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Knowledge, Skills, Attitudes, and Practices of Learners in Disaster Risk Reduction and Management

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Abstract: *The study determined the levels of knowledge, skills, attitudes, and practices learners in disaster risk reduction and management in selected coastal schools of the 5th Congressional District of Iloilo, classified as to sex and grade level, and assessed the significant differences among these variables. Using a descriptive quantitative research design, 350 learners from Grades 3 to 6 were surveyed through validated Likert-scale instruments. Stratified random sampling ensured proportional representation across schools, sexes, and grade levels.*

Findings revealed that learners demonstrated high levels of knowledge, skills, attitudes, and practices in disaster risk reduction and management. Female learners exhibited significantly higher skills, attitudes, and practices compared to males, while no significant differences were found in knowledge when grouped by sex. Grade 6 learners consistently showed significantly higher knowledge, skills, and attitudes compared to lower grade levels, suggesting that maturity and increased exposure to DRRM activities enhance preparedness. Practices, however, did not differ significantly across grade levels, indicating uniformity in school-based DRRM implementation.

The results imply that while sex and grade level influence certain aspects of DRRM competencies, overall preparedness remains consistently high among learners. To address identified gaps, particularly among younger learners and males, learner-centered outputs were developed. These included the instructional storybook "Si Yola at ang Magic Go Bag" and disaster preparedness infographics, designed to simplify DRRM concepts, strengthen competencies, and promote inclusive, sustainable, and collaborative strategies for disaster education

Keywords: *knowledge, skills, attitudes, and practices*

I. INTRODUCTION

Disasters are significant disruptions that exceed the capacity of communities to cope using their own resources and pose threats to lives, property, and the environment. Disaster Risk Management (DRM) refers to the application of disaster risk reduction strategies and policies aimed at preventing new disasters, reducing existing disaster risks, and managing residual risks to enhance resilience and reduce disaster losses [1].

This relational perspective views Disaster Risk Management as a dynamic sociocultural process shaped by historical processes, everyday social practices, and institutional structures. DRM is embedded in socially constructed systems influenced by power relations, divisions of labor, and broader societal arrangements [2]. A systemic view of disaster risk formation highlights that disaster vulnerability and resilience are significantly shaped by social and structural conditions rather than by hazards alone.

The Global Assessment Report on Disaster Risk Reduction 2022 reports that disaster frequency and intensity have increased due to climate change, rapid urbanization, environmental degradation, and weak governance systems. The report emphasizes that disasters are primarily the result of human decisions and development practices rather than

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purely natural phenomena. Unsustainable resource use, poor planning, and social inequities significantly increase community vulnerability worldwide [3].

The Philippines is among the most disaster-prone countries globally due to its location along the Pacific Ring of Fire and its exposure to typhoons, floods, earthquakes, and volcanic eruptions [4]. Disasters continue to disrupt lives, infrastructure, and educational systems, particularly in developing and hazard-prone nations such as the Philippines. Children are among the most vulnerable populations because of their developmental limitations and dependency, making disaster risk reduction (DRR) a national priority that emphasizes resilience-building beginning in basic education.

Elementary schools play a crucial role in disaster risk reduction as they function not only as centers of learning but also as community safety hubs during emergencies. Developing disaster management competencies among young learners equips them with essential knowledge, skills, and decision-making abilities to assess risks, recognize hazards, and respond effectively during emergencies. Studies in Philippine contexts show that learners' awareness of DRR concepts is positively associated with higher preparedness and practical understanding of safety protocols, highlighting the impact of school-based DRRM education [5].

In the 5th District Coastal Elementary Schools of Iloilo, where communities are regularly exposed to typhoons, storm surges, flooding, and coastal erosion, disaster risk reduction education is particularly critical. Coastal schools are often more vulnerable due to geographic exposure, limited resources, and climate-related environmental hazards. Strengthening learners' disaster management competencies in these communities is therefore essential to promoting preparedness, safety, and resilience at both school and community levels.

Despite the presence of national DRRM policies and school-based programs, studies have shown variations in implementation and effectiveness across elementary schools. Limited instructional resources, insufficient teacher support, and workload constraints often hinder consistent and meaningful integration of DRRM concepts into classroom practice [6].

Additionally, elementary learners face personal and contextual challenges that affect the development of disaster preparedness competencies. Emotional responses such as fear or anxiety from prior disaster experiences, cognitive limitations associated with age, and socio-economic constraints may reduce learners' ability to internalize DRR practices. Differences in disaster exposure further influence learners' understanding and application of preparedness behaviors, underscoring the importance of assessing learners' actual competencies rather than focusing solely on program implementation [5]–[7].

