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Preparedness and Proficiency Level of Learners in Disaster-Related Contents in Science

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Abstract:
The Philippines is among the most disaster-prone countries globally, frequently experiencing typhoons, earthquakes, floods, and volcanic eruptions. These recurring hazards disrupt education and community stability, underscoring the need for schools to integrate disaster risk reduction into the curriculum. This study examined the relationship between disaster preparedness and proficiency in disaster-related content among Grade 8 learners in Science. A descriptive-correlational design was employed, involving 206 Grade 8 learners from a public secondary school in Central Philippines during the Academic Year 2025–2026. Disaster preparedness was measured using a researcher-made test, while proficiency was assessed through disaster-related items in the Quarter 3 examination. Findings revealed that learners demonstrated high disaster preparedness overall, with female students and those from economically stable families showing stronger readiness. Proficiency in disaster-related content was satisfactory, with minimal gender differences but significant disparities across socioeconomic groups. Preparedness differed significantly by sex but not by socioeconomic status, while proficiency showed the opposite pattern. A moderate positive correlation was found between preparedness and proficiency, indicating that knowledge and readiness reinforce each other. The study concludes that disaster education initiatives are effective but require continuous reinforcement. Inclusive strategies, participatory simulations, and equitable access to resources are recommended to strengthen both preparedness and scientific proficiency. These findings highlight the importance of integrating practical disaster learning experiences into the curriculum to foster resilience among learners.

Keywords: Science Education, Preparedness, Disaster-Related Contents, Central Philippines

1. Introduction

The Philippines has been consistently identified as one of the most disaster-prone countries in the world, frequently experiencing calamities such as earthquakes, typhoons, floods, and volcanic eruptions. These recurring events not only threaten lives and property but also disrupt education and community stability. In response, schools are called upon to play a proactive role by systematically integrating disaster-risk education into the curriculum (Dela Cruz & Ormilla, 2022). Embedding such knowledge and skills within formal learning ensures that students are not only academically prepared but also resilient,

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capable of reducing vulnerability, and equipped to respond effectively to emergencies. This curricular integration is therefore essential in fostering a culture of safety and preparedness among the youth, who represent the most vulnerable yet most critical sector in building community resilience.

A disaster is a serious disruption in the functioning of a community or society, arising when hazardous events interact with conditions of exposure, vulnerability, and limited capacity. Such disruptions often result in significant human, material, economic, and environmental losses. Globally, disasters ranging from earthquakes and storms to floods and droughts claim thousands of lives each year (Wyss et al., 2023). In the Philippines, natural calamities such as typhoons, earthquakes, and other hazards have repeatedly damaged homes, displaced families, and devastated communities, leaving lasting impacts on both lives and livelihoods (Santos, 2021).

The Philippines is one of the most disaster-prone countries in the world, positioned along the "typhoon belt" and within the Pacific Ring of Fire, making it highly vulnerable to several catastrophic events, including earthquakes, and typhoons (Lu, 2024). Tropical cyclones or typhoons are one of the most destructive hydrometeorological hazards to which the Philippines is vulnerable, along with heavy rainfall, droughts, and floods, which are responsible for loss of lives and damage to the country's economy (Basconcillo & Bangquiao, 2025). At the same time, seismic hazards pose a persistent threat, as the country's location along active fault lines exposes communities to frequent earthquakes that can cause widespread destruction. According to the Philippine Atmospheric, Geophysical, and Astronomical Services Administration (PAGASA), an average of 20 tropical storms enter the Philippine Area of Responsibility each year, with about 10 making landfall. Together with recurring earthquakes, these hazards highlight the urgent need for comprehensive disaster preparedness and resilience measures across all sectors of society.

Citizens must be equipped not only with knowledge for daily living but also with essential survival skills during calamities and disasters. To address this need, the Department of Education issued Order No. 37, s. 2015, formally known as the Comprehensive Disaster Risk Reduction and Management in Basic Education Framework. This policy guides disaster risk reduction and management (DRRM) efforts in the education sector, aiming to build resilience in schools and offices while ensuring that quality education continues even in times of crisis. As youth are disproportionately affected by the impacts of disasters, their unique vulnerabilities must be recognized. At the same time, young people possess tremendous potential to influence positive preparedness actions and foster resilience within their homes and communities, making them vital partners in disaster risk reduction initiatives.

In Science, the introduction of topics involving earthquakes and typhoons are greatly demonstrated in Grade 8 lessons. It is particularly discussed in the Curriculum Guide of DepEd for Grade 8 and covers discussions on the type and activity of volcanoes, why Philippines is prone to typhoons and gather information from the Department of Science and Technology and other reliable websites to identify how authorities support communities affected by typhoons. Despite the integration of disaster-related topics

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and reinforcement of precautionary measures, learners often struggle to translate theory into practice when disasters occur (Andales et al., 2022), which may be attributed to the limited level of preparedness they acquire.

