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Assessment of emergency awareness and preparedness among students and employees at Benguet State University – Buguias Campus

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Abstract. In the Philippines, ranked the world's most disaster-prone nation, recent calamities like Typhoon Carina (2024) inflicted ₱308.5 million in school damages, underscoring the urgent need for robust emergency preparedness in hazard-vulnerable higher education institutions (HEIs) such as Benguet State University–Buguias Campus (BSU-Buguias), a landslide hotspot in the Cordillera. This mixed-methods study assessed awareness levels among students and employees for earthquakes, fires, typhoons, and landslides; evaluated overall emergency preparedness; and identified institutional gaps to bolster DRRM resilience. An explanatory sequential design surveyed 291 respondents (268 students, 23 employees) using a reliable (Cronbach's $\alpha=0.943$) 4-point Likert-scale questionnaire, followed by key informant interviews. Data were analyzed via weighted means, standard deviations, and thematic analysis, grounded in Situational Awareness, Protection Motivation, and Organizational Preparedness Theories. Overall awareness was "Aware" (M=3.09), highest for earthquakes (3.33, Completely Aware) but lowest for landslides (2.87); preparedness was moderately "Aware" (M=2.57), with high willingness (3.20) offset by low supply accessibility (1.96) and training (1.98). Employees showed greater variability; qualitative data highlighted signage and route deficiencies. Findings reveal a critical awareness-preparedness disconnect, urging hands-on drills, accessible supplies, hazard-specific signage, and LGU partnerships to translate motivation into operational resilience, aligning with RA 10121 mandates for safer Philippine HEIs.

Keywords. emergency preparedness, disaster awareness, DRRM, higher education, Buguias Campus

Introduction

Emergency preparedness of students and employees in higher education institutions (HEIs) is essential for promoting safety, resilience, and continuity during disasters. Beyond academic instruction, these stakeholders play a vital role in safeguarding campus communities. This importance intensifies in hazard-prone settings like the Philippines, which frequently experience typhoons, earthquakes, and landslides. These natural hazards continue to severely impact schools, highlighting the critical need for disaster risk reduction and management (DRRM) integration.

The Philippines, ranked among the world's most disaster-prone countries, witnesses frequent destructive events such as Typhoon Carina (2024), which caused ₱308.5 million

damages to Northern Luzon schools, Typhoon Egay (2023), disrupting 479 schools across nine regions, and the 2022 Luzon earthquake, damaging over 9,500 schools (NDRRMC, 2023). Despite mandates like Republic Act No. 10121 requiring educational institutions to embed DRRM in their operations, readiness levels vary: only 54% conduct regular drills, and fewer than 40% have designated disaster officers (DepEd, 2022; Lu, 2025).

In the Cordillera Administrative Region (CAR), risks are further amplified by mountainous terrain and frequent rainfall. Benguet Province, home to Benguet State University–Buguias Campus (BSU–Buguias), is highly susceptible to landslides and flooding, with Tublay, Bokod, and Buguias ranked among the nation’s highest risk zones (Agoot, 2023). Recent disasters continue to damage educational facilities, but many schools lack updated DRRM plans and consistent practice of safety drills (DepEd Benguet Division, 2023). Local data on preparedness at BSU–Buguias are limited, hindering targeted risk reduction efforts.

This study aims to assess the emergency preparedness level of students and employees at BSU–Buguias Campus and generate insights to enhance institutional resilience and the effectiveness of disaster risk reduction and management initiatives in this hazard-prone higher education setting.

Literature Review

Emergencies in schools are inevitable, and the preparedness of students and employees is critical for safety and educational continuity (Ibrahim et al., 2025). Emergency preparedness entails proactive planning including risk assessment, prevention measures, and readiness to respond (IFRC, n.d.; WHO, 2023). Globally, HEIs increasingly acknowledge the importance of structured disaster preparedness, integrating curriculum and institutional procedures to raise disaster awareness and response capacity (Patel et al., 2023).

Barriers to effective preparedness include inadequate training, outdated plans, and weak stakeholder engagement (Horton et al., 2023; Pal et al., 2023). Clear evacuation signage and hazard-specific guidance are crucial for effective response (Wang, 2025). Simulation and hands-on training have proven more effective than lectures alone for boosting competence (Alinier & Sonesson, 2025; Aslanoğlu, 2024). However, inconsistent delivery and lack of localization of preparedness education limit effectiveness (Guo et al., 2025).

In the Philippine context, HEIs face compound risks from typhoons, earthquakes, floods, and landslides. Studies reveal mixed preparedness levels: Malonecio (2023) noted high disaster awareness and readiness scores among college students but varied by hazard type, while Taja-on et al. (2025) highlighted the need for experience-based disaster education to complement knowledge. Salita et al.’s (2020) research among teachers showed high self-efficacy but inconsistent translation into preparedness actions, underscoring psychological barriers like fear.

Awareness correlates positively with preparedness but does not guarantee operational readiness. Baldomar (2024) found gaps in students’ understanding of specific protocols, emphasizing curriculum integration and community collaboration as critical. Leadership plays a pivotal role: principals’ adaptive leadership and community mobilization have enhanced preparedness despite resource scarcity (Atillo et al., 2025; Pardillo, 2025).

Recent literature also calls for embedding DRRM within wider sustainability and urban planning frameworks in HEIs (Fernandes Sanches et al., 2021; Macatulad & Biljecki, 2024). Nonetheless, practical application remains uneven, especially in rural and hazard-prone areas. Locally, studies in flood- and landslide-prone regions report high awareness but weak implementation of real-world drills and emergency supply access, indicating gaps between policy and practice (Cubillas et al., 2022; Dela Peña, 2025; Balanggoy, 2024; Bela-o, 2025).

Budget constraints and logistical challenges are common, limiting program reach despite understanding its importance (Viado, 2023; Arcegoni et al., 2024). Participatory strategies like student-led hazard mapping prove effective in fostering engagement (Arcegoni et al., 2024). Overall, while DRRM integration improves safety awareness and community involvement, there is a marked shortage of role-based assessments and protocol-specific preparedness in higher education institutions, especially in high-risk zones like Benguet.

Theoretical / Conceptual Framework

This study is anchored on theories and principles that explain the dimensions of emergency preparedness within educational institutions. It draws from the Situational Awareness Theory (Endsley, 1995), which emphasizes the importance of perceiving, understanding, and projecting environmental cues during emergencies. This theory guides the formulation of research questions and survey items assessing how students and employees of Benguet State University–Buguias Campus recognize hazard signals, interpret their meanings, and anticipate appropriate responses.