Given these challenges, examining the disaster management competencies of elementary learners in coastal education settings is necessary. Assessing learners' knowledge, skills, attitudes, and practices provides empirical evidence that can guide curriculum development, instructional strategies, and targeted interventions. Such evidence is essential to ensuring that DRRM initiatives result in meaningful learning outcomes and practical safety behaviors among learners.

The primary purpose of this study was to assess the knowledge, skills, attitudes, and practices of elementary learners in selected coastal schools in the 5th District of Iloilo and to determine their contribution to effective disaster risk reduction and management. The findings are expected to support educators, school administrators, and policymakers in strengthening disaster education and promoting safer, more resilient learning environments in disaster-prone coastal communities.

Theoretical Framework and Conceptual Framework

This study is grounded in Social Cognitive Theory (SCT) and Protection Motivation Theory (PMT), which explain how elementary learners develop disaster risk reduction and management (DRRM) competencies. SCT emphasizes that learners acquire disaster preparedness knowledge, skills, and behaviors through observation, modeling, and self-efficacy within their school and social environments. PMT complements this by explaining how learners' perceptions of risk, severity, and coping ability motivate them to engage in protective and preparedness behaviors.

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Guided by these theories, the conceptual framework examines how sex and grade level (independent variables) influence learners' knowledge, skills, attitudes, and practices in DRRM (dependent variables). The framework assumes that differences in learner characteristics affect exposure to learning experiences, motivation, and preparedness behaviors. Strengthening these competencies through learner-centered interventions is expected to enhance disaster preparedness and resilience among elementary learners in coastal communities. Through this framework, the study examined how selected factors influenced learners' preparedness competencies and overall readiness in disaster situations. The structured relationship among variables provided a clear basis for statistical analysis and interpretation, supporting the development of effective disaster risk reduction education and preparedness strategies within coastal elementary schools.

The conceptual framework explains that learners' **sex and grade level** serve as independent variables that influence their **knowledge, skills, attitudes, and practices** in disaster risk reduction and management. These competencies affect learners' awareness, preparedness, and participation in disaster-related activities. Knowledge refers to understanding disaster concepts and safety procedures; skills involve the ability to apply these measures; attitudes reflect learners' willingness and sense of responsibility; and practices represent actual preparedness behaviors. The framework illustrates how demographic factors shape disaster preparedness among elementary learners in selected coastal schools in the 5th District of Iloilo and provides a basis for statistical analysis and interpretation.

Statement of the Problem

This study aims to assess the knowledge, skills, attitudes, and practices of learners in disaster risk reduction and management. Specifically, it sought to answer the following questions:

1. What is the level of knowledge of learners in disaster risk reduction and management as an entire group and when classified by sex, and grade level?
2. What is the level of skills of learners in disaster risk reduction and management as an entire group and when classified by sex, and grade level?
3. What is the level of attitudes of learners in disaster risk reduction and management as an entire group and when classified by sex, and grade level?
4. What is the level of practices of learners in disaster risk reduction and management as an entire group and when classified by sex, and grade level?
5. Is there a significant difference in the level of knowledge among learners in terms of sex, and grade level?
6. Is there a significant difference in the level of skills among learners in terms of sex, and grade level?
7. Is there a significant difference in the level of attitude among learners in terms of sex, and grade level?
8. Is there a significant difference in the level of practices among learners in terms of sex, and grade level?
9. What output can be designed to address the identified gaps among elementary learners?

Hypotheses

Based on the identified specific problems, the following hypotheses were evaluated:

1. There is no significant difference in the level of knowledge, skills, attitudes, and practices in Disaster Risk Reduction and Management among public elementary learners as to sex.
2. There is no significant difference in the level of knowledge, skills, attitudes, and practices in Disaster Risk Reduction and Management among public elementary learners as to grade level.

Significance of the Study

This study provides baseline data relevant to various stakeholders involved in disaster risk reduction and management. The findings benefit learners by enhancing their disaster preparedness, teachers by guiding the integration of age-appropriate DRRM strategies, and parents/guardians by promoting a culture of safety at home. School

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administrators may use the results to strengthen preparedness programs and improve school safety, while policy makers and DRRM practitioners can draw on the evidence to inform policies and community-based interventions. The study also benefits the researcher by identifying gaps in learners' competencies and serves as a valuable reference for future researchers through its validated instruments, framework, and evidence-based findings.

Scope and Limitations

This study examined the knowledge, skills, attitudes, and practices (KSAP) of elementary learners in disaster risk reduction and management in selected coastal schools in the 5th District of Iloilo. Using a descriptive quantitative design, data were collected through structured Likert-scale questionnaires to determine learners' preparedness competencies and the influence of sex and grade level on these variables. While the study provided insights into the relationship between demographic factors and disaster preparedness, it was limited by time constraints, participant availability, and reliance on self-reported data. Despite these limitations, the findings contribute to strengthening school-based DRRM education and promoting safer, more resilient learning environments in coastal communities.

