Disaster Risk Reduction Education, Preparedness, and Resilience among High School Learners in New Bataan

Edu A. Lavega[1], Cristine Mae S. Bajenting[2], Queen Bee Onarse[3], Marianne Kaye B. Fernandez[4], Mark Gim M. Eguia[5], Leticia O. Descallar[6], Alona S. Galache[7]

Holy Cross of Davao College

DOI: https://doi.org/10.47772/IJRISS.2026.100500529

Received: 26 April 2026; Accepted: 01 May 2026; Published: 06 June 2026

ABSTRACT

This study examined the predictive influence of Disaster Risk Reduction Education (DRRE) and student preparedness on resilience among high school learners in New Bataan, Davao de Oro. Grounded in Protection Motivation Theory, the study employed a quantitative predictive-correlational design involving 304 Grade 10 students selected through simple random sampling. Data were collected using a validated survey questionnaire and analyzed using descriptive statistics, Spearman's rho correlation, and multiple linear regression. Results revealed high levels of DRRE (M = 3.66), student preparedness (M = 3.62), and student resilience (M = 3.70). Significant positive relationships were found between DRRE and student resilience ($\rho = .816$, $p < .001$) and between student preparedness and student resilience ($\rho = .774$, $p < .001$). Multiple regression analysis further showed that DRRE and student preparedness significantly predict student resilience ($R^2 = .795$, $p < .001$), with DRRE emerging as the stronger predictor. The findings highlight the importance of strengthening disaster risk reduction education and preparedness programs to enhance student resilience in disaster-prone communities.

Keywords: Disaster Risk Reduction Education, Student Preparedness, Student Resilience, High School Learners, Correlational-Predictive Design

INTRODUCTION

Background of the Study

Low resilience is a significant issue for students living in disaster-prone areas. In Indonesia, a study revealed that the personal resilience profile of high school students in Lombok is suboptimal, with an average score below 60% across seven key aspects of resilience. This suggests a lack of essential skills for effective disaster mitigation and coping (Dwiningrum et al., 2020). In Pakistan, students demonstrate low disaster resilience, primarily due to a lack of knowledge and awareness about disaster management and preparedness. Most students are unaware of its significance, the various phases involved, and the risks and vulnerabilities associated with disasters (Abdullah et al., 2023). Similarly, in Bogor City, Indonesia, a significant number of students demonstrate low levels of resilience, with research indicating that only 56% of certain populations exhibit resilience (Nurfitri et al., 2022).

In the Philippines, students exhibit low disaster resilience, largely due to the vulnerability of educational facilities. These structures are often inadequately assessed for seismic risks, highlighting the need for structural retrofitting to improve safety and minimize potential losses during earthquakes. In Butuan City, Philippines, vulnerability to recurring disasters exposes critical gaps in school disaster preparedness, particularly student resilience. Despite some progress in structural resilience and training, the absence of comprehensive risk information and monitoring systems highlights a key issue: students are not adequately equipped to respond to disasters (Cubillas et al., 2022). Due to low resilience levels, students may struggle to effectively cope with the challenges posed by disasters, making them more vulnerable to emotional stress, confusion, and poor decision-making during emergencies. Although extensive research highlights the low disaster resilience among students, there is limited investigation into the interplay between disaster risk reduction (DRR) education and student

preparedness in shaping the resilience of high school learners. The urgency to conduct this study arises from the severe impact of the low disaster resilience of learners, which necessitates immediate action to address these issues. Timely research is essential to develop targeted interventions and policies to improve disaster resiliency among high school learners.

Statement of the Problem

The primary concern of this study is to examine the role of disaster risk reduction education on the preparedness and resilience among high school students in New Bataan. Specifically, it seeks to answer the following questions:

1. To ascertain the level of disaster risk reduction education among high school students in terms of:
    1.1 knowledge; and
    1.2 attitude.

2. To determine the level of student preparedness in terms of:
    2.1 disaster emergency plan; and
    2.2 emergency supply kit.

3. To assess the level of student resilience in terms of:
    3.1 helping;
    3.2 adaptability;
    3.3 self-confidence;
    3.4 trusting in God and hopefulness; and
    3.5 social support.

4. To determine the significant relationship between disaster risk reduction education, student preparedness, and student resilience.

5. To determine which variables significantly predict student resilience in terms of:
    5.1 disaster risk reduction education; and
    5.2 student preparedness.

Hypothesis

H_{01}: There is no significant relationship between disaster risk reduction education and student preparedness and resilience.

H_{02}: Disaster risk reduction education and student preparedness do not significantly predict student resilience.

THEORETICAL FRAMEWORK

Rogers (1975) introduced the Protection Motivation Theory (PMT) to explain how fear appeals influence individuals' attitudes and behaviors. The theory originated from studies on persuasive communication, particularly how perceived threats can motivate protective actions, as further elaborated by Norman et al. (2015). PMT explains behavior through two cognitive appraisal processes: threat appraisal and coping appraisal. The threat appraisal process involves perceptions of severity, vulnerability, and perceived rewards, while the coping appraisal process includes response efficacy, self-efficacy, and response costs (Xiao et al., 2014).

In the context of Disaster Risk Reduction (DRR), PMT provides a relevant framework for understanding how disaster-related education influences students' motivation to adopt protective behaviors and develop resilience. DRR education strengthens students' threat appraisal by increasing awareness of disaster risks, while preparedness enhances coping appraisal by improving their perceived ability to respond effectively during emergencies.

