



Awareness on Simulation Exercises on Disaster Risk Reduction Management Skills of Learners: Basis for Enhancement Program

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ABSTRACT

Disaster risk reduction and management (DRRM) education is essential in enhancing learners' preparedness for emergencies. Simulation-based learning, such as fire safety and earthquake drills, is widely used to develop practical skills and improve knowledge retention among students. This study aimed to examine the relationship between simulation exercises and the DRRM skills of learners at Murcia Elementary School, Negros Occidental, during the school year 2023 - 2024. It also sought to determine whether significant differences in DRRM knowledge and skills exist when grouped according to sex, grade level, and family income. A descriptive-correlational research design was employed involving 237 learners from Grades 4, 5, and 6. Data were collected using a structured instrument measuring DRRM knowledge and skills. Statistical analyses included descriptive measures and tests of difference to assess variations across demographic profiles. Findings indicated that both male and female learners demonstrated a high level of DRRM knowledge and skills. Grade 4 learners exhibited the highest competency among all grade levels. Across income groups, learners consistently showed high preparedness. Statistical analysis revealed significant differences in DRRM knowledge and skills across grade levels ($p < 0.05$), while no significant differences were found when grouped by sex or family income ($p > 0.05$). Simulation exercises are effective in enhancing learners' DRRM competencies, supporting experiential and situated learning theories. The results highlight the importance of integrating simulation-based activities into the curriculum to strengthen disaster preparedness. Enhancement programs may be developed to sustain and further improve learners' DRRM skills across grade levels.

Keywords: DRRM, Simulation Exercise, Enhancement Program, school curriculum

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INTRODUCTION

Disasters, both natural and human-induced, continue to pose significant threats to communities worldwide, underscoring the urgent need for effective Disaster Risk Reduction and Management (DRRM) education. Learners, as future contributors to community resilience, must be equipped with the knowledge and skills necessary to respond appropriately during emergencies. DRRM education aims not only to raise awareness but also to develop practical competencies that reduce vulnerability and enhance preparedness. In elementary schools, simulation exercises—such as fire and earthquake drills—are commonly used as experiential learning strategies to reinforce these competencies by allowing learners to practice appropriate responses in controlled, realistic settings.

Despite the institutionalization of DRRM through Republic Act 10121 and the widespread implementation of simulation-based activities in schools, a critical gap remains in the empirical assessment of their effectiveness. Existing studies predominantly emphasize the implementation and perceived benefits of simulation exercises but provide limited evidence on how learners' awareness of these activities translates into measurable DRRM knowledge and skills. Furthermore, there is a lack of localized research that examines this relationship within elementary school contexts, particularly in Murcia Elementary School, Negros Occidental. Previous studies in the province have largely focused on specific sectors or locations, leaving school-based DRRM competencies underexplored.

This gap raises important concerns regarding whether current simulation practices genuinely enhance learners' preparedness or merely fulfill compliance requirements without ensuring meaningful learning outcomes. Without systematic evaluation, schools may be unable to identify strengths and deficiencies in their DRRM programs or to design targeted interventions that address learners' specific needs.

Therefore, this study seeks to investigate the relationship between learners' awareness of simulation exercises and their DRRM knowledge and skills. By generating empirical evidence, the study aims to inform the development of an enhancement program that strengthens disaster preparedness and supports the creation of more effective, evidence-based DRRM practices in elementary education.

OBJECTIVES OF THE STUDY

This study aimed to determine the relationship between simulation exercises skills towards disaster risk reduction management skills of learners of Murcia Elementary School in the school year 2023- 2024.

1. What is the profile of pupils when grouped according to sex, grade level and average monthly income?
2. What is the level of skills in simulation exercises in fire safety and earthquake drills of learners when grouped according to profile?
3. What is the level of disaster risk reduction management skills of learners when taken as a whole and when grouped according to profile?
4. Is there a significant relationship between simulation exercises and the disaster risk reduction management skills of learners?
5. Based on the result of the study, what intervention should be proposed?

LITERATURE REVIEW

This section presents selected studies and literature relevant to Disaster Risk Reduction and Management (DRRM) and simulation-based learning, with emphasis on their implications for elementary education.

