

**AWARENESS AND PREPAREDNESS OF PUPILS TOWARDS DISASTER
RISK REDUCTION MANAGEMENT: BASIS FOR INTERVENTION
PROGRAM**

ABSTRACT

Emergencies related to natural disasters often happen quickly. In a disaster, the school's job is to protect its people, especially the students in elementary schools, who are the most susceptible. The study focuses on the awareness and preparedness for disaster among intermediate students. This study employed the quantitative research design using descriptive and correlational methods. The stratified random sampling was used, and a total of one hundred eighty-six (186) intermediate students from a selected school in the division of Davao del Sur, Philippines. The study results reveal that the level of awareness of disaster risk reduction management among elementary pupils was similarly very high. Results also revealed the students' high disaster risk reduction management preparedness level. Furthermore, the results showed that the awareness of disaster risk reduction management and the preparedness for disaster risk reduction management among elementary pupils show a significant relationship between the variables. Overall, this study equips students with a critical understanding of preventive measures of awareness and preparedness for disaster risk reduction management, regardless of their grade level.

Keywords: disaster awareness, disaster preparedness, disaster-related knowledge

INTRODUCTION

Emergencies related to natural disasters often happen quickly. In a disaster, the school's job is to protect its people, especially the students in elementary schools, who are the most susceptible. Preparedness for disasters is unquestionably a top priority throughout the world. Consequently, people and nations must receive disaster education to raise awareness (Tsai et al., 2020). On the other hand, schools, as places of learning, have to help students learn more and be better prepared for disasters. Students get information from their schools, homes, and neighborhoods as quickly as possible. Therefore, educating young children about catastrophe risk reduction is crucial and beneficial (Pambudi & Ashari, 2019). The need for more excellent public knowledge is the main factor that causes disasters. Tragedies and numerous losses in terms of life and property due to the inability of the current situation to do so (Sengün & Küçükşen et al., 2019).

Countries and international organizations emphasize the value of disaster education today (How et al., 2020). This study focuses on the earthquake that happened in Nepal. With a long history of adverse effects in Nepal, earthquakes are the most common and deadliest natural hazard in Nepal, and they have a long history of impact on the country (Bollinger et al., 2016). All-inclusive public awareness and education are fundamental for reducing casualties, personal injuries, and property damage from natural disasters (Torani et al., 2019).

According to research, Indonesian and Filipino children missed less school due to the smaller scale of the catastrophe. Disaster education is a crucial educational process that instructs individuals on what to do before,

during, and after a disaster or emergency. It also offers a method for disaster recovery and prevention (Duffy, 2018). Through education and learning, people gain the knowledge, skills, talents, and perspectives necessary to properly prepare for and deal with the effects of disaster shocks. Given the growing effects of climate change, raising children's knowledge and skills in disaster preparedness and emergency management is crucial. Children are victims of natural disasters brought on by climate change in over 175 million cases (Codreanu et al., 2014; Fahad & Wang, 2020).

The Philippines is regarded as one of the locations with immediate risks. Given its natural geological and hydro-meteorological features, which disaster scenarios brought on by humans exacerbate, it is one of the disaster-prone locations (Domingo & Manejer, 2018). There must be open contact with instructors for disaster education to be successful and implemented in our educational system without problems (Maya, 2018). In the study of Mac Anthony et al. (2017), to encourage this activity preparedness in the school curricula and any other school programs and to increase the level of resiliency of the students toward natural disasters, the Department of Education (DepEd) implements one of the contingencies of the (DRRM Act) "Philippine Disaster Risk Reduction and Management Act of 2010".

DepEd's School Disaster Risk Reduction Management Program aims to increase students' understanding of disaster risk reduction. Disasters and other unforeseen events sometimes are too much for the affected people. Most disasters, or the risks that lead to disasters, are brought on by natural disasters, to which many people are frequently exposed (Nia et al., 2017). Measures to reduce hazards and educate students about disasters at the school level can

fosters shared understanding, ownership, and self-confidence (Shah, 2020). It is performed through several Disaster Risk Management (DRM) activities, emphasizing organized efforts in preventing, assessing, and lowering the causal aspects of disaster risk. The different actions taken before, during, and after the disaster can be categorized into three periods (Hicks et al., 2019; Oktari et al., 2020).

Students are more vulnerable to harm than the general population, mainly if they are in school when a disaster strikes (Tipler et al., 2017). The lack of sufficient emergency preparation in schools, which causes students to suffer physically, emotionally, and behaviorally, is of growing concern (Kruger et al., 2018). According to the study of Dikmenli et al. (2018), thinking ahead about what might go wrong is one of the best and most effective ways to stop disasters before they happen.