In this study, Disaster Risk Reduction Education (DRRE) and student preparedness are conceptualized as independent variables, while student resilience serves as the dependent variable. Guided by PMT, the framework assumes that DRRE and preparedness do not only relate to resilience but also significantly predict it, with DRRE expected to play a stronger role in shaping students' resilience in disaster-prone environments.

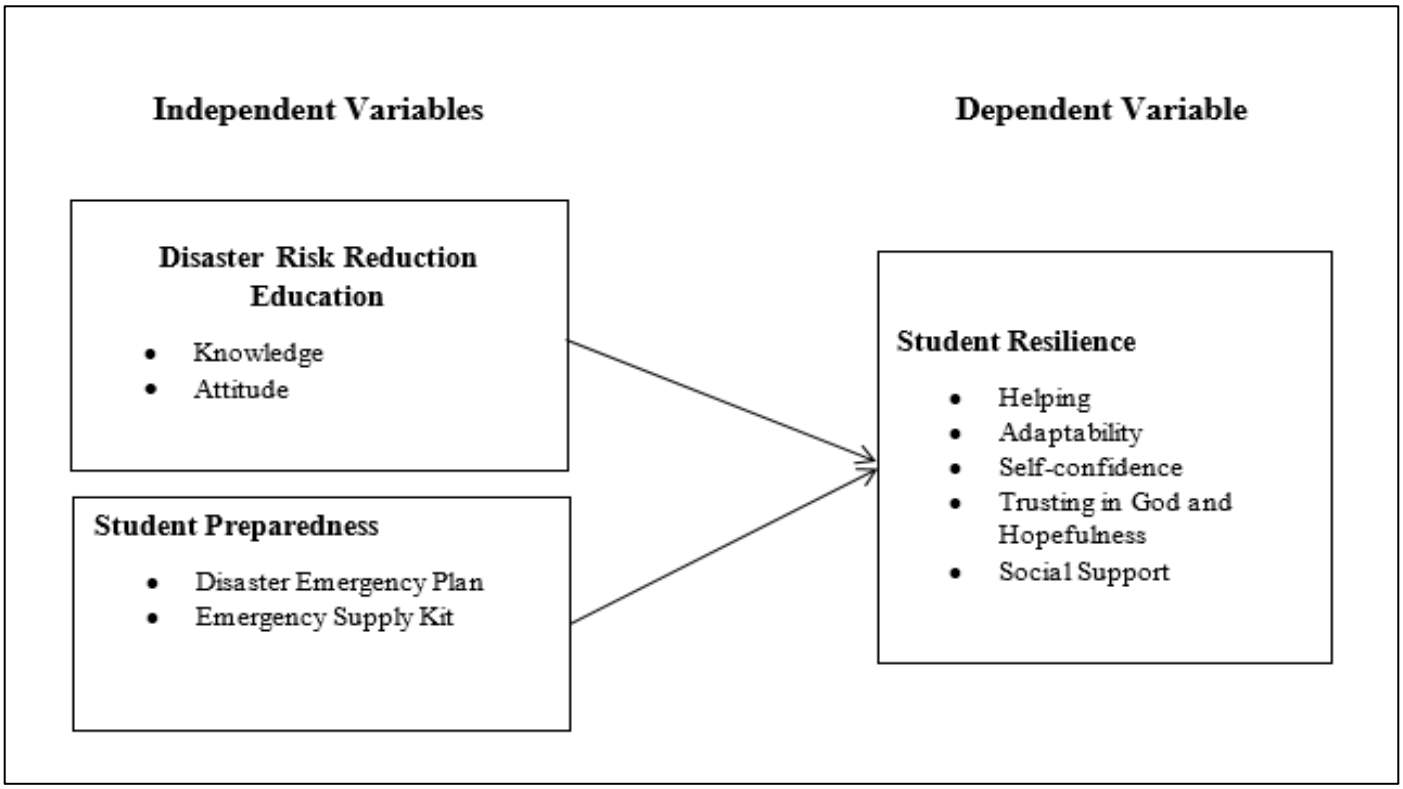

Figure 1. Conceptual Framework

METHODOLOGY

Study Design

The researchers employed a quantitative, predictive-correlational design to examine the relationships between disaster risk reduction, student preparedness, and resilience among high school learners. According to O'Dell (2024), this design was utilized to investigate whether a significant predictive relationship existed between predictor variables and criterion variables. In this study, disaster risk reduction education and preparedness served as predictor variables, while student resilience was the criterion variable. In addition, the use of a correlational design was appropriate as it aimed to assess the influence of the independent variables on student resilience. Correlational analysis allowed the researchers to describe the relationships between one or more predictor variables and the criterion variable (Gall et al., 2015, as cited in O'Dell, 2024), making it a fitting approach for examining how disaster risk reduction education and preparedness contributed to the resilience of high school learners.