Disaster Risk Reduction Management for Schools

Disaster Risk Reduction and Management (DRRM) in schools plays a vital role in minimizing disaster risks through structured education and training. Recent international research highlights that integrating DRRM into formal education significantly enhances community resilience and preparedness (Hassan, 2025). DRRM encompasses four key components: prevention and mitigation, preparedness, response, and recovery and rehabilitation (Monalisa, 2023). These components collectively ensure that schools not only reduce risks but also build adaptive capacities among learners.



Empirical studies further emphasize that school-based DRRM programs are most effective when integrated into curricula and supported by teacher training and institutional resources (Mertayasa et al., 2024). However, persistent gaps such as inadequate teacher preparation, limited funding, and inconsistent implementation hinder the effectiveness of these initiatives (Hassan, 2025). These challenges indicate that while DRRM is widely adopted in policy, its practical outcomes require further evaluation.

Simulation Exercises in Schools

Simulation exercises (SimEx) are widely recognized as essential tools for experiential learning in disaster preparedness. Recent global studies demonstrate that structured and repeated simulation activities significantly improve learners' decision-making skills, response time, and situational awareness during emergencies (Zhuge et al., 2024). Moreover, emerging evidence from international literature shows that immersive simulation approaches, including digital and scenario-based models, enhance knowledge retention and skill transfer beyond traditional instruction.

These findings strongly support Kolb's Experiential Learning Theory, which posits that learning occurs through concrete experience and active engagement. Simulation exercises provide learners with opportunities to experience, reflect, and apply knowledge in realistic contexts. Similarly, Situated Cognition Theory explains that learning is more effective when it occurs within authentic environments, such as disaster simulations that mirror real-life situations. In addition, the Community of Practice Framework is reflected in collaborative drills, where learners build shared understanding through participation and interaction.

Despite these strengths, current research reveals a critical gap: many studies focus on immediate outcomes of simulation exercises but fail to examine how learners' awareness and participation translate into sustained DRRM knowledge and skills. This limitation highlights the need for studies that connect simulation exposure with measurable learning outcomes.

Simulation Exercises by Sex

Research suggests that simulation-based learning may produce varying experiences across sexes due to differences in socialization, participation, and access to training opportunities. Recent studies highlight the need for inclusive simulation design that considers gender-responsive approaches to maximize engagement and learning outcomes (Zhuge et al., 2024; Pamaong, 2025).

From a theoretical lens, these findings align with the Community of Practice Framework, which emphasizes inclusive participation and shared learning. Ensuring that both male and female learners actively engage in simulations supports equitable skill development and collaborative learning environments. However, empirical evidence remains inconclusive regarding whether sex significantly influences DRRM competencies, indicating a need for further investigation.

Disaster Risk Reduction Management by Sex

International reports underscore that disaster impacts and preparedness levels are not gender-neutral. Studies from global organizations highlight disparities in access to resources, information, and opportunities for participation in disaster preparedness activities (World Bank, 2021). Women and girls often face structural barriers that affect their ability to prepare for and respond to disasters effectively.

These findings reinforce the importance of inclusive DRRM education that addresses gender-based differences. However, in school contexts, particularly among elementary learners, there is limited empirical evidence on whether such disparities significantly affect DRRM knowledge and skills, thereby presenting a gap that warrants further study.

DRRM for Elementary Pupils

DRRM education must be developmentally appropriate to effectively address the cognitive and emotional capacities of learners. International frameworks such as the Hyogo Framework for Action emphasize integrating disaster education into school curricula to build resilience from an early age. Recent studies indicate that younger learners benefit more from interactive and experiential approaches, while older students can engage in more complex problem-solving tasks (Pamaong, 2025).

These findings support Experiential Learning Theory, as younger learners particularly benefit from hands-on activities like drills and simulations. However, there remains a need to examine how DRRM competencies vary across grade levels, particularly in localized school settings.



Simulation Exercises in Fire Safety and Earthquake Drills

Simulation exercises focusing on fire safety and earthquake preparedness are among the most common DRRM strategies in elementary schools. Recent empirical evidence confirms that these activities enhance students' procedural knowledge, confidence, and ability to respond effectively during emergencies (Zhuge et al., 2024). Additionally, simulation-based learning promotes long-term retention of safety protocols when conducted regularly and systematically.

