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Bridging the Gap: Strengthening Student Disaster Resilience Towards Sustainable Policy and Practice

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Abstract Disaster resilience starts where preparedness and awareness converge, giving students the skills to respond effectively to crises. This research investigates the gaps in student disaster awareness and preparedness, identifying challenges and seeking solutions to improve disaster resilience through the creation of the Integrated Student Disaster Resilience Framework (ISDRF). This qualitative research study utilizes a perspective approach drawn from a combination of literature reviews, expert analyses, and case studies to comprehensively examine resilience-building measures. Analyses show that although students are aware of disaster risks, they tend to lack hands-on response capabilities, institutional support mechanisms, collaborative partnerships for disaster preparedness, and access to localized preparedness planning. Addressing these shortcomings necessitates an integrative approach focusing on disaster education enhancement, the development of community partnerships, and the inclusion of technology-driven solutions within preparedness initiatives. This research contributes to establishing a sustainable and resilient culture, ensuring increased awareness and empowering students as responders in disaster situations.

Keywords: disaster resilience, disaster preparedness, disaster education, community partnerships, student response capability, risk reduction, technology-driven solutions

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1. INTRODUCTION

A disaster is a natural or human-made risk that seriously disrupts the conventional operation of a community and results in extensive human, material, financial, or environmental losses that exceed the affected community's capacity to cope. Natural catastrophes are becoming more common and severe, raising worldwide concerns. Countries such as Myanmar, Japan, Indonesia, and the United States are often hit by deadly earthquakes and volcanic eruptions, highlighting the ongoing danger presented by geological hazards (Patel et al., 2023).

One recent example is the 7.7-magnitude earthquake that struck central Myanmar on March 28, 2025, and caused tremors as far as Bangkok, Thailand. In Myanmar, the quake claimed over 3,000 lives and left hundreds more unaccounted for. In Bangkok, an under-construction skyscraper collapsed that caused further deaths and injuries of several others (Center for Disaster Philanthropy, 2025). Similarly, the 2011 Tohoku earthquake and tsunami in Japan caused massive devastation and loss of lives, and triggered a nuclear disaster at the Fukushima Daiichi power plants (World Nuclear Association, 2024). Indonesia, located in the Pacific Ring of Fire, experienced the deadly 2018 Anak Krakatoa eruption that triggered a tsunami that devastated nearby coastal areas (BGS Press, 2019). The 1994 California Northridge earthquake caused severe damage to infrastructure and financial losses amounting to billions of dollars (California Earthquake Authority, 2016).

Figure 1 shows the global distribution of significant seismic activities that took place in 2023, validating the widespread coverage of such geological events such in countries such as Turkey, Indonesia, and China (NGDC/WDS, 2024). This is indicative of the ongoing risks of tectonic activity, stressing the need for proactive disaster preparedness and mitigation measures at the global level (Cahapay & Ramirez, 2020; Susanto et al., 2016).

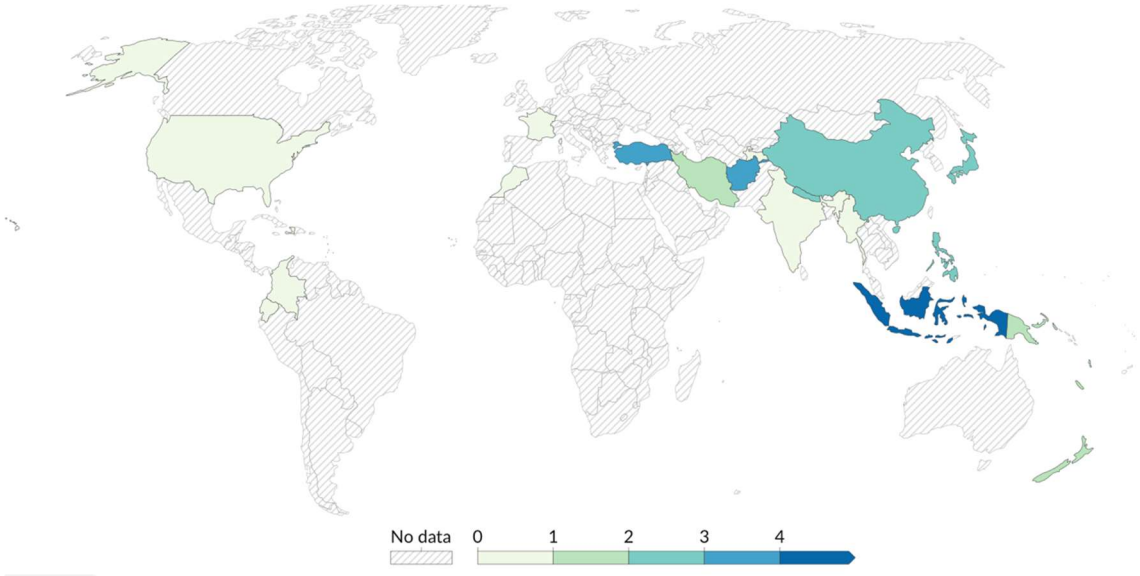

Figure 1. Number of significant earthquakes data

Note. From National Geophysical Data Center/World Data Service (NGDC/WDS, 2024). Global Significant Earthquake Database. NOAA National Centers for Environmental Information. Copyright 2024 by OurWorldinData.org

The Philippines is very prone to volcanic eruptions and earthquakes as it is located on the Pacific Ring of Fire. The country has experienced numerous destructive occurrences, like the 1990 Luzon earthquake and the 2020 Taal Volcanic eruption. Both resulted in extensive damage, widespread evacuations, economic disruption, and fatalities (Aguilar, 2016). Figure 2 shows that the Philippines has suffered significant earthquakes from 1599 to 2023, highlighting its persistent exposure to seismic hazards.