Locale of the Study

The research was conducted in New Bataan, a municipality in Davao de Oro, Philippines, located in the southeastern part of Mindanao. New Bataan, known for its agricultural economy and mountainous terrain, is also highly vulnerable to various natural disasters, including typhoons, landslides, and earthquakes. This made it a critical setting for studying the impact of disaster risk reduction education and preparedness on the resilience of high school learners. Given the area's susceptibility to earthquakes and other natural hazards, the research focused on how educational interventions enhanced students' knowledge, preparedness, and resilience in facing

such disasters. The findings provided valuable insights into the specific challenges faced by learners in disaster-prone areas and informed strategies for improving educational approaches to disaster preparedness.

Sample and Sampling Technique

This study involved the total population of Grade 10 high school learners in one school in New Bataan, with a total sample of 304 students. Grade 10 learners were chosen as respondents because their Araling Panlipunan subject included Disaster Risk Reduction (DRR) Education, ensuring they had relevant knowledge and experience related to the study. The sample size followed established guidelines, as referenced in Aithal and Aithal (2020), where a sample of 300 was considered "good" for research purposes. This selection ensured that the data collected was representative and sufficient for analysis.

This study utilized simple random sampling. According to Noor et al. (2022), simple random sampling was a commonly used method in quantitative research, particularly in studies employing survey instruments. It was considered effective when dealing with homogeneous and uniformly distributed populations. In this sampling technique, each individual in the population had an equal chance of being selected, with the selection process determined purely by chance.

Data Collection

The researchers collected survey responses over a one-month period using an online Google Form to ensure a comprehensive dataset and monitored responses to ensure adequate participation, addressing any issues that arose during data collection. The researchers distributed the survey link to the selected high school learners, ensuring that clear instructions were provided on how to complete the survey. This included a thorough explanation of the study's purpose and the confidentiality of responses. Throughout the data collection period, the researcher supervised the process remotely, clarifying any doubts the learners had about the survey. After receiving the completed responses, the researchers validated the data by checking for completeness and consistency, removing any incomplete or invalid responses to ensure the reliability of the dataset.

Data Analysis

Descriptive statistics were employed for data analysis to provide a clear and manageable summary of the observations collected from a large sample. Mishra et al. (2019) explained that descriptive statistics were essential for summarizing data sets, enabling researchers to convey the most significant aspects of the data in a straightforward manner. This approach included the presentation of key metrics such as the mean and standard deviation (SD), which succinctly described the fundamental characteristics of the study data.

In addition, inferential statistics were employed to make predictions and evaluate hypotheses concerning the relationships between variables. As noted by Ali and Bhaskar (2016), inferential statistics involved analyzing data from a sample to draw conclusions about the broader population. The main objective was to address or test the research hypotheses.

In this study, Spearman's rho correlation was used to examine and quantify the relationships among the variables, particularly because the data violated the assumption of normality as shown in the Shapiro-Wilk test results ($p < .001$). Spearman correlation is appropriate for non-normally distributed data and is used to determine the strength and direction of relationships between variables (Gogtay and Thatte, 2017). This was utilized to identify significant associations between disaster risk reduction education, student preparedness, and student resilience.

Furthermore, multiple linear regression analysis was employed to determine the predictive influence of disaster risk reduction education and student preparedness on student resilience. This analysis was essential in identifying the extent to which the independent variables jointly and individually predict the dependent variable, thereby providing a deeper understanding of their predictive relationships.

Data Interpretation

The researchers employed techniques specifically aligned with the analysis methods utilized in this study. In the descriptive statistics phase, measures of central tendency were applied to summarize the average values of disaster risk reduction education, preparedness, and resilience among high school learners, providing a representative value for each dataset (Mishra et al., 2019). During the correlational analysis, Spearman's rho correlation coefficients were used to evaluate the strength and direction of the relationships between these variables, particularly because the data violated the assumption of normality. Spearman's rho is appropriate for non-normally distributed data and provides insight into the degree of association among the variables (Gogtay & Thatte, 2017).

Research Instrument

The research instrument that was used in the study was divided into two parts. The first part of the questionnaire focused on the independent variables: disaster risk reduction education and student preparedness. The level of disaster risk reduction education (Parallag, 2024) had two indicators: knowledge and attitude. Next, the questionnaire measured the level of student preparedness (Cortes and Tactay, 2024), which had two indicators: disaster emergency plan and emergency supply kit.

The second part of the questionnaire, student resilience, had five indicators: helping, adaptability, self-confidence, trusting in God and hopefulness, and social support (Mohammadinia et al., 2019). The questionnaire used a five-point Likert scale, ranging from "Strongly Disagree" to "Strongly Agree," to evaluate the level of these variables. Additionally, the contents of the questionnaire were validated by a panel of experts.

Ethical Considerations

Ethical considerations played a vital role in this research. The study prioritized the rights and well-being of participants, fostering trust and transparency throughout the research process (Laurijssen et al., 2022), as cited in the study of Lubguban et al. (2024). Therefore, respondents were asked to sign an informed consent form before data collection. Additionally, the researchers ensured the safety and well-being of individuals involved to prevent harm or exploitation, as emphasized by Pietilä et al. (2020). Protecting the privacy and confidentiality of participants' data was also crucial for maintaining trust and respecting their rights (Indriasari and Karman, 2023). Sensitive information, such as participants' identities, was safeguarded, and their data was handled with integrity.

Moreover, fairness in research was ensured by treating all participants equitably, especially vulnerable groups (Strauss et al., 2021). The researchers addressed justice issues by avoiding discrimination, promoting inclusivity, and considering the impact of their studies on diverse populations.

