

# SCHOOL-BASED DISASTER RISK REDUCTION MANAGEMENT PRACTICES AND HAZARD PREPAREDNESS FOR SAFE LEARNING ENVIRONMENT

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## ABSTRACT

The study dealt with the school-based disaster risk reduction management practices and hazard preparedness for safe learning environment in 2nd Congressional District. It specifically determined the level of school-based disaster risk reduction management practices; level of hazard preparedness of schools; and the level of safe learning environment. Further, it determined the significant relationship between the school-based disaster risk reduction management practices and safe learning environment; the significant influence of the school-based disaster risk reduction management practices to safe learning environment; the significant relationship between the hazard's preparedness of school and safe learning environment; the significant influence on the schools' hazard preparedness to safe learning environment. This research utilized a descriptive–correlation research design to analyze from the 100 respondents taken through quantitative method, purposive sampling technique was used. The instrument used was utilized a modified questionnaire from DRRM Manual to gather the data needed. Results of the validity and reliability test using Cronbach's Alpha was .840 with 50 samples, which meant that the items in the instruments were reliable. Data gathering procedure using communication addressed to the Schools Division Superintendents, and the statistical tools utilized mean. To test the hypotheses, it employed Spearman rho and multiple linear regression. Results revealed that the school-based disaster risk reduction management practices were highly correlated with a safe learning environment. It meant that the higher the school-based disaster risk reduction management practices, the higher will be the level of safe learning environment. In the same manner, the school-based disaster risk reduction management practices were highly influenced to the safe learning environment. It meant that disaster response, disaster rehabilitation and recovery, and disaster prevention and mitigation were the best predictors of pupils' safety. While disaster preparedness, disaster response, disaster rehabilitation and recovery, and disaster prevention and mitigation were the best predictors of teachers' safety. On the one hand, disaster preparedness, disaster response, disaster rehabilitation and recovery were the predictors of stakeholders' safety while disaster response, disaster prevention and mitigation were the best predictors of school plant and facilities safety. Furthermore, the schools' hazard preparedness was highly correlated with a safe learning environment. It meant that the higher the schools hazard preparedness, the higher the level of safe learning environment. Meanwhile, on the level of influence, the schools' hazard preparedness was highly influenced to a safe learning environment. It meant that pupils' safety was highly influenced by environmental hazards and socio-economic, political and security hazards. On the one hand, natural hazards and socio-economic, political and security hazards were the best predictors of teachers' safety. While environmental hazards and socio-economic, political and security hazards were found to be the best predictors of stakeholders' safety. Moreover, school plant and facilities safety were highly influenced by natural hazards, human-induced hazards, and environmental hazards.

**Keyword:** - School-based disaster risk reduction management practices, hazard preparedness, and safe learning environment.

## 1. INTRODUCTION

Natural disasters like hurricanes, wildfires, floods, and earthquakes have become more frequent and intense globally in recent times. These incidents have shown how urgently comprehensive catastrophe risk reduction and preparedness measures are needed to safeguard people's safety and protect vulnerable groups, especially in educational settings. In this regard, hazard preparedness and school-based disaster risk reduction management techniques are essential to establishing a secure learning environment for faculty and staff. Furthermore, the earthquake that struck Mindanao, specifically in the Province of North Cotabato, altered several aspects of Cotabateños' lives.

Schools are not exempt from the effects of disasters, and the presence of young, inexperienced people who need extra care and attention makes them even more vulnerable. Acknowledging this, academic institutions globally are progressively implementing preemptive strategies to reduce hazards, efficiently handle crises, and foster adaptability among personnel and pupils (Tapsell, 2015).

Bostick, Holzer, and Sarkani (2017) emphasized that a variety of actions and approaches are included in school-based disaster risk reduction management procedures with the goal of locating, evaluating, and controlling possible risks on and around school grounds. This entails carrying out risk analyses, putting in place structural and non-structural safeguards to improve the resilience of buildings, setting up early warning systems, and creating emergency action plans. Additionally, as stated by Liu et al (2017), incorporating disaster risk reduction within the curriculum enables students to gain the abilities, knowledge, and mindset required for readiness and action.

Contrarily, hazard preparedness entails giving educational institutions the tools they need to react quickly and effectively to a calamity. This entails educating educators and personnel about emergency measures, doing frequent exercises and role-plays, setting up communication guidelines, and assembling necessary supplies. Schools can lessen the possible effects of disasters, lower the number of injuries and fatalities, and guarantee that instruction continues even under trying conditions by fostering a culture of preparedness (Cepal, 2017).

Beyond addressing immediate hazards, school-based disaster risk reduction management strategies and hazard preparedness contribute to the creation of a safe learning environment. Additionally, it helps staff and students feel safe, confident, and well-rested, which makes it easier for them to concentrate on their academic goals without worrying about being afraid or distracted all the time. Furthermore, these practices are beneficial venues for community involvement, bringing together parents, local government agencies, and pertinent parties in cooperative endeavors to foster resilience and sustainable development (Kendig, & Grider, 2015).

