

DISASTER LITERACY, PERCEIVED PREPAREDNESS, AND RESPONSE CAPABILITIES AMONG SENIOR HIGH SCHOOL LEARNERS

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Abstract:

With the rising frequency and intensity of natural disasters in the Philippines and across the globe, enhancing disaster preparedness through education has become an urgent priority. This study assessed the levels of disaster literacy, perceived preparedness, and response capabilities among 233 senior high school learners in a coastal public high school in Bacolod City, a community highly vulnerable to typhoons, flooding, and other hydrometeorological hazards. Employing a descriptive-comparative-correlational design, the study utilized a teacher-made disaster literacy test and an adapted survey instrument to collect data, which were analyzed using descriptive statistics, Mann-Whitney U tests, and Pearson correlation. Results showed that students were fairly satisfactory in disaster literacy, somewhat prepared, and perceived themselves as prepared to respond during disasters. No statistically significant differences were observed based on sex or academic strand. However, significant but weak inverse correlations were found between disaster literacy and both perceived preparedness and response capabilities, indicating that knowledge alone may not directly enhance students' disaster readiness. These findings highlight the need for experiential, skills-based learning approaches in disaster education. Schools must go beyond cognitive instruction and adopt simulation-based and community-integrated strategies to bridge the gap between awareness and action.

Keywords: *disaster literacy, disaster preparedness, disaster response, senior high school, experiential learning, DRRM education, Bacolod City*

Introduction:

In recent decades, the frequency and severity of natural hazards have dramatically increased, intensifying the need for nations to develop comprehensive disaster risk reduction and management (DRRM) strategies. The World Meteorological Organization (WMO, 2025) reported that 2024 was the hottest year on record, underscoring the growing threat posed by climate change-induced disasters such as typhoons, floods, droughts, and wildfires. Globally, events like wildfires in Los Angeles, flooding in Sudan and Nepal, and heatwaves across Europe have resulted in economic losses, population displacement, and ecological damage (Eklund & Gaffney, 2025). The Asia-Pacific region, home to 60% of the world's population, is particularly vulnerable due to its high exposure to geophysical and hydrometeorological hazards (United Nations Office for Disaster Risk Reduction, 2024).

The Philippines, located along the Pacific Ring of Fire and the typhoon belt, ranks among the world's most disaster-prone countries. On average, 20 tropical cyclones enter the Philippine Area of Responsibility annually, with about 8-9 making landfall (Climate Tracker Asia Team & Oscar M. Lopez Center for Climate Change Adaptation and Disaster Risk Management Foundation, Inc., 2024). Earthquakes, volcanic eruptions, floods, and landslides compound these risks. In 2024, Super Typhoon Man-Yi (locally known as Pepito) affected over 10 million people and caused agricultural damages exceeding ₱266 million (Gasgonia, 2024). Similarly, the eruption of Mount Kanlaon in December 2024 forced evacuations and exposed gaps in regional emergency response protocols (Gomez, 2024). These recurring disasters not only disrupt lives but also strain the education sector, demanding proactive and well-integrated school-based preparedness initiatives.

Schools are crucial agents in promoting disaster risk awareness, preparedness, and resilience among youth. The Sendai Framework for Disaster Risk Reduction 2015–2030 emphasizes the role of formal education in building the capacities of children and youth to reduce and respond to disaster risks. According to Peek (2008), when disaster education is integrated into school systems, it significantly enhances children's understanding, reduces panic, and improves response during emergencies. In the Philippines, the Department of Education institutionalized DRRM through DepEd Order No. 33, s. 2021, mandating schools to implement preparedness and response protocols, particularly for hydrometeorological hazards. However, compliance and effectiveness vary across schools and regions, often due to limited resources, training, and context-sensitive curricula.