This study sought to examine the relationship between disaster preparedness and the proficiency level of Grade 8 learners in the Science subject. Beyond establishing this correlation, the research envisions the development of supplementary interventional resources that strengthen both preparedness and scientific proficiency. These materials were anchored on the Grade 8 Science Revised K-10 Curriculum, ensuring alignment with national standards while enhancing learners' capacity to apply scientific knowledge to real-life disaster scenarios.

Statement of the Problem

This study aimed to determine the relationship between disaster preparedness and the proficiency level of Grade 8 learners in disaster-related content. This study also sought to respond to the following questions:

1. What is the level of disaster preparedness of Grade 8 learners?
2. What is the proficiency level of Grade 8 learners in disaster-related content?
3. Is there a significant difference in the level of disaster preparedness of Grade 8 learners when taken as a whole and grouped according to sex and socio-economic status?
4. Is there a significant difference in the proficiency level of Grade 8 learners in disaster-related content when taken as a whole and grouped according to sex and socio-economic status?
5. Is there a significant relationship between the level of disaster preparedness and the proficiency level of Grade 8 learners in disaster-related content?

Hypotheses

Given the preceding inferential problems, it was hypothesized that:

1. There is no significant difference in the level of disaster preparedness of Grade 8 learners when taken as a whole and grouped according to sex and socio-economic status.
2. There is no significant difference in the proficiency level of Grade 8 learners in disaster-related content when taken as a whole and grouped according to sex and socio-economic status.
3. There is no significant relationship between the level of disaster preparedness and proficiency level of Grade 8 learners in disaster-related contents.

2. Framework

This study is anchored on the Theory of Planned Behavior (TPB) by Icek Ajzen (2020). TPB is a psychological theory that links beliefs to behavior, suggesting that behavior is a function of an individual's behavioral intention (Conner & Sparks, 2020). Also known as the Theory of Reasoned Action, TPB distinguishes between three types of beliefs that affect an individual's intention to perform a specific behavior. Behavioral beliefs, which translate into attitudes toward the behavior. Normative beliefs, which relate to perceived attitudes of peers and respected figures toward the behavior. Lastly,

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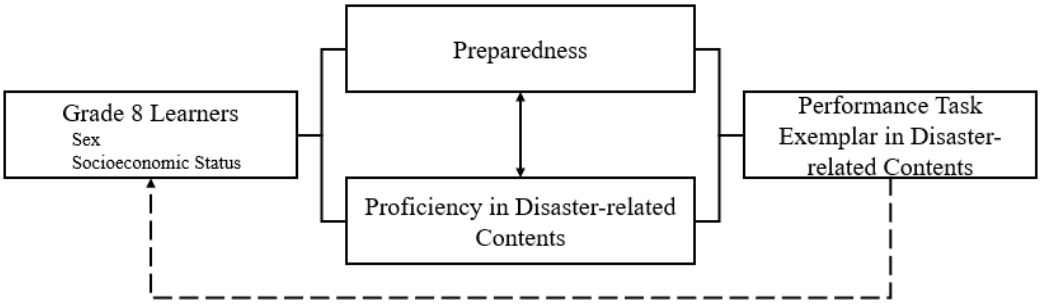
control beliefs, or perceived ability to perform the behavior.

Moreover, it explains how human actions are guided by intention, which in turn is shaped by attitudes, subjective norms, and perceived behavioral control (Ajzen, 2020). In disaster preparedness, learners' attitudes reflect their personal beliefs about the importance of readiness and safety. Subjective norms, such as expectations from teachers, peers, and family, influence whether learners feel socially obligated to practice preparedness measures. Perceived behavioral control, meanwhile, refers to their confidence in applying disaster-related knowledge and skills during actual emergencies. When these three components align positively, learners are more likely to translate classroom theory into effective disaster response. However, if perceived behavioral control is weak, learners may struggle to act despite having knowledge of precautionary measures. This makes TPB a valuable lens for examining the proficiency level of learners in disaster-related science content.

Figure 1: Schematic Diagram of the Study



The diagram showed how different elements contribute to disaster preparedness among Grade 8 learners. From the disaster preparedness as part of the lesson in grade 8 and performance task is given to effectively execute preparedness during emergencies. As part of the study, the learners were grouped according to sex and social economic status. The proficiency of the learners in disaster-related contents as assessed by the teachers through performance task exemplar. This exemplar strengthens both the learner's proficiency and preparedness, creating a more practical and responsive learning experience.