II. REVIEW OF RELATED LITERATURE

Recent studies emphasize that disaster management competencies among elementary learners are essential for improving safety, reducing disaster risks, and strengthening community resilience. These competencies consist of knowledge, skills, attitudes, and practices (KSAP) that enable learners to anticipate, respond to, and recover from disaster events [1]. Repeated instruction, experiential learning, and participation in drills significantly enhance learners' resilience and preparedness [2][3].

Research indicates that experiential and school-based disaster education strengthens learners' practical skills and responsible attitudes toward safety. Learners who engage in drills, simulations, and community-based preparedness activities demonstrate improved application of disaster-related knowledge in real-world situations, particularly in coastal and disaster-prone areas [3][4]. Studies further show that grade level influences disaster preparedness competencies, with older learners—especially those in Grade 6—exhibiting higher levels of knowledge and skills [5][6].

Disaster risk reduction (DRR) practices include preparedness, prevention, response, and recovery behaviors such as participating in drills, hazard reporting, and safe evacuation [7][1]. Learners exposed to structured DRR programs consistently demonstrate stronger preparedness behaviors than those without regular training [8][9]. Developing a culture of safety in schools reinforces the integration of knowledge, skills, and attitudes into consistent disaster preparedness practices [9].

Learners' disaster management competencies are also influenced by environmental, social, and personal factors. Individual characteristics such as prior disaster exposure and risk awareness, combined with social support from teachers, peers, and family, promote positive preparedness behaviors [10][11]. Environmental factors, including school infrastructure and availability of safety information, further shape learners' ability to practice DRR behaviors effectively [11].

Challenges in DRR education include the growing frequency of climate-related disasters and the fragmented integration of disaster risk reduction (DRR) and climate change adaptation (CCA) strategies [12][13]. International frameworks such as the Sendai Framework for Disaster Risk Reduction reinforce the need for coordinated, inclusive, and sustainable disaster education, especially in high-risk and coastal communities [13][14][15].

Theoretical perspectives such as Social Cognitive Theory and Protection Motivation Theory support the idea that disaster preparedness is shaped by social modeling, self-efficacy, and risk perception [16][17]. Policies including the DepEd DRRM Framework further institutionalize disaster education by promoting competency development and active learner participation [1][7].

Empirical studies consistently reveal that while learners often acquire disaster-related knowledge, effective preparedness depends largely on the development of practical skills through continuous training, drills, and real-life

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application [8][18][19]. Overall, the literature underscores that strengthening disaster preparedness among elementary learners requires a holistic and experiential approach integrating knowledge, skills, attitudes, and practices, particularly in coastal and disaster-prone settings.

III. METHODOLOGY

This study employed a descriptive research design to assess the knowledge, skills, attitudes, and practices (KSAP) of elementary learners in disaster risk reduction and management in selected coastal elementary schools in the Schools District of San Dionisio, Iloilo. The design aimed to provide an accurate description of learners' disaster preparedness without manipulating variables.

The respondents consisted of 350 Grade 3–6 learners selected from a population of 2,282 pupils through stratified random sampling, ensuring proportional representation by sex and grade level. Data were collected from seven coastal elementary schools in the district.

A researcher-developed questionnaire, aligned with DepEd DRRM policies, was used as the primary data-gathering instrument. The questionnaire included sections on demographic profile and KSAP domains and utilized a five-point Likert scale. The instrument underwent expert validation and a pilot test, yielding acceptable reliability coefficients for all domains.

Data were gathered with proper permissions and ethical safeguards, including informed parental consent and learner assent. The questionnaires were personally administered and carefully reviewed prior to analysis.

Statistical analysis was conducted using SPSS, applying descriptive statistics (frequency, percentage, mean, and standard deviation) and inferential tests (independent-samples t-test, one-way ANOVA, and Tukey's HSD). These analyses examined learners' preparedness levels and determined differences in KSAP when grouped according to sex and grade level.

IV. RESULT

Level of Knowledge of Learners in Disaster Risk Reduction and Management

The mean and standard deviation were used to determine the level of knowledge of learners in Disaster Risk Reduction and Management when taken as an entire group and classified according to sex and grade level. As an entire group, learners (M = 4.16; SD = 0.57) demonstrated a high level of knowledge, indicating adequate understanding of DRRM concepts and principles.

When grouped according to sex, both male (M = 4.10; SD = 0.58) and female (M = 4.20; SD = 0.57) learners exhibited high knowledge levels. Although both groups showed strong knowledge, female learners scored marginally higher, suggesting possible differences in attentiveness and engagement toward disaster preparedness practices. This finding is consistent with Bronfman (2019), who noted that female learners often demonstrate greater comprehension of preparedness concepts.