These outcomes are consistent with both Kolb's Experiential Learning Theory and Situated Cognition Theory, as learners acquire and apply knowledge in realistic, context-based scenarios. However, most studies emphasize general effectiveness and do not sufficiently examine how awareness of these simulations influences actual competency levels.

Simulation Exercises and Socioeconomic Factors

Socioeconomic status plays a significant role in shaping learners' access to and engagement with DRRM education. Recent international studies indicate that students from lower-income families may face barriers such as limited educational resources, reduced parental involvement, and higher exposure to disaster risks (Brown & Davis, 2022).

While these findings highlight inequalities in access and participation, there is limited research examining how socioeconomic status directly influences learning outcomes in simulation-based DRRM activities. This gap underscores the need for more inclusive and context-sensitive research.

Synthesis

Overall, the reviewed literature demonstrates that simulation-based learning is a highly effective strategy for enhancing DRRM knowledge and skills, strongly supported by experiential and situated learning theories. However, a critical gap persists in understanding how learners' awareness and participation in simulation exercises translate into measurable competencies. Furthermore, limited localized studies examine how demographic factors such as sex, grade level, and family income influence these outcomes. Therefore, establishes the need for a contextualized investigation that integrates theoretical frameworks with empirical analysis to determine the relationship between simulation exercises and DRRM skills among elementary learners. Such evidence is essential for developing targeted, inclusive, and effective DRRM enhancement programs in schools.

METHODOLOGY

This section describes the research design, subject and respondents of the study, population and sample size, sampling techniques, data gathering instrument, validity and reliability of the research instrument, data gathering procedures and data analyses.

Research Design

This study employed a descriptive-correlational research design to systematically examine the relationship between simulation exercises and Disaster Risk Reduction and Management (DRRM) skills among elementary learners. A descriptive approach was utilized to provide a comprehensive account of the current level of learners' DRRM knowledge and skills, particularly in relation to simulation exercises such as fire safety and earthquake drills. According to Siedlecki (2020), descriptive research is appropriate for identifying and describing characteristics of a population or phenomenon without manipulating variables.

In addition, a descriptive-comparative component was incorporated to determine whether significant differences exist in learners' DRRM skills when grouped according to demographic variables such as sex, grade level, and average monthly family income. This approach allowed for systematic comparisons across groups with categorical independent variables, thereby identifying patterns and variations in learners' competencies.

Furthermore, the correlational aspect of the design was employed to examine the degree and direction of the relationship between learners' level of awareness of simulation exercises and their DRRM knowledge and skills. This enabled the testing of the null hypothesis and the determination of whether a statistically significant relationship exists between the variables. Correlational analysis is appropriate in this context as it measures the extent to which two or more quantitative variables are related and vary together in a predictable manner.

Overall, the use of a descriptive-comparative and correlational design provided a comprehensive framework for analyzing both differences among groups and relationships between variables, without manipulating the study conditions. This design is



appropriate for generating empirical evidence that can inform the development of targeted DRRM enhancement programs in educational settings.

Subject and Respondents of the Study

The subject and respondents of this study were the learners from Murcia Elementary School, specifically those enrolled in the 2023-2024 academic year. The study included learners from Grades 4-6 to represent a different range of age groups and educational stages. The respondents were willing to participate in the study, which included completing before and after simulation exercises and engaging in follow-up surveys. For the learners who were minors, parental or guardian consent was required in participation in the study's activities.

