

E-Drill: A Disaster Preparedness Learning Application for Young Learners *Enhancing Earthquake Preparedness Through Simulation*

Arianne Kimberly DC. Alvarez¹, Yessamien P. Lumagdong², Janna Francine A. Mendez³, Paul John D. Cabance⁴

¹National University Bulacan Inc. Bulacan, City of Baliwag, Philippines
alvarezakd@students.nu-baliwag.edu.ph

²National University Bulacan Inc. Bulacan, City of Baliwag, Philippines
lumagdongyp@students.nu-baliwag.edu.ph

³National University Bulacan Inc. Bulacan, City of Baliwag, Philippines
mendezjfa@students.nu-baliwag.edu.ph

⁴National University Bulacan Inc. Bulacan, City of Baliwag, Philippines
picabance@nu-baliwag.edu.ph

Abstract: *This study presents the development of E-Drill: A Disaster Preparedness Learning Application for Young Learners, a desktop-based educational application designed to support earthquake preparedness learning among Grade 3 students. The system aims to improve learners' understanding of proper earthquake response through interactive and simulation-based activities. Key features of the application include an earthquake scenario simulation, an emergency go-bag selection activity, item-based pop quizzes, evacuation path guidance, and a "Duck, Cover, and Hold" simulation to reinforce correct safety behaviors. The application allows learners to actively participate in preparedness activities within a safe and controlled virtual environment, supporting learning through practice and interaction. E-Drill serves as a supplementary learning tool that enhances traditional disaster preparedness education by making safety lessons more engaging and age-appropriate. The system was developed for educational and demonstration purposes and is not intended to replace official school earthquake drills or disaster response protocols.*

Keywords— Disaster preparedness; Earthquake preparedness; Educational application; Simulation-based learning; Young learners

1. INTRODUCTION

Disaster preparedness education has become increasingly crucial as the Philippines continues to face a high frequency of natural hazards, particularly earthquakes. According to the Philippine Institute of Volcanology and Seismology (PHIVOLCS, 2024), the country experiences frequent seismic activity due to its location along the Pacific Ring of Fire. Despite regular school drills, many young learners struggle to internalize and apply emergency response skills effectively, often treating drills as routine tasks rather than essential life-saving practices (Department of Education [DepEd], 2024). [1][2]

Current trends in education emphasize the integration of digital technology and interactive learning to improve student engagement and retention, particularly among young learners. Digital simulations and gamified learning environments have shown strong potential in helping students visualize emergency scenarios and improve their ability to respond appropriately during earthquakes (Abdelwahed et al., 2022). Simulation-based learning environments allow learners to actively participate in disaster scenarios, reinforcing correct responses through practice and repetition. However, traditional preparedness methods in Philippine schools often lack interactive components and fail to provide repeated, practical exposure to safety procedures. [3]

The persistent gap in effective earthquake preparedness among young learners presents a pressing educational concern. Conventional drills alone do not fully foster comprehension, confidence, or independent decision-making during emergencies. This limitation highlights the need for accessible, technology-driven tools that make safety education more engaging, memorable, and applicable to real-world contexts.

By leveraging digital interactivity, E-Drill helps address the educational gap in disaster readiness by equipping students with practical knowledge and encouraging active participation beyond rote learning. The application serves as a supplementary educational resource that supports national disaster risk reduction initiatives and contributes to strengthening community resilience from the ground up.

1.1 Statement of the Problem

Earthquakes remain a major threat in the Philippines; however, many young learners struggle to fully understand and apply proper earthquake preparedness procedures despite regular school drills. Traditional preparedness activities are often repetitive and lack interactive elements, leading learners to perceive them as routine tasks rather than critical safety practices. Although young learners benefit more from experiential and interactive learning approaches, disaster

preparedness instruction in elementary schools continues to rely heavily on verbal explanations and limited simulations. This creates a gap between knowledge acquisition and the practical application of safety behaviors during emergencies.

In response to this concern, the study aims to address the need for an engaging, child-appropriate, and technology-driven learning tool that can reinforce earthquake preparedness concepts in a safe and controlled environment. Specifically, the study seeks to determine:

1. How can an interactive educational application be developed to teach earthquake preparedness effectively to Grade 3 learners?
2. How functional, reliable, and efficient is the E-Drill application as a learning tool?
3. How compatible, secure, flexible, and safe is the system when used on desktop environments?
4. How acceptable is the E-Drill application based on the evaluation of students, IT professionals, and disaster preparedness experts?