Complementing this is the Protection Motivation Theory (Rogers, 1975; 1983), which explains how individuals are motivated to adopt protective behaviors when they perceive a threat as severe, recognize their vulnerability, and believe they have the capacity to respond effectively. This framework informs the measurement of risk perception, self-efficacy, and willingness to engage in preparedness actions as key factors in influencing individual readiness during emergencies. The study also integrates the Organizational Preparedness Theory (Tierney, 2007) which highlights that resilience depends on systematic planning, coordination, communication, and resource allocation. This theoretical lens shapes the qualitative aspects of the study, focusing on how the university manages its preparedness systems and ensures coordination among its stakeholders.

In addition, the study is grounded in the legal and policy frameworks of the Republic Act No. 10121 (Philippine Disaster Risk Reduction and Management Act of 2010), CHED Memorandum Order No. 1, s. 2014, and the Sendai Framework for Disaster Risk Reduction 2015–2030 which mandate the integration of disaster risk reduction and management into educational institutions. These frameworks provide a legal and institutional foundation ensuring that the study’s findings can inform both compliance and improvement in BSU’s DRRM initiatives.

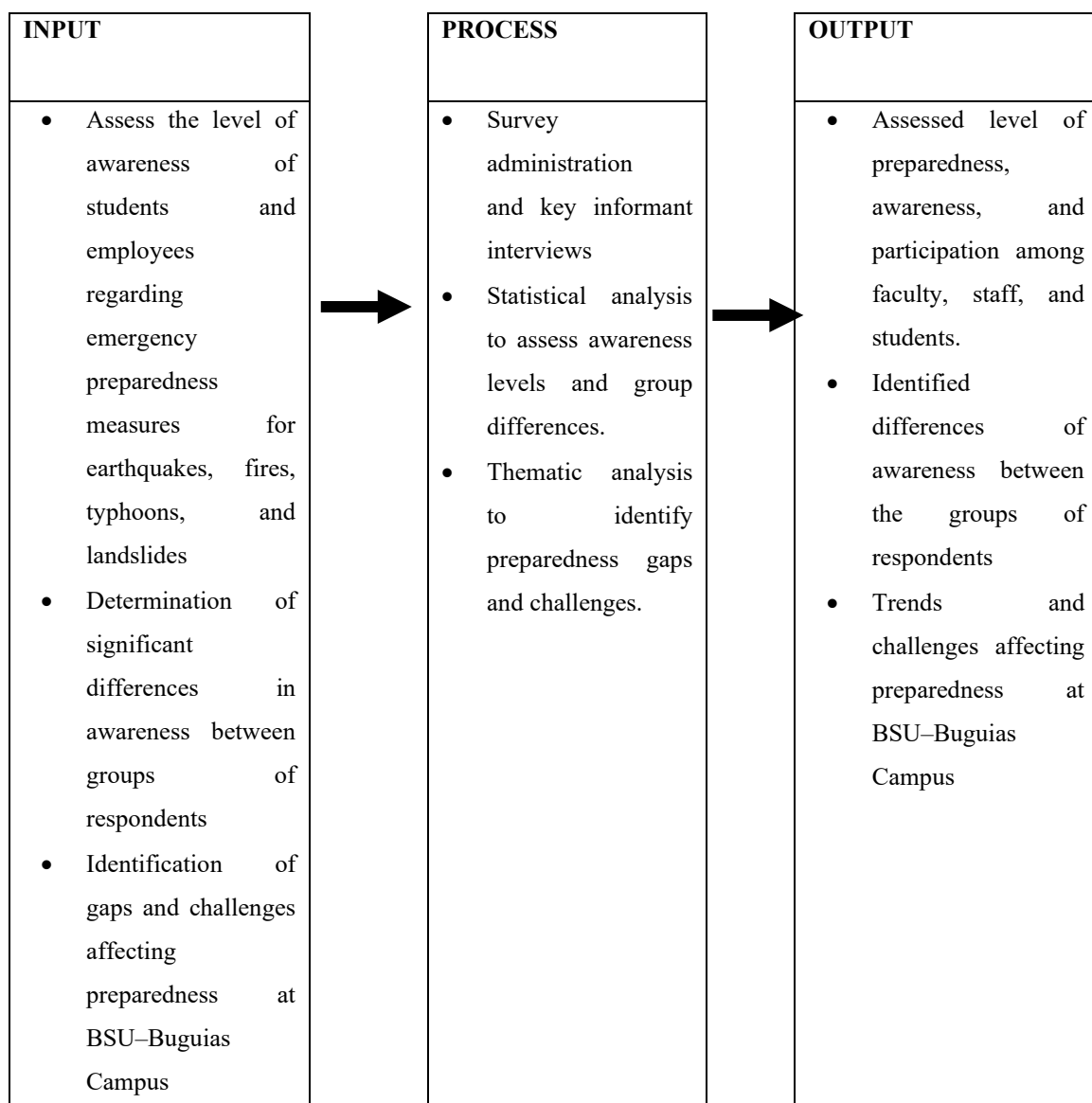
Collectively, these theories and frameworks guide the formulation of research questions, the design of quantitative and qualitative instruments, and the interpretation of findings. They ensure that the study not only measures preparedness levels but also identifies the behavioral, cognitive, and organizational factors influencing them. By integrating these perspectives, the study produces findings that are both theoretically grounded and practically relevant in strengthening localized emergency preparedness and resilience at BSU–Buguias Campus.

Thus, Figure 1 illustrates the research paradigm. It utilized the Input–Process–Output (IPO) framework to systematically examine the emergency preparedness of Benguet State University–Buguias Campus. The inputs of the study included the assessment of students’ and employees’ level of awareness regarding emergency preparedness measures for earthquakes, fires, typhoons, and landslides, as well as the identification of significant differences in awareness between groups of respondents and the recognition of gaps and challenges affecting preparedness within the campus. These inputs were addressed through a series of processes, which involved the administration of survey questionnaires and the conduct of key informant interviews to gather both quantitative and qualitative data. The data were then subjected to

statistical analysis to evaluate awareness levels and test for significant differences between groups, alongside thematic analysis to identify preparedness gaps and institutional challenges.