Population and Sample Size

Murcia Elementary School is composed of 582 intermediate pupils; this is the total population of the study. The researcher applies Yamane's Formula to determine the sample size from the total population and take into account the margin of error and level of confidence. The tolerance level is 5% or 0.05 and 95% level of confidence. Hence, the calculated sample size is 237 pupils.

$$n = \frac{N}{1 + Ne^2}$$

It is computed as

Where:

n= number of samples

N= total population

e= margin of errors/tolerance level

$$\begin{aligned}
 n &= \frac{582}{1 + 582 (0.0025)} \\
 &= \frac{582}{2.455} \\
 &= \frac{582}{2.455} \\
 &= 237
 \end{aligned}$$

Sampling Technique

In this study, Stratified Random Sampling was employed. It is a method of sampling that involves the division of a population into smaller groups known as strata. In stratified sampling stratification, the strata are formed based on members' shared attributes or characteristics. The researcher applied this type of sample technique in which samples were taken respectively from different levels. Hence, the calculated sample sizes in each grade level undergo this technique to further assess the DRRM skills and simulation exercise results in a diverse and equal manner. The simple random sampling technique in draw lots was used to identify the respondents from each grade level and sections.

Table 1

Distribution of Respondents

Grade Level	Population (N)	Sample (n)
Grade 4	194	79
Grade 5	193	79
Grade 6	195	79
Total	582	237

Note. N = population size; n = sample size.



Data Gathering Instruments

The researcher utilized and developed a researcher-made questionnaire that aligned with the research problems and objectives. The researcher utilizes a traditional approach of data gathering techniques such as the use of printed survey questionnaires for the respondents.

The first part of the survey questionnaire is the demographic profile of the learners which is categorized into sex, grade level, and average monthly income. The second part of the survey assesses the learners' knowledge and practical skills from the common simulation exercises. This section includes questions and situations that require learners to demonstrate their knowledge and understanding of the procedures and safety measures that should be taken during specific disaster scenarios, such as fires or earthquakes. The third part of the survey focuses on evaluating the learners' DRRM skills, extending beyond the immediate context of the simulation exercises. The objective is to identify potential dangers in their environment and understand the risks associated with those hazards and their preparedness for emergencies, including knowledge of evacuation routes, emergency contacts, and the use of safety equipment.

Validity and Reliability of the Research Instrument

This study ensures the validity of the instruments, content experts in DRRM and educational assessment were consulted during the development phase. The survey and test items were reviewed for their content, relevance, and appropriateness to the learners' age group and educational level. All competencies were subjected to face and content validity utilizing the research instrument validation Scale developed by Good and Scates (1972). A total of three (3) jury of experts who are designated as District Disaster Risk Reduction and Management (DRRM) coordinators of their respected schools and validated the items in the survey questionnaire. The following identified validators are skilled in the said study and a graduate of master's degree on related field. As validated by the content experts of the research instrument the total mean score of the survey questionnaire is 4.53, verbally interpreted as "Very High."

Reliability is adhered to by testing the instruments for internal consistency and stability over time. Cronbach's alpha was employed to measure the internal consistency of the survey and test items. These steps check that the data gathered were both accurate and consistent, contributing to the overall credibility of the study's findings of the research instrument. The questionnaire got an alpha score of 0.722 interpreted as Very Good.

Data Gathering Procedures

The researcher wrote a letter and sought the permission of the School's Division Superintendent to conduct the Afterwards, the researcher submitted a letter of approval to the principal of Murcia Elementary School. This correspondence describes the study's objective, scope, and character, as well as the expected advantages to both the students and the institution. The principal's clearance was crucial since it indicated the backing of the school administration and allowed the study to take place on school grounds.

When the consent had been acquired, the researcher sent letters to the teachers of the learners who participated in the study Teachers were informed about the study's aims, the significance of their participation in assisting the research, and the anticipated timing of the simulation exercises and data collection activities. Afterwards, identified learners were given a consent form for the confirmation of each learner with their parents as per part of the study. Orientation sessions were held to inform the student participants of the study's procedures. Researchers explained the simulation exercises, data collection methods, and the importance of honest and active participation to participants during this session. The session provided an opportunity for students to ask questions and express any concerns they have about the study.

Data Analysis

The descriptive, inferential, and correlational analyses were used to utilize and analyze the data.

To answer the statement of the Problem 1, the descriptive analysis was used, particularly the frequency and percentage, in determining the profile of pupils when grouped according to sex, grade level and average monthly income.

To answer the statement of the Problems 2, the descriptive analysis was also used, the researcher utilized the mean on the level of knowledge in simulation exercises in fire safety and earthquake drills as shown below.