According to Munyiri et al. (2019), disaster risk is caused by danger or a mix of risks, susceptibility, and insufficient defenses to reduce the realistic likelihood of it occurring because catastrophes can strike suddenly. In addition to suffering bodily harm, calamity victims endure a double mental trauma burden. Winarni et al. (2018) claim that several ideas and actions make up disaster risk reduction (DRR) meant to analyze and control the disaster risk through routine operations and catastrophes' negative impacts—the plan for disaster mitigation, awareness, and vigilance. In enhancing cultural values in the elementary schools' disaster risk reduction programs are designed to (1) Motivation and knowledge of disaster risk, (2) values and attitudes regarding disaster risk, (3) the knowledge and abilities necessary to prevent disaster on a personal and societal level; and (4) emergency ability to respond (Winarni,

2016). The expectation that teachers will impart DRR information and abilities to students so that they can participate proactively in DRR activities and react effectively in a disaster is a recurrent theme in DRR education (Nakano, 2021).

This study tries to determine how much elementary students know about and do things to reduce the chance of disasters. This study hopes to teach and help students, teachers, parents, school officials, and rural health units (students). This study is most helpful to the students since it directly affects them.

Research Objectives

The primary objective of this research is to use the findings as the foundation for a professional and societal growth program.

The specific objectives are:

1. to determine the level of awareness on disaster risk reduction management of elementary pupils in terms of:

1.1 disaster-related knowledge;

1.2 disaster awareness; and

1.3 disaster readiness.

2. to determine the level of preparedness on disaster risk reduction management of elementary pupils in terms of:

2.1 assessment and planning;

2.2 physical and environmental protection; and

2.3 response capacity: supplies and skills.

3. to determine if there is an existing significant relationship between the level of awareness and preparedness on disaster risk reduction management among elementary pupils.

METHOD

Respondents

This study was conducted in the division of Davao del Sur, Philippines. A stratified random sampling was used to select respondents. The elements within stratified samples within each stratum are comparable in terms of a few essential criteria (Parsons, 2017). A total of one hundred eighty-six (186) intermediate students in Kiblawan Central Elementary School were the research respondents who took part in answering the survey questionnaire on the awareness and preparedness of pupils towards disaster risk reduction management: basis for an intervention program, 186 samples lay hold of in strict compliance with the following inclusion criteria: (1) students aged 9, 10, 11, and 12, of any gender (2) a bona fide Kiblawan Central Elementary School student enrolled for the school year 2022-2023 and (3) must be in the intermediate grade level (Grade 4-6). The respondents have the right to withdraw from the study; however, withdrawal the day before the final defense will not be accepted.

Table 1. *The distribution of the 186 intermediate pupils included in the study*

GRADE LEVEL	TOTAL NUMBER OF STUDENT'S	TOTAL NUMBER OF STUDENT'S
Grade 4	117	61
Grade 5	135	71
Grade 6 Section Jade	37	18
Total	357	186

Instruments

The study used a modified research questionnaire. A survey questionnaire developed by Dikmenli et al. (2018) was the research tool employed in the study. Some questions or remarks go along with each indicator. Disaster-Related Knowledge has three questions, Disaster

Awareness has three questions, and Disaster Preparedness and Readiness has three questions. Thus, in awareness of disaster risk reduction management, Respondents were asked the following questions on a five-point Likert scale, with one being the lowest answer and five being the highest:

MEAN RANGE	DESCRIPTIVE LEVEL	DESCRIPTIVE INTERPRETATION
4.20-5.00	Very high	This measure indicates that the items relating to the awareness of disaster risk reduction management of students embodied in the item were always present.
3.40-4.19	High	This measure indicates that the items relating to students' awareness of disaster risk reduction management embodied in the item were sometimes present.
2.40-3.39	Moderate	This measure indicates that the items relating to students' awareness of disaster risk reduction management embodied in the item were often present.
1.80-2.59	Low	This measure indicates that the items relating to students' awareness of disaster risk reduction management embodied in the item were seldom present.
1.00-1.79	Very Low	This measure indicates that the items relating to students' awareness of disaster risk reduction management embodied in the item

Meanwhile, the second set of questionnaires focused on the elementary school students' preparedness for disaster risk reduction management adapted from Risk Reduction Education for Disasters (2010), with measures of three indicators, namely Assessment and Planning (3) questions, Physical and Environmental Protection (3) questions, Response Capacity: Supplies and

Skills(3) questions. Thus, in preparedness for disaster risk reduction and management. Respondents were asked the following questions on a five-point (5) Likert scale, with 1 being the lowest answer and five being the highest:

MEAN RANGE	DESCRIPTIVE LEVEL	DESCRIPTIVE INTERPRETATION
4.20-5.00	Very high	This measure indicates that the items relating to the preparedness on disaster risk reduction management of students embodied in the item were always present.
3.40-4.19	High	This measure indicates that the items relating to students' preparedness for disaster risk reduction management embodied in the item were sometimes present.
2.40-3.39	Moderate	This measure indicates that the items relating to students' preparedness for disaster risk reduction management embodied in the item were often present.
1.80-2.59	Low	This measure indicates that the items relating to students' preparedness for disaster risk reduction management embodied in the item were seldom present.
1.00-1.79	Very Low	This measure indicates that the items relating to students' preparedness for disaster risk reduction management embodied in the item must be

