

JOURNAL OF INTERDISCIPLINARY PERSPECTIVES

ISSN Print: 2984-8288, ISSN Online: 2984-8385
Vol. 4 No. 10, pp. 194-205, October 2026

Original Article

# Earthquake Awareness and Preparedness among Teachers and Students: Implications for School Safety Enhancement Program

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**Article History:**

Date received: July 5, 2026
Date revised: August 26, 2026
Date accepted: September 9, 2026

**Recommended citation:**

Gorosin, R., Baleña, M.J., Baleña, J., Alvarez, R., Budan, M.J., Luyao, J.A., & Sabellano, G. (2026). Earthquake awareness and preparedness among teachers and students: Implications for school safety enhancement program. *Journal of Interdisciplinary Perspectives*, *4*(10), 194-205. https://doi.org/10.69569/jip.2026.411y

**Abstract.** This study assessed the level of earthquake awareness and preparedness among teachers and students as a basis for a proposed School Safety Enhancement Program. A descriptive-comparative research design was employed, and data were gathered using a validated and reliability-tested questionnaire adapted from the Knowledge, Attitude, and Practices (KAP) framework. A total of 277 respondents, comprising 81 teachers and 196 Grade 12 students, participated in the study. Respondents were selected through stratified random sampling, with teachers and Grade 12 students treated as separate strata. Descriptive statistics, including weighted mean and standard deviation, were used to determine the levels of earthquake awareness and preparedness, while the Mann–Whitney *U* test was applied to examine differences between the two groups. Results showed that both groups reported very high levels of earthquake awareness across all dimensions. No statistically significant difference was found in overall earthquake awareness ($U = 7{,}680$, $p = .671$). Both groups also reported high levels of earthquake preparedness; however, a statistically significant difference was found in overall self-reported earthquake preparedness ($U = 9{,}981$, $p < .001$, rank-biserial correlation = 0.2574), with Grade 12 students reporting higher preparedness than teachers. At the dimension level, significant differences were found in Participation in Earthquake Drills ($p < .001$) and Confidence in Response ($p < .001$), whereas Preparedness Actions did not differ significantly ($p = .341$). The findings indicate that the observed difference in reported preparedness was concentrated in drill participation and confidence in response rather than preparedness actions. Based on these findings, a School Safety Enhancement Program was proposed as an evidence-informed framework to address the identified preparedness needs and strengthen school-based earthquake preparedness. Because the program was not implemented or experimentally evaluated in the present study, its effectiveness cannot be established from the findings.

**Keywords:** *Disaster risk reduction; Earthquake awareness; Earthquake preparedness; Grade 12 students; Magpet National High School; School safety; Teachers.*

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The Philippines is situated along the Pacific Ring of Fire, making it highly vulnerable to seismic hazards such as earthquakes. These events pose substantial risks to human life, infrastructure, and the continuity of educational activities. Schools, as densely populated environments, are particularly susceptible to earthquake-related disasters, underscoring the necessity of effective preparedness and response mechanisms to protect learners and educational personnel (United Nations Office for Disaster Risk Reduction [UNDRR], 2015). Earthquake preparedness in schools constitutes a fundamental aspect of disaster risk reduction and management (DRRM). It includes developing awareness, knowledge, and appropriate response behaviors among teachers and students. Teachers are expected to serve as immediate responders and leaders during emergencies, whereas students must demonstrate proper safety practices such as "Drop, Cover, and Hold" and orderly evacuation. Nevertheless, evidence suggests that awareness does not always translate into preparedness behaviors, indicating persistent gaps in school-based disaster readiness (Gür Erdoğan & Şimşek, 2023; Victoriano & Marcos, 2025).

The Knowledge, Attitude, and Practices (KAP) framework has been widely used to assess disaster preparedness because it helps identify gaps between awareness and actual behavior. According to the World Health Organization (WHO, 2008), KAP surveys provide valuable information for designing interventions that enhance preparedness and response capacities. Likewise, the Sendai Framework for Disaster Risk Reduction emphasizes education and preparedness as essential components of resilient communities and institutions (UNDRR, 2015).

In the Philippine context, the Department of Education Disaster Risk Reduction and Management Service (DepEd DRRMS) regularly conducts earthquake drills and preparedness programs to strengthen school safety and emergency response capabilities. However, the effectiveness of these initiatives depends largely on the actual levels of awareness and preparedness demonstrated by teachers and students. Continuous assessment is therefore necessary to identify existing strengths and gaps and to sustain a culture of disaster resilience within educational institutions (Victoriano & Marcos, 2025).

Magpet National High School in Magpet, North Cotabato, serves a diverse population of teachers and senior high school learners who may be exposed to the region's inherent earthquake risks. Understanding teachers' and Grade 12 students' earthquake awareness and preparedness is essential for identifying current safety practices and areas for improvement. Grade 12 students were selected because of their maturity and greater exposure to school-based disaster preparedness activities, while teachers were included because of their critical role in implementing emergency protocols and ensuring student safety during emergencies. Accordingly, this study aims to assess the level of earthquake awareness and preparedness among teachers and Grade 12 students of Magpet National High School, Magpet, North Cotabato, to inform a School Safety Enhancement Program. Specifically, it seeks to determine the levels of earthquake awareness and preparedness, examine whether significant differences exist between teachers and students in these dimensions, and propose interventions to strengthen disaster readiness and promote a culture of safety and resilience within the school community.

***Basic Understanding of Earthquakes***

A fundamental understanding of earthquakes is essential for fostering disaster resilience within school communities. Knowledge of the causes, characteristics, and impacts of earthquakes enables individuals to make informed decisions and respond appropriately during emergencies. In countries in seismically active regions, disaster education has become a vital part of basic education because it equips learners with the scientific knowledge and practical skills needed to reduce risk. International frameworks likewise emphasize that education is a critical mechanism for building resilient societies and promoting informed decision-making among learners and educators (United Nations Office for Disaster Risk Reduction [UNDRR], 2015). Studies have demonstrated that disaster-based school programs significantly improve students' knowledge, awareness, and preparedness behaviors through continuous exposure to disaster concepts and community-based learning activities (Adiyoso & Kanegae, 2013; Shaw et al., 2004). These findings suggest that strengthening earthquake literacy among teachers and students remains a cornerstone of effective disaster risk reduction in schools.

