

Enhancing Students' Disaster Knowledge with BPBD Socialization Programs and Innovative Essay Writing Projects at SMAN 4 Semarang

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Abstract

This study aims to enhance students' disaster knowledge through a BPBD socialization program and disaster research activities by writing innovative scientific essays. The novelty of this study lies in using project-based learning through disaster-themed essay writing, which involves socialization and engages students in a practical learning project. The research subjects were class XI Socrates 1 students at SMAN 4 Semarang. This research employed a quantitative method with a pre-experimental one-group pretest-posttest design. The activity stages included disaster preparedness socialization, scientific essay workshop, essay writing assistance, and evaluation through an essay presentation and post-test assessment. Data were collected using test instruments and essay assessment sheets in a Likert scale, then analyzed using descriptive percentages, N-Gain scores, and the Wilcoxon Signed-Rank Test. The results showed a 24% increase in students' disaster knowledge after participating in the program. The N-Gain score reached 60%, which suggests that the program implementation was moderately effective in improving students' knowledge. Furthermore, the Wilcoxon test results showed a significant p-value of less than 0.05, indicating a significant difference in students' learning outcomes before and after participating in the program. These findings conclude that integrating BPBD disaster preparedness outreach programs and disaster research into Geography education effectively enhances students' disaster knowledge.

Keywords: disaster education, disaster knowledge, socialization

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1. Introduction

Implementation of disaster education in high school education units has been included in the Geography subject. For example, in grade X, material on disaster literacy can be mixed in the chapters on Maps, Lithosphere, Hydrosphere, and others, or in grade XI, which has its own chapter, namely the Disaster chapter. Integrating disaster material in geography subjects is very appropriate, considering that geography emphasizes a deeper understanding of the geographical factors of disasters, such as location, topography, and human interaction with the environment (Gustavo & Rakuasa, 2023). In addition, disaster education in Geography encourages students to think critically and analytically and provide solutions to natural phenomena that can potentially cause disasters. This implementation aligns with a contextual learning approach where students are invited to understand disaster theory and its mitigation and can familiarize themselves with real conditions in the area where they live (Syafitri et al., 2023). Thus, students can build awareness and responsibility as a young generation responsive to potential disasters and active in disaster mitigation efforts from an early age (Nurhayati et al., 2022).

Implementing disaster education in geography subjects in the Kurikulum Merdeka allows teachers to provide students with variations in learning styles, models, or learning approaches. For example, efforts to improve students' disaster preparedness through the application of WebGIS technology with the SETS (Science, Environment, Technology, Society) learning model, the application of Augmented Reality (AR)-based learning media, the application of socialization to students, and many more (Septiana et al., 2024; Fuedsi et al., 2024; Ayu et al., 2021). However, there are still challenges and obstacles to the implementation of disaster education in the learning process, such as the lack of disaster learning that directs students in the process of solving real problems, low variation in the application of disaster learning media, minimal teacher literacy in compiling teaching materials, and the lack of disaster socialization by related institutions (Manek, 2023; Oktaria et al., 2023; Kurniawan et al., 2024). To overcome these challenges, it is necessary to strengthen and synergize efforts between schools, teachers, local governments, and related institutions to create more holistic, contextual, and sustainable disaster education learning in the school environment. In addition, the application of innovative learning approaches and models is also needed so that the transfer of knowledge related to disasters can be carried out optimally. Therefore, this study aims to apply disaster learning materials through the socialization of the BPBD program and disaster research in innovative student essay designs. This is done so that students feel the atmosphere of learning new disaster materials and do not get bored easily.