From these processes, the outputs of the study emerged, including a clear profile of the level of preparedness, awareness, and participation among faculty, staff, and students; the identification of differences in awareness between respondent groups; and the documentation of prevailing trends and challenges that influenced the overall state of emergency preparedness at BSU–Buguias Campus.

Figure 1
Paradigm of the Study



Significance of the Study

The study seeks to assess the emergency preparedness of students and employees at Benguet State University–Buguias Campus in order to strengthen institutional resilience and

promote a culture of safety within the academic community. The findings will provide significant contributions to the following:

University Community. It will help improve safety measures, training programs, and emergency protocols, thereby protecting students, faculty, staff, and property during emergencies.

Students and Employees. The study promotes greater awareness and engagement in emergency preparedness efforts. It encourages proactive participation in drills, hazard education, and institutional initiatives that contribute to personal safety and collective resilience.

Local DRRM Councils and Emergency Responders. The research offers localized data that may improve coordination between BSU–Buguias Campus and external agencies during actual emergencies, fostering a more integrated response system.

Academic Community. The study contributes to the limited body of literature on emergency preparedness in rural higher education settings. It highlights the importance of role-based analysis and mixed-methods approaches in understanding preparedness dynamics in hazard-prone institutions.

Objectives of the Study

This study aims to assess the emergency preparedness of students and employees at Benguet State University–Buguias Campus, with the goal of strengthening the institution’s disaster resilience and readiness. Specifically, it seeks to:

1. Evaluate the level of awareness among students and employees regarding various types of emergency situations, including:
 - a. Earthquakes
 - b. Fires
 - c. Typhoons
 - d. Landslides
2. Assess the current level of emergency preparedness practiced by the students and employees.

Methodology

This section of the paper discusses the study design, population and locale of the study, data gathering tool, data gathering procedures, treatment of data, and ethical considerations.

Study Design

The study utilized a mixed-method approach, specifically an explanatory sequential design, to address the statement of the problem. In the quantitative phase, data on the level of awareness, emergency preparedness, and areas for improvement were collected using a structured survey administered to students and employees of BSU–Buguias Campus. The quantitative results provided a descriptive profile of the respondents’ awareness and preparedness levels across different emergency situations, namely earthquake, fire, typhoon, and landslide, and helped identify the indicators that required further improvement.

The qualitative phase followed and was guided by the quantitative results. Selected participants took part in key informant interviews to explain the reasons behind the observed levels of awareness and preparedness and to provide insights on the identified gaps in emergency management. This allowed for richer and contextualized understanding of the survey findings and helped to validate, clarify, and elaborate on the quantitative results. The integration of both phases provided a more comprehensive interpretation of the data that addressed all the specific objectives of the study.

Population and Locale of the Study

The population of this study consisted of all officially enrolled undergraduate students and all employed faculty and staff of Benguet State University–Buguias Campus during the First Semester of Academic Year 2025–2026. The total undergraduate student population was 979, while the total employee population was 85. Random selection of respondents was conducted using the official master lists obtained from the Registrar’s Office (for students) and the Human Resource Management Division Office (HRMDO) (for employees). Only individuals actively enrolled or employed on campus during data collection were included in the sample.

To determine the sample size, Slovin’s formula was used at a 5% margin of error and 95% confidence level:

$$n = \frac{N}{1 + Ne^2}$$

Where:

n = sample size (1,064)
 N = total population
 e = margin of error (0.05)

Table 1 presents the population and sample allocation for the study at Benguet State University–Buguias Campus. It shows a total population of 1,064 individuals, divided into two groups: students and employees. Students represent the overwhelming majority with 979 individuals, constituting 92.01% of the population, while employees’ number 85, comprising 7.99%. The sample was proportionally allocated, with 268 students and 23 employees, totaling 291 respondents.

Table 1
Distribution of Students and Employees

Group	Population (N _i)	Percentage (%)	Allocated Sample (n _i)
Students	979	92.01%	268
Employees	85	7.99%	23
Total	1,064	100%	291

Data Gathering Tools

This study utilized a structured survey questionnaire as the primary data-gathering tool to assess the level of emergency preparedness of students and employees at Benguet State University–Buguias Campus. The instrument was divided into four parts: (1) level of awareness and (2) emergency preparedness. It focused on four types of emergencies: earthquakes, fires, typhoons, and landslides. The questionnaires employed a 4-point Likert-type scale designed to measure awareness, preparedness, and perceptions regarding institutional gaps. This scale was selected for its clarity, simplicity, and ability to capture the degree of respondents’ perceptions without offering a neutral midpoint, thus encouraging more decisive responses.

The instrument was partially adapted from the PHIVOLCS and DepEd Earthquake Preparedness Manual for Schools, as well as previous studies on emergency preparedness in higher education institutions, with proper acknowledgment and citation. A pilot test was conducted among 30 respondents from a comparable campus to evaluate the clarity, consistency, and usability of the survey tool. The pilot data were analyzed using Cronbach’s Alpha to establish internal consistency.

Table

2

Reliability Statistics of the Survey Instrument

Number of Items	Sum of Item Variances	Total Variance of Sum	Cronbach's Alpha
58	24.44	332.06	0.943

Cronbach's Alpha was computed using the following formula:

$$\alpha = \frac{N}{N - 1} \left(1 - \frac{\sum \text{item variances}}{\text{total variance of sum}} \right)$$

Where:

N = number of items = 58
 Sum of item variances = 24.44
 Total variance of the summed scale = 332.06

Substituting the values yielded a reliability coefficient of $\alpha = 0.943$, which indicates excellent internal consistency (Gliem & Gliem, 2003). Thus, the instrument was deemed reliable and appropriate for final data collection.

Data Gathering Procedures

Before data collection, the researchers secured ethics clearance from the Benguet State University Research Ethics Committee and permission from the Campus Executive Dean. Respondents received an invitation letter and informed consent form that explained the purpose, voluntary nature, and confidentiality of the study. The structured questionnaires were administered to students during scheduled class hours and to employees through their respective offices, either in paper form or via secure online links. Completed questionnaires were retrieved immediately on-site or electronically monitored until the required sample was achieved.

To enrich the quantitative findings, key informant interviews were conducted with administrators, student leaders, and selected staff, each lasting approximately 30 to 45 minutes. The data-gathering process lasted four to six weeks, depending on class schedules, office availability, and administrative approvals. Throughout the entire process, strict ethical considerations were observed, ensuring voluntary participation, confidentiality, informed consent, and the right to withdraw at any time without penalty.