***Knowledge of Earthquake Safety Procedures***

Knowledge of earthquake safety procedures constitutes a crucial element of school disaster preparedness. Standard practices such as "Drop, Cover, and Hold On," orderly evacuation, and adherence to emergency protocols help minimize injuries and fatalities during seismic events. Research indicates that continuous disaster education and practical training significantly improve learners' and teachers' understanding of appropriate safety

responses. Educational interventions that combine lectures, simulations, and experiential learning have been found to increase disaster preparedness among students (Nur'aeni et al., 2023). Furthermore, integrating disaster education into the geography curriculum strengthens students' awareness, mitigation skills, and school-based preparedness through disaster simulations, risk mapping, and community partnerships (Kurniawan et al., 2025). Teachers also play an indispensable role in transmitting safety knowledge and reinforcing proper disaster behaviors among learners, thereby enhancing the overall effectiveness of school preparedness programs (Nagata & Kimura, 2017).

***Awareness of School Evacuation Plans***

Awareness of school evacuation plans enables teachers and students to respond systematically and efficiently during earthquake emergencies. Familiarity with evacuation routes, designated assembly areas, emergency signage, and institutional protocols reduces confusion and panic during actual disasters. The Sendai Framework underscores preparedness planning and community participation as essential strategies for building resilience in educational institutions (UNDRR, 2015). Ronan et al. (2018) emphasized that children's participation in evacuation drills and preparedness activities enhances their understanding of emergency procedures and strengthens their confidence in responding to disasters. Likewise, school-based disaster resilience initiatives promote collaboration among administrators, teachers, learners, and families, resulting in more effective implementation of evacuation plans and emergency response systems (Muñoz et al., 2020). These findings highlight the importance of regularly assessing and reinforcing awareness of school evacuation mechanisms.

***Participation in Earthquake Drills***

Earthquake drills give teachers and students opportunities to practice emergency procedures and build confidence in responding to real disasters. Regular drills reinforce knowledge retention, improve coordination, and cultivate a culture of preparedness within schools. Adiyoso and Kanegae (2013) found that disaster-based school programs significantly enhanced students' earthquake preparedness through repeated simulations and participatory activities. Similarly, Jafari et al. (2020) reported that continuous school drills strengthened community-based disaster risk management and increased institutional resilience. Sakurai et al. (2020) likewise demonstrated that school-based disaster education programs positively influenced students' preparedness behaviors and risk perceptions following major earthquake events. Collectively, these studies affirm that regular earthquake drills remain a fundamental strategy for promoting disaster readiness among school stakeholders.

***Preparedness Actions***

Preparedness actions include proactive measures taken before disasters, such as preparing emergency kits, identifying safe meeting places, and participating in school and community preparedness activities. These actions translate knowledge into practical behaviors that reduce vulnerability during emergencies. Research indicates that educational interventions combining experiential learning and community engagement effectively strengthen disaster preparedness behaviors among learners (Shoji et al., 2020). Integrating disaster education into formal curricula and extracurricular activities further promotes a culture of preparedness and encourages students to participate actively in mitigation efforts (Kurniawan et al., 2025). Moreover, studies on disaster education in South America and the Caribbean emphasize that sustained collaboration among schools, families, and local communities is necessary for building long-term resilience and effective preparedness practices (Muñoz et al., 2020). These findings demonstrate that preparedness requires not only awareness but also continuous engagement in preventive and protective actions.

***Confidence in Responding During Earthquake Emergencies***

Confidence in responding during earthquake emergencies reflects an individual's perceived ability to remain calm, make appropriate decisions, and assist others during disaster situations. Self-efficacy is a significant predictor of effective emergency response behaviors among both teachers and students. Studies show that repeated exposure to drills and simulation-based activities strengthens psychological readiness and builds confidence in executing safety procedures (Sakurai et al., 2020). Likewise, integrating disaster education into school curricula improves learners' preparedness and encourages proactive responses to emergency situations (Kurniawan et al., 2025). Disaster education initiatives that emphasize practical experiences and community participation also contribute to stronger coping mechanisms and greater resilience among school populations (Tatebe & Mutch, 2015). Consequently, building confidence through continuous education, drills, and participatory learning remains an essential goal of school-based disaster risk reduction programs.

## Methodology

**Research Design**

This study employed a descriptive-comparative research design. The descriptive component determined respondents' levels of awareness and preparedness across specific dimensions: basic understanding of earthquakes, knowledge of earthquake safety procedures, awareness of the school's evacuation plan, participation in earthquake drills, preparedness actions, and confidence in responding during earthquake emergencies. The comparative component of the study examined whether significant differences existed between teachers and Grade 12 students in earthquake awareness and preparedness. This design was appropriate because it enabled the researcher to describe existing conditions and compare two naturally occurring groups without manipulating any variables. According to John W. Creswell and J. David Creswell (2018), descriptive-comparative research is suitable for investigating differences among groups based on existing characteristics and conditions.

Furthermore, the study adopted a cross-sectional approach, wherein data were collected from the respondents at a single point in time through a structured questionnaire adapted from the Knowledge, Attitude, and Practices (KAP) framework of the World Health Organization (WHO, 2008) and contextualized using disaster risk reduction guidelines from the United Nations Office for Disaster Risk Reduction and the Department of Education Disaster Risk Reduction and Management Service. The findings served as the basis for proposing a School Safety Enhancement Program to strengthen disaster preparedness and promote a culture of safety and resilience within the school community.