Disaster literacy—defined as the ability to access, understand, and act on disaster-related information—is a vital component of this educational response. According to Çalışkan and Üner (2020), disaster literacy goes beyond basic awareness, encompassing informed decision-making across all phases of disaster risk management: mitigation, preparedness, response, and recovery. However, there is debate about how disaster literacy should be measured and operationalized. Some scholars argue that knowledge alone is insufficient, and that literacy must include

emotional readiness, critical thinking, and behavioral competence (Brown et al., 2014; Gaillard & Mercer, 2012). This complexity underscores the need for a multidimensional approach to disaster education.

Similarly, the concepts of perceived preparedness and response capabilities warrant critical reflection. Perceived preparedness refers to an individual's subjective evaluation of their readiness to face disaster events. It is shaped by prior experiences, access to resources, and self-efficacy (Maddux & Rogers, 1983; Bubeck et al., 2012). On the other hand, response capabilities pertain to actual or perceived ability to act appropriately during and after a disaster. These include knowledge of emergency protocols, skills in first aid, and effective decision-making under stress. While schools may conduct drills and disseminate information, the transfer of knowledge to action remains a significant gap (Wang et al., 2023).

Studies across educational settings indicate that while students often score moderately high in disaster knowledge, this does not consistently translate to adequate preparedness or effective response behavior (Vu et al., 2023; Cortes & Tactay, 2024). This knowledge-behavior gap presents a challenge to educators and policymakers. According to İşleyen and Demirkaya (2024), nursing students with high disaster literacy did not always demonstrate confidence in their response capabilities, pointing to the importance of experiential learning. Similarly, Gaillard and Mercer (2012) argue that disaster knowledge needs to be localized and integrated with community-based practices to foster genuine preparedness.

In Bacolod City, a low-lying coastal urban center in the Western Visayas region of the Philippines, vulnerability to disasters is particularly high. Repeated flooding events—such as those in 2021, 2023, and 2024—have severely impacted residential communities and schools. Barangay Singcang-Airport, located near the Guimaras Strait, regularly experiences inundation even with moderate rainfall, due to poor drainage and waste management infrastructure (Bayoran, 2025; Titong, 2023). Despite ongoing DRRM initiatives, local stakeholders have noted inconsistencies in student preparedness and participation, especially in low-income public schools where disaster training is limited.

Understanding how senior high school learners in these vulnerable communities perceive their disaster preparedness and response capabilities is essential. Adolescents are increasingly recognized as active participants in community resilience—not just passive victims (Peek, 2008). With proper training and knowledge, they can serve as first responders or advocates within their families and neighborhoods. However, in order to unlock this potential, educators must identify gaps in disaster literacy and translate cognitive knowledge into practical competence through localized, inclusive, and sustained interventions.

This study, therefore, investigates the levels of disaster literacy, perceived preparedness, and response capabilities of senior high school learners in a coastal public high school in Bacolod City. It further examines whether sex and academic strand affect these levels and explores the relationships between knowledge, preparedness, and response. By drawing on the Knowledge, Attitudes, and Practices (KAP) model (Launiala, 1970), as well as Protection Motivation Theory (PMT) (Maddux & Rogers, 1983) and Social Cognitive Theory (SCT) (Bandura, 1986), the research adopts a multi-theoretical lens to understand the dynamics at play. Unlike previous studies that focus solely on knowledge or preparedness, this study aims to connect the dots across the continuum—from literacy to action, highlighting how knowledge must be transformed into attitudes and actual behavioral responses during disasters.

Despite existing mandates and programs, limited empirical data exist regarding the effectiveness of school-based DRRM initiatives in Bacolod City, especially at the senior high school level. Furthermore, few studies in the Philippine context interrogate the interrelationship between disaster literacy and actual or perceived response capabilities. This research addresses that gap and contributes to ongoing conversations about how schools can foster not just disaster-aware but disaster-resilient learners.