Design and Procedure

The study used a descriptive-correlational research design employing a quantitative research methodology. According to Reddy (2019), quantitative research investigates a phenomenon using numerical data and mathematical, statistical, or computational methods. Quantitative research allows researchers

to learn more about a specific group. Quantitative research requires the collection and examination of numerical data. According to Bhandari (2021), a correlational study strategy examines connections between variables. When two (or more) variables are correlated, it shows the intensity and direction of their relationship. It is simpler to anticipate and explain how variables connect using the non-experimental research approach known as descriptive correlational research (Quaranta, 2015).

The following steps were used to gather data. The researchers' questionnaires underwent validation. Before the survey, the researchers waited for the officially approved questionnaire and data-gathering certification. Then, researchers received the questionnaire's validation and sent a letter directly to the Department of Education Davao del Sur. The second phase of the data collection proceeded after the approved letter was released. Researchers visited a school where the study was conducted after submitting the letter to the principal's office. Finally, the researchers coordinated the RPPC office for the statistician's request. Later after, researchers collaborated with the statistician once the transcription was completed. Data was then forwarded back to the researchers to finalize the manuscript.

The mean and Pearson-R were used in this study's data analysis. The average score of the students for each statement and indication is calculated using the mean. A rational and stable statistic is the mean. Meanwhile, the relationship between the two variables was measured using the Pearson-R. One can determine whether there is a measure of the strength and direction of the relationship between two variables using Pearson's Correlation analysis (Hwee & Yew, 2018). Descriptive-correlational data analysis was used in the

study. Descriptive analysis was frequently employed before conducting an experimental functional analysis as part of a thorough functional assessment of problem behavior. The procedure started with getting the scores of every student from each indicator. Mean and standard deviation will be computed to analyze elementary students' awareness and disaster-risk reduction management preparedness. Mean was to be used to determine if there is an existing significant relationship between the level of awareness and preparedness on disaster risk reduction management among elementary pupils in Kiblawan Central Elementary School. Standard Deviation was used to obtain the distribution of the study's respondents. Spearman will measure the significant relationship between the level of awareness and preparedness in disaster risk reduction management.

Ethical Considerations

This study firmly adheres to the ethical protocols and guidelines the University of Mindanao Ethics Committee set forth. The researcher religiously requested and secured permission from key school officials to complete this research. The researcher ensured the appropriateness of identifying recruiting parties and reviewed the risks and measures to mitigate these risks (including physical, psychological, and social-economic. Proper authorization and consent are also obtained from the sample of the study, in which they are assured that all their rights would be fully protected, specifically in handling the data such as, but not limited to:

Voluntary Participation. The respondents' participation is entirely voluntary and anonymous to protect their privacy, and information is given whenever the respondents do not understand before deciding whether to

participate in the study. The respondents' names did not appear anywhere, and no one except the researcher knew about the respondents' specific answers. If confidential, the researcher assigns a number to the responses, and only the researcher has the key to indicate which number belongs to which respondent.

Informed Consent Process. The survey questionnaire utilized in this study is clear and comprehensible; the researcher ensures that the respondents are

fully aware of the benefits the school may get from the study. The survey is conducted with the approval of the concerned school authorities and the respondents' permission.

RESULTS AND DISCUSSION

Level of Student's Awareness on Disaster Risk Reduction Management

Table 2 displays the findings from the descriptive statistics on the awareness of disaster risk reduction management level among elementary pupils, which has an overall mean of ($\bar{x}=4.19, SD=0.56$), marked as very high.

Presents the result of the level of awareness on disaster risk reduction among elementary pupils. Disaster related knowledge has a percentage mean of ($\bar{x}=4.19, SD=0.80$), described as very high. The researchers carried out data

collection procedures in order to get the data required for the study, with disaster awareness a mean of ($\bar{x}=3.96, SD=0.71$) and disaster readiness a mean of ($\bar{x}=4.41, SD=0.60$). Generally, it is inferred that elementary pupils are highly aware of the school's disaster risk reduction management. This, moreover, implies that disaster-related knowledge, disaster awareness, and disaster readiness are pronounced among elementary pupils.