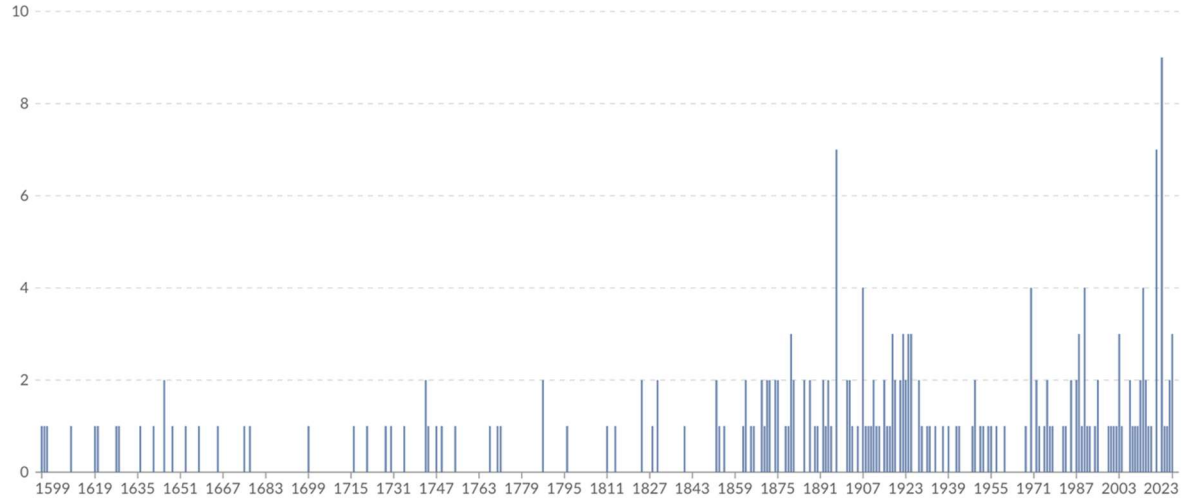

Figure 2. Earthquakes in the Philippines: Data from 1599 to 2023

Note. National Geophysical Data Center/World Data Service (NGDC/WDS, 2024). Global Significant Earthquake Database. NOAA National Centers for Environmental Information. Copyright 2024 by OurWorldinData.org

Meanwhile, the Philippines has also experienced multiple significant volcanic eruptions from 1853 to 2020, proving its proneness to volcanic hazards. As indicated in Figure 3, data reveal that while eruptions have been recorded throughout history, there is an evident increase in frequency in recent decades. In particular, the 1991 Mount Pinatubo eruption was considered one of the most catastrophic events that led to environmental damage, global climatic effects, and the displacement of thousands of people. Additionally, the 2020 Taal Volcano eruption serves as a recent reminder of the Philippines' continuous volcanic threat, prompting the need for continued research and policy efforts to improve resilience against possible future eruptions.

Even though national policies and risk-reduction programs have been implemented, there are still gaps in disaster education, institutional preparedness, and student participation in disaster risk reduction efforts (De Chavez & Lim, 2025). The Sendai Framework for Disaster Risk Reduction 2015-2030 mentioned the role of education in providing youth with the knowledge and skills they need to respond effectively to emergencies.

However, resilience in education goes beyond immediate recovery, but it also includes empowering students through continuous learning, adaptive approaches, and proactive participation in disaster risk reduction activities (Rogayan & Nebrida, 2019). Schools, being key institutions for student development, must integrate structured disaster education,

emergency preparedness activities, and strong community collaborations to foster a resilient community (Shiwaku & Shaw, 2016).