Methodology:

This study employed a descriptive-comparative-correlational design to assess the disaster literacy, perceived preparedness, and response capabilities of senior high school learners in a disaster-prone urban community. The descriptive component aimed to determine the general levels of disaster-related knowledge and perceptions among students; the comparative aspect sought to explore significant differences in these variables when grouped by sex and academic strand; and the correlational analysis was used to examine the relationships among disaster literacy, preparedness, and response capabilities. This design is appropriate when seeking to understand current phenomena and relationships among variables without manipulating them (Bloomfield & Fisher, 2019).

The study was conducted in Barangay Singcang-Airport, a coastal and low-lying area in Bacolod City, Philippines. This locale is particularly susceptible to flooding, storm surges, and other weather-related disturbances, making it a strategic site for assessing school-based disaster risk reduction education. According to the Bacolod City Disaster Risk Reduction and Management (DRRM) Plan and recent reports (Bayoran, 2025; Titong, 2023), this area has experienced multiple flooding incidents and is among the most vulnerable barangays in the city.

The respondents consisted of 233 Grade 11 and Grade 12 senior high school students from the Humanities and Social Sciences (HUMSS) and Technical-Vocational-Livelihood (TVL) strands enrolled in a public high school located in the barangay. A stratified random sampling technique was employed to ensure proportional representation across grade levels, sex, and academic tracks. This sampling method increases the precision of estimates by ensuring that subgroups are adequately represented (Cooksey, 2020).

To gather data, the researcher utilized two instruments: a teacher-made multiple-choice test to assess disaster literacy, and an adapted survey questionnaire to measure perceived preparedness and response capabilities. The literacy test was constructed based on the competencies outlined in the K-12 Earth and Life Science and Disaster Readiness and Risk Reduction curriculum guides, and benchmarked against the Division Assessment of Learning tool. The preparedness and response survey was adapted from the instrument developed by Tuladhar et al. (2015), which has been used in similar contexts. It employed a 5-point Likert scale to capture perceptions ranging from strong disagreement to strong agreement.

To establish content validity, the instruments were reviewed by 10 experts in disaster education and curriculum design using Lawshe's (1975) Content Validity Ratio (CVR) method. All test items were rated as "essential" by the panel, achieving a CVR of 1.00 for each item. The overall evaluation of the test instrument was rated as "Very Good" ($M = 4.82$). For reliability, the disaster literacy test underwent pilot testing and yielded a Kuder-Richardson Formula 20 (KR-20) coefficient of 0.75, indicating acceptable internal consistency. The preparedness and response survey achieved a Cronbach's Alpha of 0.94, suggesting high reliability (Cohen et al., 2017).

Upon receiving clearance from the school division superintendent and principal, data gathering commenced. For respondents below 18 years old, informed consent was obtained from both the students and their parents or guardians. The researcher explained the study's purpose, assured voluntary participation, and emphasized confidentiality and anonymity in accordance with the Data Privacy Act of 2012. Students were also advised that they could withdraw at any time without penalty. Hard copies of the instruments were distributed and collected during class hours, with each session lasting approximately 60 minutes.

The data were processed using descriptive and inferential statistics. To answer the first three research questions, means and standard deviations were computed. For analyzing differences across sex and strand, the Mann-Whitney U test was employed, as the data did not follow a normal distribution. To test relationships among disaster literacy, preparedness, and response capabilities, the Pearson Product-Moment Correlation Coefficient was used. This statistical approach was appropriate for examining linear relationships among continuous variables (Frost, 2018).

The ethical principles of respect for persons, beneficence, and justice guided the conduct of this study, in line with international research ethics protocols. No participants were placed at risk beyond minimal discomfort, and all efforts were made to ensure equitable treatment and transparent communication throughout the research process. The results were later shared with school officials and participants through a formal dissemination activity, further reinforcing the collaborative nature of the research.

Results:

The study aimed to determine their levels of disaster literacy, perceived preparedness, and disaster response capabilities, as well as to identify any significant differences across sex and academic strand, and relationships among these key variables. Descriptive and inferential statistics, including Mann-Whitney U tests and Pearson correlation coefficients, were utilized in the analysis.