1.2 Objectives of the Study

The general objective of the study is to develop an interactive educational application that enhances students' knowledge and practical understanding of earthquake preparedness.

Specifically, the study aims to do the following:

1. To design an earthquake simulation using click-to-move mechanics with hazard drill obstacles.
2. To incorporate the activities that allow students to practice essential earthquake preparedness skills, which are the following:
 - 2.1 To integrate an emergency, go-bag activity where students select appropriate items needed during an earthquake.
 - 2.2 To integrate a short "Duck, Cover, and Hold" simulation to help students understand the basic protective steps.
 - 2.3 To integrate item-based pop quizzes that appear when students select household objects related to earthquake preparedness.
 - 2.4 To integrate an evacuation path activity that guides students in following safe exit routes.
3. To assess learners' comprehension through quizzes and overall in-game performance.

1.3 Significance of the Study

The findings of the study will benefit the following:

Grade 3 Students. As the primary users of the E-Drill application, Grade 3 students will benefit from an interactive and engaging learning tool that helps them understand proper earthquake preparedness practices. The system allows learners to practice correct response actions through simulations and activities, improving their awareness and readiness during emergencies.

Local Disaster Risk Reduction and Management Office (LDRRMO). The LDRRMO may benefit from the study as the system promotes correct disaster response behaviors among young learners, supporting disaster risk reduction and preparedness initiatives.

Schools and Educational Institutions. Although developed for Grade 3 students at Tiaong Elementary School, the findings of this study may benefit other schools by serving as a reference for integrating interactive learning tools into disaster preparedness programs.

Present and Future Researchers. This study may serve as a useful reference for present and future researchers conducting related studies. It provides insights into the design, development, and evaluation of educational applications focused on disaster preparedness and simulation-based learning.

1.4 Scope and Limitations

This focuses on the creation and limited implementation of E-Drill, intended for Grade 3 students at Tiaong Elementary School. It covers how the system functions, how users interact with its features, and how it operates within a controlled home-based setting.

However, it is limited to Grade 3 students and does not include other grade levels or learners outside Tiaong Elementary School. The application is used only as an additional digital tool and is not designed to replace official earthquake drills or existing school protocols. The system does not include complex game mechanics, multiplayer options, or advanced interactive features to maintain accessibility for its target users. Results may be influenced by students' individual comfort with digital devices, which the study does not attempt to measure in depth. The evaluation phase is restricted to a small group of Grade 3 students' representatives, with feedback support from Local Disaster Risk Reduction and Management (LDRRM) representatives for content validation. The results of the study may be influenced by individual differences in students' familiarity with digital devices, which are not examined in depth. Broader deployment and testing across other schools or communities are beyond the scope of this study.

1.5 Definition of Terms

The following terms are hereby defined in this study:

Disaster Preparedness. Refers to the knowledge, skills, and actions developed in advance to effectively respond to and reduce the impact of disasters such as earthquakes.

Earthquake Preparedness. The process of educating and training individuals to understand appropriate actions before, during, and after an earthquake to ensure safety.

Educational Application. A software program designed to support learning by providing instructional content, activities, and interactive experiences for users.

Emergency Go-Bag. A prepared bag containing essential items needed during emergencies, such as food, water, a flashlight, and first-aid supplies, is included as an activity in the application.

Interactive Simulation. A learning feature that allows users to actively engage in simulated scenarios, enabling practice of correct actions in a controlled virtual environment.

2. METHODOLOGIES

This provides an overview of the methodologies the researchers have used to develop E-Drill, including how necessary data were gathered, the instruments utilized, and the analysis performed to progress the study.

2.1 Research Design and Instrument

This study employed a developmental–descriptive research design. The developmental aspect focused on the design and development of the application, while the descriptive aspect was used to evaluate the system’s quality and acceptability based on feedback from selected respondents. This approach is consistent with previous system development studies that combined system creation and user-based evaluation to assess software effectiveness and usability [4].

The research instrument used in this study was based on the ISO/IEC 25010:2023 software quality model, which provides a comprehensive framework for evaluating software systems across multiple quality characteristics. This international standard guided the assessment of the application in terms of Functional Suitability, Reliability, Performance Efficiency, Compatibility, Interaction Capability, Security, Safety, and Flexibility, ensuring a systematic and standards-based evaluation of the system’s software quality [6].

The structure and format of the instrument, including the use of a 5-point Likert scale, were adapted from established ISO-based software evaluation studies and contextualized to fit the educational nature and target users of the application [4].