Treatment of Data

The study employed both quantitative and qualitative data analysis procedures to comprehensively assess the level of emergency preparedness at Benguet State University–Buguias Campus. For the quantitative data, responses from the structured survey questionnaires were tallied, encoded, and statistically processed using Microsoft Excel and the Statistical Package for the Social Sciences (SPSS) version 29. Descriptive statistics such as frequency, percentage, weighted mean, and standard deviation were used to determine the respondents' level of awareness, preparedness, and areas for improvement across different emergency situations (earthquake, fire, typhoon, and landslide). Combined weighted means were computed to represent the overall preparedness levels of both students and employees.

To interpret the weighted mean scores, the following Four-Point Likert Scale Mean Interpretations were adopted:

Table 3
Level of Awareness on the Different Emergencies

Numerical Value	Statistical Limits	Descriptive Equivalent	Symbol	Interpretation
4	3.25 – 4.00	Completely Aware	CA	Respondents have full understanding and are very knowledgeable about emergency protocols.
3	2.50 – 3.24	Aware	A	Respondents have adequate awareness but may still lack depth in some areas.
2	1.75 – 2.49	Slightly Aware	SA	Respondents have limited awareness and require more orientation and training.
1	1.00 – 1.74	Not Aware	NA	Respondents lack basic knowledge and understanding of emergency-related concepts.

Table 4
Level of Emergency Preparedness

Numerical Value	Statistical Limits	Descriptive Equivalent	Symbol	Interpretation
4	3.25 – 4.00	Strongly Agree	SA	Respondents are highly prepared, confident, and capable of responding effectively to emergencies.
3	2.50 – 3.24	Agree	A	Respondents are moderately prepared but may lack consistency in actual emergency response actions.
2	1.75 – 2.49	Disagree	D	Respondents have limited preparedness and require more training, orientation, and resources.
1	1.00 – 1.74	Strongly Disagree	SD	Respondents are not prepared and do not demonstrate any confidence or capability in emergency response.

For the qualitative part, responses from open-ended survey items and interview excerpts were analyzed using descriptive qualitative analysis. Responses were summarized, grouped according to similarities, and presented as supporting narratives to provide context and explanation to the quantitative findings.

Lastly, data triangulation was used to integrate quantitative results with qualitative insights. This allowed for deeper interpretation of patterns, verification of findings, and

identification of contextual and behavioral factors influencing emergency preparedness among students and employees.

Ethical Considerations

The study ensured voluntary participation through informed consent, with respondents free to withdraw at any time without penalty. Anonymity was maintained by not collecting personally identifiable information, and confidentiality was upheld by securing all responses and reporting results only in aggregated form. All digital data was stored in a password-protected device accessible only to the researcher and was deleted after one year following the completion of the study to ensure compliance with data privacy and ethical research standards. Risks to participants were minimized by avoiding sensitive questions and ensuring that no physical or psychological harm was involved. Participant selection followed non-discriminatory criteria, limited only to the study's objectives. Findings were shared with the campus administration and participants through a summary report to support improvements in the university's emergency preparedness and response initiatives.

Results and discussion

This section presents the results and discussion of the study, organized according to the sequence of the research objectives. The presentation begins with the assessment of the respondents' level of awareness on the four emergency situations: earthquake, fire, typhoon, and landslide. This is followed by the analysis of their emergency preparedness, and finally, the identification of areas for improvement based on the highest-rated indicators. Both quantitative and qualitative findings are integrated to provide deeper interpretation and explanation of the results.

Level of Awareness of Students and Employees regarding Different Types of Emergency Situations

This section presents the level of awareness of students and employees regarding different types of emergency situations specifically earthquake, fire, typhoon, and landslide. Their awareness was assessed using weighted mean and interpreted through the four-point Likert scale. The results indicate how knowledgeable the respondents are about emergency concepts, safety procedures, and institutional protocols related to disaster preparedness.

Level of Awareness of Students and Employees on Earthquake Safety Protocols

Table 5 presents the level of awareness of students and employees on earthquake safety protocols. The overall weighted mean for earthquake preparedness is 3.33 (A). This corresponds to the descriptive equivalent of "Completely Aware." This suggests that, across both indicators and both demographic groups (students and employees), the respondents generally perceive themselves as having a high level of awareness regarding fundamental earthquake safety measures.

Students (3.66) report a slightly higher level of awareness than Employees (3.43). This minor difference could be attributed to factors such as recent and frequent safety drills in educational settings, or perhaps the inclusion of disaster education in the current curriculum. The Standard Deviation is lower for Students (0.58) compared to Employees (0.71). This suggests that the students' responses were more homogeneous (clustered closer to the mean), while the employees' responses showed a slightly greater variability or wider range of perceived awareness.

Table 5
Level of Awareness on Earthquake Protocols

INDICATORS	Students		Employees		Weighted Mean	Descriptive Equivalent
	Weighted Mean	Standard Deviation	Weighted Mean	Standard Deviation		
1. I know the proper “Drop, Cover, and Hold” procedure	3.66	0.58	3.43	0.71	3.55	Completely Aware
2. I know the evacuation routes and safe assembly points for earthquakes	3.14	0.81	3.08	0.83	3.11	Completely Aware
Sub-mean: 3.33 (Aware)						

The highest-rated indicator was “I know the proper ‘Drop, Cover, and Hold’ procedure,” which obtained a combined weighted mean of 3.55 (Completely Aware). This result shows that both students (WM = 3.66) and employees (WM = 3.43) are highly aware of the fundamental response technique widely taught during earthquake drills and safety campaigns. This is consistent with routine safety information provided by institutions and reinforced through national campaigns such as the “Shake Drill” led by NDRRMC. Educational programs in schools and workplaces have been shown to significantly increase procedural knowledge and preparedness for earthquake response (Subedi et al., 2020).

On the other hand, the lowest-rated indicator was “I know the evacuation routes and safe assembly points for earthquakes” with a combined weighted mean of 3.11, interpreted as Aware. Although both students (WM = 3.14) and employees (WM = 3.08) demonstrated awareness, their ratings were notably lower compared to procedural awareness. This suggests that while respondents know what actions to take during an earthquake, they are less familiar with the specific locations of designated evacuation routes and assembly points on campus. This implies a need for improved signage, visible evacuation maps, and regular orientation specific to building layouts. Several studies recommend continuous drills and clear communication as essential for preparing communities effectively, supporting the implication that improved signage and regular orientation programs would address current gaps in evacuation route awareness (BNHS study, 2025).