**Respondents and Sampling Procedure**

The study respondents were teachers and Grade 12 students of Magpet National High School, Magpet, North Cotabato. The teacher population consisted of 102 Junior High School (JHS) and Senior High School (SHS) teachers, while the Grade 12 student population consisted of 400 students. The two groups were included because teachers and Grade 12 students are key stakeholders in school-based disaster risk reduction and management and play direct roles in responding to emergencies. The required sample size was determined using the Raosoft sample size calculator with a 95% confidence level, 5% margin of error, and 50% response distribution. Based on these parameters, 81 teachers were selected from a population of 102 teachers, and 196 Grade 12 students were selected from a population of 400 students, for a total sample of 277 respondents.

Stratified random sampling was employed, with teachers and Grade 12 students treated as separate strata. The school administration provided separate sampling frames for the two groups. The names of eligible teachers and Grade 12 students were entered separately into Wheel of Names, a computerized random-selection tool. The required number of respondents was then randomly selected from each stratum: 81 teachers and 196 Grade 12 students. This procedure ensured that each eligible member within each stratum had an equal chance of being selected while maintaining representation from both groups. The eligibility criteria required teacher respondents to be officially employed as JHS or SHS teachers at Magpet National High School during the data collection period. Student respondents were required to be officially enrolled Grade 12 students of the school during the same period. All Grade 12 student respondents were 18 years old at the time of data collection and could therefore provide informed consent independently. All selected respondents voluntarily agreed to participate in the study. The study excluded respondents who were not officially part of the identified populations, declined participation, or submitted questionnaires that did not meet the study's completion requirements.

**Research Instrument**

The study utilized a structured questionnaire adapted from the Knowledge, Attitude, and Practices (KAP) framework developed by the World Health Organization (WHO, 2008) and contextualized using the disaster risk reduction guidelines of the United Nations Office for Disaster Risk Reduction (UNDRR, 2015) and the Department of Education Disaster Risk Reduction and Management Service (DepEd DRRMS). The questionnaire consisted of three parts. Part I elicited the demographic profile of the respondents, including age, sex, role, and department or grade level. Part II measured earthquake awareness through three indicators: (1) Basic Understanding of Earthquakes, (2) Knowledge of Earthquake Safety Procedures, and (3) Awareness of the School's Earthquake Evacuation Plan. Each indicator comprised five statements, yielding a total of fifteen items. Part III assessed earthquake preparedness in terms of (1) Participation in Earthquake Drills, (2) Preparedness Actions, and (3) Confidence in Responding During Earthquake Emergencies. Likewise, each indicator consisted of five statements, resulting in another fifteen items. The respondents rated each statement using a five-point Likert scale. Separate

interpretation tables were utilized for earthquake awareness and earthquake preparedness to provide the corresponding verbal descriptions and numerical ranges.

The research instrument underwent content validation to ensure relevance, clarity, and alignment with the study objectives. The questionnaire was adapted from the Knowledge, Attitude, and Practices (KAP) framework of the World Health Organization (WHO, 2008) and contextualized using the disaster risk reduction guidelines of the United Nations Office for Disaster Risk Reduction (UNDRR, 2015) and the Department of Education Disaster Risk Reduction and Management Service (DepEd DRRMS). A panel of experts in educational management, disaster risk reduction and management, and research methodology evaluated it. The validators assessed the items' appropriateness, comprehensibility, and adequacy and provided recommendations for improvement. The researchers incorporated necessary revisions to enhance the instrument's content validity and suitability for the local context and the study's objectives.

To establish the instrument's reliability, the researchers conducted a pilot test among 30 student respondents and 10 teacher respondents who were not included in the actual study. The data obtained from the pilot testing were analyzed using Cronbach's alpha to determine the internal consistency of each dimension of the questionnaire. The results showed acceptable to excellent reliability coefficients: Basic Understanding of Earthquakes ($\alpha = .77$), Knowledge of Earthquake Safety Procedures ($\alpha = .87$), Awareness of the School's Earthquake Evacuation Plan ($\alpha = .88$), Participation in Earthquake Drills ($\alpha = .81$), Preparedness Actions ($\alpha = .89$), and Confidence in Responding During Earthquake Emergencies ($\alpha = .83$). These values exceeded the recommended threshold of 0.70, indicating satisfactory internal consistency and reliability of the instrument (DeVellis, 2017). Thus, the questionnaire was deemed valid and reliable.

**Data Collection Procedure**

Data collection was conducted in April 2026 following approval from the school administration and completion of the required ethical procedures. Before the study, the researchers submitted a formal letter requesting permission to administer the survey to the Principal I of Magpet National High School, Magpet, North Cotabato. After approval, the researchers coordinated with the school administration to facilitate respondent selection and schedule data collection activities. Before administering the questionnaire, the researchers explained the study's purpose, the voluntary nature of participation, and the confidentiality of respondents' information. The researchers obtained informed consent from all participants and assured them that their responses would be used solely for academic and research purposes. The researchers personally administered the questionnaire to the selected teachers and Grade 12 students. Respondents were given sufficient time to complete the instrument and were encouraged to provide honest and accurate responses. The researchers collected the completed questionnaires immediately after completion to ensure a high retrieval rate and minimize data loss. After retrieving the questionnaires, the researchers checked the responses for completeness, encoded them, organized them, and prepared them for statistical analysis. The study findings served as the basis for developing a School Safety Enhancement Program to strengthen earthquake awareness and preparedness among members of the school community. All 277 selected respondents completed the questionnaire and provided usable responses, resulting in a 100% response rate. The researchers checked the accomplished questionnaires for completeness before encoding and analyzing the data. The researchers excluded any questionnaire with missing responses from the final dataset; consequently, they did not perform statistical imputation or replace missing values. The final dataset consisted of 277 complete responses, comprising 81 teachers and 196 Grade 12 students.