Finally, maintaining transparency throughout the research process enhanced the study's credibility and integrity (Pietilä et al., 2020). The researchers upheld transparency by openly reporting methods, results, and findings, fostering accountability, reproducibility, and trust among researchers, participants, and the public.

RESULTS AND DISCUSSION

The study utilized descriptive statistics, Spearman's rho correlation, and multiple linear regression to examine the relationships and predictive influence of disaster risk reduction education, student preparedness, and student resilience among high school learners. The collected data were organized and presented in five tables.

Table 1 presents the mean scores used to determine the level of disaster risk reduction education in terms of knowledge and attitude. Table 2 shows the mean scores for student preparedness, specifically disaster emergency plan and emergency supply kit. Table 3 presents the level of student resilience across its indicators: helping, adaptability, self-confidence, trusting in God and hopefulness, and social support.

Table 4 displays the results of the Spearman's rho correlation analysis used to determine the significant relationships among disaster risk reduction education, student preparedness, and student resilience. Finally, Table 5 presents the results of the multiple linear regression analysis used to identify which variables significantly predict student resilience.

Levels of Independent and Dependent Variables

Level of Disaster Risk Reduction Education: Table 1 presents the assessed level of Disaster Risk Reduction Education (DRRE) among high school students in New Bataan based on two indicators: knowledge and attitude. The findings revealed that the overall mean score for DRRE is 3.66, which falls under the "High" category on the 5-point Likert scale.

Disaster Risk Reduction Education	Standard Deviation	Mean	Interpretation
Knowledge	.84	3.55	High
Attitude	.93	3.77	High
Overall	.84	3.66	High

Table 1. Level of Disaster Risk Reduction among high school learners

Students demonstrate a high level of knowledge about disaster risk reduction, indicating awareness of disaster risks, safety protocols, and mitigation strategies. However, the standard deviation of 0.84 suggests variability in students' knowledge levels, implying that not all learners possess the same degree of understanding.

The mean score of 3.77 for attitude reflects a strong positive disposition toward disaster risk reduction, indicating students' willingness to engage in preparedness and response activities. Nevertheless, the relatively higher standard deviation of 0.93 indicates differences in students' level of engagement and commitment.

The overall DRRE score of 3.66 confirms that students generally possess strong disaster awareness and positive attitudes. However, the observed variability suggests that disaster education may not be uniformly experienced by all students, highlighting the need for more consistent and inclusive implementation of disaster risk reduction programs.

These findings are supported by previous studies, which indicate that students often exhibit high levels of disaster awareness and positive attitudes toward preparedness (Lapada, 2022; Mamon, 2019; Alkalash et al., 2023; Vu et al., 2023). However, similar to the present study, variations in knowledge and engagement levels remain a concern, emphasizing the importance of strengthening educational interventions.

Level of Student Preparedness: Table 2 presents the level of student preparedness in terms of disaster emergency plan and emergency supply kit. The results show that the overall mean score for preparedness is 3.62, which falls under the "High" category based on the 5-point Likert scale.

Student Preparedness	Standard Deviation	Mean	Interpretation
Disaster Emergency Plan	1.11	3.56	High
Emergency Supply Kit	1.04	3.67	High
Overall	1.03	3.62	High

Table 2. Level of Student Preparedness

The mean score of 3.56 for disaster emergency plans indicates that students generally understand structured disaster response procedures, such as evacuation routes and communication strategies. However, the relatively high standard deviation of 1.11 suggests notable inconsistencies in preparedness, indicating that while some students are well-prepared, others may lack sufficient planning and training.

The mean score of 3.67 for emergency supply kits reflects students' recognition of the importance of essential survival materials. Nevertheless, the standard deviation of 1.04 indicates variability in access to or preparation of these resources, suggesting that not all students are equally equipped for emergencies.

Overall, the preparedness level of 3.62 confirms that students demonstrate a generally high level of readiness. However, the observed variability (SD = 1.03) highlights gaps in consistent preparedness practices among learners. This suggests the need for more structured, uniform, and experience-based disaster preparedness programs to ensure that all students are adequately equipped to respond to emergencies.

These findings are supported by previous studies indicating that students often exhibit high levels of disaster preparedness knowledge but may vary in actual readiness and resource availability (Mamon, 2019; Cabuga & Cañete, 2023; Calamba, 2024; Wang et al., 2023; Mandal et al., 2023). Such variations emphasize the importance of strengthening both knowledge and practical application in disaster preparedness initiatives.

Level of Student Resilience: Table 3 presents the level of student resilience among high school learners, measured across five indicators using a 5-point Likert scale. The overall mean of 3.70 indicates that students generally demonstrate a high level of resilience in dealing with challenges.

Student Resilience	Standard Deviation	Mean	Interpretation
Helping	.99	3.68	High
Adaptability	.93	3.62	High
Self-confidence	.84	3.62	High
Trusting in God and hopefulness	1.12	3.88	High
Social Support	.95	3.68	High
Overall	.90	3.70	High

Table 3. Level of Student Resilience

For Helping, the mean score of 3.68 indicates that students generally show a strong willingness to assist others, demonstrating social responsibility and empathy. However, the standard deviation 0.99 reveals differences in students' supportive behaviors. This result aligns with findings that disaster-resilient students actively contribute by sharing knowledge, promoting preparedness, and enhancing emergency response efforts (Topno, 2021). Additionally, service-learning experiences help build social capital and preparedness, strengthening students' ability to support others during crises (Velotti, 2022).