The overall awareness of disaster risk reduction management of

elementary pupils is very high, which indicates that elementary pupils have developed their knowledge within themselves. When the results are examined

UNDER PEER REVIEW

Table 2. *Level of awareness on disaster risk reduction management of elementary pupils, n=186*

INDICATORS	\bar{x}	SD
1.DisasterRelatedKnowledge	4.19	0.80
2.DisasterAwareness	3.96	0.71
3.DisasterReadiness	4.41	0.60
OVERALL	4.19	0.56

more closely, they reveal a very noticeable difference in the ratings of the three indicators, suggesting that all respondents had a positive perception of their level of awareness of disaster risk reduction management across the board. It provided elementary students with relevant activities or tasks that foster knowledge of the disaster, and they comprehend the significance of awareness of disaster, as evidenced by the highest score among the three indicators: disaster readiness. On the other hand, elementary pupils were also highly satisfied with two indicators. These findings can be compared to the declaration made by Cerulli et al. (2020) that education will play a significant role in raising public awareness of disasters.

Disaster readiness, with a mean of 4.41, was the highest-rated level of awareness. Their level of disaster awareness significantly influences students' readiness for catastrophes. Schools are one of the leading agents associated with social readiness and students. One method to get ready is to have students respond to disasters and children's level of readiness. According to Khorram-Manesh et al. (2018), the students benefit from this readiness in several ways, including mental preparation for the disaster, encouragement to work with emergency management practitioners, an increase in their confidence in handling emergencies, assistance in understanding the psychological and physical effects of the disaster and their reactions, and heightened awareness of personal safety.

Disaster Related Knowledge had a total mean score of 4.19, indicating a high level of awareness. Attitudes are shaped by knowledge, which heightens awareness of impending environmental disasters. This study investigates how knowledge management is used throughout the disaster management process to validate its benefits for lessening the effects of disasters and increasing disaster resilience. Rico et al. (2019) state that students are part of the school community, serving as sources of knowledge and spreading disaster knowledge to surrounding areas.

Disaster Awareness rated the lowest score, with a mean of 3.96. Disaster awareness education can be implemented in schools by educating students about risks and hazards, fostering curiosity about possible dangers, allowing students to engage in disaster-related activities, and adopting proactive measures to prepare for and recover from catastrophes. According to Lisnasari (2018), numerous natural disasters teach us the value of disaster awareness and the need for people to approach decision-making with the appropriate mindset.

Level of Students Preparedness on Disaster Risk Reduction Management

Table 3 presents the findings from the descriptive statistics used to gauge intermediate student's disaster risk reduction management level. The overall mean of preparedness on disaster risk reduction management is ($\bar{x}=4.39$, $SD=0.46$), rated as being high. The 3 indicators score may have resulted from primary students receiving a high level of preparedness on their physical environmental protection ($\bar{x}=4.22$, $SD=0.76$), response capacity ($\bar{x}=4.46$, $SD=0.52$), and assessment planning ($\bar{x}=4.49$, $SD=0.53$). In general, it is

Table 3. *Level of preparedness on disaster risk reduction management of elementary pupils, n=186*

INDICATORS	\bar{x}	SD
1.AssessmentPlanning	4.49	0.53
2.PhysicalEnvironmentalProtection	4.22	0.76
3.ResponseCapacity	4.46	0.52
OVERALL	4.39	0.46

surmised that the very high level of physical environmental protection, response planning, and capacity planning, the condition associated with preparedness for disaster risk reduction management among elementary pupils, is always present.

The level of preparedness for disasters might be a crucial determining factor. The study's findings provided data with an overall average of 4.39, indicating that the participants were well-prepared. Educational institutions must be prepared to protect staff and students' well-being and lessen the effects of disasters.

Assessment planning garnered the highest score with a mean of 4.49, indicating that most elementary pupils are always actively prepared for disaster risk reduction management assessment planning at school. These findings agree with the study of Maminta (2019) proposed instructive implications, practice, and constant preparation to sustain catastrophe preparedness and successful emergency management.

Response Capacity has a mean score of 4.46, rated as a high level of preparedness. Disaster response indices are crucial for assessing the readiness, resilience, mitigation, societal vulnerability, and hazard exposure of students and staff. Moreover, Jou et al. (2022), people feel that the harmful effects on their environments significantly affect how they act in response.

Ensuring the well-being of both students and staff through a safe and healthy physical school environment fosters learning.

Physical Environmental Protection is the lowest rating in this indicator, with a mean score of 4.22. Disaster preparedness education and training efforts have effectively enhanced the pupils' readiness to respond to disasters and protect the environment. Ong et al. (2021) also found a link between how serious people thought disaster risk reduction management was and their fear of what might happen.

Relationship Between Awareness and Preparedness on Disaster Risk Reduction Management

Table 4 displays the results of the relationship between the independent (awareness of disaster risk reduction management) and dependent (preparedness of disaster risk reduction management). Since the data resists the normality, Spearman rho was used to test it. Results show a significant relationship between the two variables $r(186) = 0.542, p < 0.001$. Therefore, the null hypothesis is rejected.

A correlation matrix examining the relationships between awareness (Disaster Related Knowledge, Disaster Awareness, and Disaster Readiness) and preparedness (Assessment Planning, Physical Environmental Protection, Response Capacity, and Overall Preparedness) in disaster risk reduction management among elementary pupils. Suryaratri et al. (2020) discovered a relationship between disaster awareness and preparedness, indicating that more public awareness of disasters translates into increased disaster preparedness.