Disaster mitigation knowledge improvement activities through disaster socialization and research programs are implemented at SMAN 4 Semarang, with the main target of grade XI students. Based on the results of teacher interviews, disaster education was applied to geography in the disaster chapter. The learning approach is still in the form of lectures, so sometimes students feel bored. In addition, the assignments given to students generally involve preparing disaster poster projects in groups. On the other hand, the school has never held a disaster socialization organized by related institutions such as BPBD (Badan Penanggulangan Bencana Daerah). The characteristics of students at SMAN 4 Semarang City come from all over Semarang City, which has

experienced disasters such as floods that occur in their environment. This is also supported by the history of disasters around the school environment, Banyumanik District, where landslides occurred in Gedawang Village and Pudak Payung Village, as well as floods that occurred in several villages in Banyumanik District, surrounding districts, and areas outside the district. From the interviews and observations, disaster preparedness efforts are needed for students to increase disaster knowledge and mitigation through a more educational and innovative approach.

The novelty of this study is based on several findings obtained from a literature review, where many still implement disaster socialization programs in qualitative and quantitative research, which only measure the success of implementing a socialization program and not its effectiveness in increasing disaster knowledge in students. Therefore, this study aims to try a different approach, assessing the effectiveness of the BPBD socialization program in increasing disaster knowledge in students. In addition, this research also integrates with disaster research-based learning, where students are given directions to compile innovative essays related to disaster problem-solving in their surrounding environment and present them to the class. This program is expected to encourage students to study disaster phenomena themselves and solutions to problems in their respective areas, creating a collective awareness of the importance of disaster mitigation and preparedness.

2. Method

This study uses a quantitative research method using a pre-experimental design, specifically a one-group pretest-posttest design. This design involves one group receiving treatment or intervention without using a control group (Adil et al., 2023). In this design, participants are given a pretest before the intervention and a posttest afterward to measure changes in knowledge or performance. The interventions used in this study were BPBD socialization activities and student projects to create innovative essays. The scheme of the one-group pretest-posttest design can be seen in the following table.

Table 1. One group pretest-posttest design scheme

Pretest	Treatment	Posttest
T1	X	T2

Description:

T1: Students' knowledge before being given treatment.

X: Treatment (socialization program and innovative essay writing).

T2: Students' knowledge after being given treatment.

The location of this research was conducted at SMAN 4 Semarang located at Jl. Kr. Rejo Raya No.12A, Srandol Wetan, Banyumanik District, Semarang City. The population used in this study were all students in class XI at SMAN 4 Semarang, totaling 396 students. From this population, the sample used was class XI Socrates 1, consisting of 36 students, which was selected using a purposive sampling technique considering that the class was a social science class. The implementation of research activities lasted for four weeks, with four meetings (disaster socialization program, essay workshops, mentoring, and final presentations). The delivery methods in this study combined contextual learning through BPBD socialization, interactive lectures in essay workshops, mentoring during the essay writing process, and scientific discussion in the final

presentation.

The stages of research used included four stages: (1) interview with the teacher, (2) implementation of pretest assessment activities and disaster socialization, (3) essay writing workshops, (4) the writing stage of student essays, and (5) the evaluation stage, which is the final presentation and posttest assessment. The flow diagram of the research used can be seen in the following image

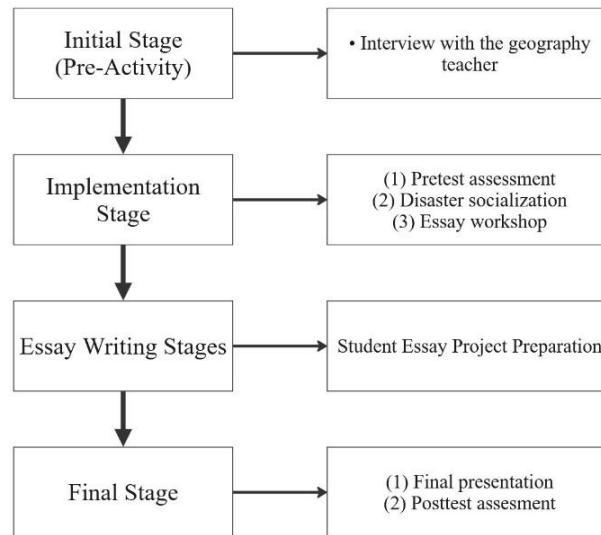


Figure 1. Research flowchart

This study collected data from interview results, test instruments, student essay assessment questionnaires, and documentation. The variables used were the Semarang City BPBD socialization program and essay writing projects as independent variables and students' disaster knowledge as dependent variables. The independent variable has two indicators, which is essay and presentation assessment indicators. Both indicators can be seen in the following table.