Mean Formula: $\bar{x} = \frac{\sum x}{n}$ where: \bar{x} = mean
 $\sum x$ = sum of all values / scores
 n = sample size



To interpret the result, the interpretation guide on the next page was used.

Scale	Description	Mean Score Range	Interpretation	Verbal Description
4	Strongly Agree	3.50-4.00	Very High Level	Learners have very high level of knowledge in simulation exercises in fire safety and earthquake drills
3	Agree	2.50-3.49	High Level	Learners have high level of knowledge in simulation exercises in fire safety and earthquake drills
2	Disagree	1.50-2.49	Low Level	Learners have low level of knowledge in simulation exercises in fire safety and earthquake drills
1	Strongly Disagree	1.00-1.49	Very Low Level	Learners have very low level of knowledge in simulation exercises in fire safety and earthquake drills

To answer statement of the Problem 3, which states the level of disaster risk reduction management skills of learners when taken as a whole and when grouped according to profile were mean was used.

The interpretation guide below was used to interpret the result.

Scale	Description	Mean Score Range	Interpretation	Verbal Description
4	Strongly Agree	3.50-4.00	Very High Level	Learners demonstrate an exceptional and consistently advanced level of disaster risk reduction management (DRRM) skills, indicating thorough understanding and preparedness.
3	Agree	2.50-3.49	High Level	Learners show a commendable and solid grasp of DRRM skills, reflecting a strong capacity to respond effectively to disaster-related situations.
2	Disagree	1.50-2.49	Low Level	Learners exhibit limited understanding of DRRM skills, suggesting the need for targeted improvement and reinforcement of disaster preparedness concepts.
1	Strongly Disagree	1.00-1.49	Very Low Level	Learners display minimal to no knowledge or application of DRRM skills, indicating a critical gap in awareness and an urgent need for intensive intervention.

Meanwhile, comparative analysis was used in problems 4 to determine the significant difference in the level of simulation exercise in terms of fire safety and earthquake drill and the level of simulation exercise of learners when grouped according to profile. Hence, Mann Whitney (U) test and Kruskal Wallis (H-test) were used. To answer problem 4, the following formula was used as shown below.

Formula for Mann Whitney or U-test.

$$U1 = W1 - n1(n2 + 1)$$



$$U2 = W2 - n2(n2 + 1)$$

Where:

- $U1$ = Wilcoxon Rank-Sum Test
- $W1$ = sum of ranks of group 1
- $n1$ = sample size of group 1
- $U2$ = Wilcoxon Rank-Sum Test
- $W2$ = sum of ranks of group 2
- $n2$ = sample size of group 2

The formula for the H-test is shown below.

$$H = \frac{12}{n(n+1)} \frac{\sum Ri^2}{n1} - 3(n+1)$$

Where:

- H = Kruskal Wallis test
- n = the number of observation
- 12 = constant
- 3 = constant

To answer problem 5 which states, is there a significant difference in the level of knowledge simulation exercises of learners when grouped according to profile. Mann Whitney (U) test and Kruskal Wallis (H) tests were used.

On the other hand, correlational analysis is used for problem 6, which states there is a significant relationship between simulation exercises and disaster risk reduction and management skills of learners, specifically utilizes the Gamma Coefficient formula as shown below:

Formula for Gamma Coefficient

$$G = \frac{N_a - N_i}{N_a + N_i}$$

where:

- N_a = number of agreements
- N_i = number of inversions

Ethical Considerations

Participants were informed about the purpose of the study. Their voluntary participation was asked, which means no participants were forced. Confidentiality of data were considered throughout the research process.

RESULTS AND DISCUSSION

This section deals with the presentation, analyses, and interpretation of data gathered to answer the problems formulated for the investigation. The presentation and analysis of data and the corresponding discussions followed were arranged in the following manner.

Frequency and Percent Distribution of the Respondents According to Profile.

Table 2

Frequency and Percentage Distribution of Respondents According to Profile

Profile	Category		%
Sex	Male	99	41.80
	Female	138	58.20
	Total	237	100.00
Grade Level	Grade 4	79	33.33
	Grade 5	79	33.33



Profile	Category		%
	Grade 6	79	33.33
	Total	237	100.00
	Family Income	Poor	174
	Low	42	17.72
	Middle	21	8.86
	Total	237	100.00

Note. *f* = frequency; % = percentage.