Furthermore, the results of the main problem of this study, as stated in

Table 4. Correlation matrix between awareness and preparedness on disaster risk reduction management of elementary pupils

		Assessment Planning	Physical Environmental Protection	Response Capacity	Overall
Disaster Related Knowledge	Spearman's rho	0.273	0.365	0.268	0.421
	p-value	<0.00	<0.00	<0.00	<0.00
Disaster Awareness	Spearman's rho	0.343	0.261	0.321	0.410
	p-value	<0.00	<0.00	<0.00	<0.00
Disaster Readiness	Spearman's rho	0.374	0.257	0.387	0.452
	p-value	<0.00	<0.00	<0.00	<0.00
Overall DV	Spearman's rho	0.394	0.386	0.400	0.542
	p-value	<0.00	<0.001	<0.001	<0.001

the preceding paragraph, support the theoretical framework anchored on Edward Lee Thorndike's (1980) Law of Readiness, which states that readiness is a condition at a particular moment. One should be ready to act in a certain way to take it as a satisfying effect, showing that there will be a corresponding rise in preparedness for disasters when catastrophe awareness grows. A conclusion like this emphasizes the need to teach disaster science management more intensely and use extension activities to spread knowledge among the students (Fujii & Kanbara, 2019; Matsumoto et al., 2018; Teo et al., 2018).

The data shows a significant positive correlation between disaster-related knowledge and assessment planning, indicating that pupils with higher disaster awareness tend to have higher preparedness levels. The findings underscore the importance of education and awareness campaigns in improving disaster preparedness among elementary pupils. Educational planning significantly influences disaster awareness, beginning with a vision

that will bring transformation or advantage. Inadvertently, the educational planner creates a roadmap that will aid in bringing about the intended change (Wanjala & Onyango, 2018). There is a need to evaluate whether students and teachers are aware of safety plans and well-prepared for calamities (Barbour et al., 2020).

This indicates that there is a moderate to weak correlation between disaster awareness and disaster preparedness based on the level of respondents' practices. For instance, Young individuals can be taught about disaster awareness through education. It can be accomplished most effectively through the sustained and dynamic participation of all parties involved (Khorram Manesh et al., 2016; Wang, 2016). Similarly, Tan and colleagues (2018) discovered that households with a higher level of disaster preparedness were more likely to engage in disaster preparedness behaviors, such as having an emergency pack and a family communication plan. The implication is that disaster risk awareness can be a significant precursor to preparing for these tragic events. Further, various types of disasters and prior exposure to disasters influence public awareness of hazards (Ho et al., 2008; AlQahtany & Abubakar, 2020).

The data analysis reveals compelling evidence supporting the null hypothesis (H_0), indicating a significant and positive relationship between the level of awareness and preparedness in disaster risk reduction management among elementary pupils. The correlation coefficients between various awareness and preparedness variables consistently show a strong positive association, all statistically significant at the $p < 0.00$ level. Specifically, heightened levels of disaster-related knowledge, awareness, and readiness are

linked to greater preparedness across dimensions such as Assessment Planning, Physical Environmental Protection, Response Capacity, and Overall Preparedness.

CONCLUSION

The study determined the significant relationship between the level of awareness and preparedness on disaster risk reduction management among elementary pupils in Kiblawan Elementary School. The respondents of this study were from intermediate grades; they were selected using stratified random sampling. The statistical result indicated the mean result on the respondents' awareness of disaster risk reduction. However, the general results of descriptive statistics revealed that the respondents have a positive, strong relationship between preventive measures of awareness and preparedness for disaster risk reduction management. It means that the respondents have a high knowledge of risk reduction practices. The results in the table show a strong and positive link between the natural disasters that happened in Kiblawan, Davao del Sur, where the school is located, and the things that were stated. The Spearman's correlation guide test determines how strongly two variables are linked. Additionally, the table shows that the respondents' levels of awareness and preparedness are varied. More information and outreach about disaster risk reduction management's readiness will be considered for all respondents, regardless of their grade.

RECOMMENDATIONS

Since the study concluded the existing relationship between the level of awareness and preparedness in disaster risk reduction management, the

researchers recommended the following:

The authors should spread information about disaster preparation to keep the community well-prepared. Teachers and School DRRM leaders should get more training and education about disasters to make people more aware of the risks and better prepared for them. Involve parents, social workers, senior citizens, barangay officials, and student reps in earthquake drills, training, and a symposium. Do more research where the main focus is creating other materials needed for DRRM and standard processes such as fire, earthquake, and evacuation drills.

Students should be informed about DRRM initiatives. Engage them in varied activities. School programs should encourage students to participate in DRRM activities through curricular and extracurricular organizations. Periodically analyze and evaluate programs and activities with students to ensure their growth and sustainability.