3. Methodology

Design

This study used a descriptive-correlational research design. A descriptive-correlational research design combined observing and describing variables, comparing naturally occurring groups, and identifying statistical relationships between them, all without manipulating variables to find cause-and-effect, focusing instead on patterns, associations, and differences between groups in real-world settings (Barooah, 2026). Researchers used methods like surveys and observations to gather data, aiming to understand what exists and how variables were related, rather than why one causes another. It is a quantitative research method that describes the relationship between two or more variables without manipulating them.

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This study primarily aimed to determine the disaster preparedness and proficiency of Grade 8 learners in disaster-related content enrolled in Academic Year 2025-2026.

Locale

The study was conducted in a large public, secondary school located in Central Philippines. Most learners from the school came from the 32 haciendas of the barangay and neighboring barangay, as well. The family varied from those with low income to moderate income-generating ones. The study was conducted in a face-to-face arrangement.

Respondents

The respondents were comprised of 206 Grade 8 learners in a large, public secondary school located in Central Philippines who were officially enrolled for the Academic Year 2025-2026. The respondents were grouped according to sex and socio-economic status through the results of the researcher-made questionnaire given on disaster preparedness and proficiency.

This research has undergone a stratified random sampling. This is a sampling which involved choosing a group of items from separating the target population element into homogenous, mutually exclusive segments, from each segment simple random sampling is chosen. The selected sample from different strata is combined to have a single sample. Stratified sampling is the technique of probability sampling in which the characteristics of a precise variable are interpreted in the universe relative to this variable (Iliyasu and Etikan, 2021)

Instruments

There were instruments used to measure the learners' level of disaster preparedness and their proficiency level in disaster-related contents. For learners' level of disaster preparedness, the researcher gathered data using a researcher-made test. The researcher-made test was composed of 21 questions about disaster preparedness specifically on active volcanoes and volcanic eruption preparedness, earthquake and earthquake preparedness, typhoon, Philippine Area of Responsibility, and typhoon warnings. The test scale against which the learners' level of disaster preparedness was classified as follows:

Table 1: Learners' Level of Disaster Preparedness Score and Description

Learners' Level of Disaster Preparedness Score	Description
0 – 4.50	Very Low Level of Preparedness
4.51 – 8.50	Low Level of Preparedness
8.51 – 12.50	Average Level of Preparedness
12.51 – 16.50	High Level of Preparedness
16.51 – 21.00	Very High Level of Preparedness

For the proficiency level of the learners in disaster-related contents, the researcher obtained the data from

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the Quarter 3 examination result. Since the quarterly examination did not solely cover the disaster-related contents alone, the researcher reviewed the Table of Specifications of the Quarter 3 examination. Below is the breakdown of competencies which covered disaster-related contents along with its corresponding items:

Table 2: Learning Competencies with Disaster-related Contents and Corresponding Items

Learning Competency	Number of items
Describe the different types of volcanoes found around the world according to their activity, type of eruption, and location in the crust	10
Relate the shape of volcano's cone to its composition	2
Gather information from secondary sources to explain how typhoons develop and why the Philippines is prone to typhoon	2
Describe the nature and characteristics of the typhoon	2
Explain the impact of landmasses and bodies of water on typhoon	1
Demonstrate precautionary measures before, during and after a typhoon	2
Interpret and respond to advisories, storm signals and evacuation orders issued by government agencies in charge	1
Total	20

The scale in which the proficiency level of the learners in disaster-related content was classified as follows:

Table 3: Learners' Level of Disaster Preparedness Score and Description

Proficiency Level for Disaster-related Contents	Description
0 – 4.50	Very Low Level of Preparedness
4.51 – 8.50	Low Level of Preparedness
8.51 – 12.50	Average Level of Preparedness
12.51 – 16.50	High Level of Preparedness
16.51 – 20.00	Very High Level of Preparedness

Validity

The researcher-made test that was used to measure the level of disaster preparedness was subjected to construct and content validity to confirm the instrument's relevance and effectiveness (Padjadjaran, 2023). The instrument for proficiency level in disaster-related contents, on the other hand, was taken from the Division Unified Test. Since the quarterly examination did not solely cover the disaster-related contents alone, the researcher reviewed the Table of Specifications of the Quarter 3 examination and carefully selected items which covered the disaster-related contents.

Ten field experts from both public and private secondary schools validated the test in terms of its credibility and relevance as an instrument. The researcher employed both the Face and Content Validity

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Ratio (CVR) by Good and Scates and Charles Lawshe, respectively. Validation of the instrument using Good and Scates resulted in a value of 4.80, interpreted as Very Good, while Content Validity Ratio (CVR) found that 30 out of 35 items were essential. Thirty items were carried on the test questionnaire to measure disaster preparedness.