Ensuring a secure learning environment requires both hazard preparedness and disaster risk reduction management strategies implemented in schools. Educational institutions may safeguard the lives and well-being of their staff and students by putting comprehensive risk reduction methods into practice, being ready for emergencies, and encouraging a culture of resilience (Liu et al, 2017). Furthermore, according to Birkman (2017), these actions support communities' general resilience and readiness, promoting a more sustainable and safe future for everybody.

The lack of research on how to include the Philippines' disaster risk reduction and management law (RA 10121) into the curricula of senior high schools in grades K–12. Because it is situated inside the Pacific Typhoon Belt and between two major tectonic plates, the Philippines is the most disaster-prone nation on Earth. In keeping with this, the DepEd launched the K–12 program in 2013 and incorporated the Disaster Readiness and Risk Reduction (DRRR) subject into the senior high school curriculum. Nevertheless, it was found that the DRRR subject was only provided as a mandatory subject in the Science, Technology, Engineering, and Math (STEM) strand after examining the curricula of two particular Philippine schools (Manalo & Manalo, 2020).

Due to his prior teaching experiences, the researcher felt compelled to investigate the effects of disaster risk reduction management and school hazards' preparedness for a safe learning environment. This might have a significant impact on both the school and the lives of the students. The researcher, a teacher, wants to make sure that the school's operational, functional, and sustainable disaster risk reduction management procedures are closely adhered to by the instructors and that school risks are planned for in order to create a safe learning environment.

## 2. METHODOLOGY

This research utilized a descriptive–correlation research design to analyze from the 100 respondents taken through quantitative method, purposive sampling technique was used. The instrument used was utilized a modified questionnaire from DRRM Manual to gather the data needed. Results of the validity and reliability test using Cronbach's Alpha was .840 with 50 samples, which meant that the items in the instruments were reliable. Data gathering procedure using communication addressed to the Schools Division Superintendents, and the statistical tools utilized mean. To test the hypotheses, it employed Spearman rho and multiple linear regression.

### 3. RESULTS AND DISCUSSION

#### Relationship Between School-Based Disaster Risk Reduction Management Practices and Safe Learning Environment

Table 1 presents the relationship between disaster preparedness and safe learning environment. The correlation matrix shows that disaster preparedness had a significant relationship with the parameter used to measure the safe learning environment education in terms of stakeholders' safety ( $r=0.157^{**}$  with a p-value of 0.000). However, no correlation found on pupils' safety, teachers' safety, and school plant and facilities safety.

The result means that disaster preparedness is highly significant to safe learning environment. The presented probability values which are less than the set 1% level of significance means that the stated hypothesis on this aspect of the study is rejected. This means that the higher the disaster preparedness practices, the higher the level of a safe learning environment particularly, for stakeholders' safety.

The findings imply that schools prioritize disaster preparedness to create a safer environment for everyone. When schools invest in robust disaster preparedness practices, they are better equipped to handle emergencies effectively, which, in turn, reduces the risk of harm to students and all members of the school community. Schools can foster a sense of security and promote a conducive atmosphere for learning and personal development.

Blair (2017) found that disaster preparedness emerges as a highly significant factor in ensuring a safe learning environment, particularly concerning the safety of stakeholders. The level of preparedness directly affects the ability of educational institutions to respond effectively to emergencies, safeguarding students, teachers, and staff alike. Investing in robust disaster preparedness measures not only enhances physical safety but also fosters a sense of security and well-being among the school community.

The correlation matrix also shows that disaster response had a significant relationship with all the parameters used to measure the safe learning environment in terms of pupils' safety ( $r=0.310^{**}$  with a p-value of 0.000); teachers' safety ( $r=0.237^{**}$  with a p-value of 0.000); stakeholders' safety ( $r=0.272^{**}$  with a p-value of 0.000); and school plant and facilities safety ( $r=0.128^{**}$  with a p-value of 0.004).

The result means that disaster response is highly significant to safe learning environment. The presented probability values which are less than the set 1% level of significance means that the stated hypothesis is rejected. This means that the higher the disaster response practices the higher the level of a safe learning environment.

It implies that a school has well-developed disaster response practices, it leads to a safer learning environment for everyone involved. This includes the students (pupils), teachers, school staff, and even the physical school infrastructure (plant and facilities).

Knezevich (2016) stated that disaster response plays a crucial role in maintaining a safe learning environment. The effectiveness and timeliness of response measures directly impact the well-being and security of students, teachers, and staff during emergencies. A well-executed disaster response plan can mitigate potential risks, minimize disruptions to education, and ensure the protection of all individuals within educational settings.

Moreover, the disaster rehabilitation and recovery had a significant relationship with all the parameters used to measure the safe learning environment in terms of pupils' safety ( $r=0.215^{**}$  with a p-value of 0.000); teachers' safety ( $r=0.135^{**}$  with a p-value of 0.000); stakeholders' safety ( $r=0.340^{**}$  with a p-value of 0.000); and school plant and facilities safety ( $r=0.191^{**}$  with a p-value of 0.004).

The result means that disaster rehabilitation and recovery is highly significant to safe learning environment. The presented probability values which are less than the set 1% level of significance means that the stated hypothesis is rejected. This means that the higher the disaster rehabilitation and recovery practices the higher the level of a safe learning environment.