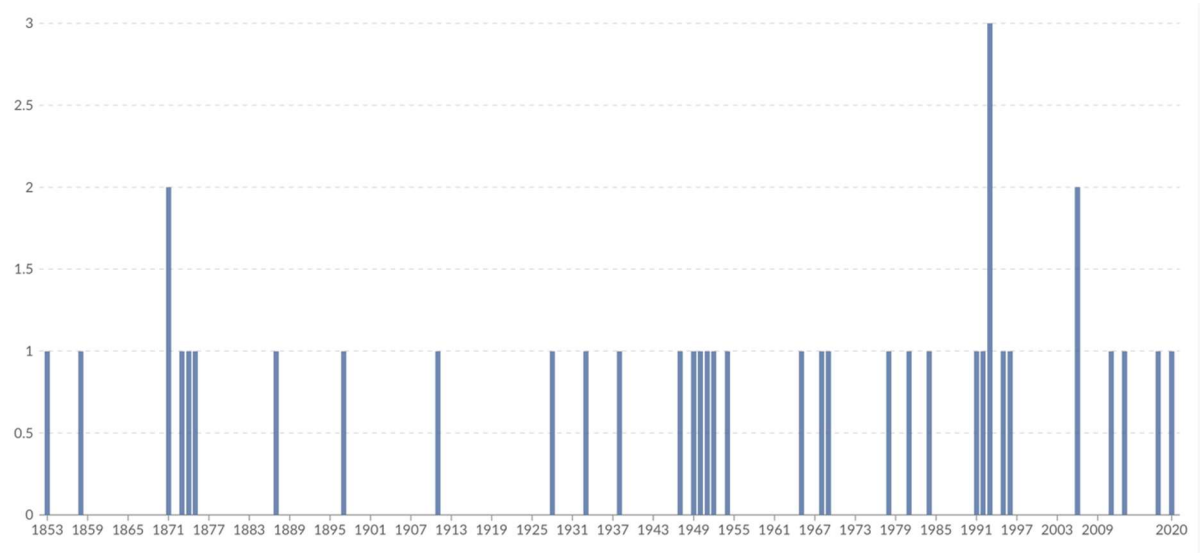

Figure 3. Volcanic Eruptions in the Philippines: Data from 1853 to 2020

Note. National Geophysical Data Center/World Data Service (NGDC/WDS, 2024). Global Significant Earthquake Database. NOAA National Centers for Environmental Information. Copyright 2024 by OurWorldinData.org

Disaster education in the Philippines remains disconnected despite national and international initiatives. Curriculum integration is not the same; teachers lack adequate training, and students participate differently in readiness programs (Masocha et al., 2025). Additionally, in coordination among schools, local government units, and disaster management organizations is aggravating the readiness gap (Commission on Audit, 2014; Wang, 2016). The lack of coordination exposes students to the risk of disasters.

This research undertaking aims to bridge disaster resilience gaps among students by examining the integration of educational frameworks, policy programs, and community outreach initiatives into the enhancement of student awareness and preparedness. The study employs a qualitative, insight-driven approach based on existing academic literature, expert analyses, and case studies to develop a comprehensive framework for strengthening disaster resilience among students. Through the integration of diverse views, the study seeks to generate practical recommendations for improving disaster education, institutional preparedness, and community engagement. Thus, developing more disaster-resilient students in disaster-prone areas such as the Philippines.

2. METHODOLOGY

This research utilizes a qualitative design following a perspective approach drawn from literature review, expert analyses, and case studies. This is a multi-disciplinary approach with the intention to analyze the challenges encountered by students in terms of disaster resilience

and propose alternative remedies. In this study, we identify gaps in disaster preparation among students by evaluating existing research and literature and assessing the efficiency of current programs or solutions. Identifying respondents and implementers of this qualitative research style provides a benchmark for other researchers to have more specific references that can be used to validate or support their research or study. This provides a distinctive perspective or examination of current research, issues, or practices (Tenny et al., 2022).

A perspective paper on closing the gap between awareness and preparedness to strengthen students' resilience is important for several critical reasons.

(1) **Addressing the Philippines' Vulnerability.** The Philippines is prone to high risks from earthquakes and volcanic eruptions. In effect, there is a need for urgency for enhanced disaster resilience in schools. This results in students having lifesaving knowledge and adaptive capabilities (Lapada, 2022).

(2) **Empowering School-Based Disaster Education.** Schools play a major role in disaster risk reduction (DRR). However, there are schools whose DRR subjects remain misaligned and with a mismatch in implementation. Concerns such as low curriculum iteration, lack of training for teachers, and lack of student engagement prevent effective disaster education (Shiwaku & Shaw, 2016). This paper highlights structured, validated disaster education models that value efficient resilience.

(3) **Multi-Stakeholder Collaboration.** Disaster preparedness needs efforts between and among schools, government officials, emergency agencies, and communities. The limited coordination among these stakeholders contributes to gaps in student preparedness and institutional readiness (De Chavez & Lim, 2025). There is a strong focus of this study in integrating policy formulation, involvement of community, and institutional programs on preparedness in establishing student disaster resilience.

(4) **Policy and Institutional Gaps.** Although with the present framework, such as the Sendai Framework for Disaster Risk Reduction (2015-2030), areas of concern in implementation and inter-agency preparedness remain. Many schools lack comprehensive disaster response plans and sufficient resources (UNDRR, 2015). This perspective paper offers insights into ensuring a clear connection of policies with practical, school-based disaster education strategies.

The study discusses and combines available research, policy frameworks, and case studies to present a perspective-based evaluation of the challenges and potential solutions related to student disaster resilience. Unlike empirical research dependent on primary data collection, this paper provides an informed and doable direction grounded in qualitative discussions, inputs from experts, and secondary data sources. This approach offers a multi-faceted understanding of disaster awareness and preparedness gaps, emphasizing the need for integrated educational strategies, supportive and timely laws, and community involvement (Herdiansyah et al., 2020). Additionally, it incorporates interdisciplinary shared ideas to propose pragmatic and actionable solutions to upgrade disaster education, foster resilience, and strengthen institutional and community-based preparedness efforts.

The downside of empirical research is its strong reliance on primary data collection. The role of this insight paper is to provide options as references for better-informed and practical sources. This approach provides a well-rounded understanding of disaster awareness and preparedness gaps. This also highlights the need for integrated educational strategies, policy support, and involvement of the community. Moreover, it blends interdisciplinary viewpoints to suggest practical and doable solutions for enhancing disaster education, forging resilience with stronger institutional and contextualized preparedness efforts.