Table 2. Essay Assesment Indicators

No	Aspect	Indicators
1	Essay Contents	Interesting topics/ideas, systematics, explanations accompanied by data and facts, explicit, concise, and comprehensive.
2	Writing Styles	Procedures for writing according to PUEBI, writing citations and bibliographies, using effective sentences, using appropriate diction, and using format according to the guidelines.
3	Essay Compositions	Fair distribution of tasks, group activity in preparing work, and collaboration.

Table 3. Essay Presentation Assesment Indicators

No	Aspect	Indicators
1	Group discussions	Provide meaningful questions and be active in asking questions.
2	Punctuality	The presentation time is appropriate and precise.

3	Presentation display	Attractive, accompanied by images or illustrations, emphasizing the points displayed, and does not display many sentences.
4	Collaboration	Cooperation in answering questions, division of tasks during presentations, all members are involved in answering questions.
5	Presentation style	Intonation, gestures, communication style, straightforwardness, and speaking to the point.

All data from both aspects are assessed using a Likert scale with a score range of 1 to 5, indicating the student achievement level of the assessed indicators. A score of 1 indicates an very poor category, 2 means poor, 3 means sufficient, 4 means good, and 5 means excellent. The results of the assessment of the two indicators are then analyzed using descriptive percentage analysis to determine the level of achievement of the indicators by students. The results of this analysis provide an objective picture of the quality of essay work and presentation by students. The formula for assessing the indicators can be seen in the following equation (Elviana & Julianto, 2022).

$$\text{Percentage (\%)} = \frac{\text{Score Obtained}}{\text{Overall Score}} * 100\% \quad (1)$$

Once the descriptive percentage value is known, the next step is to group it into the five categories.

Table 4. Student Essay Assessment Criteria

Percentage Score	Result
0-20%	Very Poor
21-40%	Poor
41-60%	Moderate
61-80%	Good
81-100%	Very Good

The variable indicators of enhancing student knowledge are obtained from the results of the pretest and post-test assessments. The test questions given to students contain general disaster material, including the definition of disasters, types and causes of disasters, and disaster mitigation. Before being analyzed, the instrument items in the pretest and posttest were tested for validity and reliability. The test results showed that 3 out of 10 questions were declared invalid, so they must be revised. The results of the reliability test showed a value of 0.547, which means it has moderate reliability, so it needs to be improved again. Therefore, the final number of valid test questions used in this study was seven.

After the pretest and posttest data were obtained, the data were then analyzed using the N-gain score and the Wilcoxon non-parametric test. The N-gain score analysis measures changes in student understanding before and after the learning intervention. The formula for calculating the N-gain score analysis can be seen as follows (Sukarelawan et al., 2024).

$$g = \frac{\text{posttest} - \text{pretest}}{\text{maximum score} - \text{posttest}} \quad (2)$$

The higher the N-gain score, the more it indicates increased student understanding

on the subjects. To find the level of increase in understanding, the N-gain score is grouped into four classes based on Sukarelawan et al. (2024).