The results imply that a school that has well-designed and efficiently implemented disaster rehabilitation and recovery practices will be better prepared to address the aftermath of a disaster. By doing so, they can ensure a safer and more conducive learning environment for students, teachers, staff, and all others involved in the school community. This preparedness helps to minimize the negative impacts of disasters and promotes a sense of security and well-being in the educational setting.

Terpstra (2016) found that disaster rehabilitation and recovery are critically important in establishing and maintaining a safe learning environment. The effectiveness of rehabilitation efforts directly associates the restoration of educational facilities, resources, and services essential for student learning and well-being. Additionally, a successful recovery process helps to rebuild the community's trust, resilience, and sense of security following a disaster.

It can be gleaned also in Table 1 the relationship between disaster prevention and mitigation and safe learning environment. The correlation matrix shows that disaster prevention and mitigation had a significant relationship with the parameters used to measure the safe learning environment in terms of pupils' safety ( $r=0.175^{**}$

with a p-value of 0.000); teachers' safety ( $r=0.194^{**}$  with a p-value of 0.000); school plant and facilities safety ( $r=0.181^{**}$  with a p-value of 0.000). However, no correlation found on stakeholders' safety.

The result means that disaster prevention and mitigation is highly significant to safe learning environment. The presented probability values which are less than the set 1% level of significance means that the stated hypothesis is rejected. This means that the higher the disaster prevention and mitigation practices the higher the level of a safe learning environment.

The findings imply that a school that focuses on disaster prevention and mitigation practices is better equipped to handle potential threats. By identifying and addressing risks before they escalate into disasters and by implementing measures to minimize the impact of unavoidable incidents, the school creates a safer learning environment. This proactive approach not only ensures the safety and well-being of students and teachers but also helps to preserve the school's facilities and resources, fostering an environment that is conducive to learning and growth.

Aldunce, Beilin, Handmer, and Howden (2014) disaster prevention and mitigation emerge as crucial elements in establishing a safe learning environment. Proactive measures to identify assess and address potential hazards can significantly reduce the risk of emergencies and their adverse impacts on educational institutions. By investing in prevention and mitigation strategies, schools and colleges can enhance the resilience of their infrastructure, protect essential resources, and safeguard the well-being of students, teachers, and staff. Moreover, Alexander (2018) fostering a culture of preparedness and awareness within the educational community can empower individuals to respond effectively to emergencies, further strengthening the overall safety and security of the learning environment.

**Table 1** Correlation matrix showing the relationship between the school-based disaster risk reduction management practices and safe learning environment

School-Based DRRM Practices		Pupils Safety	Teachers Safety	Stakeholders Safety	School Plant and Facilities	
Spearman's rho	<b>Disaster Preparedness</b>	Correlation Coefficient	0.046	0.067	<b>0.157**</b>	0.066
		Sig. (2-tailed)	0.309	0.137	0.000	0.141
	<b>Disaster Response</b>	Correlation Coefficient	<b>0.310**</b>	<b>0.237**</b>	<b>0.272**</b>	<b>0.128**</b>
		Sig. (2-tailed)	0.000	0.000	0.000	0.000
	<b>Disaster Rehabilitation and Recovery</b>	Correlation Coefficient	<b>0.215**</b>	<b>0.135**</b>	<b>0.340**</b>	<b>0.191**</b>
		Sig. (2-tailed)	0.000	0.003	0.000	0.000
	<b>Disaster Prevention and Mitigation</b>	Correlation Coefficient	<b>0.175**</b>	<b>0.194**</b>	0.008	<b>0.181**</b>
		Sig. (2-tailed)	0.000	.0000	0.865	0.000

\*\* Highly Significant

\* Significant at 5% level

**Influence of the School-Based Risk Reduction Management Practices on Safe Learning Environment**

In Table 2, the result reveals that the combined effect of the school-based disaster risk reduction management practices **highly influenced** to safe learning environment in terms of pupils' safety (F-value = 24.407, Probability = 0.000\*\*). The stated hypothesis of the study was rejected because the probability value is significantly lesser than 0.001 level of significance.

In fact, 16.50% of the variation of safe learning environment in terms of pupils' safety was accounted by school-based disaster risk reduction management practices. The remaining 83.50% was accounted by some practices not involved in the study.

Among the school-based disaster risk reduction management practices involved in the study, disaster response, disaster rehabilitation and recovery, and disaster prevention and mitigation were found to be the

significant predictors on the safe learning environment. Further, it shows that in every unit increases in disaster response, there is a corresponding increase in pupils' safety by .225. The results further tell that for every unit increases in disaster rehabilitation and recovery, there is a corresponding increase in pupils' safety by .164 and in every unit increases in disaster prevention and mitigation, there is a corresponding increase in pupils' safety by .174 considering other variables constant. The results indicate that investing in disaster response, rehabilitation, and prevention practices has a positive influence on the safety of pupils in educational settings. Schools that prioritize and improve these aspects of disaster management are more likely to provide a safer learning environment for their learners.