Table 2 presents the frequency and percentage distribution of respondents according to sex, grade level, and family income. In terms of sex, the majority of the respondents were female (58.20%), while males comprised 41.80% of the total population, indicating a slightly higher representation of female learners in the study.

As to grade level, the respondents were evenly distributed across Grades 4, 5, and 6, each accounting for 33.33% of the total sample. This equal distribution ensures balanced representation across the three grade levels, allowing for fair comparison of DRRM-related outcomes among groups.

Regarding family income, most of the respondents belonged to the “poor” category (73.42%), followed by the “low” income group (17.72%), and a small proportion from the “middle” income category (8.86%). This indicates that the majority of learners come from economically disadvantaged backgrounds, which may have implications for access to educational resources and disaster preparedness support.

Overall, the profile distribution suggests a predominantly female, evenly grade-distributed, and low-income respondent group, which provides a relevant context for analyzing the learners’ DRRM knowledge and skills.

Level of Knowledge in Simulation Exercise Skills in Fire Safety and Earthquake Drills of Learners According to Profile

The level of knowledge in simulation exercise in fire safety and earthquake drills of learners based on sex, grade level, and family income is high. The data are revealed in table 3.

Table 3

Level of Knowledge in Simulation Exercises in Fire Safety and Earthquake Drills of Learners According to Profile

Profile	Category	<i>n</i>	Mean	Interpretation
Sex	Male	99	2.90	High level
	Female	138	2.90	High level
Grade Level	Grade 4	79	2.97	High level
	Grade 5	79	2.86	High level
	Grade 6	79	2.87	High level
Family Income	Poor	174	2.90	High level
	Low	42	2.90	High level
	Middle	21	2.92	High level
Overall	—	237	2.90	High level

Note. *n* = sample size.

Table 3 presents the level of knowledge of learners in simulation exercises in fire safety and earthquake drills when grouped according to sex, grade level, and family income. As shown, both male and female respondents obtained the same mean score of 2.90, which is interpreted as a high level of knowledge. This indicates that sex does not appear to influence learners’ knowledge in simulation exercises.

In terms of grade level, Grade 4 learners obtained the highest mean score (M = 2.97), followed by Grade 6 (M = 2.87) and Grade 5 (M = 2.86), all of which are interpreted as high levels. This suggests that learners across all grade levels demonstrate



strong knowledge of simulation exercises, with only slight variations observed among groups. Regarding family income, all categories—poor ($M = 2.90$), low ($M = 2.90$), and middle ($M = 2.92$)—were interpreted as high level. This implies that socioeconomic status does not significantly affect learners' knowledge of simulation exercises in fire safety and earthquake drills. Overall, the composite mean of 2.90 indicates that learners possess a consistently high level of knowledge in simulation exercises. This suggests that the school's implementation of disaster preparedness activities is effective in promoting awareness and understanding among learners, regardless of their demographic profile.

Salsabil Syah Putri et al. (2025) conducted research on **earthquake disaster simulation training with elementary school students in Padang City**, Indonesia. The results showed that *simulation exercises significantly increased students' knowledge and preparedness attitudes regarding earthquake disasters*, indicating that using simulation as a training method effectively improved children's awareness and readiness to respond. When grouped by family income, learners categorized as "Poor" have a mean score of 2.900, those in the "Low" income category have a mean score of 2.891, and those in the "Middle" income category have a mean score of 2.917. All income groups show a "High Level" of knowledge. The findings found that simulation exercises are an effective way to increase earthquake and home fire preparedness, regardless of family income level. Hence, it provides hands-on training and allows learners to practice responding to emergencies (Salsabil Syah Putri et al., 2025). When grouped as a whole, the data indicates that learners have a high level of knowledge, with all groups categorized within the "High Level" range. Reddin et al. (2021) published a report that advanced training to acquire the knowledge and abilities needed for disaster response is essential before conducting simulation drills.

