

Natural Disaster Prevention Literacy Education among Intermediate-Level Students

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ABSTRACT: This study aimed to determine the significant difference in the level of natural disaster prevention literacy education among intermediate-level students when analyzed according to age and grade level. The study employed the non-experimental quantitative research design utilizing descriptive-comparative method, and convenience sampling with Mean, t-test, and Analysis of Variance (ANOVA) as statistical tools. Researchers used adapted and validated survey questionnaires in gathering the data from the 186 target respondents. The findings revealed that intermediate-level students have high level of natural disaster prevention literacy education, indicating that school's educational programs targeting this age group are effective in imparting critical knowledge and skills related to disaster preparedness. Furthermore, the results showed no significant difference in students' natural disaster preventative literacy education based on grade level and age. This means that regardless of a student's demographics, educational endeavors in this field are may have been inclusive and accessible to many students. This study highlights the necessity of teaching natural disaster prevention in schools across grades and focusing on providing the students with the knowledge and perception needed to improve their natural disaster prevention skills. Future researchers are recommended to consider other variables such as socio-economic status, geographic location, cultural attitudes, parental involvement, community engagement, technology access and learning methods. This may provide additional information on the variables affecting intermediate-level students' involvement in disaster preparedness initiatives.

KEYWORDS : *natural disaster, prevention, literacy, education, intermediate-level students*

I. INTRODUCTION

Natural disasters are dangerous occurrences with atmospheric, geological, and economic bases (such as droughts, earthquakes, floods, storms, and landslides), which can lead to fatalities, property destruction, and social and environmental disruption (Prasad, 2020). Natural disaster literacy includes knowledge, attitudes, and actions related to natural disasters. The knowledge component is the first of the three dimensions of natural disaster literacy. The fundamental level is shown by the knowledge held in the first dimension. The knowledge we come into contact with daily. However, anything that fails to solve problems or improve quality of life is irrelevant. The second dimension is internalizing knowledge as attitudes. The third dimension, which relates to advanced-level natural catastrophe policies, is the transition of internalized and adopted information into actions (Sözcü, 2019).

Connor (2011) stated that the need for quantitative literacy must be increased to critically evaluate public information and knowledge on natural hazards in the environment in which humans' dwell and the possible issues that may occur as a result of events. In this setting, it is critical to define natural disaster literacy. In Vietnamese schools, disaster-prevention education is primarily delivered through extracurricular activities, experiences, planned drills, injury-prevention training, swimming lessons, and events; a natural disaster exam; integration of disaster-prevention knowledge into the curriculum in high schools; and the creation of student development manuals, teacher training materials, and student and teacher manuals. However, the impact has not been seen widely due to the restrictions on financing, time, space, materials, and integration into high school courses. There is currently no disaster prevention education available in the area. Natural disasters continue to occur and are getting more unusual and unpredictable, having a significant impact on the nation and the Vietnamese people. Consequently, disaster prevention education must be provided consistently in various ways (Tong et al., 2020).

According to the World Risk Report (2018), the Philippines was ranked ninth globally in terms of disaster risk, with an index score of 21.29. The country has a very high risk of experiencing earthquakes, cyclones, floods, droughts, and sea level rise (42.69 risk index points). The risk index scores for the nation's vulnerability (50.11), susceptibility (28.63), and lack of coping mechanisms (82.14) are all high. The risk rating

for the absence of adaptive capacities is currently at a medium level (39.56 points). Based on the nation's geographic location and geology make it vulnerable to natural disasters, and the public needs to be informed about the possibility of multiple disasters often happening to deal with them (Rogayan & Dollete, 2020). The development of disaster-aware and disaster-ready students is also crucially aided by the Philippine Department of Education (DepEd) and the Commission on Higher Education (CHED). The development of environmentally concerned and informed learners is mostly the responsibility of educational institutions (Rogayan & Nebrida, 2019). In order to improve students' environmental literacy in the Philippines, several stakeholders should work together to make more of an effort (Gatan et al., 2021).

The connection between knowledge and behavior is frequently supported by traditional behavioral theories. The social cognitive theory by Bandura is one of the theories that is often cited (Espina & Teng-Calleja, 2015). According to this concept, education intended to encourage positive behavior change will be expected to increase understanding of the impacts of behavior change and have a favorable impact on outcome expectations. Therefore, if this theory is used in the current study, it may be confidently stated that knowledge about natural catastrophes is expected to trigger positive behavior change within disaster preparedness. The relationship between science literacy and students' readiness for disasters is thought to be direct and statistically significant.