Reliability

For the reliability of the instruments for both the Disaster Preparedness Test, Kuder Richardson Formula 20 was employed. The respondents who participated in the reliability test were not part of the actual respondents of the study. Reliability of the researcher-made test is confirmed by the total value of the coefficient of correlation (r) = 0.77 which is interpreted as reliable.

Data Collection

For data collection in this study, the researcher sent a letter to the Superintendent and to the School Head of the public school to ask permission for the conduct of the study. After obtaining the approval from the authorities, the researcher constructed table of specifications for topics involving disaster preparedness. Development of researcher-made test for Disaster Preparedness then followed. The researcher-made test was subjected to validity and reliability. The respondents were informed about the test's purpose, schedule, and coverage. An assent and consent form were given to the parents or guardians of the respondents. The respondents were comprised of Grade 8 learners grouped according to sex and socio-economic status. The data collected were thoroughly checked, recorded, and underwent statistical treatment.

Data Analyses

The numerical data gathered from the instruments were subjected to specific descriptive and inferential statistical treatment.

To determine learners' level of disaster preparedness and their proficiency level in disaster-related content, when taken as a whole and when grouped according to sex and socioeconomic status, mean and standard deviation were used.

To determine the significant difference in the level of disaster preparedness of Grade 8 learners when taken as a whole and grouped according to sex and socio-economic status, Mann-Whitney U test was utilized.

To determine the significant difference in the proficiency level of Grade 8 learners in disaster-related content when taken as a whole and grouped according to sex and socio-economic status, Kruskal-Wallis was used.

To determine the significant relationship between the level of disaster preparedness and the proficiency level of Grade 8 learners in disaster-related content, Spearman's correlation was utilized.

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4. Results and Discussions

The result and discussion of data are discussed and shown in tabular form according to the sequence of the statement of the problem and hypotheses presented in Chapter 1.

Table 4: Level of Disaster Preparedness of Grade 8 Learners When Taken as a Whole and When Grouped According to Sex and Socioeconomic Status

Variables	Mean	Interpretation	SD
Sex			
Female (n=107)	16.69	Very High Preparedness	2.640
Male (n=99)	15.78	High Preparedness	3.272
Socioeconomic Status			
Poor (n=56)	15.52	High Preparedness	3.501
Low Income [Not Poor] (n=68)	16.47	High Preparedness	2.799
Lower Middle Income (n=56)	16.46	High Preparedness	2.743
Middle-Upper Middle Income (n=26)	16.81	Very High Preparedness	2.638
As a Whole (n=206)	16.25	High Preparedness	2.988

Table 4 reveals that Grade 8 learners exhibit a generally high level of disaster preparedness, with an overall mean of 16.25, interpreted as High Preparedness. Female learners show very high preparedness (M=16.69) compared to males (M=15.78, High Preparedness), suggesting that females tend to be more proactive or attentive in disaster-related situations. When grouped by socioeconomic status, learners from middle-upper middle income families (M=16.81) demonstrate very high preparedness, while those from poor households (M=15.52) still maintain a high level, indicating effective disaster education across income groups. The relatively small differences in mean scores imply that preparedness is consistently strong among all learners, regardless of sex or economic background. In general, the results highlight that Grade 8 learners possess estimable disaster readiness, with slight variations influenced by gender and access to resources.

These results imply that school-based disaster risk reduction programs and integration of disaster risk reduction are effective in instilling preparedness among learners, but differences remain. The slightly lower scores among poor learners highlight the need for fair access to resources, training, and community support to ensure preparedness is not hindered by socioeconomic limitations. The higher preparedness among females may reflect stronger engagement in school drills or risk-awareness activities, suggesting that gender-sensitive approaches could further enhance outcomes. In general, the findings emphasize the importance of sustained disaster education integrated into the lesson to maintain high preparedness levels across diverse learner groups.

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This interpretation aligns with recent works emphasizing the effectiveness of school-based disaster risk reduction programs and structured curricula in fostering readiness. The study of Hernandez et al. (2021) found that learners and personnel demonstrated strong disaster awareness and preparedness, while Chong et al. (2025) highlighted resilience among middle-income groups. Similarly, DepEd DRRMS (2021) and the Climate Change Commission (2021) reported that integrating disaster preparedness into the K–12 curriculum strengthened learner participation and proactive attitudes. Collectively, these studies support the conclusion that structured education and resource access contribute to commendable levels of preparedness among learners.