When grouped according to grade level, all learners demonstrated high knowledge. Grade 3 learners obtained (M = 4.07; SD = 0.55), Grade 4 learners (M = 4.09; SD = 0.56), Grade 5 learners (M = 4.13; SD = 0.64), and Grade 6 learners achieved the highest mean score of (M = 4.33; SD = 0.50). These results suggest that DRRM knowledge increases progressively across grade levels, with Grade 6 learners showing the strongest understanding. This may be attributed to increased exposure to disaster risk reduction instruction, cognitive development, and greater participation in school-based preparedness activities. The findings conform with Epal et al. (2024), who reported that learners demonstrate high levels of disaster preparedness knowledge and adaptive capacity.

Table 2 shows the data.

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Table 2: Level of Knowledge of Learners in Disaster Risk Reduction and Management

Knowledge	SD	Mean	Description
As an Entire Group	0.57	4.16	High
Sex			
Male	0.58	4.10	High
Female	0.57	4.20	High
Grade Level			
Grade 3	0.55	4.07	High
Grade 4	0.56	4.09	High
Grade 5	0.64	4.13	High
Grade 6	0.50	4.33	High

Note: Very Low (1.00-1.50), Low (1.51-2.50), Moderate (2.51-3.50), High (3.51-4.50), Very High (4.51-5.00)

Level of Skills of Learners on Disaster Risk Reduction and Management

The mean and standard deviation were used to determine the level of skills of learners in Disaster Risk Reduction and Management when taken as an entire group and classified according to sex and grade level. As an entire group, learners (M = 4.24; SD = 0.58) demonstrated a high level of skills, indicating strong competence in disaster preparedness and response. When grouped according to sex, both male (M = 4.16; SD = 0.62) and female (M = 4.32; SD = 0.55) learners exhibited high skill levels. Although both groups showed strong competence, female learners scored slightly higher, suggesting greater attentiveness and participation in school-based preparedness activities. This finding is consistent with Cvetković et al. (2018), who reported that female learners often display stronger preparedness behaviors in disaster contexts.

When grouped according to grade level, all learners demonstrated high skills. Grade 3 learners obtained (M = 4.21; SD = 0.57), Grade 4 learners (M = 4.11; SD = 0.58), Grade 5 learners (M = 4.16; SD = 0.68), and Grade 6 learners achieved the highest mean score of (M = 4.44; SD = 0.44). These results suggest that DRRM skills increase progressively across grade levels, with Grade 6 learners showing the strongest competence. This may be attributed to increased exposure to structured training, cognitive maturity, and active participation in school-based drills and programs. The findings conform with Malasarte et al. (2024), who emphasized that learners' skills in disaster preparedness improve through experiential learning and repeated practice.

Table 3 shows the data.

Table 3: Level of Skills of Learners on Disaster Risk Reduction and Management

Skills	SD	Mean	Description
As an Entire Group	0.58	4.24	High
Sex			
Male	0.62	4.16	High
Female	0.55	4.32	High
Grade Level			
Grade 3	0.57	4.21	High
Grade 4	0.58	4.11	High
Grade 5	0.68	4.16	High
Grade 6	0.44	4.44	High

Note: Very Low (1.00-1.50), Low (1.51-2.50), Moderate (2.51-3.50), High (3.51-4.50), Very High (4.51-5.00)

Level of Attitudes of Learners in Disaster Risk Reduction and Management

The mean and standard deviation were used to determine the level of attitudes of learners in Disaster Risk Reduction and Management when taken as an entire group and classified according to sex and grade level. As an entire group,

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learners (M = 4.27; SD = 0.61) demonstrated a high level of attitudes, reflecting positive dispositions, readiness, and willingness to participate in disaster preparedness, response, and mitigation activities.

When grouped according to sex, both male (M = 4.16; SD = 0.63) and female (M = 4.34; SD = 0.59) learners exhibited high attitudes. Although both groups showed strong dispositions, female learners scored slightly higher, suggesting greater willingness to participate and stronger responsiveness toward disaster preparedness practices. This finding aligns with Bronfman (2019), who reported that female learners often show higher engagement and a more proactive orientation toward preparedness.

When grouped according to grade level, all learners demonstrated high attitudes. Grade 3 learners obtained (M = 4.15; SD = 0.66), Grade 4 learners (M = 4.24; SD = 0.66), Grade 5 learners (M = 4.22; SD = 0.61), and Grade 6 learners achieved the highest mean score of (M = 4.43; SD = 0.49). These results suggest that attitudes toward disaster risk reduction and management become progressively more positive as learners advance in grade level. The higher mean score of Grade 6 learners may be attributed to increased exposure to DRRM instruction, greater maturity, and more active participation in school-based preparedness activities. This result is consistent with Epal et al. (2024), who reported that learners demonstrate high levels of positive attitudes, preparedness, and adaptive capacity in disaster-related contexts. Table 4 shows the data.