According to the Protection Motivation Theory (PMT), a health promotion paradigm, obtaining some risk information could stimulate an individual to assess the danger's significance, sensitivity, and capacity to mitigate it. Rogers presented the PMT concept in 1975 (which he revised in 1985) to describe the processes that lead people to adopt protective behaviors and lessen perceived risks (Rogers, 1975). It describes how the actions performed to defend oneself are guided by a cognitive process, which can be used to examine both adaptive behavior and maladaptive behavior. According to PMT, similar principles underlie the intentions and behaviors associated with disaster preparedness. As a result, Grothmann and Patt (2005) propose using PMT to investigate disaster preparedness behavior. PMT has thus emerged as one of the most popular disaster prevention decision-making frameworks.

An investigation that used Social Cognitive Theory for disaster preparedness demonstrated that community function is another reason to prepare for disasters of a natural hazard's cognitive and emotional effects (Lee & Lemyre, 2009). When motivated, individuals have good intentions to prepare and are built on the foundation of their self-efficacy and goals for outcomes. However, implementing the targets into practice depends on how they impart the role of preparation to individuals, have an assurance of the sources of disaster information, a strong sense of community, and recognize that the risk only occasionally manifests itself (Lee & Lemyre, 2009). The study's results above support the theory that social and personal variables influence an individual's emergency preparation (McIvor et al., 2009).

The study's independent variable is natural disaster prevention, while the dependent variable is literacy education. According to Sena and Woldemichael (2006), natural disaster prevention refers to the actions performed to stop a natural phenomenon or prospective danger from negatively impacting people or economic assets. The independent variable has three indicators: knowledge, perception, and skills. Knowledge is defined as having data, understanding, and abilities gained via education or experience and having a theoretical or practical comprehension of something. Perception is the capacity to perceive and become aware of something through the senses—skills: a trained ability to perform something effectively.

On the other hand, Kruidenier's (2002) literacy education refers to reading and understanding written language, which might be simple but limited. According to research on literacy education in natural disaster prevention, it is essential to provide people with the knowledge, skills, and attitudes needed to lessen the effects of disasters (Rahim & Wu, 2015). When written expression is included in the definition of literacy, which is the capacity to create understandable text, the complexity of this definition is nearly doubled.

Based on the theoretical basis, this study at Angel Central Elementary School concentrated on literacy education among intermediate students to prevent natural disasters. According to research, disaster preparedness among intermediate-level pupils is still not at the expected level (Wardana, 2021). The current condition of disaster education in intermediate schooling is distinguished by a lack of guidelines and evaluation measures (Khorram-Manesh et al., 2015).

The researchers have not found any existing local studies in the community, and even though there have been studies related to Natural Disaster Prevention, there have been limited studies on intermediate students' awareness and readiness for disasters, considering studies that have been done on natural disaster prevention. As a result, the research findings may aid students in developing disaster prevention education and improve their understanding of the subject, enhancing their learning. The school community and other instruction contribute to raising awareness of literacy instruction for preventing natural disasters, developing disaster prevention education, improving their understanding of the subject, and enhancing their learning. In addition, future researchers can build on this study's findings to develop and evaluate new teaching strategies for preventing natural disasters. This study aims to determine the literacy level of intermediate students at Angel Villarica Central School regarding disaster prevention. It specifically aimed to answer the following questions:

1. What is the demographic profile of the respondents in terms of:
 - 1.1 age; and
 - 1.2 grade level?
2. What is the level of literacy education among intermediate students in preventing natural disasters in terms of:
 - 2.1 knowledge;
 - 2.2 perception; and
 - 2.3 skills?
3. Is there a significant difference in the students' natural disaster prevention literacy education when categorized according to their demographic profile?

This study aimed to assess intermediate students' literacy education in preventing natural catastrophes at Angel Villarica Central School. This research is significant for a variety of crucial stakeholder groups. The project will raise students' knowledge and awareness of natural catastrophe preventative literacy education. Furthermore, the study will benefit the students' parents by addressing their children's concerns about disaster prevention.