Furthermore, future researchers may further research if there is a change amongst the mentioned relationships and what factors affect the changes (if any).

REFERENCES

A *Safer Future*. (1991). National Academies Press.
<https://doi.org/10.17226/1840>

Ali, Q., Yaseen, M. R., Anwar, S., Makhdam, M. S. A., & Khan, M. T. I. (2021). The impact of tourism, renewable energy, and economic growth on ecological footprint and natural resources: A panel data analysis. *Resources Policy*, *74*, 102365.
<https://doi.org/10.1016/j.resourpol.2021.102365>

AlQahtany, A. M., & Abubakar, I. R. (2020). Public perception and attitude to disaster risks in a coastal metropolis of Saudi Arabia. *International Journal of Disaster Risk Reduction*, *44*, 101422.
<https://doi.org/10.1016/j.ijdrr.2019.101422>

Anthony, M., Vargas, A., & Ignacio Lakip Son. (2017). Disaster risk reduction

knowledge of Grade 11 students: Impact of senior high school disaster education in the Philippines. *International Journal of Health System and Disaster Management*, 5(3), 69.
https://doi.org/10.4103/ijhdsdm.ijhdsdm_16_17

Barbour, M. K., Labonte, R., Hodges, C. B., Moore, S., Lockee, B. B., Trust, T., & Kelly, K. (2020). Understanding pandemic pedagogy: Differences between emergency remote, remote, and online teaching. *State of the Nation: K-12 Learning in Canada*. <http://hdl.handle.net/10919/101905>

Bhandari, P. (2020, June 12). What is Quantitative Research? | Definition, Uses & Methods. Scribbr. https://www.scribbr.com/methodology/quantitative-research/?fbclid=IwAR0Jy43LTsrT9mE-UdWrU3DO3elwrE6rNZpKJgO_fpPWpwfYde9GxfgFlwk

Bollinger, L., Tapponnier, P., Sapkota, S. N., & Klinger, Y. (2016). Slip deficit in central Nepal: omen for a repeat of the 1344 AD earthquake? *Earth, Planets and Space*, 68(1). <https://doi.org/10.1186/s40623-016-0389-1>

Cerulli, D., Scott, M., Aunap, R., Kull, A., Pärn, J., Holbrook, J., & Mander, Ü. (2020). The Role of Education in Increasing Awareness and Reducing Impact of Natural Hazards. *Sustainability*, 12(18), 7623. <https://doi.org/10.3390/su12187623>

Codreanu, T. A., Celenza, A., and Jacobs, I. (2014). Does disaster education of teenagers translate into better survival knowledge, knowledge of skills, and adaptive behavioral change? a systematic literature review. *Prehosp. Disaster Med.* 29, 629–642. doi: 10.1017/S1049023X14001083

Dikmenli, Y.; Yakar, H.; Konca, A. (2018). Development of Disaster Awareness Scale: A Validity and Reliability Study. *Review of*

International Geographical Education Online (RIGEO), 8(2), 206-220.
Retrieved from
<http://www.rigeo.org/vol8no2/Number2Summer/RIGEO-V8-N2-2.pdf>

- Domingo, S.N., & Manejer, A.J.A. (2018). Disaster preparedness and local governance in the Philippines. <http://hdl.handle.net/10419/211072>
- Duffy, N. (2018). A new approach to disaster education. The international emergency management society (items). https://www.researchgate.net/publication/329105392_A_new_approach_to_disaster_education
- Fahad, S., and Wang, J. (2020). Climate change, vulnerability, and its impacts in rural Pakistan: a review. *Environ. Sci. Pollut. Res.* 27, 1334–1338. doi: 10.1007/s11356-019-06878
- Fuji, M., & Kanbara, S. (2019). Analysis of gender differences in disaster preparedness for Nankai through earthquake. *Health Science Journal*, 13(2), 1-4. <https://doi.org/10.21767/1791-809X.1000644>
- Hwee, L., & Yew, J. (2018). The constructs that influence students' acceptance of an e-library system in Malaysia. *International Journal of Education and Development Using ICT*, 14(2). <https://www.learntechlib.org/p/184682>
- Hicks, A., Barclay, J., Chilvers, J., Armijos, M. T., Oven, K., Simmons, P., et al. (2019). Global mapping of citizen science projects for disaster risk reduction. *Front. Earth Sci.* 7:226. doi: 10.3389/feart.2019.00226
- How, V., Azmi, E. S., Abdul Rahman, H., & Othman, K. (2020). The Way Forward: Opportunities and Challenges of Sustainable School Disaster Education in Malaysia. *International Journal of Academic Research in Business and Social Sciences*, 10(15). <https://doi.org/10.6007/ijarbss/v10-i15/8252>
- Kruger, J., Brener, N., Leeb, R., Wolkin, A., Avchen, R.N., Dziuban, E. (2018). School district crisis preparedness, response, and recovery plans — United States, 2006, 2012, and 2016. *Morbidity and Mortality Weekly Report*, 67(30), 809-814.
- Khorram-Manesh, A., Lupesco, O., Friedl, T., Arnim, G., Kaptan, K., Djalali, A. R., Foletti, M., Ingrasia, P. L., Ashkenazi, M., Arculeo, C., Fischer, P., Hreckovski, B., Komadina, R., Voigt, S., Carlström, E., & James, J. (2016). Education in Disaster Management: What Do We Offer and What Do We Need? Proposing a New Global Program. *Disaster Medicine and Public Health Preparedness*, 10(6), 854–873. <https://doi.org/10.1017/dmp.2016.88>
- Khorram-Manesh, A., Berlin, J., Roseke, L.L., Aremyr, J., Sörensson, J., & Carlström, E. (2018). Emergency Management and Preparedness