Table 4: Level of Attitudes of Learners in Disaster Risk Reduction and Management

Attitudes	SD	Mean	Description
As an Entire Group	0.61	4.27	High
Sex			
Male	0.63	4.16	High
Female	0.59	4.34	High
Grade Level			
Grade 3	0.66	4.15	High
Grade 4	0.66	4.24	High
Grade 5	0.61	4.22	High
Grade 6	0.49	4.43	High

Note: Very Low (1.00-1.50), Low (1.51-2.50), Moderate (2.51-3.50), High (3.51-4.50), Very High (4.51-5.00)

Level of Practices of Learners in Disaster Risk Reduction and Management

The mean and standard deviation were used to determine the level of practices of learners in Disaster Risk Reduction and Management when taken as an entire group and classified according to sex and grade level. As an entire group, learners (M = 4.22; SD = 0.60) demonstrated a high level of practices, indicating consistent engagement in disaster preparedness activities across schools.

When grouped according to sex, both male (M = 4.12; SD = 0.58) and female (M = 4.28; SD = 0.60) learners exhibited high practice levels. Female learners scored slightly higher, suggesting greater consistency and attentiveness in applying preparedness practices. This finding aligns with Bronfman et al. (2019), who noted that female learners often display stronger preparedness behaviors and more regular participation in disaster-related activities.

When grouped according to grade level, all learners demonstrated high practices. Grade 3 learners obtained (M = 4.14; SD = 0.72), Grade 4 learners (M = 4.17; SD = 0.65), Grade 5 learners (M = 4.21; SD = 0.53), and Grade 6 learners achieved the highest mean score of (M = 4.32; SD = 0.48). These results suggest that practices in DRRM become progressively more consistent as learners advance in grade level, with Grade 6 learners showing the strongest application of preparedness activities. This may be attributed to increased maturity, greater exposure to school-based drills, and more active participation in disaster-related programs. The findings conform with Malasarte et al. (2024), who reported that learners' disaster preparedness practices improve through experiential learning and repeated reinforcement in school settings. Table 5 shows the data.

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Table 5: Level of Practices of Learners in Disaster Risk Reduction and Management

Practices	SD	Mean	Description
As an Entire Group	0.60	4.22	High
Sex			
Male	0.58	4.12	High
Female	0.60	4.28	High
Grade Level			
Grade 3	0.72	4.14	High
Grade 4	0.65	4.17	High
Grade 5	0.53	4.21	High
Grade 6	0.48	4.32	High

Note: Very Low (1.00-1.50), Low (1.51-2.50), Moderate (2.51-3.50), High (3.51-4.50), Very High (4.51-5.00)

Difference on the Level of Knowledge Among Learners in Terms of Sex

An independent-sample t-test was conducted to compare the level of knowledge of male and female learners in Disaster Risk Reduction and Management. The results revealed that there was no significant difference in the knowledge levels of male (M = 4.10; SD = 0.58) and female (M = 4.20; SD = 0.57) learners; t(348) = –1.59, p = .113. The magnitude of difference in the means (mean difference = –0.10, 95% CI: –0.23 to 0.03) was very small, with an effect size of eta squared = 0.007. Therefore, the hypothesis stating that there are no significant differences in the level of knowledge of public elementary learners in terms of sex was not rejected. These findings suggest that both male and female learners possess relatively similar levels of knowledge in DRRM, indicating that sex does not significantly influence the learners' understanding of disaster preparedness concepts and principles. Table 6 shows the data.

Table 6: Difference on the Level of Knowledge Among Learners in Terms of Sex

Sex	M	SD	N	MD	95% CI		df	t	p	ETA Squared
					Lower	Upper				
Male	4.10	0.58	138	-0.10	-0.23	– 0.03	348	-1.59	.113	0.007
Female	4.20	0.57	212							

Difference on the Level of Knowledge Among Learners in Terms of Grade Level

A one-way between-groups analysis of variance (ANOVA) was conducted to explore the level of knowledge as to grade level. Respondents were divided into four groups according to their grade level (Group 1: Grade 3; Group 2: Grade 4; Group 3: Grade 5; Group 4: Grade 6). There was a statistically significant difference at the $p < .05$ level in knowledge scores for the four grade levels: $F(3, 346) = 4.020$, $p = .008$. Despite reaching statistical significance, the actual difference in mean scores between the groups was small. The effect size, calculated using eta squared, was 0.034. Post-hoc comparisons using the Tukey HSD test indicated that the mean score for Grade 6 learners (M = 4.33, SD = 0.50) was significantly higher compared to Grade 3 (M = 4.07, SD = 0.55) and Grade 4 (M = 4.09, SD = 0.56). Grade 5 learners (M = 4.13, SD = 0.64) did not differ significantly from Grade 6 learners. Therefore, the hypothesis stating that there are no significant differences in the levels of knowledge as to grade level was rejected. These results indicate that the level of knowledge significantly varies depending on the learners' grade level, with Grade 6 learners demonstrating the highest knowledge in DRRM. Table 7 shows the data.