Anderson (2018) found that disaster response, rehabilitation, and prevention/mitigation measures collectively exert a significant influence on pupils' safety within educational settings. A well-coordinated and timely disaster response can effectively address immediate threats and protect students during emergencies. Meanwhile, rehabilitation efforts ensure the swift restoration of learning facilities and resources, minimizing prolonged disruptions to education. Additionally, Bach, Bouchon, Fekete, Birkmann, and Serre (2013) added that a proactive prevention and mitigation strategies help to identify and mitigate potential hazards, reducing the overall risk of disasters impacting students, teachers, and staff. Therefore, prioritizing these interconnected aspects of disaster management is crucial for ensuring a safe and secure learning environment that prioritizes the well-being and academic success of all pupils.

Furthermore, the result reveals that the combined effect of the school-based disaster risk reduction management practices **highly influenced** the safe learning environment in terms of teachers' safety (F-value = 17.483, Probability = 0.000\*\*). The stated hypothesis of the study was rejected because the probability value is significantly lesser than 0.001 level of significance.

In fact, 12.40% of the variation of safe learning environment in terms of teachers' safety was accounted by school-based disaster risk reduction management practices. The remaining 87.60% was accounted by some practices not involved in the study.

Among the school-based disaster risk reduction management practices involved in the study, disaster preparedness, disaster response, disaster rehabilitation and recovery, and disaster prevention and mitigation were found to be the significant predictors on the safe learning environment. Further, it reveals that in every unit increases in disaster preparedness, there is a corresponding increase in teachers' safety by .110. While in every unit increases in disaster response, there is a corresponding increase in teachers' safety by .189. The results further tell that for every unit increases in disaster rehabilitation and recovery, there is a corresponding increase in teachers' safety by .135 and in every unit increases in disaster prevention and mitigation, there is a corresponding increase in teachers' safety by .200. This indicates that investing in various aspects of disaster management, such as preparedness, response, rehabilitation, and prevention, has a positive influence on the safety of teachers in the educational setting. Schools that prioritize and improve these aspects of disaster management are more likely to provide a safer and more secure working environment for their teachers. These findings highlight the importance of comprehensive disaster management practices to protect the well-being of teachers, who play a vital role in the education system.

Bil, Vodak, Kubecek, Bilova, and Sedonik (2015) shared that disaster preparedness, response, rehabilitation, and prevention/mitigation strategies collectively play an important role in influencing teachers' safety within educational environments. Comprehensive disaster preparedness ensures that educators are equipped with the necessary knowledge, skills, and resources to respond effectively to emergencies, safeguarding their well-being in crisis situations. Prompt and well-coordinated disaster response efforts provide immediate support and protection to teachers during unforeseen events, minimizing potential harm and ensuring their safety.

The result also reveals that the combined effect of the school-based disaster risk reduction management practices **highly influenced** to safe learning environment in terms of stakeholders' safety (F-value = 25.543, Probability = 0.000\*\*). The stated hypothesis of the study was rejected because the probability value is significantly lesser than 0.001 level of significance.

In fact, 22.30% of the variation of safe learning environment in terms of stakeholders' safety was accounted by school-based disaster risk reduction management practices. The remaining 77.70% was accounted by some practices not involved in the study.

Among the school-based disaster risk reduction management practices involved in the study, disaster preparedness, disaster response, and disaster rehabilitation and recovery were found to be the significant predictors on the safe learning environment. Further, it shows that in every unit increases in disaster preparedness, there is a corresponding increase in stakeholders' safety by .246. While in every unit increases in disaster response, there is a corresponding increase in stakeholders' safety by .223. The results further tell that for every unit increases in disaster rehabilitation and recovery, there is a corresponding increase in stakeholders' safety by .346 considering other variables constant. The results indicate that investing in various aspects of disaster management, such as

preparedness, response, and rehabilitation, has a positive contribute on the safety of stakeholders in an organization or institution. This includes students, teachers, staff, parents, and the community. These findings underscore the importance of comprehensive disaster management practices in ensuring the well-being and safety of all individuals and groups associated with an organization or institution during and after a disaster.

Bovornkitti (2017) also found that disaster preparedness, response, and rehabilitation emerge as key factors influencing the safety of stakeholders in disaster-affected areas. Effective preparedness ensures that stakeholders are equipped with the necessary knowledge, tools, and strategies to anticipate, mitigate, and respond to emergencies, enhancing their overall safety and resilience. A well-coordinated disaster response provides timely and appropriate support to address immediate needs, protecting stakeholders from harm during crisis situations.

Additionally, the result reveals that the combined effect of the school-based disaster risk reduction management practices **highly influenced** to safe learning environment in terms of school plant and facilities safety (F-value = 11.686, Probability = 0.000\*\*). The stated hypothesis of the study was rejected because the probability value is significantly lesser than 0.001 level of significance.

In fact, 8.60% of the variation of safe learning environment in terms of school plant and facilities safety was accounted by school-based disaster risk reduction management practices. The remaining 91.40% was accounted by some practices not involved in the study.