Training for Youth (EMPTY): The Results of the First Swedish Pilot Study. *Disaster Medicine and Public Health Preparedness*, 12(6), 685–688. <https://doi.org/10.1017/dmp.2017.144>

- Lapada, A. (2022). DISASTER RISK REDUCTION KNOWLEDGE AMONG FILIPINO SENIOR HIGH SCHOOL STUDENTS. *Journal of Social Sciences Review*, 2(1), 56-73.
- Lisnasari, S.F., 2018, 'The influence of knowledge and attitudes of elementary school students no. 047174 Kuta Rayat Sub District Naman Teran against earthquake disaster preparedness', in The 11th International Workshop and Conference of Asean Studies in Linguistics, Islamic and Arabic Education, Social Sciences and Educational Technology 2018, (047174), pp. 751–757, <https://osf.io/kwfjn/download/?format=pdf>.
- Maminta, L.G. (2019). Level of Awareness on Disaster Preparedness. *Journal of Physics: Conference Series*, 1254, 012015. <https://doi.org/10.1088/1742-6596/1254/1/012015>
- Matsumoto, M., Sasaki, T., & Muslim, D. (2018). A STUDY ON THE LEVEL OF DISASTER AWARENESS AND PREPAREDNESS BETWEEN INDONESIAN AND JAPANESE STUDENTS. *Doboku Gakkai Ronbunshu*. https://doi.org/10.2208/jscejsp.74.i_53
- Maya, İ. (2018). ORTAOKUL ÖĞRETMENLERİNİN GÖRÜŞLERİNE GÖRE TÜRKİYE'DE AFETE GİRİŞİMİ UYGULAMALARI. *The Journal of Academic Social Science Studies*, 7(Number: 71), 49–65. <https://doi.org/10.9761/jasss7804>
- N. Muniyiri, I., W. Thinguri, R., & Edabu, P. (2019). Influence of School Managers' Training on Disaster Risk Management in Public Secondary Schools within Nairobi City County Kenya. *American Journal of Educational Research*, 7(12), 948–956. <https://doi.org/10.12691/education-7-12-9>
- Nakano, G., & Yamori, K. (2021). Disaster risk reduction education that enhances the proactive attitudes of learners: A bridge between knowledge and behavior. *International Journal of Disaster Risk Reduction*, 66, 102620. <https://doi.org/10.1016/j.ijdrr.2021.102620>
- Nia, S.P.S., & Kulatunga, U. (2017). The importance of disaster management and impact of natural disasters on hospitals. *DI.lib.uom.lk*. <http://dl.lib.uom.lk/handle/123/17230>
- Oh, N., & Lee, J. (2020). Changing landscape of emergency management research: A systematic review with bibliometric analysis. *International Journal of Disaster Risk Reduction*, 49, 101658. <https://doi.org/10.1016/j.ijdrr.2020.101658>