Table 7: Difference on the Level of Knowledge Among Learners in Terms of Grade Level

Grade Level	Mean	SD	Df	F	P	Eta Squared	Post-hoc Test Tukey HSD
a. Grade 3	*4.07*	*0.55*	*3,346*	*4.020*	*.008**	*.034*	*d > a*
b. Grade 4	*4.09*	*0.56*					*d > b*

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c. Grade 5	*4.13*	*0.64*	*No significant difference vs. d*
d. Grade 6	*4.33*	*0.50*	*Significantly higher than a & b*

**p<0.05 Significant to 0.05 alpha level*

Difference on the Level of Skills Among Learners in Terms of Sex

An independent-sample t-test was conducted to compare the level of skills of male and female learners in Disaster Risk Reduction and Management. The results revealed that there was a significant difference in the skills levels of male (M = 4.11; SD = 0.62) and female (M = 4.32; SD = 0.55) learners; t(348) = –3.30, p = .001. The magnitude of difference in the means (mean difference = –0.21, 95% CI: –0.34 to –0.09) was small to moderate, with an effect size of eta squared = 0.030. Therefore, the hypothesis stating that there are no significant differences in the level of skills of public elementary learners in terms of sex was rejected. These findings suggest that female learners demonstrated significantly higher skills in DRRM compared to male learners, indicating that sex plays a role in shaping learners' competence and engagement in disaster preparedness practices.

Table 8 shows the data.

Table 8:Difference on the Level of skills Among Learners in Terms of Sex

Sex	M	SD	N	MD	95% CI		df	t	p	ETA Squared
					Lower	Upper				
Male	4.11	0.62	138	-0.21	-0.34	– 0.09	348	-3.30	.001*	0.030
Female	4.32	0.55	212							

Difference on the Level of skills Among Learners in Terms of Grade Level

A one-way between-groups analysis of variance (ANOVA) was conducted to explore the level of skills as to grade level. Respondents were divided into four groups according to their grade level (Group 1: Grade 3; Group 2: Grade 4; Group 3: Grade 5; Group 4: Grade 6). There was a statistically significant difference at the p < .05 level in skills scores for the four grade levels: F(3, 346) = 5.82, p = .001. Despite reaching statistical significance, the actual difference in mean scores between the groups was small to moderate. The effect size, calculated using eta squared, was 0.048. Post-hoc comparisons using the Tukey HSD test indicated that the mean score for Grade 6 learners (M = 4.33, SD = 0.50) was significantly higher compared to Grade 3 (M = 4.07, SD = 0.55), Grade 4 (M = 4.09, SD = 0.56), and Grade 5 (M = 4.13, SD = 0.64). Therefore, the hypothesis stating that there are no significant differences in the levels of skills as to grade level was rejected. These results indicate that the level of skills significantly varies depending on the learners' grade level, with Grade 6 learners demonstrating the highest skills in DRRM. Table 9 shows the data.

Table 9: Difference on the Level of Skills Among Learners in Terms of Grade Level

Grade Level	Mean	SD	Df	F	P	Eta Squared	Post-hoc Test Tukey HSD
a. Grade 3	4.07	0.55	3,346	5.82	.001*	.048	d > a
b. Grade 4	4.09	0.56					d > b
c. Grade 5	4.13	0.64					d > c
d. Grade 6	4.33	0.50					Significantly higher than a, b, and c

**p<0.05 Significant to 0.05 alpha level*

Difference on the Level of Attitudes Among Learners in Terms of Sex

An independent sample t test was conducted to compare the level of attitudes of male and female learners in Disaster Risk Reduction and Management. The results revealed that there was a significant difference in the attitudes of male (M = 4.16; SD = 0.63) and female (M = 4.34; SD = 0.59) learners; t(348) = –2.75, p = .0016. The magnitude of

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difference in the means (mean difference = –0.18, 95% CI: –0.31 to –0.05) was small, with an effect size of eta squared = 0.021. Therefore, the hypothesis stating that there are no significant differences in the level of attitudes of public elementary learners in terms of sex was rejected. These findings suggest that female learners demonstrated significantly higher attitudes toward DRRM compared to male learners, indicating that sex plays a role in shaping learners' willingness, responsiveness, and positive orientation toward disaster preparedness practices.
Table 10 shows the data.