Level of Knowledge in Disaster Risk Reduction Management Skills of Learners According to Profile

The level of knowledge in disaster risk reduction management of learners according to sex, grade level, and family income is high level. Table 4 below shows the data.

Table 4

Level of Knowledge in Disaster Risk Reduction and Management Skills of Learners According to Profile

Profile	Category	<i>n</i>	Mean	Interpretation
Sex	Male	99	3.15	High level
	Female	138	3.18	High level
Grade Level	Grade 4	79	3.22	High level
	Grade 5	79	3.18	High level
	Grade 6	79	3.08	High level
Family Income	Poor	174	3.16	High level
	Low	42	3.18	High level
	Middle	21	3.14	High level
Overall	—	237	3.16	High level

Note. *n* = sample size.

The table on the previous page presents the level of disaster risk reduction management skills of learners when taken as a whole and when grouped according to sex, grade level and family income. When grouped according to sex, male learners have a mean score of 3.15, while female learners have a slightly higher mean score of 3.18. Both scores are interpreted as "High Level" of disaster risk reduction management skills. Both male and female students at Saint Mary's University have a good awareness of disaster risk reduction of local and national DRR standards and protocols (Tabangcura, 2023). Tabangcura (2023), revealed that regardless of sex and school, respondents' awareness of disaster and its programs do not vary that much.

In terms of grade level, the data show that Grade 4 learners have the highest mean score of 3.22, followed by Grade 5 learners with a mean score of 3.18, and Grade 6 learners with a mean score of 3.08. All grade levels are within the "High Level" category, but Grade 4 learners show the highest level of disaster risk reduction management skills. This implies a slight decrease in perceived skill level as grade level increases. In support to the study of Hardi et al., (2018), it is found that elementary schools, across all levels, can play a crucial role in disaster preparedness by empowering students, implementing disaster education, and empowering schools in critical situations.



When grouped by family income, learners categorized as "Poor" have a mean score of 3.16, those in the "Low" income category have a mean score of 3.18, and those in the "Middle" income category have a mean score of 3.14. All income groups present a "High Level" of disaster risk reduction management skills. The government of Japan published a report that families with higher incomes may have greater access to resources for disaster preparedness, including training programs, safety equipment, and information on risk management. In contrast, lower-income families might face barriers to accessing similar resources, which can affect their preparedness and response skills during the disaster (Kwan & Lentz, 2021). When grouped as a whole, the overall mean score for all learners is 3.16, which is interpreted as "High Level". This implies that learners possess a high level of disaster risk reduction management skills.

Elementary school students show a strong understanding of disaster mitigation and preparedness but need more education on environmental factors and social factors to improve their problem-solving abilities in emergency flood response. Research indicates that students in elementary schools generally exhibit a strong understanding of disaster preparedness and mitigation strategies. A study by Ronan et al. (2016) found that children who receive structured DRRM education demonstrate improved response behaviors during emergencies.

Relationship Between the Level of Simulation Exercise and Level of Disaster Risk Reduction

Management Skills of Learners

There is no strong connection between how well learners perform in simulation exercise and the level of disaster risk reduction management skills of learners. Table 6 shows the data.

Table 6

Relationship Between the Level of Simulation Exercise and Level of Disaster Risk Reduction Management Skills of Learners

Level of Simulation Exercise	Very High	High	Low	Very Low	Total
Very High	0	1	0	0	1
High	10	209	0	0	219
Low	0	16	1	0	17
Very Low	0	0	0	0	0
Total	10	226	1	0	237

Note. G = computed statistic (Goodness-of-fit test); p = probability value.

Computed G value = 0.949

p -value = 0.100

Decision: Accept H_0

Interpretation: Not significant at 0.05 level of significance

Table 6 presents the relationship between the level of simulation exercises and the level of Disaster Risk Reduction and Management (DRRM) skills of learners. As shown in the results, most learners who reported a high level of simulation exercise also demonstrated a high level of DRRM skills ($n = 209$), while only a small number fell under the very high ($n = 10$) and low ($n = 16$) categories. Likewise, learners with low levels of simulation exercise were mostly distributed under the high DRRM skills category ($n = 16$), with only one learner falling under the low category. There were no respondents classified under the very low level of simulation exercise and DRRM skills.