For Adaptability, the mean score of 3.62 suggests that students can adjust to changing situations, though some struggle more than others. The standard deviation of 0.93 indicates moderate variability. This finding supports research showing that 24% of high school students in Karanganyar District exhibit high adaptability and 72% medium adaptability in disaster preparedness (Hafida et al., 2024). Similarly, 30% of students with strong coping skills and social support demonstrate high resilience (Yosep et al., 2024). Furthermore, Senior High School students at Del Pilar National High School showed strong disaster preparedness (WM = 3.88) and knowledge (WM = 3.53), reinforcing the link between preparedness and adaptability (Cabuga & Cańete, 2023).

For Self-confidence, the mean score of 3.62 indicates that students generally feel confident in overcoming challenges, though a standard deviation of 0.84 suggests variation in self-esteem levels. This result aligns with research showing that resilience is closely linked to faith, as students scored 3.64 for relying on faith in God during adversity (Gabay et al., 2024). Moreover, disaster resilience education enhances self-confidence by equipping students with hazard awareness and emergency response skills, empowering them to take initiative and contribute effectively to their communities (Mamon, 2019).

For Trusting in God and Hopefulness, the mean score of 3.88 suggests that students strongly rely on faith and hope when facing adversity, though a standard deviation of 1.12 indicates significant variation. Studies confirm that higher religiosity strengthens adolescent resilience, as shown by a strong correlation ($r = .758$, $p < .01$)

between religiosity and resilience (Dariyo & Tumanggor, 2023). Similarly, students who believe in divine support score 3.64 in resilience, reinforcing the role of faith in overcoming challenges (Gabay et al., 2024).

For Social Supporting, the mean score of 3.68 shows that students generally feel well-supported by peers and social networks, though a standard deviation of 0.95 suggests that some feel isolated. Research highlights that parental support is crucial for resilience, particularly during the COVID-19 pandemic (Sari & Alfiasari, 2024). Additionally, peer support is vital in mitigating the adverse effects of disasters, as seen in the Fort McMurray wildfire survivor study (McDonald-Harker et al., 2021). Emotional and instrumental support further enhance adolescent resilience, emphasizing the importance of strong social networks (Cruz & Girlie, 2022).

Significant Relationship between Independent Variables and Dependent Variable

Significance in the Relationship between Disaster Risk Reduction Education, Student Preparedness, and Student Resilience: Table 4 presents the Spearman's rho correlation coefficients between Disaster Risk Reduction Education (DRRE), Student Preparedness, and Student Resilience among 304 high school learners. The table shows the strength and direction of relationships among the variables.

Variables	Spearman's rho (ρ)	df	p-value	Interpretation
DRRE and Student Resilience	0.816	302	< .001	Significant
Student Preparedness and Student Resilience	0.774	302	< .001	Significant

Table 4. Significance in the Relationship between DRRE, Student Preparedness, and Student Resilience

The correlation analysis revealed a strong positive relationship between Disaster Risk Reduction Education (DRRE) and Student Resilience ($\rho = 0.816$, $p < .001$). This indicates that students with higher levels of disaster risk reduction education tend to demonstrate higher levels of resilience. The findings suggest that DRR education contributes to the development of students' coping capacity, adaptive behaviors, and ability to respond effectively during disaster situations.

This supports the idea that increased knowledge and awareness regarding disaster risks enhance learners' resilience in disaster-prone environments. The result is consistent with the study of Pal et al. (2021), which emphasized that disaster risk reduction education strengthens resilience by improving awareness, preparedness, and adaptive capacity among learners.

Similarly, the relationship between Student Preparedness and Student Resilience showed a strong positive correlation ($\rho = 0.774$, $p < .001$). This indicates that students who are more prepared for disasters also tend to exhibit higher levels of resilience.

The findings imply that preparedness practices, such as emergency planning and readiness activities, contribute to students' ability to cope effectively during adverse situations. This result aligns with the study of Calamba (2024), which found that higher levels of disaster preparedness are associated with stronger resilience among students exposed to disaster risks.

Overall, the results demonstrate that Disaster Risk Reduction Education and Student Preparedness are significantly and positively related to Student Resilience. This implies that strengthening disaster education and preparedness initiatives may contribute to enhancing the resilience of high school learners in disaster-prone communities.

Predictive Influence of Disaster Risk Reduction Education and Student Preparedness on Student Resilience

Table 5 presents the results of the multiple linear regression analysis used to determine the predictive influence of Disaster Risk Reduction Education and Student Preparedness on Student Resilience among high school learners. It shows the overall model fit as well as the individual contribution of each predictor variable in explaining variations in student resilience.

Table 5. Multiple Linear Regression Predicting Student Resilience

Model Fit Measures		
Model	R	R^2
1	0.892	0.795
Note: Model estimated using N = 304.		

Model Coefficients – Student Resilience					
Predictor	Estimate (B)	SE	t	p	Decision
Intercept	0.278	0.1043	2.66	0.008	-
DRR Education (DRRE)	0.710	0.0480	14.79	< .001	Significant
Student Preparedness	0.229	0.0398	5.75	< .001	Significant

The multiple linear regression analysis was conducted to determine the predictive influence of Disaster Risk Reduction Education (DRRE) and Student Preparedness on Student Resilience among high school learners.