2.1 Data Collection, Interpretation, and Analysis

This study analyzes relevant literature, current policies, and reported case studies to yield a perspective-driven analysis of the issues and possible steps involved in enhancing disaster awareness and preparedness in schools. Rather than embracing the process of primary data collection, this study synthesizes insights derived from expert perceptions, qualitative evaluation, and secondary literature to form a well-informed perspective. This study formulates practical strategies aimed at enhancing student disaster resilience towards sustainable policy and practice.

The study draws on reports from the National Disaster Risk Reduction and Management Council (NDRRMC), the United Nations Office for Disaster Risk Reduction (UNDRR, 2019), and disaster education and risk management research. Its aim is to determine patterns linked to earthquake and volcanic activities, assess awareness and preparedness levels in schools, evaluate the effectiveness of response systems, and determine areas of policy gaps. The key considerations are the frequency and intensity of seismic events, the ability of schools to manage emergencies, and the importance of collaboration among stakeholders in Disaster Risk Reduction (DRR). These sources provide a critical analysis of the danger represented by natural hazards and suggest essential measures for increasing student disaster resilience.

Data visualizations from UNDRR, *Our World in Data,* the Philippines Statistics Authority, and Statista were used to analyze the state of disaster awareness and preparedness in schools. The approach involves identifying relevant datasets, interpreting graphical representations, and integrating findings into the Integrated Framework for School-Based Disaster Resilience.

3. RESULTS AND DISCUSSION

3.1 The Philippines' Vulnerability to Natural Disasters

In terms of disaster risk, the Philippines ranked third among all the countries with the highest risks worldwide, according to the World Risk Report 2018, with an index value of 25.14% (World Economic Forum, 2018). At least 60% of the country's total land area is exposed to multiple hazards, and 74% of the population is susceptible to their impact (GFDRR, 2016). This is mainly related to geography and setting, as the Philippines is in the Ring of Fire between

the Pacific and Eurasian tectonic plates. Volcanoes and earthquakes seriously threaten people's safety.

As shown in Figure 4, the risk index of natural disasters in the Philippines as of December 2024 highlights that earthquakes pose a significant threat, with a risk index score of 9.7 out of 10. This underscores the country's high vulnerability to seismic hazards, emphasizing the urgent need for robust disaster preparedness and risk reduction measures.

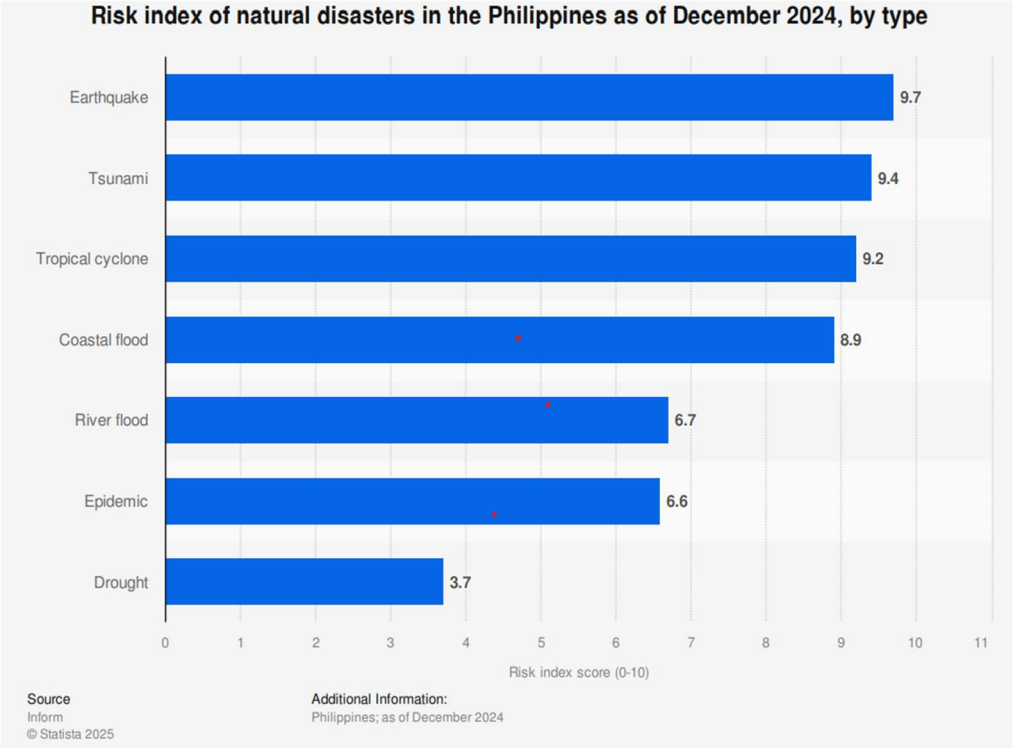

Figure 4. Risk index of natural disasters in the Philippines as of December 202, by type (Balita, 2023)

Besides earthquakes, volcanic eruptions throughout the "Ring of Fire" continuously endanger the population of more than 100 million people. Figure 5 shows that Luzon Island of the Philippines has endured 33 volcanoes since January 2024. Rising on the Island of Luzon, the Taal Volcano erupted on January 12, 2020, posing severe risks across Batangas and Cavite provinces.