The computed G value of 0.949 with a p -value of 0.100 indicates that there is no statistically significant relationship between the level of simulation exercise and the level of DRRM skills of learners at the 0.05 level of significance. Therefore, the null hypothesis is accepted. This finding implies that although learners generally exhibit high levels of both participation in simulation exercises and DRRM skills, the degree of simulation exercise exposure does not significantly influence their DRRM skill levels.



It suggests that other factors—such as classroom instruction, prior knowledge, teacher facilitation, or environmental exposure—may also contribute to learners' DRRM competencies. Overall, the results indicate that while simulation exercises are an important educational tool in disaster preparedness, their direct relationship with DRRM skill levels in this study is not statistically significant.

The effectiveness of simulation exercises in improving DRRM skills may depend on the quality, realism, and frequency of the drills to the learners. It implies that poorly designed or infrequent exercises may not improve learners' overall DRRM skills. Regular and well-executed simulation exercises are necessary to reinforce learning and build practical experience. Contrary to the findings of Hassan, O. A. B. (2025) it was found that regular participation in simulation exercises can enhance learners' knowledge, skills, and confidence in responding to disasters. As presented in their results, these exercises provide practical experience and help students develop critical thinking and problem-solving abilities essential for effective DRRM. Hence, learners' performance in simulation exercises and their DRRM skills can be influenced by various individual factors, such as age, sex, socioeconomic status, and prior experiences (Asih et al., 2023).

CONCLUSION

The study reveals that learners demonstrate generally high levels of disaster risk reduction and management (DRRM) knowledge and skills, regardless of sex or socioeconomic status, indicating relatively equitable learning outcomes across these groups. However, significant differences are observed across grade levels in both knowledge and skills, suggesting that academic level or exposure plays a key role in shaping DRRM competence. In contrast, sex and family income do not significantly influence learners' DRRM outcomes.

Furthermore, while learners show strong participation in simulation exercises, no significant relationship is found between simulation exposure and DRRM skills. This implies that simulation activities alone may not be sufficient to directly enhance competency, and that other instructional or experiential factors may contribute more substantially to learners' disaster preparedness. Overall, the findings highlight grade level as the most influential factor in DRRM development and suggest the need to strengthen and better integrate simulation-based learning with other instructional strategies to maximize its effectiveness.

RECOMMENDATIONS

Based on the findings of the study, the following recommendations are proposed:

1. Since most learners come from low-income households, the school may strengthen support programs that address learners' broader needs (e.g., learning resources and psychosocial support) to help sustain their engagement in DRRM education, although socioeconomic status was not found to significantly affect DRRM knowledge and skills.
2. As significant differences were found across grade levels, teachers are encouraged to design age-appropriate and differentiated DRRM instruction, particularly reinforcing competencies among Grade 5 and Grade 6 learners where slightly lower mean scores were observed compared to Grade 4.
3. In view of the finding that simulation exercises did not show a significant relationship with DRRM skills, simulation activities should be re-evaluated and enhanced to ensure they are more structured, competency-based, and directly aligned with measurable skill development outcomes.
4. Although no significant differences were found in DRRM outcomes by sex, schools should continue promoting gender-inclusive participation in simulation exercises to maintain equitable learning opportunities for all learners.
5. DRRM should be further strengthened as an integrated, cross-curricular component in subjects such as Science, Araling Panlipunan, and MAPEH, with emphasis on practical application and experiential learning.
6. Regular monitoring and assessment of DRRM knowledge and skills should be conducted, particularly disaggregated by grade level, to track learning progression and address identified variations among learners.
7. Teachers should be provided with continuous professional development training focused on effective DRRM instruction and improved facilitation of simulation exercises to enhance their instructional impact.

Conflict of Interest

There is no conflict of interest in the conduct of the study, as the researchers had no personal, financial, or professional interest that could have influenced the design, implementation, or reporting of the research. The study was carried out with full objectivity and integrity, and all findings were presented transparently. This ensures the credibility of the results and upholds the ethical standards expected in the scholarly research.



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