Qualitative responses further supported this finding, as some participants mentioned that “We know what to do, but we are unsure where the actual evacuation areas are located.” Others expressed that evacuation maps are visible in some buildings but not consistently posted in all campus facilities. Such qualitative insights reflect a common theme in earthquake preparedness literature: individuals often know what to do during an earthquake but lack detailed spatial knowledge about safety zones. This gap reduces the overall effectiveness of preparedness measures and highlights the importance of integrating qualitative feedback into preparedness planning and risk communication strategies (Yildiz, 2020).

Together, these findings indicate that while educational efforts have successfully raised procedural earthquake awareness, more focused interventions on environmental familiarity and continuous, clear communication are necessary to improve comprehensive preparedness.

Level of Awareness of Students and Employees on Fire Safety Protocols

As shown in Table 6, the overall sub-mean is 2.97, which is interpreted as "Aware." This indicates that, on average, respondents possess a satisfactory foundational knowledge of fire-related safety measures. However, this overall score masks significant variability and critical gaps between different safety components, which require deeper analysis to ensure actual preparedness. An awareness level of "Aware" is generally acceptable but often signifies knowledge that may not translate perfectly into effective action during a high-stress emergency.

Table 6
Level of Awareness on Fire Safety Protocols

Indicators	Students		Employees		WM	Descriptive Equivalent
	WM	SD	WM	SD		
1. I am aware of safe exit routes during a fire.	3.26	0.73	2.75	0.92	3.22	Aware
2. I know who to contact in case of a fire emergency.	2.76	0.86	2.87	0.90	2.77	Aware
3. I am aware of fire alarms.	3.26	0.77	3.21	0.76	3.26	Completely Aware
4. I am aware of fire drills.	3.25	0.76	3.35	0.70	3.26	Completely Aware
5. I know the campus policy on the use of fire extinguishers	2.14	0.77	2.87	1.01	2.20	Slightly Aware
6. I am aware of the proper actions to take if I smell gas inside a building.	3.07	0.82	3.09	0.83	3.07	Aware
7. I am aware of the proper actions to take if I see smoke inside a building.	3.04	0.80	3.04	0.81	3.04	Aware
Sub-mean: 2.97						Aware

The highest-rated indicators were "I am aware of fire alarms" and "I am aware of fire drills," both achieving a combined weighted mean of 3.26 ("Completely Aware"). This strong awareness confirms that the institution is effective in communicating and enforcing the warning systems and the basic process of an organized response, likely due to mandatory and occasional safety exercises. The similar findings reported by Gao et al. (2025) concerning the positive impact of fire drill participation on safety knowledge support the interpretation that these

routine institutional practices successfully instill awareness of the need for an organized response, establishing fundamental behavioral conditioning.

The awareness level notably decreases when moving from knowing that one should respond to knowing how to take specific, life-saving action. While respondents demonstrated adequate awareness of general steps, such as proper actions when smelling gas (3.07) or seeing smoke (3.04), the awareness of safe exit routes showed a concerning variance, particularly among Employees (2.75) compared to Students (3.26). This finding suggests a potential failure in providing consistent, localized, and repeated exposure to evacuation maps and routes across all employee workplaces, indicating a significant risk since employees often occupy fixed posts and are expected to guide others during an emergency.

Furthermore, the ability to initiate the emergency response chain is questionable, given the relatively low mean score of 2.77 ("Aware") for knowing who to contact in case of a fire emergency. While employees were slightly more aware (2.87) than students (2.76), this low score indicates that the specific internal campus emergency contacts (e.g., campus security, facilities management), which are crucial for rapid, official intervention, are not clearly or consistently communicated, potentially leading to critical delays.

The most significant and alarming finding is the lowest-rated indicator: "I know the campus policy on the use of fire extinguishers," with a weighted mean of 2.20, interpreted as "Slightly Aware." This demonstrates a critical weakness in the institution's fire safety profile, as extinguisher use is an active, practical skill essential for preventing small fires from escalating into major disasters. The awareness is particularly low among Students (2.14), while the higher Standard Deviation for Employees (1.01) suggests a highly polarized group—likely only a few designated personnel (e.g., security, maintenance) possess this knowledge, while the majority are uninformed. This aligns with research in other educational settings (Bushesha & Ndibalema, 2025) that identified inadequate training on practical fire safety measures like extinguisher usage. The qualitative interview findings further compound this concern by pointing to resource-related issues such as insufficient availability, unclear labeling, and poor maintenance of extinguishers, reflecting challenges commonly identified in workplace risk assessments (Hassanain, 2022). This highlights a dual problem: a knowledge gap in the practical application (the P.A.S.S. method) and a systemic gap in ensuring the accessibility and readiness of the equipment itself.

Consequently, these findings underscore a vital need for the institution to transition from mere general awareness to robust, practical readiness. The high scores on alarms and drills only confirm that respondents know when to evacuate, not how to actively manage or suppress a fire threat. The discrepancy emphasizes the importance of implementing comprehensive, hands-on, experience-based disaster education programs, as advocated by Taja-on et al. (2025), to reinforce the practical application of protocols.

Specifically, the institution must focus on mandatory fire extinguisher training for all constituents, clearer communication of institutional policies, and an immediate audit and enhancement of physical safety infrastructure and signage (Mendoza & Reyes, 2023) to ensure effective emergency response and safety.

Level of Awareness of Students and Employees on Typhoon Safety Protocols

The data presented in Table 7 reveals a general consensus regarding typhoon preparedness, summarized by an overall sub-mean of 3.19, interpreted as "Aware" (or Aware). This suggests that both students and employees have an adequate foundational understanding of the safety measures required during typhoon events. The term "Aware" implies that respondents believe they possess the necessary knowledge, establishing a solid base of general

self-efficacy in dealing with typhoons. However, a deeper analysis of the individual indicators points to areas where awareness is less robust, particularly concerning location-specific planning and institutional coordination.