In addition, this research will benefit students by raising awareness among young children regarding the possible consequences of disasters on individuals while strengthening their knowledge and skills for the future. The findings are also very beneficial for the school's teachers, as the study will provide perceptions on the value of educating about natural disaster prevention, emphasizing giving students a better grasp of how to improve their natural disaster prevention skills. This would also assist the nation in achieving its goal of offering education to prevent natural disasters.

Lastly, the study's findings will provide researchers with helpful knowledge that will serve as a foundation and guide for their future work in literacy education focused on preventing natural disasters.

II. METHOD

Research Respondents

The research respondents of this study are the intermediate-level students (Grade 4 to Grade 6) of Angel Villarica Central Elementary School. The researchers chose one hundred eighty-six (186) respondents using convenience sampling. Convenience sampling is a non-probabilistic technique commonly used in quantitative studies, where respondents are selected depending on their accessibility to the researcher (Suen et al., 2014). Several researches suggest that if parametric tests are to be employed 30 – 500 subjects would be the necessary sample size (Ross, 2020; cited in Bacala et al., 2024).

Materials and Instrument

A set of questionnaire was adapted from the study of Vu et al. (2023), which was validated by experts in questionnaire construction. The adapted standardized questionnaire is valid in contents as it underwent a series of modifications to classify the most reliable and valid questions. Further, it was already tested and proven by the authors per se. The questionnaire was designed in a very comprehensive form with the help of expert validators to provide the respondents with ease and comfort in answering each question and understanding the study's objective. The instrument is intended to measure the natural disaster prevention literacy education of the students with subscales of knowledge (8 items), perception (15 items), and skills (10 items). This 33-item survey utilized a 5-point Likert type scale (from Very Low to Very High).

Design and Procedure

Research Design. This study utilized a non-experimental quantitative, descriptive-comparative method of research to determine the level of natural disaster prevention literacy education of the intermediate-level students. The differences in the level of natural disaster prevention literacy education when analyzed according to their demographic profile were also sought. Descriptive-comparative method of research aims to observe and describe the variations between different groups in a population without intentionally changing any factors (Cantrell, 2011, cited in Villaabrille et al., 2024; Camino et al., 2023; Maranga et al., 2023).

Data Collection. The researchers sought approval from the Dean of College and Schools Division Superintendent, after the approval, the letter was sent to the School Principal prior to the administration of the research instruments. Consent was also sought from the respondents for voluntary participation. Respondents were given ample time to complete the tool. Retrieval on the said instrument was done immediately after the respondents answered the tool completely. After gathering the necessary data, these were tabulated, subjected to statistical treatment, and interpreted accordingly.

Statistical Tools. The following statistical tools were employed in this study:

Mean. This was used to determine the level of natural disaster prevention literacy education among intermediate-level students.

t-test for Independent Samples. This was used to determine the significant difference in the natural disaster prevention literacy education among students when analyzed according to age.

Analysis of Variance (ANOVA). This was used to determine the significant difference in the natural disaster prevention literacy education among students when analyzed according to grade level.

Ethical Considerations. The researchers ensured that the study was conducted with adherence to ethical standards. It followed protocol and underwent examination. To ensure ethical considerations were met, the researchers followed the necessary processes in conducting the study.

III. RESULTS AND DISCUSSION

Demographic Profile of the Respondents

Table 1 shows the demographic and relative distribution of the respondents. The survey comprised 186 intermediate-level students, distributed by age and grade level. Regarding demographics, the age distribution among respondents, 9 to 10-year-old (40.4%), and 11-year-old and above (59.6%) is crucial in natural disaster prevention. The demographic breakdown highlights the significance of age-appropriate interventions to foster natural disaster prevention literacy across different age groups, guaranteeing complete and inclusive educational outcomes.

However, in the case of a natural disaster, the student distribution throughout grade levels; grade 4 (33.5%), grade 5 (32.4%), and grade 6 (34.0%) is highly relevant. This proportional distribution among grade levels shows that a thorough investigation of literacy instruction related to preventing natural disasters has considered any differences in curricular focus and learning objectives among various educational levels. This data set points out the significance of considering age and grade level when evaluating the efficiency of educational interventions in disaster preparedness.

