra.

The design of this study consists of two measurements, namely at the time of the pretest, then given the UBD model treatment using Pop-Up Book media and the second measurement at the time of the posttest. Here are the steps of the UBD model with Pop-Up Book media (Mctighe & Wiggins, 2012) Identify the desired result is the teacher considers learning priorities by emphasizing the purpose of knowledge transfer such as learners being given essential question questions to explore learners' understanding after the answers have been delivered before entering the next stage. Find evidence of assessment if the teacher wants to prove that the student has managed to achieve the desired. Proving that students are asked to take a test to measure students understanding. Plan learning After the teacher identifies and analyzes the level of understanding of students, then the teacher plans the learning by compiling the learning until it becomes effective.

The population in this study is a student in grade III SD N Percobaan which amounts to 42 students of grade III SD N Percobaan. The number of 42 people was then divided into two selected groups using a simple cluster random sampling. The group was divided into a control group (without treatment) of 21 people and an experimental group (which was given treatment) of 21 people. The research data were

accumulated using observation techniques and learning result tests. Before this research, a content validity test was carried out first using the validity index approach and proof of reliability using the assessment techniques between appraisers. The assessment results show that all items are valid and all instruments are reliable (Creswell, 2009).

Data analysis techniques on quantitative data using the available statistical methods. The statistics used are descriptive statistical analysis and inferential analysis using a t-test. Before testing, a data normality test was first carried out 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). The statistical hypothesis in this study is outlined as follows:

H0 : $\mu 1 \geq \mu 2$: There was no significant change in UBD's learning model for disaster literacy of grade III students
H1: : $\mu 1 < \mu 2$: There is a significant improvement in UBD's learning model for disaster literacy of grade III students
$\mu 1$: The learning result of learners before the practice of the UBD learning model.
$\mu 2$: the learning result of learners after the practice of the UBD learning model.

3. RESULTS & DISCUSSION

The pretest results are used to determine the initial ability of students regarding the material provided, namely about disaster mitigation. In addition, the pretest value is used to determine whether the sample used has a homogeneous initial ability. Pretest data is prepared using the SPSS program. The results of the calculation of the different tests of the two average pretest averages can be described that the respondents used in this study were 42 respondents consisting of an experimental class of 21 respondents and a control class of 21 respondents. The pretest results of the experimental class respondents were 48.8 while in the control class, they got an average of 50.8.

3.1. Data of Experimental Class Student Scores

The implementation of the research was conducted in the Experimental class in which there was a treatment. The implementation of this research consists of several stages. The first stage for initial data collection is to pretest. This pretest aims to find out the initial score of students before being given treatment or before using the UBD model with disaster literacy Pop-up Book media.

The next stage is to provide treatment of an introduction to disaster mitigation using Pop-up Book.

Table 1. Descriptive Statistical Data of Experimental Class Student Scores

Statistics	Score
Before Model application	
Mean	48,8
Median	48
Modus	56
Standard Deviasi	6,6
Minimum	37
Maksimum	60
After Model application	
Mean	77,52
Median	78
Modus	80
Standard Deviasi	4,23
Minimum	68
Maksimum	84

Based on Table 1. It can be defined as the initial ability (pretest) and the final ability (postest) which can be a significant amount of difference and there is an increase in the ability of children to understand disaster mitigation materials. It can be depicted in the graphic form in figure 1.