The country has experienced numerous devastating seismic events, as presented in Figure 6, deaths from earthquakes in the Philippines. The 1978 Moro Gulf Earthquake was one of the deadliest in Philippine history. The magnitude 8.0 earthquake triggered a tsunami that claimed the lives of at least 8,000 people and caused widespread destruction in Mindanao. Similarly, the 1990 Luzon earthquake, which registered a magnitude of 7.7, resulted in over 1600 deaths.

In addition to earthquakes, volcanic eruptions have also led to significant casualties. Figure 7 presents deaths from volcanic eruptions in the Philippines by 1754 to 2020. The 1991 eruption of Mount Pinatubo, one of the most powerful eruptions in the 20th century that caused the deaths of approximately 800 people due to pyroclastic flows, ashfall, and subsequent lahar. More recently, the 2020 Taal Volcano eruption displaced thousands of families and resulted in

fatalities linked to respiratory complications and hazardous living conditions in evacuation centers.

Figure 5. Total number of volcanoes in the Philippines as of January 2024, by location (Statista, 2025)

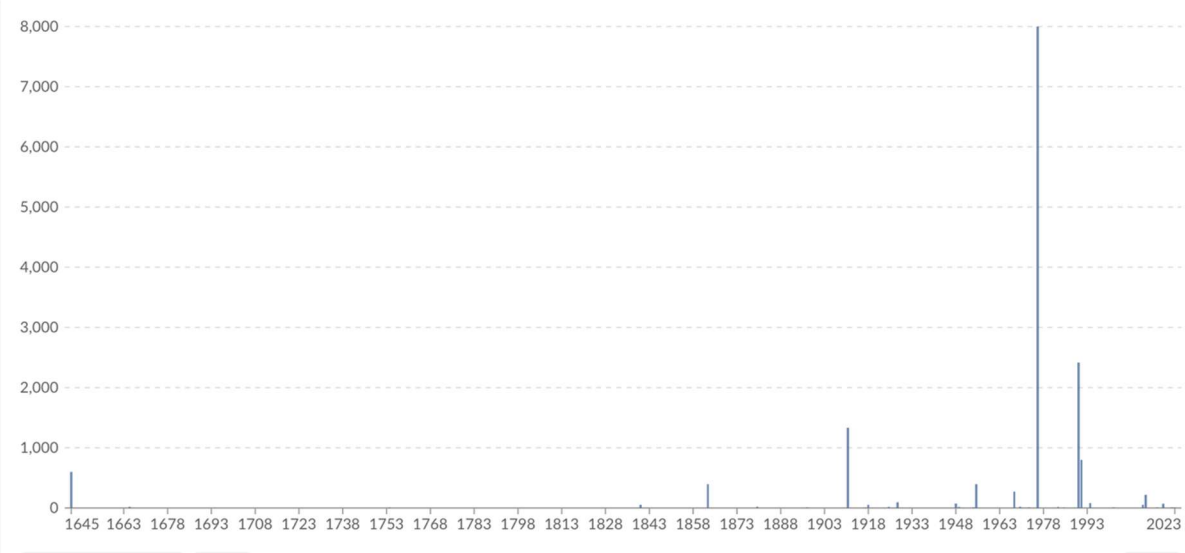

Figure 6. Deaths from earthquakes in the Philippines from 1645 to 2023

Note. From National Geophysical Data Center/World Data Service (NGDC/WDS, 2024) Global Significant Earthquake Database, 2024, NOAA National Centers for Environmental Information. Copyright 2024 by OurWorldinData.org