Table 7

Level of Awareness on Typhoon Safety Protocols

INDICATOR	Students Weighted Mean	Standard Deviation	Employees Weighted Mean	Standard Deviation	Weighted Mean	Descriptive Equivalent
1. I know the safety measures to take before typhoons.	3.26	0.72	3.43	0.71	3.27	Aware
2. I know the safety measures to take during typhoons.	3.19	0.75	3.43	0.71	3.21	Aware
3. I know the safety measures to take after typhoons.	3.17	0.80	3.35	0.76	3.18	Aware
4. I am aware of designated safe areas or shelters during typhoons.	3.09	0.80	2.91	1.08	3.08	Aware
5. I know where to access reliable weather updates and advisories.	3.14	0.76	3.32	0.82	3.16	Aware
6. I know class suspension and emergency protocols.	3.16	0.77	3.09	1.06	3.15	Aware
7. I am aware of the importance of storing food and water.	3.23	0.78	3.22	0.93	3.23	Aware
8. I am aware of the importance of storing other basic necessities.	3.25	0.77	3.43	0.82	3.27	Aware
9. I know the role of the LGU and the university in typhoon response.	3.21	0.85	3.04	0.91	3.20	Aware
			Sub-mean: 3.19 Aware			

The data strongly indicates that respondents are most aware of household-level preparedness and the general sequence of safety steps. The highest-rated indicators were: "I am aware of the importance of storing other basic necessities" (WM = 3.27) and "I know the safety measures to take before typhoons" (WM = 3.27). Following closely is "I am aware of the importance of storing food and water" (WM = 3.23). These findings demonstrate that the

fundamental message regarding securing basic supplies in anticipation of prolonged weather disturbances has been successfully disseminated and internalized. This strong awareness of pre-typhoon actions, during-typhoon actions (3.21), and post-typhoon actions (3.18) confirms a generalized understanding of the three phases of disaster response.

Furthermore, employees consistently show higher awareness across these immediate safety measures (e.g., safety measures before typhoons: Students 3.26 vs. Employees 3.43), indicating better retention or more explicit organizational training for staff regarding immediate personal and property safety.

In contrast to the strong generalized knowledge, the lowest-rated indicator is "I am aware of designated safe areas or shelters during typhoons," with a combined weighted mean of 3.08 ("Aware"). This represents a critical gap between knowing what to do and knowing where to go. While this score is still technically in the "Aware" range, its relative weakness indicates uncertainty regarding the exact locations of official evacuation shelters, both on campus and in nearby communities.

The difference in awareness between groups is notable here: Students (3.09) are slightly more aware than Employees (2.91), while the Employees' Standard Deviation (1.08) is significantly higher, suggesting a highly non-uniform and polarized knowledge base among staff regarding designated campus shelters.

This finding is particularly concerning given the employee's qualitative statement: *"Some parts of the campus experience water pooling during heavy rain... Evacuation areas should be clearly identified and communicated."* This directly links the knowledge gap to existing infrastructure vulnerabilities (poor drainage) and underscores the need for spatial risk communication, such as clear signage and hazard mapping. This supports the literature that preparedness programs often fail to communicate location-specific protocols (Guo et al., 2025).

Other key indicators of institutional awareness show a moderately strong, yet still improvable, status. Knowledge of "class suspension and emergency protocols" (WM = 3.15) and "where to access reliable weather updates and advisories" (WM = 3.16) suggests effective, albeit sometimes imperfect, institutional communication channels. Similarly, "I know the role of the LGU and the university in typhoon response" (WM = 3.20) is satisfactory.

However, the higher standard deviations across multiple employee indicators (e.g., safe areas SD = 1.08; protocols SD = 1.06) suggest a consistency challenge in how institutional policies and emergency information are disseminated and internalized among the employee population.

These findings strongly suggest that while the institution has successfully promoted the general concept of preparedness (e.g., storing supplies), it has fallen short in providing the specific, actionable, and spatial information necessary for a coordinated and safe evacuation. The relative lack of clarity on shelters is particularly risky, as theoretical knowledge is useless if individuals cannot safely reach a designated location during a high-stress event. The findings align with research emphasizing that institutions often deliver information verbally but lack the visible markers, maps, and accessible signage required during actual emergencies (Viado, 2023; Arcego et al., 2024).

Therefore, enhanced Disaster Risk Reduction and Management (DRRM) efforts must prioritize localized hazard mapping, the creation of highly visible and accessible signage for safe shelters and evacuation routes, and strengthened coordination with the LGU (UNDRR, 2025) to ensure that the adequate general awareness translates into practical, life-saving readiness.

Level of Awareness of Students and Employees on Landslide Safety Protocols

The overall level of awareness regarding landslide safety protocols, as presented in Table 8, is encapsulated by a combined sub-mean of 2.87, interpreted as "Aware." Notably, this is explicitly stated as the lowest overall awareness level among all four hazards studied, underscoring that while respondents possess basic hazard recognition, their knowledge of procedural and location-specific preparedness is significantly limited. This low score suggests that the perceived risk, despite the area's known vulnerability, may not translate into adequate confidence in actionable safety measures.

Table 8

Level of Awareness Landslide Safety Protocols

INDICATORS	STUDENTS		EMPLOYEES		Weighted Mean	Descriptive Equivalent
	WM	SD	WM	SD		
1. Buguias is a landslide-prone area.	2.98	0.84	2.96	1.00	2.98	Aware
2. I know the evacuation areas in case of a landslide.	2.90	0.97	2.57	1.06	2.87	Aware
3. I know tilting trees or unusual soil movement warning signs.	2.87	0.82	2.65	1.09	2.85	Aware
4. I know cracks or fissures as warning signs of landslides.	2.95	0.75	2.78	1.06	2.94	Aware
5. I know what actions to take during a landslide.	2.84	0.86	2.83	1.01	2.83	Aware
6. I know safe routes away from landslide-prone slopes.	2.80	0.82	2.61	1.09	2.78	Aware
7. I know the community's early warning systems for landslides.	2.85	0.78	2.57	1.06	2.83	Aware
			Sub-mean: 2.87			Aware

The highest-rated indicators relate to the fundamental recognition of the hazard and its signs. The indicator "Buguias is a landslide-prone area" achieved the highest mean (2.98, Aware), showing a generalized, satisfactory recognition of geographical vulnerability. This is immediately followed by awareness of "cracks or fissures as warning signs of landslides" (WM = 2.94, Aware). This indicates that the community successfully perceives the threat through visible environmental clues, such as land cracks or slope instability. This aligns with the Situational Awareness Theory, where respondents demonstrate a perception of the hazard.

However, while general awareness of the environmental signs is present, awareness of more dynamic indicators like "tilting trees or unusual soil movement" (WM = 2.85, Aware) is slightly lower, suggesting that the recognition of subtle, non-fissure-related warning signs is less uniform.