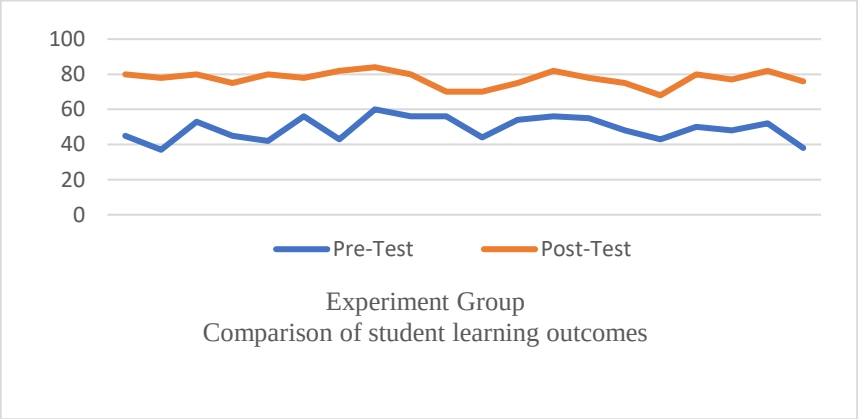

Figure 1. The distribution of student scores in the experimental class

Class III A is used as an experimental class. In learning in this experimental class using the UBD learning model with Pop-Up Book media. The teacher explained the material about the disaster that occurred in Indonesia with a Pop-Up Book media after which the students paid attention to what was conveyed by the teacher. The use of Pop Up Book media by compiling learning with the Understanding by Design model attracts students' learning interest. Students gain knowledge through visuals. With this UBD learner, it makes it easier for teachers to explain materials about disasters. In table 1. descriptive statistics obtained information that learning by applying the UBD learning model with Pop-Up Book media has a higher score than before applying the UBD learning model with Pop-Up Book media. The average score of students before applying the UBD learning model with Pop-Up Book media was only 53.09, while after learning to apply the UBD learning model with Pop-Up Book media, the average score of students was 66.85, meaning that there was a descriptive improvement.

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3.2. Data of Student Grades in Control Class

The implementation of this study consists of several stages, namely the pretest stage and closed with the posttest stage without any special treatment.

Table 2. Descriptive Statistical Data of Student Grades in Control Class

Statistic	Score
Pretest	
Mean	50,8
Median	52
Modus	44
Standard Deviasi	8,94
Minimum	36
Maksimum	64
Posttest	
Mean	49
Median	52
Modus	40
Standard Deviasi	7,52
Minimum	40
Maksimum	60

Based on Table 3. It can be defined the initial capability (pretest) and the final capability (postest) which can be the number of unstable differences between the initial ability and the final ability of in to understand the disaster mitigation material. It can be depicted in figure 2.

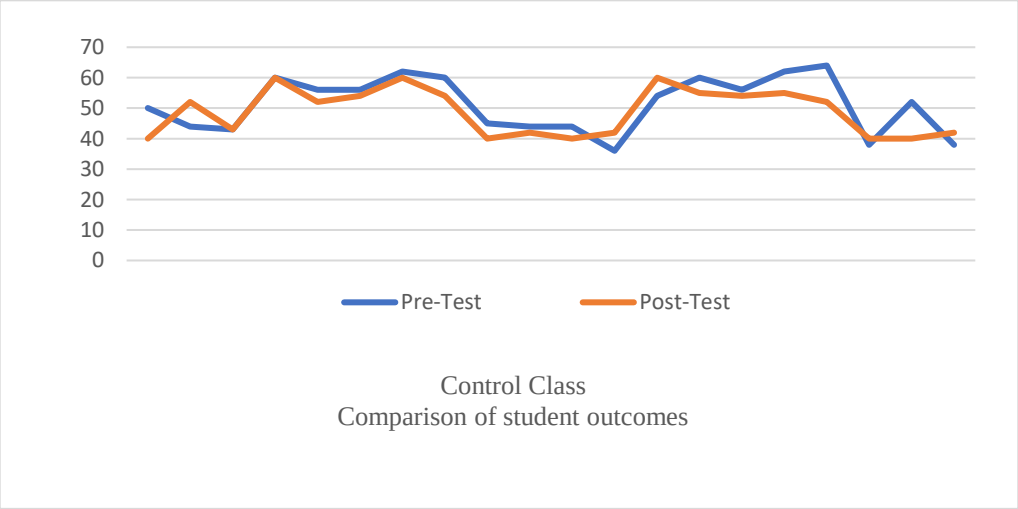

Figure 2. The distribution of students' grades in a control class

3.3. Data Test t Posttest

After the students in the control class and experimental class have carried out the posttest. The posttest was used to determine whether there were differences in student learning results in disaster literacy activities in grade III at SD N Percobaan Padang, West Sumatra between the experimental class and the control class after being given treatment.