[7]. The evaluation indicators were reclassified in accordance with the ISO/IEC 25010:2023 revision to ensure alignment with the system’s objectives, interactive features, and the cognitive level of young learners. This reclassification supports more accurate measurement of interaction capability and usability in educational applications [5].

The adapted instrument was utilized to gather feedback from Grade 3 students of Tiaong Elementary School and IT professionals. Student respondents evaluated the system based on ease of use, interaction capability, safety, and learning effectiveness, while IT professionals assessed the system’s technical quality, including performance, reliability, compatibility, and security. This structured evaluation approach ensured a comprehensive assessment of the system’s software quality attributes from both end-user and expert perspectives, as recommended in ISO/IEC 25010-based evaluation studies [6], [

2.2 ADDIE Development Methodology

Figure 1

ADDIE Developmental Model.



This study uses the ADDIE Model—Analysis, Design, Development, Implementation, and Evaluation—as the primary framework for developing the E-Drill application, as shown in Figure 1. The ADDIE Model was selected because it provides a structured and systematic approach to developing educational materials. Since the study is an educational tool for earthquake preparedness, the model supports the alignment of system features, learning activities, and instructional content with the abilities and needs of young learners.

The methodology begins with the analysis phase, which involves identifying essential earthquake preparedness concepts and reviewing relevant safety guidelines to ensure accuracy. The design phase focuses on planning the application’s layout, user interface, and interactive components. During the development phase, the system is produced by integrating core features such as simulations, quizzes, and go-bag activity. The implementation phase introduces the completed application to the intended users to

observe navigation, comprehension, and interaction. Finally, the evaluation phase utilizes a printed survey questionnaire to gather feedback on usability, performance, and ease of use, providing a basis for system improvement in terms of clarity, engagement, and educational value.

2.3 Target Respondents and Sampling Technique

The study employed a purposive sampling method to select participants for testing and evaluating the E-Drill application. This applies to the study intentionally for targeted, specific groups of respondents who were most relevant to the objectives of the research and the nature of the system being developed.

The primary respondents of the study were Grade 3 students of Tiaong Elementary School, who represent the intended end-users. Focusing on this ensured that the evaluation accurately reflected the experiences of learners whose age level, cognitive readiness, and developing comprehension skills matched the design and instructional goals of the application. This approach allowed the assessment results to be relevant, reliable, and aligned with the objectives of the study.

The total population of Grade 3 students at Tiaong Elementary School consisted of fifty-six (56) learners distributed across two (2) sections. To determine an appropriate number of student respondents, Slovin's Formula was used as a reference in computing the minimum sample size, with a five percent (5%) margin of error, considering the exploratory and usability-focused nature of the study:

Slovin's Formula is expressed as:

$$n = \frac{N}{1 + N(e)^2}$$

$$n = \frac{56}{1 + 56(0.05)^2}$$

$$n = \frac{56}{1 + 56(0.0025)}$$

$$n = \frac{56}{1 + 0.14}$$

$$n = \frac{56}{1.14}$$

$$n = 49.12 \approx 49$$

where n represents the sample size, N represents the total population, and e represents the margin of error. Based on the computation using Slovin's Formula, the estimated target sample size was forty-nine (49) Grade 3 students.

These forty-nine (49) students were selected as respondents, provided that a signed parent or guardian consent form was obtained before participation. The requirement of parental consent ensured ethical compliance, as the respondents were minors. This was considered sufficient to evaluate system usability, learning interaction, navigation, and overall user experience.

In addition to student respondents, six (6) expert evaluators were included to strengthen the validity of the system evaluation. These experts were purposively selected based on their professional background, years of experience, and availability within the local area, ensuring relevance to the objectives of the study.

Three (3) IT professionals from NU Baliuag, each with relevant technical expertise, evaluated the system's software quality in terms of performance, reliability, compatibility, and functionality. Meanwhile, three (3) Local Disaster Risk Reduction and Management (LDRRM) representatives with at least three (3) years of professional experience served as content experts to validate the accuracy, relevance, and appropriateness of the earthquake preparedness concepts integrated into the application.

The expert evaluators were not included in the Slovin computation, as they do not belong to the target learner population. Instead, they were deliberately selected to provide informed technical and content validation, consistent with the principles of purposive sampling.

Table 1
Summary of Total Respondents.