**Data Analysis**

The data were analyzed using descriptive and inferential statistical procedures. Means and standard deviations summarized self-reported earthquake awareness and preparedness, while medians and interquartile ranges described the distributions of the composite scores. The Shapiro–Wilk test examined score distributions within each respondent group. Because the study involved two independent groups and the distributions departed from normality, we used the Mann–Whitney $U$ test to determine whether significant differences existed between teachers and Grade 12 students. The overall earthquake awareness and overall earthquake preparedness composite scores served as the primary outcomes for testing the two prespecified null hypotheses. We also conducted dimension-level Mann–Whitney $U$ analyses to identify which specific dimensions contributed to observed group differences. We reported rank-biserial correlation as the effect-size measure and interpreted its

direction according to the ordering of the comparison groups. We evaluated statistical significance at the 0.05 level.

**Ethical Considerations**

The study adhered to fundamental ethical principles to protect participants' rights and welfare. The researchers obtained informed consent from all participants before they participated in the study. All Grade 12 student respondents were 18 years old at the time of data collection in April 2026 and could therefore provide informed consent on their own behalf. Participants were informed of their right to decline participation or withdraw from the study at any stage without penalty or negative consequences. Participation or nonparticipation did not affect students' academic standing or teachers' professional status. The researchers maintained respondents' confidentiality and anonymity throughout the research process. The questionnaire did not collect names or other personally identifiable information. The researchers used the information solely for academic and research purposes and reported it in aggregate form. Completed questionnaires and electronic research files were stored securely and were accessible only to the researchers.

The principles of beneficence, non-maleficence, justice, and respect for persons guided the conduct of the study. The research involved only completing a questionnaire on earthquake awareness and preparedness and did not involve physical intervention or exposure to hazardous activities. The researchers reported the findings honestly and objectively and avoided fabricating, falsifying, or misrepresenting data. The study was conducted with due regard for the privacy, dignity, and voluntary participation of all respondents. The findings are intended to contribute to the understanding of earthquake awareness and preparedness within the school and to inform the development of a proposed School Safety Enhancement Program.

## Results and Discussion

**Level of Earthquake Awareness Among Teachers and Students**

**Table 1.** *Level of Earthquake Awareness Among Teachers and Students*

| Dimension | Group | *M* | *SD* | Interpretation |
|---|---|---|---|---|
| Basic Understanding | Teachers | 4.47 | 0.42 | Very Aware |
| | Students | 4.47 | 0.32 | Very Aware |
| Safety Procedures | Teachers | 4.41 | 0.41 | Very Aware |
| | Students | 4.34 | 0.40 | Very Aware |
| School Evacuation Awareness | Teachers | 4.46 | 0.41 | Very Aware |
| | Students | 4.52 | 0.37 | Very Aware |
| Overall Mean | **Teachers** | **4.44** | **0.28** | **Very Aware** |
| | **Students** | **4.44** | **0.21** | **Very Aware** |

The results presented in Table 1 reveal that both teachers and students reported a very high level of earthquake awareness across all dimensions. Among teachers, the highest mean was obtained for Basic Understanding of Earthquakes ($M$ = 4.47, $SD$ = 0.42), followed by School Evacuation Awareness ($M$ = 4.46, $SD$ = 0.41) and Safety Procedures ($M$ = 4.41, $SD$ = 0.41). Teachers obtained an overall mean of 4.44 ($SD$ = 0.28), interpreted as Very Aware. Similarly, Grade 12 students obtained the highest mean in School Evacuation Awareness ($M$ = 4.52, $SD$ = 0.37), followed by Basic Understanding of Earthquakes ($M$ = 4.47, $SD$ = 0.32) and Safety Procedures ($M$ = 4.34, $SD$ = 0.40). Their overall mean was 4.44 ($SD$ = 0.21), also interpreted as Very Aware. Overall, both groups reported very high earthquake awareness across all three dimensions, although the highest-rated dimension differed slightly between teachers and Grade 12 students.

The findings suggest that teachers and Grade 12 students reported comparable levels of awareness regarding earthquake hazards, safety procedures, and school evacuation protocols. The similarity in overall awareness suggests that both groups may have had comparable exposure to school-based disaster preparedness information and activities. However, because the study relied on self-reported responses and employed a cross-sectional design, the results should be interpreted as respondents' reported awareness rather than as evidence of objectively measured knowledge or actual emergency competence. The present findings are consistent with Adiyoso and Kanegae (2013), which showed that disaster-based school programs significantly improved students' earthquake awareness and preparedness through participatory and experiential learning activities. Similarly, Shaw et al. (2004) emphasized that education, previous disaster experiences, and continuous exposure to preparedness initiatives enhance individuals' understanding of hazards and encourage proactive disaster-response behaviors.

Furthermore, Kurniawan et al. (2025) reported that integrating disaster education into the curriculum strengthens school-based preparedness by improving learners' awareness, risk perception, and emergency response capabilities. Collectively, these studies support the importance of school-based disaster education and preparedness activities in promoting earthquake awareness; however, the present study did not directly examine the causal contribution of such activities to respondents' awareness levels.

**Level of Earthquake Preparedness Among Teachers and Students**

**Table 2.** *Level of Earthquake Preparedness Among Teachers and Students*

| Dimension | Group | *M* | *SD* | Interpretation |
|---|---|---|---|---|
| Participation in Earthquake Drills | Students | 4.44 | 0.44 | Always Prepared |
| | Teachers | 4.18 | 0.57 | Often Prepared |
| Preparedness Actions | Students | 4.07 | 0.48 | Often Prepared |
| | Teachers | 4.13 | 0.54 | Often Prepared |
| Confidence in Response | Students | 4.40 | 0.38 | Always Prepared |
| | Teachers | 4.16 | 0.44 | Often Prepared |
| Overall Mean | **Students** | **4.30** | **0.26** | **Always Prepared** |
| | **Teachers** | **4.16** | **0.31** | **Often Prepared** |

Table 2 shows that both teachers and Grade 12 students reported generally high levels of earthquake preparedness across the three dimensions. Among the students, the highest mean was obtained for Participation in Earthquake Drills ($M$ = 4.44, $SD$ = 0.44), followed by Confidence in Response ($M$ = 4.40, $SD$ = 0.38) and Preparedness Actions ($M$ = 4.07, $SD$ = 0.48). Students obtained an overall mean of 4.30 ($SD$ = 0.26), interpreted as Always Prepared. Among teachers, the highest mean was obtained for Participation in Earthquake Drills ($M$ = 4.18, $SD$ = 0.57), followed by Confidence in Response ($M$ = 4.16, $SD$ = 0.44) and Preparedness Actions ($M$ = 4.13, $SD$ = 0.54). Teachers obtained an overall mean of 4.16 ($SD$ = 0.31), interpreted as Often Prepared.