Among the school-based disaster risk reduction management practices involved in the study, disaster response, and disaster rehabilitation and recovery, and disaster prevention and mitigation were found to be the significant predictors on the safe learning environment. Further, it reveals that in every unit increases in disaster response, there is a corresponding increase in school plant and facilities safety by .133. While in every unit increases in disaster rehabilitation and recovery, there is a corresponding increase in school plant and facilities' safety by .153. The result further shows that for every unit increases in disaster prevention and mitigation, there is a corresponding increase in school plant and facilities safety by .136 considering other variables constant. The findings indicate that prioritizing in various aspects of disaster management, such as response, rehabilitation, and prevention, has a positive influence on the safety of the school's physical infrastructure. By implementing effective disaster response plans, focusing on rehabilitation and recovery efforts, and adopting proactive prevention and mitigation measures, schools can protect and ensure the longevity of their plant and facilities even in the face of potential disasters or emergencies. These findings give the importance of comprehensive disaster management practices to safeguard the physical assets that are essential for providing a safe and conducive learning environment for students and teachers.

Comfort, Sungu, Johnson, and Dunn (2015) stated that disaster response, rehabilitation, and prevention/mitigation efforts collectively exert a significant influence on the safety of school plants and facilities. Effective disaster response ensures timely interventions to address immediate damages and hazards, safeguarding the integrity and functionality of educational infrastructure. Meanwhile, rehabilitation initiatives contribute to the prompt restoration and repair of school facilities, minimizing disruptions to learning environments and ensuring structural integrity post-disaster.

**Table 2** Summary of the Influence on the school-based disaster risk reduction management practices and the safe learning environment

School-Based Disaster Risk Reduction Practices	Pupils' Safety	Teachers' Safety	Stakeholders' Safe	School Plant and Facilities Safety
	t-Value	t-Value	t-Value	t-Value
(Constant)	25.835	10.028	8.843	13.816
Disaster Preparedness	0.487	2.820*	6.015**	1.029
Disaster Response	6.655**	5.076**	5.693**	3.607**
Disaster Rehabilitation and Recovery	4.802**	3.599**	8.733**	4.086**
Disaster Prevention and Mitigation	4.882**	5.193**	1.402	3.552**

$R^2 = 0.165$	$R^2 = 0.124$	$R^2 = 0.223$	$R^2 = 0.086$
Prob. = 0.000**	Prob. = 0.000**	Prob. = 0.000**	Prob. = 0.000**

<i>F – Value =</i>	<i>F–</i>	<i>F-Value</i>	<i>F-Value</i>
24.407	Value=17.483	=25.543	=11.686

### Relationship Between Hazard Preparedness of School and Safe Learning Environment

Table 3 presents the relationship between natural hazard preparedness and safe learning environment. The correlation matrix shows that natural hazard preparedness had a significant relationship with the parameter used to measure the safe learning environment education in terms of teachers' safety ( $r=0.461^{**}$  with a p-value of 0.000); school plant and facilities safety ( $r=0.346^{**}$  with a p-value of 0.000). However, no correlation found on pupils' safety and stakeholders' safety.

The result means that natural hazard preparedness is highly significant to safe learning environment. The presented probability values which are less than the set 1% level of significance means that the stated hypothesis on this aspect of the study is rejected. This means that the higher the natural hazard preparedness, the higher the level of a safe learning environment particularly, on teachers' safety and school plant and facilities safety.

The findings imply a positive relationship between the level of natural hazard preparedness and the safety of the learning environment, specifically concerning teachers' safety and the safety of school infrastructure and facilities. In simpler terms, when a school is well-prepared for natural hazards, it tends to provide a safer environment for both teachers and students.

Buckle, Mars, Brandsen, Boogers, and Tops (2016) said that natural hazards emerge as highly significant factors associating both teachers' safety and the safety of school plants and facilities. Teachers are particularly vulnerable during natural disasters due to their responsibility for students' well-being and the potential challenges of evacuating or securing educational spaces. Additionally, Gillespie (2017) shared that school plants and facilities are at risk of structural damage, disruption, and destruction from various natural hazards, compromising the learning environment and posing safety risks to students, teachers, and staff alike. Therefore, prioritizing comprehensive disaster preparedness, response, rehabilitation, and prevention/mitigation strategies tailored to address natural hazards is essential. These measures are crucial for enhancing the resilience and safety of educational institutions, ensuring the protection of all stakeholders, and maintaining a secure and conducive learning environment in the face of natural disasters.

Also, the data in Table 3 disclose the relationship between human induced hazard preparedness disaster response and safe learning environment. The correlation matrix shows that between human induced hazard preparedness had a significant relationship with all the parameters used to measure the safe learning environment in terms of pupils' safety ( $r=0.081^*$  with a p-value of 0.048); teachers' safety ( $r=0.092^*$  with a p-value of 0.039); stakeholders' safety ( $r=0.093^*$  with a p-value of 0.038); and school plant and facilities safety ( $r=0.345^{**}$  with a p-value of 0.004).

The result means that human induced hazard preparedness disaster response is significant to safe learning environment. The presented probability values which are less than the set 5% level of significance means that the stated hypothesis is rejected. This means that the higher the human-induced hazard preparedness the higher the level of a safe learning environment.