Table 10: Difference on the Level of Attitudes Among Learners in Terms of Sex

Sex	M	SD	N	MD	95% CI		df	t	p	ETA Squared
					Lower	Upper				
Male	4.16	0.63	138	-0.18	-0.31	– 0.05	348	-2.75	.0016	0.021
Female	4.34	0.59	212							

Difference on the Level of Attitudes Among Learners in Terms of Grade Level

A one-way between-groups analysis of variance (ANOVA) was conducted to explore the level of attitudes as to grade level. Respondents were divided into four groups according to their grade level (Group 1: Grade 3; Group 2: Grade 4; Group 3: Grade 5; Group 4: Grade 6). There was a statistically significant difference at the $p < .05$ level in attitudes scores for the four grade levels: $F(3, 346) = 5.82$, $p = .001$. Despite reaching statistical significance, the actual difference in mean scores between the groups was small to moderate. The effect size, calculated using eta squared, was 0.048. Post-hoc comparisons using the Tukey HSD test indicated that the mean score for Grade 6 learners ($M = 4.33$, $SD = 0.50$) was significantly higher compared to Grade 3 ($M = 4.07$, $SD = 0.55$), Grade 4 ($M = 4.09$, $SD = 0.56$), and Grade 5 ($M = 4.13$, $SD = 0.64$). Therefore, the hypothesis stating that there are no significant differences in the levels of attitudes as to grade level was rejected. These results indicate that the level of attitudes significantly varies depending on the learners' grade level, with Grade 6 learners demonstrating the most positive attitudes toward DRRM.
Table 11 shows the data.

Table 11: Difference on the Level of Attitudes Among Learners in Terms of Grade Level

Grade Level	Mean	SD	Df	F	P	Eta Squared	Post-hoc Test Tukey HSD
a. Grade 3	4.07	0.55	3,346	5.82	.001*	.048	d > a
b. Grade 4	4.09	0.56					d > b
c. Grade 5	4.13	0.64					d > c
d. Grade 6	4.33	0.50					Significantly higher than a, b, and c

**p<0.05 Significant to 0.05 alpha level*

Difference on the Level of Practices Among Learners in Terms of Sex

An independent-sample t-test was conducted to compare the level of practices of male and female learners in Disaster Risk Reduction and Management. The results revealed that there was a significant difference in the practices of male ($M = 4.12$; $SD = 0.58$) and female ($M = 4.28$; $SD = 0.60$) learners; $t(348) = –2.35$, $p = .019$. The magnitude of difference in the means (mean difference = –0.16, 95% CI: –0.29 to –0.03) was small, with an effect size of eta squared = 0.016. Therefore, the hypothesis stating that there are no significant differences in the level of practices of public elementary learners in terms of sex was rejected. These findings suggest that female learners demonstrated significantly higher practices in DRRM compared to male learners, indicating that sex influences the consistency and attentiveness of learners in applying disaster preparedness activities. Table 12 shows the data

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Table 12: Difference on the Level of Practices Among Learners in Terms of Sex

Sex	M	SD	N	MD	95% CI		df	t	p	ETA Squared
					Lower	Upper				
Male	4.12	0.58	138	-0.16	-0.29	– 0.03	348	-2.35	.019*	0.016
Female	4.28	0.60	212							

Difference on the Level of Practices Among Learners in Terms of Grade Level

A one-way between-groups analysis of variance (ANOVA) was conducted to explore the level of practices as to grade level. Respondents were divided into four groups according to their grade level (Group 1: Grade 3; Group 2: Grade 4; Group 3: Grade 5; Group 4: Grade 6). The results revealed that there was no statistically significant difference at the $p < .05$ level in practices scores for the four grade levels: $F(3, 346) = 1.60$, $p = .190$. The effect size, calculated using eta squared, was 0.014, indicating a very small difference in mean scores between the groups. Post-hoc comparisons using the Tukey HSD test indicated that Grade 6 learners ($M = 4.33$, $SD = 0.50$) were relatively higher compared to Grade 3 learners ($M = 4.07$, $SD = 0.55$), with a mean difference of –0.28 ($p = .010$). However, no significant differences were observed between Grade 6 and Grade 4 ($M = 4.09$, $SD = 0.56$) or Grade 5 ($M = 4.13$, $SD = 0.64$). Therefore, the hypothesis stating that there are no significant differences in the levels of practices as to grade level was not rejected overall. These results suggest that while Grade 6 learners tend to demonstrate relatively stronger practices in DRRM compared to Grade 3 learners, the differences across grade levels are generally minimal and not statistically significant at the overall group level. Table 13 shows the data.