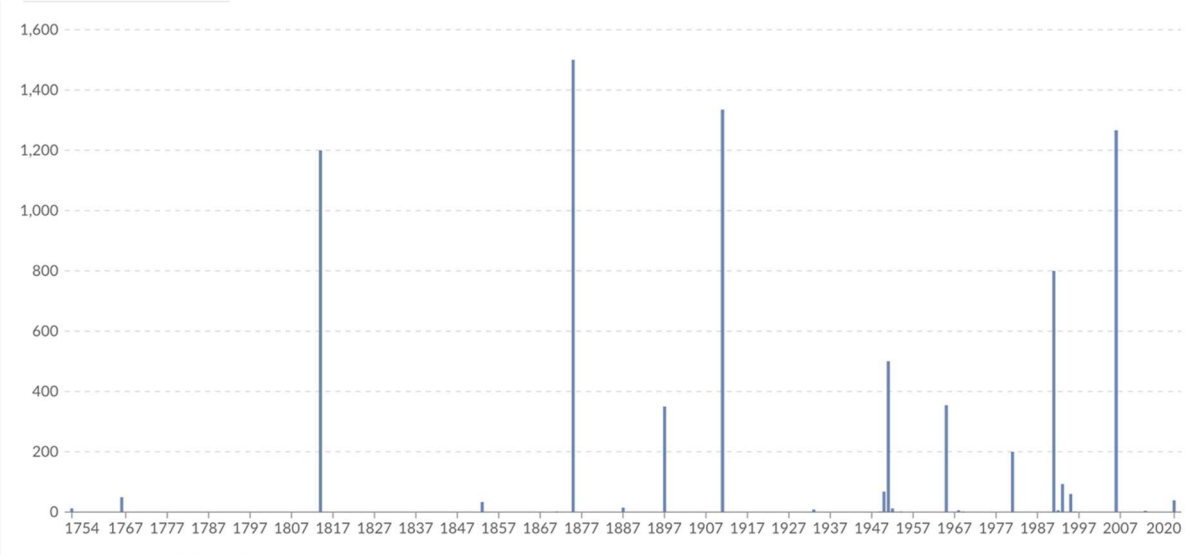

Figure 7. Deaths from volcanic eruptions in the Philippines from 1734 to 2020

Note. From National Geophysical Data Center/World Data Service (NGDC/WDS, 2024) Global Significant Earthquake Database. NOAA National Centers for Environmental Information. Copyright 2024 by OurWorldinData.org

3.2 Gaps in School-Based Disaster Education

While Disaster Risk Reduction (DRR) education is formally integrated into the Philippine education system, its actual implementation and effectiveness remain limited and have yet to be fully realized within schools. The inability to provide experiential training is one of the key hurdles, wherein earthquake drills are carried out as normal drills and not as experiential learning drills that familiarize students with survival skills, including first aid and evacuation drills (DepEd, 2020). The sad reality is that these activities were carried out for mere compliance with the quarterly simultaneous earthquake drill. Second, few teachers have emergency response skills, and they are therefore poorly prepared to guide students effectively during emergencies (Stough et al., 2019).

Also, the DRR curriculum is fragmented, where disaster preparedness is usually taught as an additional subject and not as an inherent capability in all subjects (Shiwaku & Shaw, 2016; Songwathana & Timalsina, 2021). With the K-12 curriculum, the Department of Education (DepEd) included Disaster Risk Reduction (DRR) as a subject in Grade 10 Social Studies (Araling Panlipunan). Learning DRR in senior high school is integrated as an inherent capability in Earth and Life Science, a universal subject to all academic tracks. DRR is, however, being taught as an additional subject in senior high school in the Science, Technology, Engineering, and Mathematics (STEM) track.

One of the significant gaps is the inconsistency in the assignment of teaching DRR by grade levels. In Grade 10, DRR is normally taught by social studies teachers or non-science majors, whereas in Grades 11 and 12, it is normally assigned to science teachers. In other cases, DRR is assigned to any available teacher, which raises concerns about whether the teachers possess the required academic background and subject matter knowledge to teach the subject effectively. There is a mismatch between teachers' qualifications and expertise and the subject

being taught. This results in a less effective delivery and transfer of knowledge. For this to be addressed, it is necessary to provide continuous in-service training to teachers to enhance their knowledge and teaching skills in DRR.

In addition, DRR education is not evenly implemented in the basic education curriculum. Since it is included in other subjects rather than as a standalone course, its teaching can be partial. In addition, DRR education is mainly addressed at the senior high school level, particularly at the science strand, where most students in the other academic strands are exposed to little or no disaster preparedness (Geronimo, 2015).

A recent study by Mamon et al. (2017) on the effectiveness of disaster education among Grade 11 students in Metro Manila revealed that high knowledge, preparedness, adaptation, and awareness levels still possess low risk perception. This implies that the successful integration of DRR education in senior high school science curriculum requires that it must be incorporated into all academic strands, including Humanities and Social Sciences (HUMSS) and Accounting and Business Management (ABM). Compulsorily making DRR a course of study for all students would render high school students well prepared with the knowledge and skills needed to effectively respond during disasters. Students will be able to enhance their understanding of disaster readiness and mitigate risk by utilizing current, comprehensive, and accurate learning resources.

The Japanese and Indonesian case studies serve as optimal models for DRR education in the Philippines. In Japan, earthquake and tsunami drills are mandatory to ensure that instructors and students are adequately informed about emergency protocols (Shiwaku & Shaw, 2016). In contrast, Indonesia has implemented community-based disaster readiness initiatives incorporating participatory training and local knowledge to empower individuals and communities with resilience (Ayuningtyas et al., 2021). By adopting these best practices, the Philippines can ensure that its disaster education program is robust enough to ensure that students are prepared to manage real-world events and are risk-aware.

3.3 The Need for Multi-Stakeholder Collaboration

Effective disaster preparedness requires a multi-stakeholder partnership among schools, government departments, local communities, and emergency service providers. Nonetheless, a set of challenges arises that hinder the effective integration of multi-stakeholder partnerships into the DRR activities of the Philippines. Research has established that most schools lack coordinated response plans with local disaster authorities, leading to inefficiency and slowness in responding to emergencies (NDRRMC, 2020). Furthermore, access to technology-based early warning systems is low in most public schools, especially in underprivileged areas, which constrains the ability to predict and respond to disasters (UNDRR, 2015). Moreover, limited engagement and involvement of students in community-based DRR activities hinder their ability to acquire hands-on experience in disaster response and resilience building (Shiwaku & Shaw, 2016).