The findings suggest that both groups reported relatively high levels of preparedness, although students reported higher overall preparedness than teachers. The relatively high student rating for participation in earthquake drills and confidence in response suggests strong self-reported engagement in preparedness activities. However, these results reflect perceived preparedness and should not be interpreted as evidence that respondents would necessarily demonstrate the same level of competence during an actual earthquake emergency. The observed difference provides a basis for considering additional opportunities for teachers to participate in practical, role-specific, and scenario-based preparedness activities, particularly in areas related to drill participation and confidence in response.

These findings are supported by Sakurai et al. (2020), who found that school-based disaster education can improve disaster preparedness and response-related competencies among students. Jafari et al. (2020) likewise emphasized the importance of repeated school-based earthquake drills and practical disaster risk reduction activities in strengthening preparedness and response capacity. Furthermore, Ronan et al. (2018) highlighted the importance of evacuation drills and school preparedness activities in developing children's understanding and readiness for emergency situations. Taken together, these studies support the importance of continuous and experiential disaster preparedness activities in strengthening self-reported readiness among school stakeholders.

**Difference in Earthquake Awareness Between Students and Teachers**

**Table 3**. *Overall Difference in Self-Reported Earthquake Awareness*

| Variable | Group | *n* | *M* | *SD* | *U* | *p* | Decision |
|---|---|---|---|---|---|---|---|
| Overall Earthquake Awareness | Students | 196 | 4.44 | 0.21 | 7680 | .671 | Not Significant |
| | Teachers | 81 | 4.44 | 0.28 | | | |

Table 3 presents the results of the Mann–Whitney $U$ test examining the difference in overall self-reported earthquake awareness between Grade 12 students and teachers. The results showed no statistically significant difference between the two groups, $U$ = 7680, $p$ = .671. Both students and teachers obtained an overall mean of 4.44, although students reported slightly lower variability ($SD$ = 0.21) than teachers ($SD$ = 0.28). Since the $p$-value was greater than the 0.05 level of significance, the null hypothesis was not rejected. Thus, the study did not detect a statistically significant difference in overall self-reported earthquake awareness between teachers and Grade 12 students. The finding implies that the two groups reported comparable levels of earthquake

awareness within the participating school. This similarity suggests that teachers and students may have had broadly similar exposure to earthquake-related information, safety procedures, and school evacuation protocols. However, this finding should not be interpreted as proof that the two groups had equivalent objectively measured knowledge or would respond identically during an actual earthquake. Since awareness was measured through self-report, differences in actual knowledge, experience, or emergency performance may not have been captured.

This finding is supported by Ronan et al. (2018), who emphasized the importance of school-based disaster education in developing disaster awareness and preparedness among young people. Similarly, Tatebe and Mutch (2015) highlighted the role of school-based disaster education in developing a shared understanding of disaster risks among members of the educational community. Sakurai et al. (2020) likewise found that disaster education in school settings can strengthen disaster-related knowledge and awareness among students. These studies support the importance of sustained school-based disaster education in developing awareness among school stakeholders, although they do not establish that the specific programs implemented at Magpet National High School caused the comparable awareness levels observed in the present study.

**Table 4.** *Mann–Whitney U Test for Differences in Self-Reported Earthquake Awareness*

| Variables | U | p | Effect Size |
|---|---|---|---|
| Basic Understanding | 7579 | .548 | .05 |
| Safety Procedures | 7051 | .138 | .11 |
| School Evacuation Awareness | 7377 | .347 | -.07 |

*Note.* Mann–Whitney *U* test; $p < .05$ indicates statistical significance. Rank-biserial correlation was used as the effect-size measure.

Table 4 presents the results of the Mann–Whitney *U* test examining differences in the self-reported earthquake awareness of teachers and Grade 12 students across three dimensions. The results showed no statistically significant differences in Basic Understanding ($p = .548$), Safety Procedures ($p = .138$), and School Evacuation Awareness ($p = .347$). Since all *p*-values exceeded the 0.05 level of significance, the null hypothesis of no difference was not rejected for any of the three dimensions. Thus, the analysis did not detect statistically significant differences in the self-reported earthquake awareness dimensions between teachers and Grade 12 students. The findings imply that teachers and Grade 12 students reported similar levels of earthquake awareness across the three dimensions within the participating school. The small rank-biserial correlations further indicate that the observed group differences were relatively small in practical terms. However, the absence of statistically significant differences should not be interpreted as evidence that the two groups are equivalent. Other factors, such as previous exposure to earthquake drills, disaster-related training, role within the school, and differences in how respondents interpreted the questionnaire items, may also influence their reported awareness.

The finding is consistent with Ronan et al. (2018), who emphasized the role of school-based disaster education in developing awareness and preparedness among young people through structured learning and preparedness activities. Similarly, Tatebe and Mutch (2015) highlighted the importance of integrating disaster education into school settings to develop shared understanding and preparedness among learners and educators. Sakurai et al. (2020) likewise demonstrated the value of school-based disaster education in strengthening disaster-related knowledge and awareness among students. Collectively, these studies support the importance of school-based disaster education in developing awareness among school stakeholders, although the present study does not establish that specific school programs caused the similar awareness levels observed between the two groups.