Table 13: Difference on the Level of Practices Among Learners in Terms of Grade level

Grade Level	Mean	SD	Df	F	P	Eta Squared	Post-hoc Test Tukey HSD
a. Grade 3	4.07	0.55	3,346	1.60	.190	.014	Slightly lower than d (not overall significant)
b. Grade 4	4.09	0.56					No significant difference vs. d
c. Grade 5	4.13	0.64					No significant difference vs. d
d. Grade 6	4.33	0.50					Relatively higher than a (MD = -0.28, p = .010)

**p<0.05 Significant to 0.05 alpha level*

Proposed Outputs to Address Identified Gaps

Storybooks and infographics were chosen because they matched the specific gaps found in the study. Storybooks were suited for lower grade learners (Grades 3–5) who scored lower since children at this stage learn best through simple, concrete, and imaginative narratives. The illustrated storybook "Si Yola at ang Magic Go Bag" made preparedness engaging and age appropriate by modeling positive behaviors through a relatable character. Infographics, on the other hand, were designed for male learners who consistently scored lower across domains. As clear, visual reinforcements, infographics provided repeated exposure in classrooms, strengthened recall, and encouraged consistent preparedness practices. Together, these tools ensured DRRM concepts were communicated effectively to younger learners and reinforced among males, promoting equitable competency development. Figures 1, 2 and 3 show the sample.

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V. DISCUSSION

This study examined the disaster risk reduction and management (DRRM) knowledge, skills, attitudes, and practices of elementary learners in coastal schools and interpreted the findings in relation to existing literature. Overall, the results indicate that learners generally demonstrate strong DRRM competencies, reflecting the effectiveness of school-based disaster education programs. However, consistent patterns across sex and grade level reveal areas that require targeted instructional attention.

The generally high level of DRRM knowledge across learners aligns with previous findings that formal instruction, curriculum integration, and repeated exposure through drills contribute to learners' understanding of disaster concepts [1], [2]. The progressive increase in knowledge across grade levels supports developmental theories suggesting that cognitive maturity and cumulative learning experiences enhance disaster-related understanding [3]. The significantly higher knowledge among Grade 6 learners compared to younger grades indicates that early-grade learners may benefit from simplified and developmentally appropriate instructional approaches rather than relying solely on standard DRRM lessons.

Skills in disaster preparedness and response showed more pronounced differences across sex and grade level. Female learners consistently demonstrated stronger disaster-related skills than male learners, a pattern reported in prior studies on gender and disaster preparedness [4], [5]. These findings may reflect differences in classroom engagement, attentiveness to instructions, and participation in school-based drills. Similarly, higher-grade learners exhibited stronger skills, supporting evidence that experiential learning such as repeated drills and practical exercises plays a critical role in translating knowledge into action [6]. This suggests that schools should emphasize hands-on activities, particularly for younger and male learners, to strengthen skill acquisition.

Learners' attitudes toward DRRM were generally positive, indicating readiness, responsibility, and willingness to engage in preparedness activities. Positive attitudes are essential because they influence motivation and sustained participation in disaster preparedness behaviors [7], [8]. The observed differences favoring female and older learners are consistent with studies showing that perceived responsibility and self-efficacy increase with maturity and exposure to disaster education [4]. These results underscore the importance of nurturing positive attitudes at earlier grade levels to prevent disengagement and to promote a culture of safety.

In terms of practices, learners reported consistently high engagement in disaster preparedness activities, suggesting that schools are effective platforms for reinforcing DRRM behaviors. The significant differences by sex, but not consistently by grade level, imply that behavioral consistency may be influenced more by personal engagement and social modeling than by age alone. This supports Social Cognitive Theory, which emphasizes the role of observed behaviors and reinforcement in shaping actions [9]. While Grade 6 learners tended to demonstrate stronger practices, the lack of large differences across grades suggests that regular drills and school routines provide equal opportunities for practice regardless of age.

Taken together, the findings demonstrate that while DRRM education in coastal elementary schools is largely effective, subtle but consistent gaps remain. Younger learners may struggle with abstract DRRM concepts, and male learners may require more engaging and visually supported approaches to sustain participation. These findings justify the development of learner-centered instructional materials, such as storytelling and visual reinforcements, to strengthen comprehension, motivation, and practice.

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In conclusion, this study confirms that disaster risk reduction education contributes positively to learners' preparedness competencies but also highlights the need for differentiated strategies. Addressing developmental and gender-related differences through age-appropriate and engaging instructional materials can enhance equity in disaster preparedness and strengthen the overall resilience of learners in disaster-prone communities.

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