Table 1
Level of Disaster Literacy

Variables	n	Mean	SD	Interpretation
Sex				
Male	111	24.76	5.36	Fairly Satisfactory
Female	122	24.88	4.22	Fairly Satisfactory
Strand				
HUMSS	133	24.60	5.09	Fairly Satisfactory
TVL	100	25.11	4.35	Fairly Satisfactory
As a whole		24.82	4.79	Fairly Satisfactory

The analysis revealed that senior high school learners demonstrated a fairly satisfactory level of disaster literacy. As shown in Table 1, the overall mean score was 24.82 ($SD = 4.79$). Disaggregated data indicated minimal differences between male ($M = 24.76$, $SD = 5.36$) and female ($M = 24.88$, $SD = 4.22$) students. By academic strand, TVL students slightly outperformed HUMSS students ($M = 25.11$ vs. $M = 24.60$), but both groups remained within the same interpretative range. These results suggest that disaster literacy is relatively uniform among students, likely

influenced by shared curriculum content such as "Earth and Life Science," which embeds disaster-related competencies across all strands.

Table 2

Perceived Disaster Preparedness

Variables	n	Mean	SD	Interpretation
Sex				
Male	111	2.98	0.25	Somewhat Prepared
Female	122	2.98	0.25	Somewhat Prepared
Strand				
HUMSS	133	2.99	0.24	Somewhat Prepared
TVL	100	2.96	0.26	Somewhat Prepared
As a whole		2.98	0.25	Somewhat Prepared

As presented in Table 2, students' perceived preparedness was generally somewhat prepared, with an overall mean score of 2.98 (SD = 0.25). Male and female students both scored identically at $M = 2.98$, indicating no gender-based variation in preparedness. Similarly, HUMSS students ($M = 2.99$) were marginally more prepared than TVL students ($M = 2.96$), although the difference was negligible. These findings reinforce the need to enhance practical aspects of preparedness training—such as drills and emergency planning—to strengthen the transition from awareness to readiness.

Table 3

Perceived Disaster Response Capabilities

Variables	n	Mean	SD	Interpretation
Sex				
Male	111	3.13	0.22	Prepared
Female	122	3.09	0.27	Prepared
Strand				
HUMSS	133	3.12	0.24	Prepared
TVL	100	3.10	0.26	Prepared
As a whole		3.11	0.25	Prepared

The overall level of response capabilities was *prepared*, with a mean of 3.11 (SD = 0.25), as shown in Table 3. Male students rated their response capabilities slightly higher ($M = 3.13$) than females ($M = 3.09$), while HUMSS students ($M = 3.12$) slightly outperformed TVL students ($M = 3.10$). However, these differences were minimal and did not reach statistical significance. The consistently moderate levels of response capabilities across sex and strand suggest equitable exposure to school-wide response protocols and training, yet underscore the potential for deeper experiential interventions.

Differences in Disaster Literacy, Preparedness, and Response

Statistical tests confirmed that there were no significant differences in disaster literacy, preparedness, or response capabilities when grouped by sex or academic strand. For disaster literacy, p -values were 0.27 for sex and 0.95 for strand, while preparedness yielded p -values of 0.82 (sex) and 0.32 (strand). Similarly, response capabilities showed no significant difference across sex ($p = 0.26$) or strand ($p = 0.57$). These results affirm the effectiveness of inclusive DRRM education in delivering consistent outcomes across demographics, but also highlight a plateau effect, with most students falling into moderate categories regardless of group.

Relationships Among Disaster Literacy, Preparedness, and Response

The correlation analysis yielded three key findings:

1. A significant but weak inverse relationship was observed between disaster literacy and perceived preparedness ($r = -0.16$, $p = 0.02$), suggesting that increased knowledge may not automatically lead to improved readiness.
2. No significant correlation was found between perceived preparedness and response capabilities ($r = -0.02$, $p = 0.81$), indicating a disconnect between planning and actual response.
3. A significant but weak negative correlation also emerged between disaster literacy and response capabilities ($r = -0.23$, $p = 0.0004$), implying that higher knowledge might be linked with more critical self-assessment, reducing perceived confidence.