Table 5. N-Gain Classification

N-Gain Score	Interpretation
< 40	Ineffective
40-55	Less Effective
56-75	Quite Effective
> 76	Very Effective

To test the research hypothesis, which is that the disaster socialization programs and essay writing projects effectively increase students' disaster knowledge significantly, it is necessary to conduct a Wilcoxon signed rank test to determine the significance of the differences in paired data. The Wilcoxon test was used in this study because the posttest assessment results were not normally distributed, so parametric tests such as the t-paired sample test could not be carried out. Therefore, a non-parametric statistical test such as the Wilcoxon signed rank test is needed because it does not require the assumption of normally distributed data (Rizki et al., 2023). The Wilcoxon test calculation analysis was carried out using SPSS software, with the following interpretation

- a) H_a = There is a significant difference in students' knowledge after participating in the program.
- b) H_0 = There is no significant difference in students' knowledge after participating in the program.
- c) If Sig. < 0.05, then it is significant (H_a is accepted, H_0 is rejected)
- d) If Sig. > 0.05, then it is not significant (H_a is rejected, H_0 is accepted)

3. Result and Discussion

A. Implementation of BPBD Socialization Program and Innovative Essay Writing Projects

The disaster socialization phase and scientific essay writing workshop occurred on May 6 and 7, 2024. Before the disaster socialization activity, students were given an initial disaster knowledge assessment as a pretest. After that, the disaster socialization activity was held by inviting speakers from the Semarang City Regional Disaster Management Agency (BPBD). In this socialization activity, the speakers from BPBD explained the disaster conditions that occurred in Semarang City a few days ago, namely the flood disaster. BPBD also explained the areas affected by the flood disaster and the losses caused. Related to disaster mitigation, BPBD explained to students about several disaster management and mitigation efforts that can be carried out, such as identifying urgent needs, evacuating affected residents, establishing evacuation posts, evacuation routes, and others. In addition, BPBD speakers also provided stimulus questions and case studies, which were then answered and responded to by students based on their knowledge and experience. Observations of the socialization activities revealed that the speakers' presentations were delivered contextually to students, thus relating them to their

own experiences. This was supported by students asking the speakers about their experiences during flooding in their neighborhoods. The socialization program conducted by the Regional Disaster Management Agency (BPBD) provided one-way information and involved students in simulations, discussions, and field practice, providing them with hands-on experience in dealing with emergency situations (Setyawan et al., 2024).



Figure 2. Disaster Socialization Activities by BPBD Kota Semarang
(Source: Documentation Activity, 2024)

The next activity was a workshop on writing scientific essays. In this activity, the speakers explained the types of scientific papers, the systematics of writing scientific papers, techniques for writing scientific papers, and the benefits of scientific writing. Based on observations, the material prepared by the speakers was delivered through two-way communication, providing space for discussion, questions, and answers for students. This interaction created an interactive atmosphere so students more easily understood the material presented (Taufiqurrahman et al., 2024).



Figure 3. Essay Writing Workshop Activities
(Source: Documentation Activity, 2024)

After completing the essay writing workshop, the next step was to give students an assignment to write an innovative essay. In this assignment, students were divided into six groups with different sub-themes: technology, education, physical geography, socio-economics, local wisdom, and disaster mitigation. All sub-themes directed students to create innovative essays according to their respective themes and related to the geography subject. In compiling this essay, the researcher applied the Project-Based Learning stages to students with an allocation of one week for completion.

The next stage is the preparation of students' essays. At this stage, each group is assigned a student mentor. The mentor provides intensive guidance throughout the scientific essay preparation process. Guidance is provided from the topic formulation, data collection, and final draft preparation. The mentors act as facilitators who help students develop logical arguments, use relevant references, and adapt their writing to applicable guidelines. In addition, in this stage also covers technical aspects such as writing structure, appropriate language usage rules, and good presentation methods. This stage of activities is carried out for one week from May 7-13, 2024 both online and offline. With this mentoring activity, the students not only produce quality scientific papers, but also experience the learning process in writing scientific papers and improve their cooperative and collaborative attitudes in writing scientific essays.