The model showed strong predictive power, with an R value of 0.892 and an R^2 value of 0.795, indicating that 79.5% of the variance in student resilience is explained by DRR education and student preparedness. This suggests that the model has strong explanatory capacity in predicting student resilience in disaster-prone contexts.

In terms of individual predictors, Disaster Risk Reduction Education significantly predicts Student Resilience ($B = 0.710$, $t = 14.79$, $p < .001$), indicating that increases in DRR education are associated with higher levels of resilience when preparedness is held constant. This supports the idea that DRR education enhances students' understanding of disaster risks and improves their capacity to respond effectively. Related studies confirm that DRR education significantly improves students' preparedness, with a reported correlation coefficient of 0.711 among high school students in Indonesia (Syaifulloh et al., 2023). Furthermore, DRR education has been found to strengthen school preparedness mechanisms by improving student outcomes through mediating effects (Wang & Li, 2023).

Similarly, Student Preparedness also significantly predicts Student Resilience ($B = 0.229$, $t = 5.75$, $p < .001$), suggesting that better preparedness is associated with higher resilience, although with a smaller effect compared to DRR education. This finding supports studies emphasizing that preparedness initiatives in schools directly enhance students' resilience by equipping them with practical skills and fostering proactive behavior during emergencies (Sibualamu et al., 2024). In addition, integrating DRR education into the curriculum is considered essential in building a sustained culture of preparedness among learners (Pambudi et al., 2025).

Overall, both DRR Education and Student Preparedness are significant predictors of Student Resilience, with DRR education emerging as the stronger predictor. This indicates that knowledge and awareness contribute more strongly to resilience development than preparedness alone.

CONCLUSION

The findings of this study highlight the crucial role of disaster risk reduction education in enhancing the preparedness and resilience of high school learners in New Bataan. The results of the multiple regression analysis show that both disaster risk reduction education and student preparedness significantly predict student resilience, with disaster risk reduction education emerging as the strongest predictor. This indicates that students who receive stronger DRR education are more likely to demonstrate higher resilience, supported by adequate preparedness skills. Overall, strengthening disaster risk reduction education in schools is essential in building more resilient learners in disaster-prone areas.

RECOMMENDATIONS

Based on the conclusion that Disaster Risk Reduction Education (DRRE) and student preparedness significantly predict student resilience, with DRRE identified as the strongest predictor, the researchers propose the following recommendations to enhance disaster risk reduction education, preparedness, and resilience among high school learners in New Bataan.

First, the Department of Education and teachers are encouraged to strengthen and update the integration of Disaster Risk Reduction (DRR) across the curriculum in alignment with the most recent DepEd policies and instructional guidelines. DRR should not be confined to Araling Panlipunan or Social Studies but should be embedded across all learning areas to ensure holistic disaster education. In addition, schools should implement experiential learning strategies such as disaster simulations, evacuation drills, and community-based DRR activities to allow students to apply knowledge in real-life scenarios and reinforce disaster awareness and response skills.

Second, schools should intensify student preparedness programs through regular disaster preparedness workshops focusing on emergency planning, survival skills, and proper use of emergency supply kits. These structured activities can help address inconsistencies in preparedness levels and ensure that all learners are equally equipped to respond during emergencies. Strengthening school-based monitoring of preparedness practices is also recommended to ensure sustained application of learned skills.

Third, since DRR education emerged as the strongest predictor of student resilience, schools should prioritize its quality, delivery, and continuity. Beyond cognitive learning, DRR instruction should emphasize decision-making, risk perception, and coping strategies to further strengthen students' adaptive capacity and resilience in disaster situations.

Fourth, to enhance student resilience holistically, schools should provide stronger psychological and social support systems. Establishing peer support groups, counseling services, and mentorship programs can help develop students' adaptability, self-confidence, and emotional stability. Community and faith-based support systems may also be encouraged as complementary coping mechanisms that foster hopefulness during adverse situations.

Fifth, collaboration between schools, Local Government Units (LGUs), disaster management agencies, and non-governmental organizations (NGOs) should be strengthened to develop more comprehensive and sustainable disaster preparedness programs. Community-wide DRR initiatives should be promoted to ensure that students, families, and stakeholders share a unified understanding of disaster preparedness and response.

Finally, this study is limited by its reliance on self-reported data, which may be influenced by response bias, and by the use of a single-school sample, which may limit the generalizability of the findings. Future studies are encouraged to include multiple schools or broader populations to enhance generalizability. Moreover, qualitative approaches are recommended to further explore students' lived experiences, coping strategies, and emotional responses during disasters to provide deeper insights into resilience development.

REFERENCES

1. Abdullah, F., Usman, F., & Shoaib, M. (2023). Disaster Management and Preparedness among Students at Tertiary Level: A Case of Mixed Method Research. Qlantic Journal of Social Sciences and Humanities, 4(3), 258-266.
2. Aithal, A., & Aithal, P. S. (2020). Development and validation of survey questionnaire & experimental data–a systematical review-based statistical approach. International Journal of Management, Technology, and Social Sciences (IJMTS), 5(2), 233-251.
3. Ali, Z., & Bhaskar, S. B. (2016). Basic statistical tools in research and data analysis. Indian journal of anaesthesia, 60(9), 662-669.