Respondent Type	Number
Grade 3 Students	49
LDRRM Representative	3
IT Professional	3
Total Respondents	55

3. PRESENTATION, DISCUSSIONS, AND INTERPRETATION OF DATA

This presents the results and discussion of the evaluation of E-Drill: A Disaster Preparedness Learning Application for Young Learners. The evaluation was conducted using a survey questionnaire adapted from the ISO/IEC 25010:2023 software quality model, which assessed the system across the quality characteristics of Functional Suitability, Reliability, Performance Efficiency, Compatibility, Interaction Capability, Security, Flexibility, and Safety.

The instrument consisted of structured evaluation statements rated using a 5-point Likert scale and was administered to Grade 3 students of Tiaong Elementary School, IT professionals, and Local Disaster Risk Reduction and Management (LDRRM) representatives. The collected responses were analyzed using descriptive statistics, particularly the computation of weighted means. The results were interpreted using the established mean range scale shown in Table 2.

Table 2
Mean Range Interpretation for the System Evaluation Instrument:

Scale	Description	Number
1	Strongly Disagree	1.00 - 1.80
2	Disagree	1.81 - 2.60
3	Neutral	2.61 - 3.40
4	Agree	3.41 - 4.20
5	Strongly Agree	4.21 - 5.00

3.1 Functionality

Table 3 evaluates the system’s ability to deliver complete educational features, support learners’ understanding of earthquake preparedness concepts, and accurately simulate essential preparedness actions. The assessment is based on the computed mean scores interpreted using the established mean range scale.

Table 3
Functionality Assessment.

Indicators	Mean	Interpretation
Does the system provide all required educational functionalities (e.g., earthquake simulation, emergency go-bag selection)?	4.88	Strongly Agree
Are the system’s features (e.g., quizzes, activities) effective in supporting learners’ understanding of earthquake preparedness concepts?	4.78	Strongly Agree

Do the interactive features (e.g., “Duck, Cover, and Hold” simulation) operate accurately to represent intended preparedness actions?	4.66	Strongly Agree
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Overall Mean	4.77	Strongly Agree
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The overall mean of 4.77, interpreted as Strongly Agree, indicates that respondents strongly agree that the application is highly functional. This result means that the system successfully provides the necessary educational components, delivers effective learning activities, and accurately presents interactive simulations such as the “Duck, Cover, and Hold” drill. Overall, the findings confirm that the application effectively fulfills its intended purpose as a disaster preparedness learning tool for young learners.

3.2 Reliability

Table 4 shows the ratings given regarding the system’s ability to maintain learner progress during activities such as quizzes and simulations, as well as its consistency in operating without crashes, errors, or loss of data. The evaluation is interpreted using the provided mean range scale.

Table 4
Reliability Assessment.

Indicators	Mean	Interpretation
Is the system able to maintain learner progress across educational activities such as quizzes and simulations?	4.55	Strongly Agree
Does the system operate consistently without crashes, errors, or loss of progress during use?	4.99	Strongly Agree
Overall Mean	4.77	Strongly Agree

The results show that the reliability indicators obtained mean scores ranging from 4.55 to 4.99, with an overall mean of 4.77. Based on the mean range scale, these values fall under Strongly Agree. This indicates that the respondents strongly agree that the system is reliable. It means the application can consistently maintain learner progress and operate smoothly without technical issues. Overall, the findings suggest that the

system performs dependably during use, making it a trustworthy learning tool for disaster preparedness education.

3.3 Efficiency

Table 5 presents the performance efficiency assessment of the system, focusing on its ability to run smoothly, respond quickly, and support uninterrupted learning activities. The table evaluates system performance in terms of speed, responsiveness, and smooth transitions between activities such as quizzes and earthquake simulations.

Table 5
Performance Efficiency Assessment.

Indicators	Mean	Interpretation
Does the system perform efficiently without noticeable delays during interactive learning activities?	4.77	Strongly Agree
Does the system allow learners to engage with content without unnecessary interruptions or lag?	4.77	Strongly Agree
Does the system provide smooth transition experiences when transitioning between activities (e.g., from quizzes to evacuation simulations)?	4.45	Strongly Agree
Overall Mean	4.66	Strongly Agree

The overall mean score of 4.66 falls under Strongly Agree, indicating that respondents strongly agree that the system performs efficiently. This result shows that the system runs smoothly with minimal delays, allowing learners to engage with activities without interruptions or lag. Although IT professionals gave slightly lower ratings on transition smoothness, the scores remain positive. Overall, the findings suggest that the system is highly efficient and capable of delivering a seamless learning experience, which is essential for maintaining learner focus and ensuring effective disaster preparedness education.