Figure 4. Student essay writing activities
(Source: Documentation Activity, 2024)

The final stage of this program was an evaluation activity in the form of an essay seminar and a post-test assessment, which took place on May 14, 2024. This seminar aimed to have students present their essays in front of the class. Each group presented their innovative work from the essays they had chosen and the solutions or recommendations they had formulated. During the seminar, other students were allowed to provide feedback and ask questions related to the essays presented. Based on observations, the seminar successfully created a discussion atmosphere among students, with many students asking questions about the essays written by other groups. The mentors also posed discussion-provoking questions related to their essays to students. During this seminar, the mentors of each group assessed the essays they had written and the students' presentation styles. After the seminar, the next stage was a post-test assessment to measure the increase in students' knowledge after intervention through the BPBD socialization program and the writing of scientific essays.



Figure 5. Student essay presentation activities
(Source: Documentation Activity, 2024)

B. Pretest and Posttest Assessment Result

The effectiveness of the BPBD socialization program and the development of innovative essay projects were measured by the increase in students' disaster knowledge after participating in the program. Students' disaster knowledge levels were measured using pretest and posttest questions, with the following results:

Table 6. Student Knowledge Based on Pretest and Posttest Scores.

Result	Pretest	Posttest
Maximum Score	100	100
Minimum Score	29	57
Standard Deviation	22,28	11,14
Average	74	92
Improvement (%)		24%
N-Gain Scores		60%

Table 6 shows increased student knowledge after participating in the disaster socialization and innovative essay writing programs. The average student score increased from 74 in the pretest to 92 in the posttest. This indicates increased student understanding of the material after the learning process. Furthermore, the minimum score in the pretest was 29, while it increased to 57 in the posttest, indicating that even students with the lowest scores experienced progress. The standard deviation in the posttest was lower than in the pretest, indicating that the distribution of student scores was more even and less varied, indicating better uniformity of learning outcomes. There was an increase in student disaster knowledge, measured by an average of 24%. Meanwhile, the N-Gain score was 60%, indicating that the disaster outreach program and essay writing project were quite effective in increasing student knowledge of disasters.

Table 7. Wilcoxon Signed Rank Test Results

	N	Mean Rank	Sum of Ranks
POSTTEST - PRETEST	Negative Ranks	0a	0,00
	Positive Ranks	18b	9,50
	Ties	10c	
	Total	28	
Z	-3.770		
Asymp. Sig. (2-tailed)	0,000		
a. POSTEST < PRETEST			
b. POSTEST > PRETEST			
c. POSTEST = PRETEST			

Based on Table 7, the results of the Wilcoxon signed rank test show that out of a total of 28 students, there were 18 students (64%) who experienced an increase in grades after treatment (positive ranks), 10 participants (36%) who showed the same pretest and posttest scores (ties), and no participants experienced a decrease in grades (negative ranks = 0). Furthermore, the Wilcoxon test produced a Z statistic value of -3.770 with a significance value (Asymp. Sig. 2-tailed) of 0.000. This value indicates that the H_a Hypothesis can be accepted, there is a significant difference in student knowledge after participating in the program. The negative sign on the Z value indicates that the posttest score is higher than the pretest, which means that the learning provided has a positive impact on improving student learning outcomes. Thus, the disaster socialization program

and essay writing project can be said to be effective in increasing student knowledge about disasters.

This finding aligns with research by Hasan et al. (2025), which states that outreach programs effectively increase students' knowledge of disaster literacy. Outreach programs are beneficial in increasing student productivity in both knowledge and skills (Maisog, 2023). Disaster outreach programs employ active communication strategies to help students understand disaster phenomena effectively (Nabila et al., 2024). This increase in knowledge following disaster outreach can be attributed to students' enthusiasm for experiencing a new learning environment (Qodir et al., 2023). By inviting BPBD (Regional Disaster Management Agency) representatives as resource persons, students can ask experts about natural disasters, their impacts, and the disaster management process.