Table 1. Characteristics of 186 students included in the survey

Profile Variables	f	%
Age		
9-10	74	40.4
11 and above	112	59.6
Grade Level		
Grade 4	62	33.5
Grade 5	60	32.4
Grade 6	64	34.0

Natural Disaster Prevention Literacy Education

The table below presents the students' level of natural disaster prevention literacy education. Overall favorable findings were found in the study on natural disaster prevention literacy education across a variety of indicators, indicating the efficacy of the educational interventions (Agustin et al. 2022; Wahyudi, 2022). Respondents in this domain appear to have a high degree of literacy, as indicated by their overall mean score ($M=4.11$, $SD = 0.357$). This shows that the majority of respondents have a high level of awareness and literacy in preventing natural disasters. This suggests that school educational programs are effective in imparting critical knowledge and skills related to disaster preparedness.

Looking at each indicator, the knowledge domain has the highest mean score ($M=4.17$, $SD=0.480$) which was described as high or evident. This shows that the respondents have a solid understanding of the ideas and topics related to the prevention of natural disasters. This means intermediate-level students regularly demonstrated a high degree of knowledge regarding methods to prevent natural disasters, as shown by their comprehension of risk assessment, hazard mitigation techniques, and evacuation protocols, according to Smith and Johnson's case study (2021). Perception domain has a mean score ($M=4.11$, $SD=0.466$) described as high or evident. It shows how participants understand about their own skills and the significance of preventing natural disasters. This high score shows that participants not only comprehend the information, but also recognize its significance and have confidence in their capacity to prevent disasters. In addition, the skills domain ($M=4.06$, $SD=0.561$) indicates that participants possess a high degree of practical capacity to implement solutions for preventing natural disasters. This implies that intermediate-level students are well-equipped with the practical skills required for efficient natural catastrophe prevention and response. It emphasizes the role of education in promoting resilience and empowering citizens to actively contribute to disaster risk reduction initiatives in their communities, highlighting the need to include practical skills training in the disaster preparedness curriculum. This means that high levels of practical skills for averting natural catastrophes, such as first aid knowledge, emergency response planning, and community resilience building, are repeatedly demonstrated in intermediate-level students (De Castro, 2023).

Lastly, the results of this study also have crucial implications concerning the way literacy education initiatives that avoid natural disasters are developed and carried out. This is indicated by the variability in the Skills indicator. Improving training in practical skills will help participants respond to natural catastrophes more effectively, which will increase community resilience. Furthermore, a culture of preparedness and proactive risk management are fostered by students' recognition of the significance of disaster prevention, which is demonstrated by their high scores in knowledge and perception.

Table 2. *Natural disaster prevention literacy education of the students, n=186*

Indicators	\bar{x}	SD
Knowledge	4.17	0.480
Perception	4.11	0.466
Skills	4.06	0.561
Overall	4.11	0.357

Significance of the Difference in Natural Disaster Prevention Literacy Education According to Age

Table 3 presents the independent samples t-test results showing the differences in students' natural disaster literacy education when analyzed by age. The findings indicate that for the knowledge, perception, skills, and overall literacy characteristics, there are no statistically significant differences between the two groups; $t(184)=1.654$, $p=.100$. However, both groups' overall mean scores are high indicating that the prevention literacy education is evident at all age ranges.

Table 3. *Independent samples t-test results showing the differences in natural disaster prevention literacy education of students when analyzed by age*

Variables	Group	n	\bar{x}	SD	t	p
Knowledge	9 to 10 years old	74	4.19	.545	.611	.542
	11 years old & above	112	4.15	.431		
Perception	9 to 10 years old	74	4.15	.518	.847	.398
	11 years old & above	112	4.09	.427		
Skills	9 to 10 years old	74	4.15	.482	1.872	.063
	11 years old & above	112	4.00	.603		
Overall	9 to 10 years old	74	4.16	.339	1.654	.100
	11 years old & above	112	4.08	.365		

* $p<0.05$

Additionally, both age groups' knowledge domain scores are high or evident. The results show that there was no significant distinction between the groups; $t(184)=.611$, $p=.542$. This shows that students in both age groups comprehend the principles of preventing natural disasters well, demonstrating the efficacy of the instruction given. For perception domain, the mean scores are high or evident but also indicating no significant difference; $t(184)=.847$, $p=.398$. This high level of perception indicates that students are confident in their understanding and the importance of disaster prevention, regardless of age. The skills domain scores are slightly higher for the younger group ($M=4.15$, $SD=.518$) compared to the older group ($M=4.00$, $SD=.603$). The t-test result; $t(184) = 1.872$, $p= 0.063$, is not statistically significant. This indicates that both groups are skilled in practical aspects of natural disaster prevention literacy education.