While the findings suggest high preparedness across groups, several studies caution against assuming uniform readiness. The study of Erman et al. (2021) and the World Bank Group emphasized that gender inequalities and structural barriers continue to affect disaster resilience, with women often disadvantaged in resource access despite awareness. The study of Chong et al. (2025) also noted persistent preparedness gaps among poorer households, underscoring the role of socioeconomic disparities. Other studies, such as those on cognitive determinants of typhoon preparedness, reported only moderate readiness levels, heavily dependent on awareness and resources. DepEd DRRMS (2021) further acknowledged challenges in program implementation, particularly in marginalized schools. These opposing perspectives highlight that while preparedness may be high overall, significant variations remain across gender and socioeconomic lines.

Table 5: Proficiency Level of Grade 8 Learners When Taken as a Whole and When Grouped According to Sex and Socioeconomic Status

Variables	Mean	Interpretation	SD
Sex			
Female (n=107)	7.03	Fairly Satisfactory	4.03
Male (n=99)	6.84	Fairly Satisfactory	3.99
Socioeconomic Status			
Poor (n=56)	6.55	Fairly Satisfactory	3.88
Low Income [Not Poor] (n=68)	7.78	Fairly Satisfactory	4.40
Lower Middle Income (n=56)	5.71	Fairly Satisfactory	3.47
Middle-Upper Middle Income (n=26)	8.19	Fairly Satisfactory	4.32
As a Whole (n=206)	6.94	Fairly Satisfactory	4.09

The data in Table 5 indicates that Grade 8 learners possess a fairly satisfactory level of proficiency in disaster-related content, with an overall mean of 6.94 and a standard deviation of 4.09. Female learners scored slightly higher (M=7.03, SD=4.03) than males (M=6.84, SD=3.99), suggesting that girls may have a marginally better grasp of disaster-related concepts. Across socioeconomic groups, proficiency remains fairly satisfactory, though learners from middle-upper middle income families (M=8.19,

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SD=4.32) show the highest mean, likely due to greater access to educational resources and information. Learners from lower middle income groups (M=5.71, SD=3.47) recorded the lowest mean, implying that limited resources may affect their mastery of disaster-related topics. Overall, the results suggest that while all learners demonstrate adequate understanding, targeted interventions and resource support could further enhance their proficiency in disaster preparedness education.

The findings imply that while learners possess a basic and fairly satisfactory understanding of disaster-related content, there is room for improvement to reach higher mastery levels. The lower scores among poor and lower middle-income learners highlight the influence of socioeconomic gaps on access to resources and learning opportunities. This result suggests that instructional interventions should be modified to bridge gaps across income groups, ensuring fair disaster education. The restrained sex differences also point to the need for inclusive teaching strategies that engage both male and female learners equally. Further, the results emphasize the importance of improving disaster education programs to lift proficiency from satisfactory to high levels.

Recent studies consistently affirm that learners generally demonstrate satisfactory levels of disaster preparedness and knowledge. The study of Seddighi et al. (2020) highlighted that school-based interventions improve awareness, though mastery remains moderate. The study of Ventura and Madrigal (2020) found that junior high school learners in in one of the provinces in the Philippines exhibited satisfactory preparedness, reflecting the effectiveness of localized disaster education programs. Moreso, the study of Hipolito (2022) and Lacat (2024) reported that both learners and science teachers possessed adequate knowledge and attitudes toward disaster preparedness, aligning with the present findings. Similarly, DepEd's DO 33, s. 2021 institutionalized disaster risk reduction education, reinforcing satisfactory proficiency levels among learners nationwide. Collectively, these studies support the conclusion that learners are adequately prepared, though not yet at advanced levels.

Contrasting evidence suggests that student proficiency in disaster-related content is uneven and sometimes below satisfactory levels, particularly among marginalized groups. The study of Torpus et al. (2024) emphasized socioeconomic disparities, noting that lower-income learners tend to have weaker disaster knowledge compared to their wealthier peers. The study of Paulsen and McCormick (2020) similarly argued that educational inequalities strongly predict preparedness outcomes, with poorer learners frequently falling short of satisfactory standards. The study of Seddighi et al. (2020) further identified systemic weaknesses in school-based disaster programs, suggesting that satisfactory proficiency is not universally achieved.

Table 6: Significant Difference in the Level of Disaster Preparedness of Grade 8 Learners When Grouped According to Sex and Socioeconomic Status

Variables	*p*-value	Significance at $\alpha = 0.05$	Status of H_o
Sex	0.057	Not Significant	Accepted

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Variables	*p*-value	Significance at α = 0.05	Status of H_o
Socioeconomic Status	0.413	Not Significant	Accepted

Table 6 presents the statistical analysis of differences in disaster preparedness among Grade 8 learners when grouped by sex and socioeconomic status. The *p*-value for sex (0.057) indicates a not significant difference, leading to the acceptance of the null hypothesis. This means that both male and female learners are the same in their level of disaster preparedness. In addition, the *p*-value for socioeconomic status (0.413) is also not significant, implying that economic background does not substantially affect learners' preparedness levels. Deeply considered, these results suggest that gender-related factors—such as attitudes toward safety, risk perception, or participation in preparedness activities—may influence readiness more than economic conditions, highlighting the importance of gender-sensitive approaches in disaster education.