Global best practices support multi-stakeholder participation as an opportunity to improve disaster resilience. In the United States, the Federal Emergency Management Agency (FEMA) runs large-scale disaster exercises, which provide communities with experiential emergency response capability (FEMA, 2022). Indonesia has also successfully implemented resident and student monitoring of eruptions through student and resident-involvement initiatives with risk assessment and evacuation planning (Calumba et al., 2021). The Philippines can do the same with more partnership and strong cooperation among schools and local disaster councils, involving students in community-based DRR efforts, and using technology to boost early warning systems. School-community partnerships can improve students' preparedness and make them proactive and well-coordinated in disaster resilience. Suppose we let our students actively participate in DRR programs and initiatives. In that case, they will gain an in-depth understanding of disaster scenarios that will help them develop the essential response skills through firsthand experience. This aligns with Jean Piaget's theory of learning by doing, as cited in the work of Pakpahan and Sariagih (2022), which emphasizes that meaningful learning occurs when students are actively engaged in experiential processes.

3.4 Policy and Institutional Challenges in Disaster Preparedness

In spite of the large presence of international frameworks like the Sendai Framework for Disaster Risk Reduction (2015-2030), there are still large gaps in the implementation and evaluation of disaster risk reduction (DRR) policies in the Philippines. Most of the schools still do not have the right disaster response equipment, for instance, the absence of emergency kits, poor evacuation plans, and poor access to emergency shelters (UNDRR, 2015). Additionally, the monitoring and evaluation methods for DRR programs are inconsistent, leading to inadequate policy execution and the inability to quantify the impact of preparedness programs implemented in educational institutions (NDRRMC, 2020).

Another critical issue is the inefficient implementation of policies incorporating disaster preparedness as a fundamental educational competency. DRR education is viewed as an add-on course rather than as a fundamental set of skills that students are expected to attain during their learning process (Shiwaku & Shaw, 2016). To address these shortcomings, national disaster policies need to be synchronized with school-based, experiential disaster schemes. A potential solution would be the technology-based solutions embedded in DRR education. Leverage AI-based early warning systems, mobile disaster preparedness apps, and virtual emergency response drills to significantly augment real-time disaster response and risk assessment (Erokhin & Komendantova, 2024). By adopting technology-enabled and policy-backed solutions, schools will be in a position to offer confidence that not only will disaster risks be imparted to students, but they will also be equipped with skills and tools to effectively respond to emergencies. The students will also learn appropriate use of technology not only just for recreation and enjoyment.

3.5 Disaster Awareness and Preparedness in Southern Zambales

Rogayan and Dollete (2020) evaluate the disaster awareness and readiness of the barrio communities in Southern Zambales, utilizing a case study to provide foundational data for recommendations about enhanced curriculum and extension program implementation. Zambales is a province situated at 15.5082° North, 119.9698° East in Central Luzon (Region III) in the Philippine archipelago, which is susceptible to natural calamities and disasters (Rogayan, 2019; Rogayan & Dollete, 2020). Like other areas in the Philippines, Zambales is also a victim of severe calamities that devastated the people.

Zambales residents suffered from the 1991 Mount Pinatubo eruption. The volcanic eruption caused $700 million in damage, $100 million due to the destruction of 16 airplanes, and $250 million to agricultural, forestry, and land property values (British Geological Survey, 2015). Residents also endured the Luzon Earthquake. Castillejos was the epicenter of the 6.1 earthquake in 2019, and according to Mogato (2023), the NDRRMC reported damage to 29 buildings and infrastructure, including Clark International Airport. Given these ongoing challenges, knowing local disaster preparedness and response tactics is crucial to resilience and safety.

The investigation indicated that barrio communities viewed earthquakes, floods, typhoons, storm surges, and volcanic eruptions as threatening and destructive. The moderately to extremely informed communities understand the nature, effects, and risks of barrio calamities. Barrio residents also exercise preparedness for emergencies by familiarizing themselves with all their structures for fire evacuation and earthquake plans. Earthquake readiness was shown by placing flashlights and sturdy shoes beside each bed. In addition, neighborhood residents "often practice" staying home until the tremor stops to ensure the safe evacuation of heavy things (Rogayan, 2019; Rogayan & Dollete, 2020).

Furthermore, the emergency personnel followed every evacuation instruction given by authorities and stayed out of the specified prohibited areas. Less noted among the tasks by respondents include creating an evacuation strategy for volcanic eruptions for their family, and going over any security and backup plans with household members for landslides and mudflows. This implies that the local government agencies must create community evacuation strategies to be publicly displayed in strategic places throughout the town to further improve people's readiness for a volcanic eruption.

3.6 Enhanced Framework for Sustainable Student Disaster Resilience

Disaster resilience is essential to education today, especially in disaster-prone regions. As individuals experience more of the effects of the disaster, it is necessary not just to expose students to theoretical knowledge but also to equip them with skills and knowledge to respond effectively to disasters. However, traditional educational paradigms have given more attention to intellectual achievement, with most of the practical preparation needed for effective disaster management going under the radar (Khorram-Manesh et al., 2016). For this reason, overall,

students are not prepared (UNICEF, 2012). The gap necessitates an integrated and comprehensive approach to develop resilience in young students.

The **Integrated Student Disaster Resilience Framework (ISDRF)** was systematically developed to address the growing need for a student-centered model of disaster preparedness and resilience. The process followed a multi-stage methodological approach, combining literature synthesis, content analysis of existing disaster education programs, and consultation with education and disaster management practitioners. The framework's rationale was grounded in the recognition that while numerous disaster risk reduction (DRR) frameworks exist, few explicitly focus on how students can be empowered as active agents of resilience within their communities.