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Table 3. Test t Posttest Data

Class	Mean	N	dk	T_{count}	T_{table}	Sig (2-tailed)	Information
Experiment	77,5	21	40	15,128	1,303	0,000	there are differences
Control	49	21					

Based on table 3. Described with confidence level= 95% or (α) = 0,05 the number of respondents for the experimental class was 31 people and the number of respondents for the control class was 31 people, so it was ttabel= 1,303. From the above data, it can be known that t_{hitung}= 15,128. So $t_{count} > t\ t_{table}$ that is 15,128>1,303 and the significance value obtained that is 0,007<0,05, then it was concluded that H_o was rejected and H_a was accepted, which means that there are differences in student learning outcomes in grade III disaster literacy at SD N Percobaan Padang, West Sumatra. In the calculation results, the average data of the experimental class value was 77.5 higher than the average score in the control class, which was 49. This shows that the provision of treatment in experimental classes using the UBD learning model with Pop-Up Book media is effective in improving disaster literacy skills in grade III students.

3.4. Result from analysis class experiment

Based on the outcomes of the analysis, it can be deduced that descriptively there are differences in student scores between the control class and the experimental class in this study. The results of the descriptive analysis show that using the UBD learning model with Pop-Up Book media is effective in improving disaster literacy and student learning outcomes. The improvement can be seen directly from the increase in student scores after the practices of the UBD learning model with Pop-Up Book media. After proving the effectiveness of the UBD learning model with Pop-Up Book media, the next thing that needs to be evident is the effectiveness of the UBD learning model with inferential Pop-Up Book media. This is done to prove the significance of the UBD learning model with Pop-Up Book media towards increasing student disaster literacy.

Table 4. Experimental Class Data Normality Test Results

Group	Value Sig KS	*α*	Conclusion
Before UbD	0.085	0,05	Normal distribution
After UbD	0.261	0,05	Normal distribution

From the results presented in table 4, the following presents the test outcomes obtained information, which in the data group before the practices of the UBD learning model with Pop-Up Book media, the sig Kolmogorov Smirnov coefficient is 0.2 and the coefficient is better than the significance level of 0.05 so that the data for the norm group is distributed. In the data group after the practices of the UBD learning model with Pop-Up Book media, the coefficient Kolmogorov Smirnov is 0.2 and this coefficient is more than the significance of 0.05 after that the data for the group can be declared normally distributed.

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After obtaining the results of the Kolmogorov-s Smirnov k test that has been described in the presentation, another piece of information relevant to the normality of the data in the two groups of variables is the presentation in the shape of a normality graph. The data in the normality graph seeks to observe the outstanding data against a straight-line graph derived from the z-score. This data normality test graph shows in Figure 3.

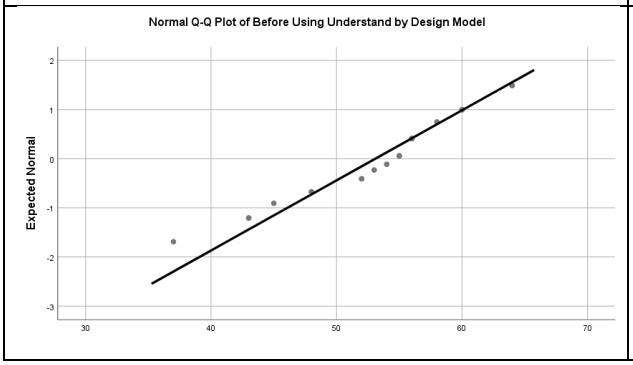
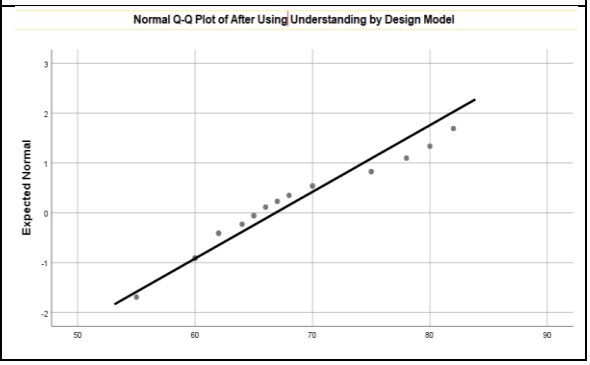
Normality Graph Q-Q Plot Before UBD Model	Normality Graph Q-Q Plot Afyer UBD Model
	

Figure 3. Graph of the normality of both data groups

Based on figure 3, information was obtained that there is a straight line derived from the z-score surrounded by data distribution for both groups of data, both data before the implementation of the UBD learning model using Pop-Up Book media and data after the implementation of the UBD learning model using Pop-Up Book media. This shows that the data in both data groups are declared normally distributed.