The implementation of disaster outreach activities in social science subjects, specifically geography, aligns with the findings of Fajar et al. (2022), which found a positive correlation or relationship between social science learning and outreach activities. This occurs because social sciences, such as geography, implement contextual learning. Contextual learning is an approach based on the need to understand through context, encompassing everyday life situations experienced by students (Aydin-Ceran, 2021). The application of contextual learning in disaster education aims to introduce students to disaster phenomena and their mitigation. Contextual learning in disaster material can increase student engagement and motivation, thus contributing to optimal conceptual understanding (Pujani et al., 2025).

Disaster socialization activity utilize visual-based media such as hazard maps, images, infographics, and videos. This presentation aims to strengthen students' understanding of the material. The use of learning media in disaster socialization aligns with the findings of Hastuti & Arisanty (2023), who found that the use of learning media has a positive impact on improving the quality of the teaching and learning process in the classroom. The use of visual media, such as disaster infographics, helps students better understand the concepts of the material or information presented (Arisyanto et al., 2025). Furthermore, Ali et al. (2024) stated that the advantages of visual media in the learning process are that they clarify abstract information and make it more concrete, and increase students' interest and motivation.

C. Students' Essay Assessment Result

Assessment of students' essays was based on three main aspects: content, writing styles, and the essay composition. Based on the assessment results, most groups demonstrated excellent quality in the substance aspect. The topics raised were highly innovative and relevant to disaster issues occurring in the students' environment, such as floods, volcanic eruptions, and landslides. The ideas developed were deemed interesting, systematic, and supported by data and facts. In terms of essay writing, the majority of groups met the scientific writing standards by the General Guidelines for Indonesian Spelling (PUEBI). Citations and bibliographies were appropriate, and diction and effective sentences were also considered good. However, several shortcomings were still found, such as variations in scientific terms in the content of the work. In terms of the writing process, all groups demonstrated good cooperation. The division of tasks within the groups was equitable, and individual activeness in discussions and writing the manuscript was evident in the results of mentor reflections and documentation of the

group work process. This writing process provided added value because it demonstrated that students not only understood the material but were also able to work together as a group to produce essays.

Table 8. Overall Student Essay Assesment Result

Group	Essay Title	Scores			Result
		Essay	Presentation	Average	
Group 1 Technology	Landslide Monitoring and Early Detection System using Arduino Uno and MPU-6050 Sensor in Semarang City	86,67	88	87,3	Very Good
Group 2 Physical Geography	Examining the Form, Process, and Material of Mount Semeru Eruption and Disaster Management in Affected Areas	93,33	88	90,67	Very Good
Group 3 Socio-Economic	Business Diversification: A Form of Community Economic Preparedness in Facing Flood Disasters in Semarang City	86,67	88	87,3	Very Good
Group 4 Disaster Mitigation	The Urgency of Establishing Mitigation Strategies to Reduce the Potential for Flood Disasters in Semarang City	93,33	92	92,67	Very Good
Group 5 Education	POSDARNA: A Podcast-Based Flood Mitigation and Response Training Program as an Effort to Achieve Disaster Awareness Among Students	86,67	92	89,33	Very Good
Group 6 Local Wisdom	Muvendra: An Alternative Media Community Innovation to Increase Public Awareness and Knowledge in the Globalization Era as an Effort to Mitigate Flood Disasters	93,33	92	92,67	Very Good

Essay presentations were assessed based on five aspects: group discussion, punctuality, PPT design, group collaboration, and presentation style. The activeness and

cooperation of group members were evident in the way students divided roles during the presentation and in answering questions from other groups. The group discussions proceeded smoothly, indicating that students understood the substance of their essays. In terms of PPT presentation design, most groups presented material with attractive, concise, and easy-to-understand designs. Punctuality was also well maintained by almost all groups, indicating good time management. Presentation styles varied from formal to semi-formal. Overall, the presentation assessment results demonstrated excellent performance, indicating that this activity enhanced disaster knowledge and honed scientific communication skills, logical argumentation, student collaboration and participation, and confidence in presenting ideas in front of the class. The essay and presentation assessments demonstrated that each group had prepared and presented their essays well. This was evident from the assessments by the mentors, which showed excellent criteria across all groups. The results of these assessments are presented in the following table.