A key observation across the table is that Students consistently report a higher Weighted Mean across all indicators compared to Employees, while the Employees' Standard Deviation is consistently higher. For example, awareness of safe routes is Students: 2.80 vs. Employees: 2.61, with the Employees' SD at 1.00. This polarization among employees suggests that only a small, specific subset of the staff (perhaps security or maintenance) may be well-informed, while the majority have highly variable or low levels of practical knowledge. The most significant concerns arise from the indicators related to procedural knowledge and safe locations. The lowest-rated indicator is "I know safe routes away from landslide-prone slopes," with a combined weighted mean of only 2.78 ("Aware"). This is critically low for a landslide-prone community and is closely followed by the low score for "I know the evacuation areas in case of a landslide" (WM = 2.87, Aware) and awareness of the "community's early warning systems" (WM = 2.83, Aware). These low scores highlight a severe deficiency in the essential elements of an effective response: location, route, and communication.

The low awareness of safe routes and shelters is compounded by the qualitative concern raised by an employee: *"the safety of the common evacuation quadrangle is questionable due to its proximity to a fault line and exposure to potential secondary hazards."* This finding aligns with the Protection Motivation Theory, which posits that low awareness of evacuation routes indicates limited response efficacy; respondents may recognize the threat but lack confidence in their ability to respond safely. MacAfee (2024) and USGS (2022) emphasize that the suitability of evacuation sites must be assessed against secondary hazards like fault lines and run-off zones, suggesting a significant gap in institutional planning and hazard communication for the campus. Furthermore, the low awareness of early warning systems (2.83) limits the community's ability to act quickly, regardless of their knowledge of warning signs.

The data collectively reveals that awareness of landslide preparedness is the least developed area among the four hazards, characterized by satisfactory general recognition of the hazard but weak, non-uniform knowledge of the critical, actionable steps—evacuation routes, safe shelters, and early warning systems. This limited preparedness mirrors findings in other high-risk communities where hazard recognition exists but actionable response knowledge is inadequate (Bugnay, 2024; Nur Alam, 2023).

Overall Level of Awareness on Different Types of Emergencies

The consolidated data in Table 9 reveals that the Overall Mean Awareness for all four types of emergencies among the BSU-Buguias Campus community is 3.09, interpreted as "Aware." This finding establishes that, in general, both students and employees possess a satisfactory foundational knowledge of emergency concepts and standard safety measures.

However, this generalized awareness is not uniformly robust across all hazards, suggesting that while respondents can recall basic safety rules and identify hazards, there are significant and strategic gaps in procedural, policy-based, and location-specific preparedness that necessitate immediate institutional focus for effective disaster response.

Table 9
Overall Level of Awareness on Different Types of Emergencies

Emergency Type	Sub-Mean	Descriptive Equivalent
Earthquake	3.33	Completely Aware
Fire	2.97	Aware
Typhoon	3.19	Aware
Landslide	2.87	Aware
Overall Mean	3.09	Aware

A clear hierarchy of awareness emerges from the sub-mean scores. Earthquake awareness ranked highest with a sub-mean of 3.33 ("Completely Aware"). This high level of readiness is strongly linked to the widespread familiarity with the fundamental "Drop, Cover, and Hold" procedure and general knowledge of evacuation points. This success is likely due to the highly visible national emphasis on earthquake safety and the effectiveness of recurrent, standardized drills, which students confirmed were common during their high school years.

The remaining three hazards all fell into the "Aware" category, but with diminishing confidence: Typhoon (3.19), Fire (2.97), and Landslide (2.87). Typhoon awareness (3.19) demonstrates a good grasp of precautionary measures like storing food and water. However, deeper analysis revealed significant gaps concerning institutional coordination and, more critically, the precise location of designated safe shelters.

Fire awareness (2.97) is primarily driven by knowledge of alarms and drills, yet it is severely limited by the low level of understanding regarding the use of fire extinguishers and specific emergency contacts. This indicates a critical deficiency in practical, life-saving intervention skills necessary to prevent a minor incident from escalating.

Landslide awareness (2.87) is the lowest-ranking hazard. Although respondents recognize the geographical hazard of the area, they exhibit a lack of clear, actionable knowledge regarding safe evacuation routes and community early warning systems. This low score reflects a failure to translate general hazard perception into location-specific response efficacy, posing the greatest vulnerability in this mountainous region.

The qualitative input from the respondents reinforces the sources of their awareness and the need for institutional intervention. Students explicitly attribute their preparedness in fire and earthquake protocols to consistent drills during their high school years, emphasizing the long-term impact of repeated, school-based exercises in building strong procedural memory and confidence (Navigate360, 2025; Cox, 2022).

Conversely, employees frequently cite external emergency preparedness trainings attended prior to or outside campus responsibilities as a key factor contributing to their understanding. This suggests that the staff's general readiness often relies on external programs, indicating a need for more frequent and comprehensive internal, campus-specific training for employees to address location-dependent hazards and policy-based actions (e.g., using campus-specific extinguishers, knowing specific internal contacts).

Level of Emergency Preparedness Among the Students and Employees

Table 10 presents a detailed assessment of the Emergency Preparedness Levels across institutional indicators, yielding an overall combined weighted mean of 2.57, interpreted as "Aware." While this suggests a moderate level of general preparedness, the data reveals a critical distinction: the community is high in willingness but critically low in operational capability and institutional support. Across nearly all indicators, Employees consistently rate institutional provisions and their own preparedness higher than Students (e.g., employee confidence: 2.87 vs. student confidence: 2.47), indicating that targeted staff training may exist but is insufficient to raise the overall institutional standard. This overall rating of "Aware" is highly misleading, as it masks severe gaps in procedural, operational, and institutional readiness that require immediate attention.