The development of the ISDRF involved three main steps:

1. **Review and Analysis of Existing Models** – Foundational frameworks and international guidelines such as the UNISDR (2019) Comprehensive School Safety Framework, UNICEF's Disaster Risk Reduction in Education initiatives, and other school-based DRR programs were analyzed. These models emphasized safety, preparedness, and community collaboration but often treated students as passive recipients rather than proactive participants.

2. **Identification of Gaps and Contextual Needs** – A needs analysis was conducted, highlighting the lack of integration between school-based disaster education, institutional governance, and local community engagement. The Philippine context, characterized by high exposure to natural hazards such as earthquakes and volcanic eruptions, necessitated a localized and student-centered approach.

3. **Framework Design and Validation** – The components of the ISDRF were then conceptualized as a three-tiered pyramid, symbolizing the progressive development of student resilience from foundational learning to active community participation. Feedback from educators and local disaster management officers was incorporated to ensure the framework's applicability, clarity, and alignment with existing disaster education policies.

The ISDRF thus offers a structured, step-by-step approach to building student resilience by emphasizing three interrelated domains: disaster education, institutional preparedness, and community collaboration. These domains are unified by the belief that disaster resilience transcends individual awareness—it is a shared societal responsibility involving schools, households, and local governments (Alcayna et al., 2016). The ISDRF integrates these elements into a coherent system that empowers students to act meaningfully in minimizing disaster risks and strengthening community preparedness (UNISDR, 2019). As illustrated in Figure 8, the framework is organized as a three-tiered pyramid, where foundational disaster education supports institutional preparedness and governance, which in turn enables broader community and stakeholder engagement, ultimately culminating in a resilient and empowered learner at the peak.

Figure 8. Integrated Student Disaster Resilience Framework (ISDRF)

Base Layer: Disaster Education and Community Integration

This base level emphasizes integrating comprehensive disaster education with the school curriculum and active community involvement. It includes awareness programs, hands-on activities, and learning materials suited to different age groups and local contexts. Students develop a comprehensive understanding of the hazards, reactions, and responsibilities that arise during catastrophes by incorporating real-world events and community activities.

Middle Layer: Institutional Preparedness and School Governance

This layer focuses on the critical function of institutional mechanisms and governance to provide a safe and nurturing environment for learning. It entails strategic deployment of policies aimed at risk reduction, enforcing school safety standards, periodic surveys of infrastructure, and continuous staff and teacher professional development. Strong leadership and effective school governance make it possible to maintain disaster risk management that is organized, inclusive, and built to last. For instance, the institution can introduce a replicable, geospatial method to assess liquefaction severity in earthquake-prone regions (Concha et al., 2020).

Top Layer: Community and Stakeholder Engagement

At this level, the framework suggests collaborative partnerships among schools, families, local government units, and other key stakeholders. Such interaction extends past traditional roles of the school for disaster preparedness programs, creating a common cause for resilience. Through the mutual sharing of resources, knowledge, and responsibilities, the communities are in a better position to prepare for, respond to, and recover from disasters.

The Learner at the Peak

At the topmost part of the pyramid is the learner, symbolizing the peak of efforts in education, governance, and community collective action towards the development of disaster resilience. The position demonstrates the ultimate purpose of these systems working together: that of creating individuals who are not only educated and competent but also able to contribute positively towards the preparedness and resilience of their communities.

4. CONCLUSION

Informed and engaged community members are vital for effective disaster preparedness and resilience. Through the ISDRF, the integration of disaster education, institutional preparedness, and community collaboration fosters a culture of shared responsibility and proactive engagement. Students benefit significantly from this approach as they gain access to accurate, updated, and practical knowledge on disaster awareness through their teachers, local institutions, and community networks. In turn, well-informed local leaders and educators can translate their knowledge into concrete actions—such as community training, information campaigns, and school-based disaster drills—that strengthen local capacity to respond to earthquakes and volcanic eruptions.

To operationalize the ISDRF, partnerships among local government units, schools, and disaster management agencies must be formalized through policies and regular capacity-building initiatives. Continuous monitoring and evaluation mechanisms should also be established to assess the framework's effectiveness and guide necessary improvements. Furthermore, integrating the ISDRF into the school curriculum and community development programs will ensure sustainability and long-term impact. By taking these steps, communities can move beyond awareness toward genuine preparedness leading to saving lives, protecting property, and building a culture of resilience across generations.

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The authors confirm using ChatGPT (https://chatgpt.com/) as a tool and guide in the introduction, methodology, and discussion of key themes related to earthquake and volcanic eruption, focusing on disaster awareness and resilience. The AI-assisted recommendations were significant in refining research questions, structuring arguments, and identifying relevant frameworks for earthquake and volcanic eruption preparedness and resilience. Also, AI played a key role in selecting the methodology for the perspective paper, ensuring clarity and coherence in data analysis and interpretation. The discussion section was further enhanced by

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INFORMED CONSENT

Informed consent is not applicable in this perspective paper.

CONFLICT OF INTEREST

The author declares that there is no conflict of interest.

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