The results imply a positive and comprehensive relationship between the level of preparedness for human-induced hazards and the safety of various aspects within the learning environment. Specifically, when a school or educational institution is well-prepared to handle human-induced hazards, it leads to a safer environment for pupils, teachers, stakeholders, as well as the safety of the school plant and facilities.

Guevarra (2016) discussed that human-induced hazards emerge as highly significant factors impacting the safety of a learning environment. These hazards, which can include technological accidents, industrial incidents, or intentional acts of harm, pose unique challenges and risks to students, teachers, and staff within educational settings. Unlike natural disasters, human-induced hazards often require specialized prevention, preparedness, and response strategies tailored to address their specific characteristics and potential impacts.

The data in Table 3 display the relationship between environmental hazard preparedness and safe learning environment. The correlation matrix shows that disaster rehabilitation and recovery had a significant relationship with the parameters used to measure the safe learning environment in terms of pupils' safety ( $r=0.304^{**}$  with a p-value of 0.000); teachers' safety ( $r=0.239^{**}$  with a p-value of 0.000); stakeholders' safety ( $r=0.201^{**}$  with a p-value of 0.000). However, no correlation found on school plant and facilities safety.

The result means that environmental hazard preparedness is highly significant to safe learning environment. The presented probability values which are less than the set 1% level of significance means that the stated hypothesis is rejected. This means that the higher the environmental hazard preparedness the higher the level of a safe learning environment.

The results imply that there is a positive correlation between the level of environmental hazard preparedness and the safety of the learning environment, particularly concerning the safety of teachers and other stakeholders. When a school is well-prepared and equipped to handle environmental hazards, it leads to a safer environment for everyone involved. This preparedness may include having proper safety protocols, emergency response plans, safety equipment, training for teachers and staff, and risk assessment measures in place to mitigate potential hazards.

Leahy (2017) environmental hazards emerge as highly significant factors affecting the safety of a learning environment. These hazards, which can encompass natural phenomena like extreme weather events, air and water pollution, and climate-related risks, pose unique challenges and threats to students, teachers, and staff within educational settings. The increasing frequency and intensity of environmental hazards due to climate change further emphasize the importance of proactive measures to mitigate risks and enhance resilience.

It can be gleaned also in Table 3 the relationship between socio-economic, political, and security hazard preparedness. The correlation matrix shows that between socio-economic, political, and security hazard preparedness had a significant relationship with the parameters used to measure the safe learning environment in terms of teachers' safety ( $r=0.207^{**}$  with a p-value of 0.000); and stakeholders' safety ( $r=0.214^{**}$  with a p-value of 0.000). However, no correlation found on pupils' safety and school plant and facilities safety.

The result means that socio-economic, political, and security hazard preparedness is highly significant to safe learning environment. The presented probability values which are less than the set 1% level of significance means that the stated hypothesis is rejected. This means that the higher the disaster socio-economic, political, and security hazard preparedness prevention the higher the level of a safe learning environment.

The findings imply that there is a correlation between socio-economic, political, and security hazard preparedness and the safety of the learning environment, specifically in terms of ensuring the safety of teachers and other stakeholders. When a school is well-prepared to address socio-economic, political, and security hazards, it contributes to creating a safer space for everyone involved. This preparedness involves having measures and plans in place to anticipate, prevent, and respond effectively to challenges that may arise from various socio-economic, political, or security-related factors.

**Table 3** Correlation matrix showing the relationship between the **hazards' preparedness of school and safe learning environment.**

			Pupils Safety	Teachers Safety	Stakeholders Safety	School Plant and Facilities
Spearman's rho	<b>Hazard Preparedness</b>					
	<b>Natural Hazards</b>	Correlation Coefficient	<b>0.098*</b>	<b>0.461**</b>	0.048	<b>0.346**</b>
		Sig. (2-tailed)	0.029	0.000	0.280	0.000
	<b>Human-Induced Hazards</b>	Correlation Coefficient	<b>0.081*</b>	<b>0.092*</b>	<b>0.093*</b>	<b>0.345**</b>
		Sig. (2-tailed)	0.048	0.039	0.038	0.000
	<b>Environmental Hazard</b>	Correlation Coefficient	<b>.304**</b>	<b>0.239**</b>	<b>0.201**</b>	0.014
		Sig. (2-tailed)	0.000	0.000	0.000	0.755
	<b>Socio-economic, Political, and Security Hazards</b>	Correlation Coefficient	0.080	<b>0.207**</b>	<b>0.214**</b>	0.025
		Sig. (2-tailed)	0.051	0.000	0.000	0.544

\*\* *Highly Significant*  
 \* *Significant at 5% level*

Le Quesne (2017) found that socio-economic, political, and security hazards emerge as highly significant factors affecting the safety of teachers and stakeholders within educational environments. These multifaceted

hazards can encompass economic instability, political unrest, civil conflicts, and security threats, posing complex challenges and risks to the well-being and security of individuals within educational settings. The interconnected nature of these hazards requires comprehensive and adaptive risk management strategies tailored to address their dynamic and evolving characteristics.