After descriptively proving the effectiveness of improving student disaster literacy, the next thing to do is to test and prove the effectiveness of using the UBD learning model with Pop-Up Book media inferentially. This verification aims to compare two groups of data using t-tests related to that in this study there is one hypothesis that was tested, namely the effectiveness of the UBD learning model with Pop-Up Book media to improve student disaster literacy. If it is presented in the form of a statistical hypothesis, then the statistics tested in this study are $H_0 : \mu 1 \geq \mu 2$ dan $H_1 : \mu 1 < \mu 2$.

The statistical hypothesis of this study shows that H0 means that there is no change in the UBD learning model with Pop-Up Book media on student disaster literacy, while H1 means that there is a change in UBD's learning model with Pop-Up Book media on students' disaster literacy ability. Test the research hypothesis requires inferential statistical analysis (t-test). The hypothesis testing criterion is to reject H0 if P-Value < 0,05 and the contrary. The results of the inferential statistical analysis with the t-test showed that the value of the coefficient t was 19.252 with df 20 and a score of p 0,00. The coefficient shows p-value<y= 0,05. Thus, it can be concluded that the test rejects H 0 or accepts H1. This shows that there is a significant influence of UBD's learning model with Pop-Up Book media on increasing student disaster literacy.

The research was conducted on grade I students at SD N Percobaan Padang West Sumatra to improve disaster literacy skills by using a Pop-Up Book media for tsunami disaster mitigation. Based on the results of research conducted in two different classes, namely the control class and the experiment class. There is a visible difference in student learning outcomes. In addition, other differences can be seen in the learning process as well where in the control class students are seen as not enjoying learning while in the experimental class, the students seem to enjoy learning more because they use Pop-Up Book media. Based on the results of research that has a big influence on learning in the classroom is learning planning so in this study there are differences that are influenced by conventional learning planning in the control class while learning planning is understanding by design which is one of the suitable learning models in an independent curriculum that has characteristics in favour of students. The above opinions are in line with the research (Rahayu et al., 2021; Vhalery et al., 2022) that in the independent curriculum, all learning activities are in favour of students, in addition to active and meaningful learning makes one of the characteristics of the "Kurikulum Merdeka".

The findings of this study show that students' disaster literacy will increase and be even better if they apply the UBD learning model with Pop-Up Book media. This is supported by the view (Supriyadi et al., 2019) and (Febrianto & Irawan, 2021) that the UBD learning model has a real advantage in its learning path, the first step is to identify the desired results, in this case, is the first step to provide formative assessments carried out by the teacher to know and help determine the focus of learning by providing lighter questions so that students can improve their thinking skills. The second step is the finding of evidence of the assessment in this case the teacher wants to prove that the student has succeeded in achieving the desired one. Proving that students are asked to do a test in groups is useful to help them analyze and compare learning topics to measure students understanding. The final stage is to plan to learn; After the teacher identifies and analyzes the level of understanding of the learners, the teacher plans the learning by structuring the learning until it becomes effective.

The findings of this study are in the same direction as the study (Mahadzir, 2013) and (Hasanudin et al., 2021) which shows that learners' disaster literacy increases from the enthusiastic response of learners in learning activities when using media designed by teachers that adapt to the three syntactic previously described. The response from students that they are happy when reading Pop-Up Book media, students become easy to understand learning materials through Pop-Up Book media. Furthermore, this study produced findings that are in line with the research (Soleha et al., 2022), (Pambudi, 2019), and (Hasanudin et al., 2021) that Pop-Up Book media is very helpful for teachers in delivering material and making learning easy and meaningful.

4. CONCLUSION

There is a significant improvement in the learning model of the UBD learning model using Pop-Up Book media on disaster literacy skills. Therefore, the practices of this model can improve disaster literacy skills in the readiness of students who respond to disasters in elementary schools. This is evidenced by an improvement in student learning result scores after applying this learning model. The findings of this study proved that the UBD learning model using Pop-Up Book media is effectively applied to improving disaster literacy skills in the classroom and it recommend to teachers apply the UBD learning model using Pop-Up Book media. This is evidenced by the cheerful response of students and their enjoying learning activities. In addition, applying the UBD learning model supports teachers in preparing learning media by paying attention to the characteristics of students, and classroom management procedures to provide support and great positive things for the application of the UBD learning model in disaster literacy activities to the maximum.

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