Table 10

Level of Emergency Preparedness of Students and Employees

Indicators	Students		Employees		Weighted Mean	Descriptive Equivalent
	Weighted Mean	Standard Deviation	Weighted Mean	Standard Deviation		
1. I feel confident in my ability to respond effectively to emergencies.	2.47	0.75	2.87	0.74	2.50	SA
2. I am prepared to carry out my role during emergencies.	2.53	0.82	3.04	0.79	2.57	A
3. I am willing to participate or assist in emergency response activities if necessary.	3.21	0.66	3.17	0.76	3.20	A
4. Emergency drills are conducted regularly.	2.13	0.74	2.52	0.88	2.16	SA
5. Emergency drills are effective.	2.63	0.67	2.65	0.87	2.63	A
6. Emergency supplies (first aid kits, fire extinguishers) are available.	2.28	0.68	2.59	0.94	2.30	SA

7. Emergency supplies are accessible.	1.90	0.70	2.52	0.93	1.96	SA
8. Emergency signage and evacuation maps are posted.	2.84	0.74	2.52	0.97	2.82	A
9. Evacuation maps are easy to understand.	2.56	0.77	2.52	1.00	2.55	A
10. Communication systems (announcements, alerts) are reliable.	2.50	0.72	2.54	1.05	2.50	A
11. The university provides adequate orientations on emergency preparedness.	1.91	0.67	2.52	0.85	1.97	SA
12. The university provides adequate training on emergency preparedness.	1.93	0.76	2.48	0.83	1.98	SA
13. The campus collaborates with LGU DRRM offices for disaster readiness.	2.41	0.64	2.88	0.88	2.45	SA
Over-all Mean					2.57	Aware

The lowest-rated indicators expose major weaknesses in the foundational infrastructure and systemic support provided by the institution, shifting the focus from individual knowledge to institutional failure. The most critical weakness is Emergency Supplies Accessibility, which received the lowest combined weighted mean of 1.96 ("Slightly Aware"). While respondents know supplies like first aid kits and fire extinguishers exist, this low score highlights profound uncertainty about their location and accessibility during an emergency. The qualitative feedback confirms this operational failure: *students reported being unsure where to get emergency tools, and employees noted that supplies are often locked inside offices, rendering them useless when needed most.* This lack of functional, visible placement, as noted

by Dela Peña (2025) concerning rural institutions, is a significant logistical failure, directly undermining the community's ability to act.

Closely following are the indicators related to institutional support: The university provides adequate orientations (WM = 1.97) and adequate training on emergency preparedness (WM = 1.98), both interpreted as "Slightly Aware." This consensus indicates that the training provided is infrequent, limited in scope, and, crucially, lacks hands-on elements. Employees suggested the necessity of "*more drills and demonstrations*," aligning with experts like Aslanoğlu (2024) and Cubillas et al. (2022), who stress that frequent, interactive drills and simulations are vital for skill-building and role clarity, not just theoretical awareness. This deficiency in practical training is further compounded by the low score for Emergency drills are conducted regularly (WM = 2.16, "Slightly Aware"). Regular drills are the primary mechanism for transforming abstract knowledge into procedural memory, and the perceived infrequency suggests a lapse in reinforcing safety protocols, thus impacting the overall effectiveness of drills (WM = 2.63).

In stark contrast to the institutional failings, the indicator Willingness to participate or assist in emergency response activities topped the list with a high mean of 3.20 ("Aware"). This finding demonstrates a strong, commendable motivation and sense of civic duty among both students and employees to engage in response activities. However, this high intent exists in a critical discrepancy with the low capability scores (Supplies: 1.96; Training: 1.98). This situation is perfectly explained by the Protection Motivation Theory, which suggests that while individuals are motivated to protect others, their Response Efficacy (belief that the action will be effective) and Self-Efficacy (belief in one's own ability to perform the action) remain low without access to resources and training. The university is failing to provide the tools for action necessary for an Organizational Preparedness Theory approach, thereby paralyzing the community's strong desire to assist.

The perceived quality of Emergency signage and evacuation maps (WM = 2.82, "Aware") also reflects a gap in execution. While signage is posted, respondents reported maps were often small, blurry, outdated, or poorly placed, failing to reflect new structures or hazard-specific zones. A major concern noted was the questionable safety of the default assembly quadrangle for specific hazards like earthquakes or collapses, necessitating hazard-specific zones. This low score highlights the need for quality over quantity, emphasizing visible, photoluminescent signs with directional arrows for low-light conditions, as stressed by Wang et al. (2025), and ensuring they clearly communicate site-specific hazard information.

The institution's primary imperative is to close the widening gap between the community's high Willingness to Participate (3.20) and the institution's poor performance in providing essential support. The university must urgently shift focus from general awareness to operational execution and logistical reinforcement. This requires an immediate logistics overhaul to ensure supplies are unlocked, visible, and regularly checked for usability, followed by the implementation of frequent, mandatory, hands-on training and a thorough audit and upgrade of all emergency signage to ensure clarity, compliance, and reflection of hazard-specific safety plans.

Conclusion and recommendations

This section presents the conclusion and recommendations in the light of significant findings revealed in the study.

Conclusion

The university community demonstrates strong intrinsic motivation for emergency response, yet this is undermined by institutional shortcomings in practical training and resource accessibility, resulting in a preparedness level that fails to match awareness potential. Procedural knowledge, particularly for earthquakes, translates effectively into perceived confidence due to standardized drills, but location-specific details like evacuation routes and safe areas remain weak across hazards, exposing vulnerabilities in high-stress scenarios. Fire and landslide protocols reveal the greatest risks, where low familiarity with active interventions (e.g., extinguishers) and early warning systems indicates a disconnect between hazard recognition and actionable efficacy, especially among employees with variable knowledge. Overall, while general awareness suffices for basic responses, the absence of robust infrastructure and frequent simulations hampers coordinated action, prioritizing theoretical knowledge over operational resilience in a landslide-prone area.

Recommendation

Based on the findings and conclusion, the University may:

1. Install clear, photoluminescent evacuation maps and hazard-specific signage (e.g., for earthquakes, fires, typhoons, landslides) in all buildings, updated with current routes, assembly points, and safe shelters; conduct a one-week campus-wide posting drive with QR codes linking to digital versions.
2. Roll out quarterly 1-hour sessions on fire extinguisher use (P.A.S.S. method), first aid, and "Drop, Cover, Hold" for all students and employees, using existing campus extinguishers and spaces; start with employee pilots to address their variability.
3. Audit and relocate first aid kits, extinguishers, and emergency supplies to unlocked, visible wall-mounted cabinets near exits; perform monthly checks by maintenance staff and label with usage instructions.
4. Hold bi-monthly hazard-specific drills (one per emergency type per semester), rotating focus (e.g., earthquake in January, fire in March); include debriefs with feedback forms to refine based on participant input.
5. Distribute laminated emergency contact lists and weather alert protocols via email and bulletin boards; integrate into orientation week and require annual acknowledgment quizzes for employees.
6. Coordinate bi-annual joint drills with local DRRM offices, focusing on early warning systems and safe routes; share campus hazard maps for mutual updates on shelters and vulnerabilities.

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