4. Alkalash, S. H., Alamer, E. H. A., Allihyani, A. M., Alhazmi, A. S., Alharthi, R. M., Bugis, A. M., ... & Bugis, A. (2023). Knowledge of and attitude toward disaster preparedness among secondary school students in the western region of Saudi Arabia. Cureus, 15(1).
5. Arcegono, W. J., Olorga, A. V., & Sumandal, M. B. (2024). Disaster Awareness and Preparedness and Disaster Risk Reduction Practices among Secondary Schools. International Journal of Education and Teaching Zone, 3(1), 94-106.
6. Cabuga Jr, C. C., & Cañete, R. A. P. (2023). Assessment of Disaster Preparedness and Related Knowledge Among Senior High Students in Del Pilar National High School, Cabadbaran City, Agusan Del Norte, Philippines. Int. J. Soc. Sci. Hum. Res, 6, 3680-3688.
7. Calamba, R. R. (2024). High school students' level of awareness and preparedness of natural disasters. International Journal of Studies in Education and Science (IJSES), 5(2), 150-167.
8. Cortes, K. J. O., & Tactay, V. M. (2024). Natural disaster preparedness and awareness of senior high school students. International Journal of Arts and Social Science, 7(5), 81. www.ijassjournal.com
9. Cruz, C. J. B. C. D., & Girlie, E. A. (2022). Social Support, Self-Efficacy, and Spirituality of Adolescents: a structural equation model of their personal resilience during a pandemic. American Journal of Multidisciplinary Research and Innovation, 1(4), 180-198.
10. Cubillas, A. U., Aviles, G. M., & Cubillas, T. E. (2022). Awareness, compliance and implementation of disaster risk reduction and management in flood-prone public elementary schools in Butuan city, Philippines. International Journal of Educational Policy Research and Review, 9(5), 157.
11. Dariyo, A., & Tumanggor, R. O. (2023). The Relationship Between Adolescent's Religiosity And Resilience In Pandemic Time. International Journal of Application on Social Science and Humanities, 1(1), 698-706.
12. Epal, B. M., Abellanosa, C., Sarmiento, M. N., & Bacatan, J. (2024). Assessment on Disaster Preparedness, Related-Knowledge, and Adaptation Among Intermediate-Level Students. European Journal of Social Sciences Studies, 10(3).
13. Gabay, P. J. V., Alejo, R. S., Bayudan, L. G., Gelloagan, A. R. B., & Pante, J. S. (2024). Blossoming Amidst Adversity: A Quantitative Review on the Resilience of Senior High School Students using Connor Davidson Resilience Scale (CD-RISC). International Journal of Innovative Science and Research Technology.https://doi.org/10.38124/ijisrt/ijisrt24mar153
14. Gall, M. D., Gall, J. P., & Borg, W. R. (2015). Applying educational research: How to read, do, and use research to solve problems of practice (7th ed.). Pearson.
15. Gogtay, N. J., & Thatte, U. M. (2017). Principles of correlation analysis. Journal of the Association of Physicians of India, 65(3), 78-81.
16. Hafida, S. H. N., Leksonoati, C. P., Musiyam, M., & Permana, M. F. C. (2024, March). The relationship of adaptation to landslide disaster preparedness on high school students in Karanganyar District. In IOP Conference Series: Earth and Environmental Science (Vol. 1314, No. 1, p. 012052). IOP Publishing.
17. Indriasari, D. T., & Karman, K. (2023). Privacy, Confidentiality, and Data Protection: Ethical Considerations in the Use of the Internet. International Journal of Islamic Education, Research and Multiculturalism (IJIERM), 5(2), 431-450.
18. Lapada, A. (2022). Disaster risk reduction knowledge among Filipino senior high school students. Journal of Social Sciences Review, 2(1), 56-73.
19. Laurijssen, S. J., van der Graaf, R., van Dijk, W. B., Schuit, E., Groenwold, R. H., Grobbee, D. E., & de Vries, M. C. (2022). When is it impractical to ask informed consent? A systematic review. Clinical Trials, 19(5), 545-560.
20. Lubguban Jr, N. S., Verano, V. S., Sarazain, K. S., & Cayogyog, A. O. (2024). The Mediating Effect of Leadership Practices on the Relationship between Organizational Values and Organizational Citizenship Behavior. The Mediating Effect of Leadership Practices on the Relationship between Organizational Values and Organizational Citizenship Behavior, 150(1), 13-13.
21. Mamon, M. A. C. (2019). Implementation and Practices of the Comprehensive School SafetyFramework: Views of Senior High School Students. 10(3), 49–60. https://ijer.penpublishing.net/makale/1023
22. Mandal, P. K., Khadgi, D., Lage, S., Yangden, N., & Subedi, S. (2023). Earthquake Preparedness Knowledge and Practice of Secondary Level. Bouddhik Abhiyan (बौद्धिक अभियान), 8(01), 174-187.