**Difference in Earthquake Preparedness Between Students and Teachers**

Table 5 presents the results of the Mann–Whitney *U* test examining whether a statistically significant difference existed in overall self-reported earthquake preparedness between Grade 12 students and teachers. The results showed a statistically significant difference between the two groups ($p < .001$). Students reported a higher overall level of preparedness ($M = 4.30$, $SD = 0.26$) than teachers ($M = 4.16$, $SD = 0.31$). Thus, the results indicate that students reported significantly higher self-preparedness scores than teachers. The finding implies that although both groups reported relatively high levels of earthquake preparedness, students reported greater overall preparedness than teachers. This difference may reflect differences in participation in school drills, prior exposure to disaster preparedness activities, or respondents' perceptions of their roles during earthquake emergencies. Nevertheless, because the study used a cross-sectional design and self-reported measures, the finding does not establish that students would demonstrate greater actual preparedness or emergency performance during an earthquake.

**Table 5.** *Overall Difference in Self-Reported Earthquake Preparedness*

| Variable | Group | *n* | *M* | *SD* | *U* | *p* | Effect Size | Decision |
|---|---|---|---|---|---|---|---|---|
| Overall Earthquake Preparedness | Students | 196 | 4.30 | 0.26 | 9981 | < .001 | .26 | Significant |
| | Teachers | 81 | 4.16 | 0.31 | — | — | — | — |

***Note.*** Mann–Whitney U test; p < .05 indicates statistical significance. Rank-biserial correlation was used as the effect-size measure. The positive coefficient indicates higher scores for students under the student-first group ordering.

Sakurai et al. (2020) support this finding, emphasizing the importance of experiential disaster education and preparedness activities in strengthening students' disaster readiness. Similarly, Jafari et al. (2020)highlighted the contribution of repeated disaster drills and practical preparedness activities to improving emergency readiness among learners. Shoji et al. (2020) likewise reported that experiential approaches to disaster education can strengthen preparedness-related behaviors and confidence in responding to disasters. These studies support the importance of active disaster-preparedness experiences in developing reported readiness, although the present study cannot establish a causal relationship between such activities and the higher preparedness reported by students.

**Table 6**. *Mann–Whitney U Test for Differences in Self-Reported Earthquake Preparedness*

| Dimension | U | p | Effect Sise | Interpretation |
|---|---|---|---|---|
| Participation in Earthquake Drills | 5759 | < .001 | −.27 | Significant |
| Preparedness Actions | 7366 | .341 | .07 | Not Significant |
| Confidence in Response | 5327 | < .001 | −.33 | Significant |

*Note.* Mann–Whitney U test; p < .05 indicates statistical significance. Rank-biserial correlation was used as the effect-size measure. The sign of the rank-biserial correlation reflects the direction of the group comparison based on the specified group ordering.

Table 6 presents the results of the Mann–Whitney *U* test examining differences in self-reported earthquake preparedness between Grade 12 students and teachers across the three preparedness dimensions. The results revealed statistically significant differences in Participation in Earthquake Drills ($p < .001$) and Confidence in Response ($p < .001$). In contrast, Preparedness Actions did not differ significantly between the two groups ($p = .341$). Based on the direction of the rank-biserial coefficients and the descriptive results, students reported higher participation in earthquake drills and greater confidence in responding to earthquake emergencies than teachers. The effect sizes for these two significant differences were relatively small to moderate, whereas the effect for preparedness actions was negligible. The findings imply that the principal difference between teachers and Grade 12 students in reported earthquake preparedness was concentrated in participation in drills and confidence in response, rather than in general preparedness actions. The higher student ratings in these two dimensions may reflect differences in drill exposure, participation roles, prior disaster-related experiences, or perceptions of responsibility during school emergencies. However, because the study was cross-sectional and relied on self-reported measures, the results cannot establish that greater drill participation caused higher confidence or that either group would necessarily demonstrate greater competence during an actual earthquake. The findings are consistent with Sakurai et al. (2020), who emphasized the importance of experiential and school-based disaster education in developing disaster preparedness and response-related competencies. Similarly, Jafari et al. (2020)highlighted the contribution of repeated drills and practical preparedness activities to strengthening students' familiarity with emergency procedures. Shoji et al. (2020) likewise emphasized the value of experiential approaches to disaster education in developing preparedness-related behaviors and confidence. These studies support the importance of active, experiential disaster preparedness activities, although the present findings should be interpreted as evidence of differences in reported preparedness rather than proof of differences in actual emergency performance.

**School Safety Enhancement Program (SSEP)**

The quantitative findings of this study revealed statistically significant differences in self-reported earthquake preparedness between teachers and Grade 12 students in terms of participation in earthquake drills and confidence in response ($p < .001$), while no statistically significant difference was found in preparedness actions ($p = .341$). Both groups, however, reported high levels of earthquake awareness and preparedness. In response to these findings, the School Safety Enhancement Program (SSEP), or Project S.Y.N.C. (Safety Yields Nuanced Cooperation), was proposed as a school-based safety enhancement framework. The program was designed to address the dimensions in which significant group differences were observed while maintaining

existing preparedness practices. It consists of three strategic pillars: Faculty Empowerment, Operational Synergy, and Sustainability Audit, each aligned with the findings of the study.

**Table 7.** *Proposed School Safety Enhancement Program*

| Strategic Pillar | Target Dimension | Objective | Proposed Activities | Responsible Persons | Timeline | Performance Indicators |
|---|---|---|---|---|---|---|
| **Faculty Empowerment** | Confidence in Response | Strengthen teachers' confidence in managing earthquake-related emergencies | Scenario-based emergency response training; classroom incident simulations; basic first-aid and emergency coordination exercises | School Head, DRRM Coordinator, Teachers | Quarterly | Increased teacher participation; improved self-reported confidence; completion of simulation activities |
| **Operational Synergy** | Participation in Earthquake Drills | Increase meaningful teacher participation and coordination during earthquake drills | Integrated teacher-student drills; assigned emergency roles; post-drill debriefing; rotation of teacher and student safety roles | DRRM Coordinator, Teachers, Student Leaders | Every scheduled drill | 100% participation of designated personnel; completed role assignments; documented post-drill evaluation |
| **Sustainability Audit** | Preparedness Actions | Maintain and strengthen existing preparedness practices | Classroom hazard inspection; checking emergency supplies; identification of blocked exits and hazards; updating classroom emergency information | DRRM Committee, Teachers, Student Representatives | Quarterly | Completed inspection checklist; identified hazards addressed; updated emergency preparedness records |

The proposed SSEP was developed from the statistically significant differences identified through the Mann–Whitney *U* analysis. Specifically, students reported significantly higher participation in earthquake drills and greater confidence in response than teachers. These findings suggest that teacher participation and confidence may warrant greater attention in future school-based preparedness activities. However, because the study used a cross-sectional design and self-reported measures, the findings do not establish that existing school programs caused the observed levels of awareness or preparedness.