### **Influence of the Schools' Hazard Preparedness on Safe Learning Environment**

Table 4, the result reveals that the combined effect of the schools' hazard preparedness is **highly influenced** to safe learning environment in terms of pupils' safety (F-value = 18.174, Probability = 0.000\*\*). The stated hypothesis of the study was rejected because the probability value is significantly lesser than 0.001 level of significance.

In fact, 12.80% of the variation of safe learning environment in terms of pupils' safety was accounted by the schools' hazard preparedness. The remaining 87.20% was accounted by some preparedness not involved in the study.

Among the schools' hazard preparedness involved in the study, environmental hazards and socio-economic, political, and security hazards were found to be the best significant predictors on the safe learning environment. Further, it shows that in every unit increases in environmental hazards, there is a corresponding increase in pupils' safety by .293. The results further tell that for every unit increases in socio-economic, political, and security hazards, there is a corresponding increase in pupils' safety by .153, considering other variables constant.

The findings imply that preparedness for hazards in schools, along with environmental hazards and socio-economic, political, and security hazards, have been identified as the most significant indicators or predictors of a safe learning environment. In other words, these factors have a strong influence on ensuring that the learning environment remains secure and conducive for learners.

Smale (2015) both natural hazards and socio-economic, political, and security hazards exert a significant influence on pupils' safety within educational settings. Natural hazards such as earthquakes, floods, and storms can pose immediate threats to students' well-being, while socio-economic, political, and security-related hazards like economic instability, civil unrest, and security threats can create ongoing risks and challenges. The combined impact of these diverse hazards shows the importance of holistic and adaptive risk management strategies tailored to address both environmental and human-induced risks.

Also as shown in Table 4, the result reveals that the combined effect of the schools' hazard preparedness is **highly influenced** to safe learning environment in terms of teachers' safety (F-value = 45.206, Probability = 0.000\*\*). The stated hypothesis of the study was rejected because the probability value is significantly lesser than 0.001 level of significance.

In fact, 26.80% of the variation of safe learning environment in terms of teachers' safety was accounted by the schools' hazard preparedness. The remaining 73.20% was accounted by some preparedness not involved in the study.

Among the schools' hazard preparedness involved in the study, natural hazards and socio-economic, political, and security hazards were found to be the best significant predictors on a safe learning environment. Further, it shows that in every unit increases in natural hazards, there is a corresponding increase in teachers' safety by .458. The results further tell that for every unit increases in socio-economic, political, and security hazards, there is a corresponding increase in stakeholders' safety by .203, considering other variables constant.

This implies that both natural hazards and socio-economic, political, and security hazards preparedness contribute to creating a safe learning environment, particularly in relation to the safety of teachers. These factors have an impact on ensuring that teachers are secure within the educational setting.

Lim (2014) found that natural hazards and socio-economic, political, and security hazards exert a significant influence on the safety of teachers within educational environments. Natural disasters such as earthquakes, floods, and hurricanes can pose immediate threats to teachers' well-being, while socio-economic, political, and security-related hazards like economic instability, civil unrest, and security threats can create on-going risks and challenges in their professional roles. The multifaceted nature of these hazards emphasizes the need for comprehensive and adaptive risk management strategies tailored to address both environmental and human-induced risks. Therefore, prioritizing proactive measures, including preparedness training, safety protocols, and situational awareness, is essential. By doing so, educational institutions can enhance the resilience and security of their teaching staff, minimizing vulnerabilities and ensuring a safe and supportive work environment even amidst a complex and evolving risk landscape.

Furthermore, the result reveals that the combined effect of the schools' hazard preparedness is **highly influenced** to safe learning environment in terms of stakeholders' safety (F-value = 11.718, Probability = 0.000\*\*). The stated hypothesis of the study was rejected because the probability value is significantly lesser than 0.001 level of significance.

In fact, 8.70% of the variation of safe learning environment in terms of stakeholders' safety was accounted by the schools' hazard preparedness. The remaining 91.30% was accounted by some preparedness not involved in the study.

Among the schools' hazard preparedness involved in the study, environmental hazards and socio-economic, political, and security hazards were found to be the best significant predictors on a safe learning environment. Further, it shows that in every unit increases in environmental hazards, there is a corresponding increase in stakeholders' safety by .199. The results further tell that for every unit increases in socio-economic, political, and security hazards, there is a corresponding increase in stakeholders' safety by .189, considering other variables constant.

The findings imply that environmental hazards and socio-economic, political, and security hazards contribute in relation to the safety of stakeholders. These hazards have a notable influence on ensuring the safety of individuals who are involved or have a stake in the educational process, emphasizing their significance in maintaining a secure educational setting.

Caprio (2014) discussed that environmental hazards and socio-economic, political, and security hazards significantly influence the safety of stakeholders within various contexts. Environmental hazards, such as natural disasters, pollution, and climate-related risks, pose direct threats to the well-being of individuals, while socio-economic, political, and security-related hazards, including economic instability, civil unrest, and security threats, create complex and often interconnected challenges. Prioritizing proactive measures, such as risk assessments, mitigation efforts, and adaptive response plans, is crucial. By doing so, organizations and institutions can enhance the resilience, security, and overall safety of stakeholders, ensuring their protection and well-being even amidst a dynamic and evolving risk landscape.