23. McDonald-Harker, C., Drolet, J. L., Sehgal, A., Brown, M. R., Silverstone, P. H., Brett-MacLean, P., & Agyapong, V. I. (2021). Social-ecological factors associated with higher levels of resilience in children and youth after disaster: the importance of caregiver and peer support. Frontiers in public health, 9, 682634.
24. Mishra, P., Pandey, C. M., Singh, U., Gupta, A., Sahu, C., & Keshri, A. (2019). Descriptive statistics and normality tests for statistical data. Annals of cardiac anaesthesia, 22(1), 67-72.
25. Mohammadinia, L., Ebadi, A., Malekafzali, H., Allen, K. A., & Nia, H. S. (2019). The design and psychometric evaluation of the Adolescents' Resilience in Disaster Tool (ARDT-Q37): A mixed method study. Heliyon, 5(7).
26. Noor, S., Tajik, O., & Golzar, J. (2022). Simple random sampling. International Journal of Education & Language Studies, 1(2), 78-82.
27. Norman, P., Boer, H., Seydel, E. R., & Mullan, B. (2015). Protection motivation theory. Predicting and changing health behaviour: Research and practice with social cognition models, 3, 70-106.
28. Nurfitri, Y., Retnowati, R., & Awaludin, M. T. (2022). Development of Digital Pocket Book for Disaster Mitigation Materials Coronavirus Disease 2019 (COVID-19) to Increase Student Resilience to Disasters. Journal Of Biology Education Research (JBER), 3(1), 11-22.
29. O'Dell, A. L. (2024). The Relationship Between High-Impact Educational Practices (HIPs) and Institutional Integration and Persistence: A Predictive-Correlational Design.
30. Pal, I., Raj, V., Pal, A., & Sukwanchai, K. (2021). Disaster risk reduction education (DRRE) and resilience in Asia-Pacific. In Disaster Resilience and Sustainability (pp. 667-683). Elsevier.
31. Pambudi, D. I., Wijaya, O., Azhari, A., & Fitrianawati, M. (2025). Disaster risk reduction education for students with diverse needs. Asia Pacific Journal of Educators and Education, 40(1).
32. Parallag, R. V. (2024). Impact of Disaster Risk Reduction (DRR) In Education on The Knowledge and Attitude of Students Toward Responding to Natural Disasters. United International Journal for Research & Technology (UIJRT). 5(5), pp22-30.
33. Pietilä, A. M., Nurmi, S. M., Halkoaho, A., & Kyngäs, H. (2020). Qualitative research: Ethical considerations. The application of content analysis in nursing science research, 49-69.
34. Sari, S. P., & Alfiasari, A. (2024). The Influence of Social Support, Self-Esteem, and Optimism on Resilience of High School Students During the Covid-19 Pandemic. Journal of Family Sciences, 9(1), 87-99.
35. Sibualamu, K. Z., Ernawati, E., Wahdini, R., Chairunisa, R., Saragih, D. B., Kusmayanti, E., & Mustafa, S. R. (2024). Kesiapsiagaan Dan Tanggap Darurat Bencana Pada Siswa Di Sekolah: a Scoping Review. KOSALA: Jurnal Ilmu Kesehatan, 12(2), 183-196.
36. Siti Irene Astuti Dwiningrum, D., Khirjan Nahdi, K., Aswasulasikin, A., Dyah Respati Suryo Sumunar, S., Rukiyati, R., & Ebny Sholikhah, E. (2020). SCHOOL STRATEGIES IN STRENGTHENING STUDENT RESILIENCE IN DISASTER-PRONE AREAS. Cakrawala Pendidikan, 39(3).
37. Strauss, D. H., White, S. A., & Bierer, B. E. (2021). Justice, diversity, and research ethics review. Science, 371(6535), 1209-1211.
38. Syaifulloh, M., Soekamto, H., Wagistina, S., & Utomo, D. H. (2023). Pengurangan Risiko Bencana: Korelasi Pengetahuan dan Kesiapsiagaan Siswa Sekolah Menengah Atas di Kota Batu. geoedusains: Jurnal Pendidikan Geografi, 4(1), 53-65.
39. Topno, P. N. (2021). Building Disaster Resilience Through Primary and Higher Education. In Handbook of Disaster Risk Reduction for Resilience: New Frameworks for Building Resilience to Disasters (pp. 203-221). Cham: Springer International Publishing.
40. Velotti, L. (2022). Supporting Community Resilience through Service-Learning Experiences for Academics, Practitioners, and Students. In Service-Learning for Disaster Resilience (pp. 8-23). Routledge.
41. Vu, B. D., Nguyen, H. T., Dinh, H. V. T., Nguyen, Q. A. N., & Ha, X. V. (2023). Natural disaster prevention literacy education among Vietnamese high school students. Education Sciences, 13(3), 262.
42. Wang, Z., Han, Z., & Li, Y. (2023). The Interplay between School Preparedness and Student's Individual Protective Actions: The Mediating Role of Disaster Education. Sustainability, 15(20), 14888.

43. Xiao, H., Li, S., Chen, X., Yu, B., Gao, M., Yan, H., & Okafor, C. N. (2014). Protection motivation theory in predicting intention to engage in protective behaviors against schistosomiasis among middle school students in rural China. PLoS neglected tropical diseases, 8(10), e3246.
44. Yosep, I., Mardhiyah, A., Maulana, I., Lukman, M., & Hikmat, R. (2024). Overview of Resilience in High School Students. Jurnal Keperawatan Komprehensif (Comprehensive Nursing Journal), 10(5), 527-534.