The Faculty Empowerment component addresses the observed difference in confidence in response by giving teachers opportunities to engage in scenario-based and role-specific emergency exercises. Activities may include simulated blocked evacuation routes, classroom management during aftershocks, and basic emergency coordination and triage scenarios. These activities are grounded in Bandura's (1997) self-efficacy theory, which emphasizes the role of mastery and experiential experiences in developing perceived capability to perform specific tasks. The approach is also consistent with Sakurai et al. (2020), who emphasized the importance of experiential disaster education in moving beyond knowledge acquisition toward practical preparedness and response competencies.

The Operational Synergy component responds to the significant difference in participation in earthquake drills. The component proposes integrated teacher-student simulations in which participants are assigned specific emergency responsibilities and subsequently engage in structured post-drill debriefings. This approach gives teachers and students opportunities to practice coordination and communication rather than merely participating in drills as routine activities. Ronan et al. (2018) emphasized the value of active participation and experiential learning in school disaster preparedness, while Jafari et al. (2020) highlighted the importance of practical and collaborative disaster preparedness activities in strengthening emergency readiness.

The Sustainability Audit component addresses Preparedness Actions, where no statistically significant difference was observed between teachers and students ($p = .341$). Rather than assuming that this dimension is deficient, the proposed program seeks to maintain and periodically assess existing preparedness practices through classroom hazard inspections, emergency-supply monitoring, and participatory safety assessments. This approach allows

the school to preserve practices already reported at relatively high levels while identifying specific areas for improvement.

*Monitoring and Evaluation*

The SSEP should initially be treated as a proposed framework rather than an evaluated intervention. Before full implementation, the school administration, DRRM personnel, teachers, and student representatives may review and validate the program to determine its feasibility, relevance, and safety. During implementation, participation records, drill-observation checklists, classroom safety inspection forms, and post-activity evaluations may monitor progress. Future evaluation should incorporate objective drill-performance measures, in addition to self-reported questionnaires, to determine whether the program produces measurable improvements in emergency response competencies and preparedness.

**Limitations of the Study**

This study has several limitations to consider when interpreting its findings. First, the study was conducted in one public secondary school, Magpet National High School, Magpet, North Cotabato; therefore, the findings are context-specific and should not be generalized to other schools or populations without further investigation. Second, the study employed a cross-sectional descriptive-comparative design, which provides a comparison of teachers' and Grade 12 students' reported earthquake awareness and preparedness at a particular point in time. Consequently, the study cannot establish causal relationships between school disaster-related activities and the respondents' levels of awareness or preparedness. Third, the study relied primarily on self-reported questionnaire responses. Although the instrument demonstrated acceptable internal consistency, self-reported measures may be influenced by social desirability, recall, and respondents' perceptions of their own knowledge and preparedness. Thus, high reported preparedness should not be interpreted as evidence of actual emergency-response competence. Fourth, the study compared teachers and Grade 12 students who may differ in **age,** previous disaster experiences, training exposure, frequency of participation in drills, and emergency responsibilities. The present analysis did not control for these factors, which may have contributed to the observed group differences. Fifth, the study used Likert-type responses, and the distributions of the measured dimensions departed from normality. Although we used nonparametric procedures for the group comparisons, the interpretation of the results should account for the ordinal and self-reported nature of the measures. Finally, the School Safety Enhancement Program (SSEP) developed from the findings is a proposed framework and was not implemented or experimentally evaluated as part of this study. Therefore, no claims can be made regarding its effectiveness. Future research should validate the proposed program with school stakeholders and evaluate its implementation using objective indicators, such as observed drill performance, emergency-response tasks, and pretest-posttest measures.

## Conclusion

The findings suggest that although teachers and Grade 12 students reported high levels of earthquake awareness and preparedness, specific dimensions of preparedness differed between the groups. In particular, teacher participation in earthquake drills and confidence in responding to earthquake emergencies warrant greater attention in future school safety initiatives. Based on these findings, the School Safety Enhancement Program (SSEP), or Project S.Y.N.C., was proposed as a framework to strengthen teacher confidence, promote collaborative participation in drills, and sustain existing preparedness practices. The conclusions of this study are limited to the participating teachers and Grade 12 students of Magpet National High School. Because the study employed a cross-sectional design and self-reported measures, the findings should not be interpreted as evidence of actual emergency competence, causal program effects, or equivalence between the two groups. Future studies may incorporate objective drill-performance assessments, longitudinal designs, and multiple schools to provide stronger evidence regarding earthquake preparedness and response capabilities.

## Contributions of Authors

Author 1: conceptualization, data gathering, data analysis, results and discussion
Author 2: data gathering, results and discussion
Author 3: data gathering, results and discussion
Author 4: conceptualization, results and discussion
Author 5: data gathering, results and discussion
Author 6: data gathering, results and discussion
Author 7: conceptualization, results and discussion

## Funding

The authors received no specific funding for this research from any public, commercial, or not-for-profit funding agencies.

## Conflict of Interests

The authors declare no conflict of interest in the conduct, analysis, and reporting of this study. All procedures, data collection, and interpretation of results were carried out objectively and solely for academic and research purposes.

## Acknowledgment

The researchers extend heartfelt thanks to the Principal of Magpet National High School, Magpet, North Cotabato, for the approval and invaluable assistance provided during the data gathering process, and to the teacher and Grade 12 student respondents for their cooperation, honesty, and active participation, which made the successful completion of this study possible.