Table 9. Student Essay Assessment Result

Aspect/Indicators	Scores					
	Group 1	Group 2	Group 3	Group 4	Group 5	Group 6
A. Essay Assessment						
1. Essay Contents	5	4	4	4	5	5
2. Writing Styles	5	5	5	5	4	4
3. Essay Compositions	3	5	4	5	4	5
B. Essay Presentations						
1. Group Discussions	5	5	5	5	5	5
2. Punctuality	5	5	5	5	5	5
3. Presentation Display	5	5	5	4	5	4
4. Collaboration	4	4	4	5	4	4
5. Presentation Style	3	3	3	4	4	5
Information: 1 = Very poor, 2 = Poor, 3 = Sufficient, 4 = Good, 5 = Excellent						

The student essay writing project is carried out entirely using a project-based learning (PjBL) approach. This approach is used so that students can actively engage in the process of solving real problems (Khanza & Nursaid, 2025). In disaster education, the PjBL approach is essential to implement, considering that students, as the next generation, need to have problem-solving skills. According to Arakawa et al. (2023), the application of project-based learning in disaster education has a positive impact in the form of increased awareness and knowledge of students regarding natural disasters. In addition, project-based learning also impacts increasing students' knowledge of natural disasters (Peny et al., 2022).

Project-based learning in essay writing has been widely used in the learning process because it can improve students' critical thinking skills regarding real-life problems (Siman, 2023). In this study, essays written by students were used as assignments so that students could express their ideas or concepts in solving disaster-related problems innovatively and creatively. The essays written by students were divided into six sub-themes representing scientific fields related to disasters. The application of this essay work in disaster education is in line with the concept of Integrated Learning according to Fajar et al. (2022) where combining several different fields of study will provide meaningful experiences for students, making it easier to understand through

direct observation and relating them to the scientific fields being studied.

Overall, the findings indicate that disaster knowledge can be enhanced through BPBD socialization programs combined with innovative essay writing projects. Students demonstrated improved understanding and critical thinking about disaster issues. However, this study has several limitations. First, the research was conducted on a relatively small sample (36 students) in one class, so the findings cannot be generalized to all students at SMAN 4 Semarang or other schools. Second, the test assessment instruments used to measure disaster knowledge had moderate reliability, which may influence the accuracy of the results. Third, the intervention activities were limited in duration, so the long-term impact of the program on students' disaster literacy could not be evaluated. Therefore, future studies with larger and more diverse samples, robust instruments, and extended implementation durations are recommended to strengthen and validate these findings.

4. Conclusion

This study shows that a disaster awareness program involving the Regional Disaster Management Agency (BPBD) and the development of disaster innovation essays significantly improved disaster knowledge among eleventh-grade students at SMAN 4 Semarang. This is evident in the 24% increase in average scores from pretest to posttest, with an N-Gain score of 60%, which is considered quite effective. Furthermore, the Wilcoxon Signed-Rank test results showed a significant improvement in student learning outcomes after participating in the program. In addition to improving learning outcomes, the program also encouraged students to think critically, creatively, and care about disaster issues through the essays they produced. The essays contained students' ideas related to disaster problem-solving solutions. Therefore, this activity increased student knowledge and fostered social awareness and sensitivity regarding the importance of disaster literacy from an early age.

This research is expected to serve as a reference in designing contextual disaster education programs that directly impact students' disaster literacy. Students gain disaster knowledge by integrating outreach programs by relevant institutions and innovative essay writing projects. They are encouraged to think critically, creatively, and reflectively about environmental disaster issues. In practice, schools and BPBD are advised to sustain the program by integrating disaster education with learning approaches that emphasize students' understanding, such as essay writing projects that foster critical thinking and awareness of disaster issues. Future research is recommended to utilize interactive media for delivering outreach materials and integrate them with innovative learning approaches.

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