The results imply that gender-sensitive approaches are crucial in disaster education programs. Female learners may be more engaged in preparedness activities due to social roles emphasizing caregiving and safety, while males may focus less on precautionary measures. This difference underscores the need for inclusive strategies that encourage male learners to actively participate in preparedness drills and risk-awareness activities. Schools should integrate gender-responsive disaster risk reduction (DRR) modules to balance participation and ensure equitable preparedness outcomes. Policymakers and educators must recognize these disparities to design interventions that strengthen resilience across all learner groups.
Recent studies affirms that female learners often demonstrate stronger disaster preparedness compared to males. The study of Erman et al. (2021) emphasized that women's caregiving roles and risk-awareness behaviors contribute to higher resilience and preparedness. The study of Lapizar et al. (2025) found that female learners in Philippine secondary schools were more proactive in disaster risk reduction practices, reflecting gendered engagement in school-based programs. Similarly, UNDRR (2022) highlighted that gender-responsive disaster education enhances preparedness outcomes, while UNFPA (2024) reported that women and girls frequently lead resilience-building initiatives in Asia-Pacific contexts. Collectively, these studies support the finding that female learners exhibit higher disaster preparedness levels than males.

Contrasting evidence suggests that preparedness differences between sexes are not always significant. The study of Peña et al. (2026) reported that learners' disaster preparedness skills did not vary meaningfully by sex, with simulation exercises showing similar outcomes for both genders. Escoto and Hussien (2024) argued that preparedness gaps were more strongly linked to grade level and resource availability than gender. These studies suggest that preparedness outcomes are shaped more by socioeconomic and institutional factors than by gender alone.

In the light of the learners' socioeconomic status, the findings imply that school-based disaster education programs may be effective in equalizing preparedness across socioeconomic groups. Even learners from

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poorer households demonstrated preparedness levels comparable to those from higher-income families, suggesting that institutional interventions can mitigate resource disparities. However, the absence of significant differences should not obscure the fact that lower-income learners may still face challenges in access to materials and community support. The results highlight the importance of sustained, inclusive disaster education policies that ensure preparedness is maintained across all socioeconomic strata.

Several studies affirm that socioeconomic status does not strongly determine disaster preparedness when schools and communities provide structured interventions. The study of Bohol (2025) found that disaster risk reduction education in Philippine secondary schools equalized preparedness outcomes across income groups. Also, Alpuerto and Briones (2025) emphasized that embedding disaster education into school curricula strengthens community resilience and minimizes socioeconomic disparities. The study of Edmeade and Buzinde (2022) highlighted that disaster preparedness programs in schools foster resilience regardless of learners' economic background. Similarly, Pal et al. (2021) reported that inclusive disaster education in South Asia ensured equitable preparedness outcomes among learners, showing that institutional support can offset resource gaps. Collectively, these studies support the finding that socioeconomic status was not a significant factor in learners' preparedness levels.

Other scholars argue that socioeconomic status remains a critical determinant of disaster preparedness. The study of Nyaphisi (2021) demonstrated that poorer learners often lack access to materials and support, resulting in lower preparedness compared to wealthier peers. Along these findings, Cong et al. (2023) found as well significant preparedness gaps among youth tied directly to income levels, with disadvantaged groups showing weaker readiness. The study of Cvetković and Šišović (2024) reported that higher-income learners consistently achieved stronger preparedness scores, underscoring the role of economic resources in resilience.

Table 7: Significant Difference in the Proficiency Level of Grade 8 Learners in Disaster-related Content When Grouped According to Sex and Socioeconomic Status

Variables	*p*-value	Significance at $\alpha = 0.05$	Status of H_o
Sex	0.722	Not Significant	Accepted
Socioeconomic Status	0.012*	Significant	Rejected

Table 7 presents the analysis of whether sex and socioeconomic status influence the proficiency level of Grade 8 learners in disaster-related content. The *p*-value for sex (0.722) indicates no significant difference, meaning that male and female learners perform similarly in disaster-related topics. This suggests that sex does not play a major role in shaping learners' understanding or mastery of disaster concepts, implying equitable learning outcomes across sexes. In contrast, the *p*-value for socioeconomic status (0.012) shows a significant difference, leading to the rejection of the null hypothesis. This finding implies that learners' proficiency is affected by their economic background – those with greater access to educational resources and support tend to achieve higher levels of understanding. Deeply considered, the

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results highlight that while gender equality in learning outcomes is achieved, socioeconomic disparities remain a critical factor influencing learners' mastery of disaster-related content, pointing to the need for inclusive educational interventions that bridge resource gaps.