## References

Adiyoso, W., & Kanegae, H. (2013). Effectiveness of disaster-based school program on students' earthquake preparedness. Journal of Disaster Research, 8(5), 1009–1017. https://doi.org/10.20965/jdr.2013.p1009

Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. Psychological Review, 84(2), 191–215. https://doi.org/10.1037/0033-295X.84.2.191

Bandura, A. (1986). Social foundations of thought and action: A social cognitive theory. Prentice-Hall.

Blanca, M. J., Alarcón, R., Arnau, J., Bono, R., & Bendayan, R. (2017). Non-normal data: Is ANOVA still a valid option? Psicothema, 29(4), 552–557. https://doi.org/10.7334/psicothema2016.383

Comfort, L. K., Wisner, B., Cutter, S. L., Pulwarty, R. S., Hewitt, K., Oliver-Smith, A., Wiener, J., Fordham, M., Peacock, W. G., & Krimgold, F. (1999). Reframing disaster policy: The global evolution of vulnerable communities. Environmental Hazards, 1(1), 39–40. https://doi.org/10.3763/ehaz.1999.0104

DeVellis, R. F. (2017). Scale development: Theory and applications (4th ed.). Sage Publications.

Freire, P. (1970). Pedagogy of the oppressed. Herder and Herder.

George, D., & Paul Mallery. (2019). IBM SPSS statistics 26 step by step: A simple guide and reference (16th ed.). Routledge.

Ghasemi, A., & Zahediasl, S. (2012). Normality tests for statistical analysis: A guide for non-statisticians. International Journal of Endocrinology and Metabolism, 10(2), 486–489. https://doi.org/10.5812/ijem.3505

Gür Erdoğan, D., & Şimşek, Ş. (2023). Investigation of teachers' sustainable earthquake awareness and earthquake knowledge levels. Sakarya University Journal of Education, 13(4), 685–700. https://doi.org/10.19126/suje.1377010

Jafari, H., Ardalan, A., & Ostadtaghizadeh, A. (2020). From "Earthquake and safety" school drills to "safe school-resilient communities": A continuous attempt for promoting community-based disaster risk management in Iran. International Journal of Disaster Risk Reduction, 45, 101512. https://doi.org/10.1016/j.ijdrr.2020.101512

Kurniawan, N., Saipiatuddin, S., & Hidayaht, A. N. (2025). Integrating disaster education into geography curriculum: Strengthening school-based preparedness. Journal of Environment and Geography Education, 2(1), 45–58. https://doi.org/10.61511/jegeo.v2i1.2025.1696

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. https://doi.org/10.4103/aca.ACA_157_18

Muñoz, V. A., Carby, B., Abella, E. C., Cardona, O. D., López-Marrero, T., Marchezini, V., & Wisner, B. (2020). Success, innovation and challenge: School safety and disaster education in South America and the Caribbean. International Journal of Disaster Risk Reduction, 44, 101395. https://doi.org/10.1016/j.ijdrr.2019.101395

Nagata, T., & Kimura, R. (2017). Proposing a multi-hazard approach to disaster management education to enhance children's "zest for life." Journal of Disaster Research, 12(1), 17–41. https://doi.org/10.20965/jdr.2017.p0017

Norris, F. H., Stevens, S. P., Pfefferbaum, B., Wyche, K. F., & Pfefferbaum, R. L. (2008). Community resilience as a metaphor, theory, set of capacities, and strategy for disaster readiness. American Journal of Community Psychology, 41(1–2), 127–150. https://doi.org/10.1007/s10464-007-9156-6

Nur'aeni, A., Ilham, S. N. P., Raihani, N., Puspitasari, R. D., Fauziyah, N. A., & Oruga, M. D. (2023). Education methods to improve earthquake preparedness among students: A literature review. Media Karya Kesehatan, 6(1). https://doi.org/10.24198/mkk.v6i1.46209

Paton, D., & Johnston, D. (2001). Disasters and communities: Vulnerability, resilience and preparedness. Disaster Prevention and Management, 10(4), 270–277. https://doi.org/10.1108/EUM0000000005930

Ronan, K. R., Alisic, E., Towers, B., Johnson, V. A., & Johnston, D. M. (2018). Children's views on evacuation drills and school preparedness. International Journal of Disaster Risk Reduction, 28, 165–175. https://doi.org/10.1016/j.ijdrr.2018.03.001

Sakurai, A., Sato, T., & Murayama, Y. (2020). Impact evaluation of a school-based disaster education program in a city affected by the 2011 Great East Japan earthquake and tsunami disaster. International Journal of Disaster Risk Reduction, 47, 101632. https://doi.org/10.1016/j.ijdrr.2020.101632

Shaw, R., Shiwaku, K., Kobayashi, H., & Kobayashi, M. (2004). Linking experience, education, perception and earthquake preparedness. Disaster Prevention and Management, 13(1), 39–49. https://doi.org/10.1108/09653560410521689

Shoji, M., Takafuji, Y., & Harada, T. (2020). Behavioral impact of disaster education: Evidence from a dance-based program in Indonesia. International Journal of Disaster Risk Reduction, 45, 101489. https://doi.org/10.1016/j.ijdrr.2020.101489

Tatebe, J., & Mutch, C. (2015). Perspectives on education, children and young people in disaster risk reduction. International Journal of Disaster Risk Reduction, 14, 108–114. https://doi.org/10.1016/j.ijdrr.2015.06.011

United Nations Office for Disaster Risk Reduction. (2015). Sendai framework for disaster risk reduction 2015–2030. https://www.undrr.org/publication/sendai-framework-disaster-risk-reduction-2015-2030

Victoriano, M. A. G., & Marcos, M. L. (2025). Disaster risk reduction and management on earthquake preparedness: An assessment. Management Education and Innovation Review, 2(1), 183–197. https://doi.org/10.53378/meir.157

World Health Organization. (2008). A guide to developing knowledge, attitude and practice (KAP) surveys. World Health Organization.