These findings challenge prevailing assumptions in the KAP model and Protection Motivation Theory, which posit a positive link between knowledge and behavior. They also align with literature suggesting that practical experience,

rather than cognitive familiarity alone, is key to building disaster resilience (Gaillard & Mercer, 2012; Wang et al., 2023).

Discussion:

This study assessed the disaster literacy, perceived preparedness, and response capabilities of senior high school students in a coastal public school in Bacolod City. The findings offer meaningful insights into the current state of disaster education among youth in disaster-prone communities and highlight key gaps between knowledge, perception, and action.

The overall fairly satisfactory level of disaster literacy among students confirms that disaster concepts are being conveyed in schools, likely due to the integration of disaster-related content in core subjects such as Earth and Life Science. This finding aligns with the framework set by DepEd Order No. 51, s. 2015, which mandates the inclusion of DRRM across the K-12 curriculum. However, the results also reveal that this knowledge remains largely theoretical. While students can recall information about hazards and safety protocols, their ability to apply this knowledge in real-life disaster contexts is less evident—a gap that reflects the concerns raised by Çalışkan and Üner (2020) and Brown et al. (2014) regarding the limits of knowledge-based disaster literacy.

Moreover, the somewhat prepared level of perceived disaster preparedness suggests a moderate level of readiness among learners. This result is consistent with previous studies such as Cortes and Tactay (2024), who reported similarly moderate preparedness among junior and senior high school students in Northern Luzon. While students are aware of emergency protocols, the absence of regular hands-on training, such as simulations and drills, may limit their confidence and capability to respond when actual disasters occur. The lack of significant difference in preparedness across sex and strand supports the argument that schools are generally delivering uniform DRRM content. However, this also points to a need for more differentiated, context-specific interventions to strengthen student engagement and action.

The finding that students were generally prepared in terms of perceived response capabilities is noteworthy. Despite their limited preparedness, students showed relatively strong confidence in their ability to respond during disasters. This could be attributed to routine school drills or community exposure to recurring hazards, especially in flood-prone areas like Barangay Singcang-Airport. Still, the weak inverse correlations found between disaster literacy and both preparedness ($r = -0.16$) and response capabilities ($r = -0.23$) complicate this interpretation. These results suggest that theoretical knowledge may not directly contribute to practical readiness and may even lead to lower self-perceived efficacy due to heightened awareness of the complexity and risks involved in disaster scenarios (Gaillard & Mercer, 2012).

This inverse relationship challenges widely held assumptions within the KAP model and Protection Motivation Theory (Maddux & Rogers, 1983), both of which propose that knowledge and perceived risk are positively associated with preparedness and action. Instead, the data suggest that students who are more informed may also be more realistic—or more critical—about their limitations. Alternatively, students with lower disaster literacy may overestimate their capabilities, a phenomenon previously noted in disaster education literature (Vu et al., 2023). These interpretations underscore the importance of developing both cognitive understanding and experiential learning in disaster education programs.

The lack of significant correlation between preparedness and response capabilities ($r = -0.02$) further highlights the disconnect between knowing what to do and actually doing it. This gap between preparedness planning and actionable response points to the need for more immersive and participatory methods of disaster education. Wang et al. (2023) emphasize the mediating role of disaster education in converting preparedness into protective actions. Without applied learning environments—such as simulation-based training, role-playing, or real-time drills—students may retain procedural knowledge but remain unprepared to operationalize it in a crisis.

Importantly, no statistically significant differences were found across sex or strand for any of the three variables measured. This suggests that disaster education is being implemented equitably in the school setting. However, uniform delivery does not necessarily equate to optimal effectiveness. It may indicate a ceiling in how much can be achieved through a generic, one-size-fits-all approach. As such, there is value in designing DRRM programs that account for students' backgrounds, learning styles, and emotional needs, as advocated by Peek (2008) and İşleyen & Demirkaya (2024).