- Oktari, R. S., Munadi, K., Idroes, R., and Sofyan, H. (2020). Knowledge management practices in disaster management: systematic review. *Int. J. Disaster Risk Reduction* 51:101881. doi: 10.1016/j.ijdr.2020.101881
- Ong, A., Prasetyo, Y., Lagura, F., Ramos, R., Sigua, K., & Villas, J. et al. (2021). Factors affecting intention to prepare for mitigation of "the big one" earthquake in the Philippines: Integrating protection motivation theory and extended theory of planned behavior. *International Journal of Disaster Risk Reduction*, 63, 102467. doi: 10.1016/j.ijdr.2021.102467
- Pambudi, D. I., & Ashari, A. (2019). Enhancing role of elementary school in developing sustainable disaster preparedness: a review with some examples from disaster-prone areas of Merapi. *IOP Conference Series: Earth and Environmental Science*, 271(1), 012016. <https://doi.org/10.1088/1755-1315/271/1/012016>
- Parsons, V. L. (2017). Stratified Sampling. *Wiley StatsRef: Statistics Reference Online*, 1–11. <https://doi.org/10.1002/9781118445112.stat05999.pub2>
- Quaranta, J. E., & Spencer, G. A. (2015). Using the Health Belief Model to Understand School Nurse Asthma Management. *The Journal of School Nursing*, 31(6), 430–440. <https://doi.org/10.1177/1059840515601885>
- Reddy, L. S., Reddy, A. S., & Reddy, S. S. P. (2019). A Quantitative Approach to Prioritize Sustainable Concrete. *Civil Engineering Journal*, 5(12), 2579–2586. <https://doi.org/10.28991/cej-2019-03091434>
- Rico, G. C. S. (2019). School-Community Collaboration: Disaster Preparedness Towards Building Resilient Communities. *International Journal of Disaster Risk Management*, 1(2), 45–59. <https://doi.org/10.18485/ijdrm.2019.1.2.4>
- Risk Reduction for Disasters. (2010). School Disaster Reduction & Readiness Checklist. Risk Reduction Education for Disasters. https://www.preventionweb.net/files/15316_rsschoolrrchecklistv.4.pdf
- Sawalha, I. H. (2020). A contemporary perspective on the disaster management cycle. *Foresight*, 22(4), 469–482. <https://doi.org/10.1108/fs-11-2019-0097>
- Şengün, H., Küçükşen, M., Gör, Ö., Üniversitesi, B., Meslek, D., & Okulu, Y. (n.d.). AFET YÖNETİMİ EĞİTİMİ NİÇİN GEREKLİ? <https://dergipark.org.tr/tr/download/article-file/748778>
- Shah, A. A., Gong, Z., Ali, M., Sun, R., Naqvi, S. A. A., & Arif, M. (2020). Looking through the Lens of schools: Children perception, knowledge,

and preparedness of flood disaster risk management in Pakistan. *International Journal of Disaster Risk Reduction*, 50, 101907.
<https://doi.org/10.1016/j.ijdrr.2020.101907>

Suryaratri, R. D., Akbar, Z., Ariyani, M., Purwalatia, A. T., & Wahyuni, L. D. (2020). The Impact of Disaster Awareness towards Household Disaster Preparedness among Families on the Coast of Banten, Sumur District, Indonesia. *IOP Conference Series: Earth and Environmental Science*, 448(1), 012122. <https://doi.org/10.1088/1755-1315/448/1/012122>

Teo, M., Goonetilleke, A., Ahankoob, A., Deilami, K., & Lawie, M. (2018). Disaster awareness and information seeking behaviour among residents from low socio-economic backgrounds. *International Journal of Disaster Risk Reduction*, 31, 1121–1131. <https://doi.org/10.1016/j.ijdrr.2018.09.008>

Tipler, K., Tarrant, R., Johnston, D., & Tuffin, K. (2017). Are you ready? Emergency preparedness in New Zealand schools. *International Journal of Disaster Risk Reduction*, 25, 324–333. <https://doi.org/10.1016/j.ijdrr.2017.09.035>

Torani, S., Majd, P. M., Maroufi, S. S., Dowlati, M., & Sheikhi, R. A. (2019). The importance of education on disasters and emergencies: A review article. *Journal of Education and Health Promotion*, 8(85), 85. https://doi.org/10.4103/jehp.jehp_262_18

Tsai, M.-H., Chang, Y.-L., Shiau, J.-S., & Wang, S.-M. (2020). Exploring the effects of a serious game-based learning package for disaster prevention education: The case of Battle of Flooding Protection. *International Journal of Disaster Risk Reduction*, 43, 101393. <https://doi.org/10.1016/j.ijdrr.2019.101393>

Wang, J.-J. (2016). Study on the context of school-based disaster management. *International Journal of Disaster Risk Reduction*, 19, 224–234. <https://doi.org/10.1016/j.ijdrr.2016.08.005>

Wanjala, G., & Onyango, M. A. (2018). Disaster awareness and preparedness of secondary schools in Homa Bay County, Kenya. In 1st Annual International Conference on Research and Innovation in Education, Kenya. <https://www.researchgate.net/publication/328578238>

Winarni, N., Ratna Kurniasari, D., Hartiningtias, D., Nusalawo, M., & Sakuntaladewi, N. (2016). PHENOLOGY, CLIMATE, AND ADAPTATION: HOW DOES DIPTEROCARPS RESPOND TO CLIMATE? *Indonesian Journal of Forestry Research*, 3(2), 129–141. <https://doi.org/10.20886/ijfr.2016.3.2.129-141>

Winarni, E. W., & Purwandari, E. P. (2018). Disaster Risk Reduction for Earthquake Using Mobile Learning Application to Improve the Students

Understanding in Elementary School. *Mediterranean Journal of Sciences*, 9(2), 205–214. <https://doi.org/10.2478/mjss-2018-0040>

UNDER PEER REVIEW