The findings imply that disaster education programs may be equally effective for both male and female learners, ensuring balanced knowledge acquisition regardless of sex. This outcome highlights the success of inclusive disaster risk reduction (DRR) curricula in minimizing gender disparities. However, while statistical differences are not significant, qualitative differences in engagement and roles may still exist. Schools should continue to promote gender-sensitive approaches to sustain reasonable participation and ensure that both male and female learners are equally empowered to apply disaster-related knowledge in practice.

Several studies support the finding that sex does not significantly influence disaster-related knowledge. The study of Hernandez et al. (2021) assessed disaster awareness among learners and teachers and found preparedness levels consistent across genders. The study of Lapizar et al. (2025) reported that gender dynamics in DRRM practices showed equal participation opportunities for male and female respondents. Moreover, Lapada (2022) found that Filipino senior high school learners demonstrated strong disaster risk reduction knowledge, with family income but not sex influencing preparedness outcomes. UNDRR (2022) emphasized that inclusive disaster education policies reduce gender disparities in knowledge acquisition.

Other studies argue that gender differences in disaster-related knowledge remain significant. The study of Muñoz-Nieves et al. (2025) found that female initially scored lower than male in disaster education modules, though the gap narrowed after program completion. The study of Chong et al. (2025), analyzing World Risk Poll data, reported that women scored higher in household resilience while men excelled in community resilience, reflecting gendered strengths. These studies challenge the present findings by showing that gender disparities in disaster knowledge and outcomes continue to exist in broader contexts.

In the light of learners' socioeconomic status, the analysis shows that socioeconomic status significantly affects the proficiency level of Grade 8 learners in disaster-related content. With a p-value of 0.012, the null hypothesis is rejected, indicating that income groups differ in their disaster knowledge. Pairwise comparisons reveal that learners from lower-middle income backgrounds scored significantly lower than those from low-income (not poor) and middle-income groups. Similarly, middle-income learners outperformed poor learners, highlighting disparities in knowledge acquisition. These findings suggest that socioeconomic status is a decisive factor influencing disaster-related proficiency among learners.

The results imply that economic resources and social conditions strongly shape learners' disaster-related knowledge. Learners from higher-income groups may have greater access to educational materials, technology, and community support, which enhance their proficiency. Conversely, economically

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challenged learners may face barriers such as limited resources and reduced exposure to disaster education programs. These disparities highlight the need for targeted interventions that prioritize marginalized groups, ensuring equitable access to disaster education.

Several studies support the finding that socioeconomic status significantly affects disaster-related knowledge. The study of Chong et al. (2025) analyzed World Risk Poll data and found that income disparities strongly shaped resilience outcomes in the Philippines. The study of Lopez et al. (2022) reported that low-income households in one of the provinces had weaker preparedness practices compared to middle-income families. Similarly, Domingo & Manejar (2021) emphasized that bottom-up DRR approaches in the Philippines revealed persistent socioeconomic inequalities in disaster readiness. Also, Acierto et al. (2023) found that resource availability in schools directly influenced learners' preparedness levels. The study of Wardana et al. (2021) highlighted that junior high school learners from higher-income families demonstrated stronger disaster awareness and preparedness. Collectively, these studies affirm that socioeconomic status is a critical determinant of disaster-related proficiency.

Other studies argue that socioeconomic status does not always determine disaster-related knowledge. Good Neighbors Philippines & UNICEF (2024) documented that inclusive child-centered DRR programs in Pampanga minimized income-based disparities. UNICEF Philippines (2024) emphasized that youth-led DRR initiatives achieved equitable preparedness outcomes across socioeconomic groups. Department of Education (2024) reported that revised DRR guidelines ensured learning continuity and preparedness regardless of income background. The study of Gotangco et al. (2021) found that tertiary learners' resilience was more influenced by awareness and adaptation than by socioeconomic status. The study of Vidal & Dela Cruz (2025) showed that secondary school learners' understanding of climate change and disaster risk was shaped more by curriculum integration than by family income.