Regardless of age, students are constantly exposed to natural disaster education, which allows for the formation and development of knowledge, perception, and skills throughout time. This continuity in instruction guarantees that students retain and improve their understanding of natural disasters, regardless of their age or prior exposure to the subject. In cases where Johnson et al.'s study from 2021 was categorized down by age, the independent samples t-test results showed no significant differences in the student's natural disaster literacy education.

Significance of the Difference in Natural Disaster Prevention Literacy Education according to Grade Level

An analysis of variance was performed to analyze the differences in students' natural disaster literacy education when analyzed by grade level, as shown in Table 4. Results show no significant difference in students' natural disaster literacy education when analyzed according to grade level, $F(2, 185) = 2.905$. This means the student's natural disaster literacy education does not significantly differ based on their grade level. The consistent results across grade levels can mean a common baseline of natural disaster knowledge or awareness among students, regardless of grade level.

This indicates that children of all ages and grades have similar levels of prior experience or comprehension of natural disasters and respond similarly to educational interventions aimed at improving their literacy in this domain. An analysis of students' natural disaster literacy education by grade level revealed no significant variations, according to Smith et al. (2021), who conducted a study assessing natural disaster literacy education across different grade levels.

Table 4. *F-test results showing the differences in natural disaster prevention literacy education of students when analyzed by grade level*

	Sum of Squares	df	Mean Square	F
Between Groups	.73	2	.362	2.905
Within Groups	23.07	185	.125	
Total	23.80	187		

* $p < 0.05$

IV. CONCLUSION AND RECOMMENDATION

Conclusion

This study showed high levels of natural disaster prevention literacy education among intermediate-level learners. This means that the students' knowledge, skills, and perception in preventing natural disasters were evident. This further indicates that even at an early age, the students acquired knowledge of concepts related to preventing natural disasters, the capacity to understand some information related to disasters, and the ability to make an informed decision, by often leading to practical applications that enhance preparedness and response techniques.

Additionally, the findings indicate no significant difference in students' natural disaster preventative literacy knowledge based on their demographic profile. This points out that there is a comprehensive and efficient educational strategy that reaches every student equally.

It also shows that the level of knowledge, abilities, and perspective on preventing natural disasters is generally consistent across various age groups and grade levels. This study shows that pupils constantly get disaster education regardless of age, promoting continual, ongoing development of knowledge, perception, and skills. It also indicates that students of all ages and academic levels have similar backgrounds in natural disaster knowledge and experience, translating into a comparable response to learning activities meant to improve natural disaster literacy.

Recommendation

The study's results and findings are used to give the following suggestions. The study emphasizes no significant differences in how students were taught natural disaster literacy depending on their age or grade level. Despite this, the researchers still recommend that educational initiatives and public awareness campaigns be used to help students of all ages and grade levels develop a thorough understanding of how to prevent natural disasters. Building resilience and encouraging a group reaction to lessen the effects of natural disasters are made possible by this strategy. It is also advised that primary schools can improve the quality of their instruction by putting in place comprehensive activities like seminars and earthquake exercises, designed to raise students' literacy in preventing natural disasters. By including these programs in the curriculum, educators can ensure pupils understand the significance of disaster prevention measures.

Moreover, schools should also encourage instructors to work in supportive environments. This cooperative approach will make it easier to share thoughts and recommendations for improving instructional tactics designed to satisfy students' academic goals, especially in terms of enhancing their natural. In addition, Parents are essential in helping students prepare for natural disasters by having conversations with them and doing activities with them at home. Parents' proactive attitudes toward safety and resilience support this involvement, which in turn fosters children's knowledge and preparation.

In carrying out a study on natural disaster preventive literacy, future researchers should consider other variables such as socio-economic status, geographic location, cultural attitudes, parental involvement, community engagement, technology access, and learning methods. This may provide additional information on the variables affecting intermediate-level students' involvement in disaster preparedness initiatives. By examining these characteristics, researchers may contribute to the body of information and offer useful insights that will help educators, legislators, and community leaders improve children's preparedness and resilience to disasters. These studies not only advance knowledge of disaster education from an academic perspective but also provide practical suggestions for enhancing instructional methods and encouraging proactive measures to successfully reduce disaster risk.

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