The study's location—a high-risk, coastal urban community—amplifies the urgency of these findings. Schools in areas like Bacolod City not only serve as learning spaces but also function as vital nodes for community preparedness. The potential of young people to act as disaster advocates, first responders, and informed citizens can only be realized through education that is contextually grounded, participatory, and skills-based. School-community partnerships, such as those outlined in the proposed Project: P.R.E.P.A.R.A., can enhance disaster education by linking classroom learning with real-world preparedness and resilience strategies.

Overall, the study reveals that while awareness and policy compliance in DRRM education are present, significant gaps persist between what students know and what they can do. The findings highlight the need to recalibrate disaster education strategies—moving beyond mere knowledge transmission to a more experiential, contextually responsive, and psychologically engaging approach.

Conclusion and Recommendations:

This study set out to examine the levels of disaster literacy, perceived preparedness, and response capabilities among senior high school learners in a coastal public high school in Bacolod City. The findings revealed that while students demonstrated a fairly satisfactory level of disaster literacy, their perceived preparedness was only somewhat adequate. Interestingly, students rated their response capabilities more positively, falling within the prepared category. However, these self-assessments were not significantly influenced by sex or academic strand, indicating a uniform reach of disaster education efforts in the school. Despite this consistency, the correlations among the variables were weak and, in the case of disaster literacy and preparedness/response, even negatively associated. This suggests a disconnect between students' knowledge and their perceived ability or readiness to act effectively in actual disaster situations.

The absence of strong positive correlations among the three core variables challenges the assumption that increasing knowledge automatically translates into action. In fact, the inverse relationships found in this study may point to a heightened sense of caution or self-awareness among more knowledgeable students, who might recognize the complexity and unpredictability of disaster scenarios. Conversely, students with lower literacy levels may be more prone to overestimating their capabilities. These findings underscore a critical gap between theoretical understanding and practical competence in DRRM education—a gap that can only be addressed through the integration of experiential and participatory learning strategies. Furthermore, the study reaffirms the importance of evaluating the actual behavioral readiness of students, not just their knowledge base or perceived preparedness.

Based on these findings, it is recommended that disaster education in schools go beyond curriculum integration and engage students through hands-on training, regular drills, role-playing exercises, and simulations that reflect real-life disaster scenarios. Such activities would help bridge the gap between awareness and action and reinforce procedural memory and confidence under pressure. Teachers should be trained not only to deliver content but also to facilitate experiential learning and reflective discussions that help students process risks and assess their preparedness realistically. Schools should partner with local disaster agencies, such as the City Disaster Risk Reduction and Management Office (CDRRMO), the Bureau of Fire Protection (BFP), and other stakeholders, to co-deliver community-based training and disaster drills.

Moreover, school administrators are encouraged to allocate resources to support these enhancements, including provisions for basic safety equipment, training materials, and transportation for educational field visits to local weather stations or emergency response centers. Students, on their part, should be encouraged to take an active role in disaster preparedness efforts within their households and communities, thereby reinforcing their school-based learning with meaningful civic participation. Finally, future research should consider including other factors such as socioeconomic status, prior disaster experience, and family preparedness strategies, which may also influence students' disaster literacy and behaviors. A follow-up longitudinal study may also provide more robust insights into how disaster education interventions influence long-term behavioral outcomes.

In conclusion, while the study affirms that DRRM education in the school is inclusive and reaching all learners equitably, it also highlights the urgent need to shift from a knowledge-centric approach to one that fosters real-world skills and resilience. Disaster-ready youth are not merely those who know what disasters are—they are those who can respond swiftly, adapt appropriately, and help others do the same. By recalibrating DRRM education to focus on application, reflection, and empowerment, schools can play a transformative role in building safer, more prepared communities.

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