Table 8: Significant Relationship between the Level of Disaster Preparedness and the Proficiency Level of Grade 8 Learners in Disaster-related Content

		Spearman's rho	*p*-value	Sig at $\alpha = 0.05$	Status of H_o
Disaster Preparedness	Disaster-related Content Proficiency	0.3662	< .001*	Significant	Rejected

The analysis in Table 8 presents a significant positive relationship between Grade 8 learners' level of disaster preparedness and their proficiency in disaster-related content. The Spearman's rho value of 0.3662* indicates a moderate positive correlation, meaning that as learners' preparedness increases, their understanding of disaster-related concepts also tends to improve. The *p*-value (< .001) confirms that this relationship is highly significant, suggesting that the observed correlation is not due to chance. Deeply interpreted, this implies that learners who are more knowledgeable and skilled in disaster-related topics are also more confident and ready to respond effectively during emergencies. This finding underscores the importance of integrating disaster education into the curriculum – enhancing conceptual

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understanding directly contributes to practical readiness, fostering scientifically literate and resilient learners capable of applying knowledge in real-world situations.

The results imply that knowledge acquisition is a critical foundation for preparedness behaviors. Schools that strengthen disaster-related content instruction are likely to improve learners' practical readiness. This highlights the importance of integrating disaster education into curricula, ensuring that learners not only understand theoretical concepts but also apply them in real-life scenarios. Policymakers and educators should prioritize knowledge-to-action frameworks, where proficiency in disaster content translates into preparedness practices. Such integration can foster a culture of resilience among youth, reducing vulnerabilities during actual emergencies.

Several studies support the finding that disaster knowledge and preparedness are positively correlated. The study of Seddighi et al. (2020) found that disaster education programs significantly improved both knowledge and preparedness among Iranian learners. The study of Musiyam et al. (2024) reported that learners with higher disaster knowledge demonstrated stronger preparedness behaviors. Relatedly, the study of Muñoz-Nieves et al. (2025) showed that disaster education modules enhanced both awareness and readiness learners. The study of Wardana et al. (2021) highlighted that junior high school learners with higher disaster awareness scores were more prepared for emergencies. Further, Vidal and Dela Cruz (2025) found that climate change and disaster risk education improved both understanding and preparedness among Philippine secondary school learners. Collectively, these studies affirm that proficiency in disaster-related content is a strong predictor of preparedness.

Other scholars caution that knowledge alone does not guarantee preparedness. Gotangco et al. (2021) argued that while disaster education improves awareness, actual preparedness depends on resources and institutional support. Domingo and Manejar (2021) emphasized that socioeconomic inequalities limit the application of disaster knowledge in practice. The study of Lopez et al. (2022) reported that coastal households, despite awareness, struggled with preparedness due to resource constraints. Chong et al. (2025) highlighted that resilience among tertiary learners was more influenced by adaptation strategies than by knowledge alone. These studies challenge the present findings by showing that preparedness outcomes are shaped not only by knowledge but also by contextual and structural factors.

5. Conclusions

The study found that Grade 8 learners possess strong disaster preparedness, highlighting the success of school-based programs in promoting safety and awareness. Gender appears to influence preparedness slightly, with female learners showing greater attentiveness to precautionary measures. Socioeconomic status also plays a role, as learners with better access to information and support tend to be more prepared. In general, the results emphasize the importance of continuous disaster education to sustain and strengthen learners' readiness across all demographic groups.

Learners generally understand disaster-related topics but still have room for improvement in mastery and

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application. Gender differences are minimal, reflecting equitable learning opportunities between male and female learners. However, socioeconomic status appears to influence proficiency, as learners with greater access to resources perform better. Strengthening disaster education through inclusive and resource-supported strategies can help ensure all learners achieve higher levels of proficiency regardless of background.

Moreover, it is revealed that gender is not significant. This implied that sex does not substantially affect learners' preparedness levels. In addition, socioeconomic status does not significantly affect preparedness, showing that access to disaster education is equitable across income levels. This suggests that schools successfully promote inclusive disaster readiness regardless of learners' backgrounds. Strengthening gender-responsive strategies in disaster education may further enhance preparedness and resilience among all learners.

For disaster-related content proficiency, gender does not play a major role in shaping learners' proficiency in disaster-related topics, reflecting equitable learning opportunities between male and female students. Socioeconomic status, however, emerges as a determining factor, as learners with better access to resources and support show higher levels of mastery. This highlights the importance of addressing resource disparities to ensure equal learning outcomes. Strengthening disaster education through inclusive strategies can help bridge gaps and promote comprehensive understanding among all learners.

Finally, disaster education effectively enhances both preparedness and content proficiency among learners. As learners become more knowledgeable, they also develop greater confidence and readiness to act during disasters. This relationship highlights the importance of integrating practical disaster learning experiences into the curriculum. Strengthening conceptual understanding through interactive and applied learning can further improve learners' preparedness and resilience.

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