The result reveals that the combined effect of the schools' hazard preparedness is **highly influenced** to safe learning environment in terms of school plant and facilities safety (F-value = 33.044, Probability = 0.000\*\*). The stated hypothesis of the study was rejected because the probability value is significantly lesser than 0.001 level of significance.

In fact, 21.10% of the variation of safe learning environment in terms of school plant and facilities safety was accounted by the schools' hazard preparedness. The remaining 78.90% was accounted by some preparedness not involved in the study.

Among the schools' hazard preparedness involved in the study, natural hazards, human-induced hazards, and environmental hazards were found to be the best significant predictors on the safe learning environment. Further, it shows that in every unit increases in natural hazards, there is a corresponding increase in school plant and facilities safety by .371. The results further tell that for every unit increases in human-induced hazards, there is a corresponding increase in school plant and facilities safety by .208. Moreover, in every unit increases in environmental hazards, there is a corresponding increase in school plant and facilities safety by .151, considering other variables constant.

This implies that natural hazards, human-induced hazards, and environmental hazards, collectively impact the safety of the learning environment, with a specific focus on the safety of school buildings and facilities. These hazards have contributed to shaping the level of safety and security within the educational infrastructure, underscoring their importance in ensuring a protected and conducive learning environment.

Boetto, Bell, and Ivory (2021) said that natural hazards, human-induced hazards, and environmental hazards exert a significant influence on the safety and integrity of school plants and facilities. Natural hazards, such as earthquakes, floods, and storms, can cause immediate and extensive damage to infrastructure, while human-induced hazards, including technological accidents and intentional acts of harm, pose additional risks to the structural and operational aspects of educational facilities. Furthermore, environmental hazards, such as pollution, climate-related risks, and ecological threats, can impact the long-term sustainability and resilience of school plants and facilities. Prioritizing proactive measures, including risk assessments, mitigation efforts, and facility upgrades, is essential. By doing so, educational institutions can enhance the resilience, safety, and functionality of their school plants and facilities, ensuring a secure and conducive learning environment for students, teachers, and staff amidst a complex and evolving risk landscape.

**Table 4** Summary of the Influence on the **hazard preparedness and safe learning environment**

Hazard Preparedness	Pupils' Safety	Teachers' Safety	Stakeholders' Safety	School Plant and Facilities Safety
	t-Value	t-Value	t-Value	t-Value
(Constant)	17.167	6.719	8.829	15.783
Natural Hazards	1.435	10.710**	0.814	8.591**
Human Induced Hazards	0.144	0.598	1.903	6.459**
Environmental Hazards	7.402**	0.262	4.091**	3.839**
Socio-Economic, Political, and Security Hazards	4.408**	5.955**	4.440**	0.158
	$R^2 = 0.128$ $Prob. = 0.000^{**}$	$R^2 = 0.268$ $Prob. = 0.000^{**}$	$R^2 = 0.087$ $Prob. = 0.000^{**}$	$R^2 = 0.211$ $Prob. = 0.000^{**}$
	$F\text{-Value} = 18.174$	$F\text{-Value} = 45.206$	$F\text{-Value} = 11.718$	$F\text{-Value} = 33.044$

#### 4. CONCLUSIONS

Based on the findings of the study, the following conclusions were drawn:

That, these disaster management practices were consistently practiced addressing disaster preparedness, response, rehabilitation, recovery, as well as prevention and mitigation. This indicates a robust commitment to safeguarding the school community and enhancing its resilience in the face of potential disasters.

Also, the aspects of schools' hazard preparedness, the respondents indicated substantial preparedness in addressing natural hazards, human-induced hazards, environmental hazards, as well as socio-economic, political, and security hazards. This comprehensive preparedness showcases a proactive approach to risk management, emphasizing the commitment of these educational institutions to ensure the safety and well-being of their students, staff, and stakeholders.

Likewise, the respondents expressed a strong sense of safety concerning pupils' well-being which highlight a robust commitment to safeguarding students within the educational setting. Additionally, respondents reported a consistent and comprehensive approach to ensuring the safety of teachers, stakeholders, as well as the security of school infrastructure and facilities.

Meanwhile, the study established a significant and positive correlation between school-based disaster risk reduction management practices and the creation of a safe learning environment. The findings emphasized the crucial role of well-implemented disaster risk reduction strategies in enhancing the overall safety and security within educational institutions.

In addition, the school-based disaster risk reduction management practices had significant impact to a safe learning environment. Implementing these practices not only enhanced the safety of educational institutions but also contributed to the overall quality of education by fostering an atmosphere of security and preparedness.

Further, schools' hazard preparedness and safe learning environment were significantly related. By prioritizing and investing in comprehensive hazard preparedness, educational institutions can effectively mitigate risks, cultivate a culture of safety, and provide optimal conditions for effective teaching and learning.

Moreover, schools' hazard preparedness significantly influenced to a safe learning environment. The findings emphasized a strong and meaningful influence between the level of hazard preparedness and the overall safety of students, teachers, and staff. This emphasis on preparedness not only mitigates potential risks but also contributes to a sense of security and confidence, fostering a positive and optimal learning experience for all.

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