3.4 Compatibility

Table 6 presents the compatibility assessment of the E-Drill system, focusing on its ability to function properly across supported desktop operating systems and run smoothly on common desktop configurations. The table summarizes the responses of Grade 3 learners, IT professionals, and LDRRM

representatives regarding how well the system works on different devices and system environments.

Table 6
Compatibility Assessment.

Indicators	Mean	Interpretation
Does the system function properly on the supported desktop operating systems (e.g., Windows, macOS)?	4.88	Strongly Agree
Is the system optimized to run smoothly on common desktop configurations?	5.00	Strongly Agree
Overall Mean	4.94	Strongly Agree

The overall mean score of 4.94 falls under Strongly Agree, which indicates that the respondents strongly agree that the system is highly compatible. This means that the system works properly on supported operating systems such as Windows and macOS and performs smoothly on standard desktop setups. The consistently high ratings across all respondent groups show that compatibility is not a concern, making the system reliable and accessible for use in different school and office environments.

3.5 Capability

Table 7 presents the interaction capability assessment of the system. This table focuses on how easy the system is to use, how intuitive the educational features are for Grade 3 learners, and how effective the tutorial is in guiding users during gameplay. The ratings were gathered to evaluate how well users can interact with the system.

Table 7
Interaction Capability Assessment.

Indicators	Mean	Interpretation
Does the system provide ease of use and navigation, particularly for users who may not be tech-savvy?	4.67	Strongly Agree

Are the system's educational features, such as quizzes and simulations, intuitive for Grade 3 learners?	4.89	Strongly Agree
Is the tutorial effective in guiding users on how to play the game, with an option to skip when appropriate?	4.89	Strongly Agree

Overall Mean	4.82	Strongly Agree
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The overall mean score of 4.82 falls under Strongly Agree, indicating that respondents strongly agree that the system has strong interaction capability. This means that the application is easy to navigate, user-friendly even for non-tech-savvy users, and suitable for young learners. The results show that the interactive features and tutorial design effectively support learning, making the system engaging and accessible for its intended users.

3.6 Security

Table 8 presents the security assessment of the application using the exact questionnaire indicators. The table evaluates the system's safeguards, secure operation, and protection against suspicious activities.

Table 8
Security Assessment.

Indicators	Mean	Interpretation
Does the application include safeguards against malware, viruses, or other threats that could affect its operation?	4.44	Strongly Agree
Does the system run securely without exposing the device to potential vulnerabilities, such as unauthorized access or code execution?	4.67	Strongly Agree
Does the application demonstrate secure behavior during use without signs of tampering or suspicious activity?	4.78	Strongly Agree
Overall Mean	4.63	Strongly Agree

The overall mean score of 4.63 falls under Strongly Agree, which indicates that respondents strongly agree that the system is secure. This result means that the application provides adequate security measures to protect users and devices while using the system. The findings suggest that the application operates safely and reliably, giving users confidence that the system can be used without exposing them to potential security risks.

3.7 Flexibility

Table 9 presents the flexibility assessment of the system. This table focuses on how well the system adapts to different desktop environments, how easy it is to install and run, and whether it supports future updates without affecting existing features.

Table 9
Flexibility Assessment.

Indicators	Mean	Interpretation
Does the application adapt well to different desktop environments or screen resolutions?	4.67	Strongly Agree
Is the system easy to install and run on supported desktop computers?	4.89	Strongly Agree
Does the system allow future content updates or replacements without affecting existing features?	4.11	Agree
Overall Mean	4.56	Strongly Agree

The overall mean score of 4.56 falls under Strongly Agree, indicating that respondents strongly agree that the system is flexible. This result means that it can easily adapt to different computer setups and allows updates or improvements without causing problems to current features. Overall, the system demonstrates good flexibility, making it suitable for long-term use and future enhancements.

3.8 Safety

Table 10 presents the safety assessment. This table evaluates whether the system provides clear guidance during earthquake simulations, promotes safe decision-making, and

presents disaster scenarios in a way that supports learning without causing fear or harm.

Table 10
Safety Assessment.

Indicators	Mean	Interpretation
Does the application provide clear guidance during earthquake simulations to avoid confusion or misuse?	4.44	Strongly Agree
Does the system encourage learners to identify safe actions and avoid unsafe choices during emergency scenarios?	4.78	Strongly Agree
Does the application simulate earthquake situations in a way that supports learning without causing distress or harm?	4.89	Strongly Agree
Overall Mean	4.70	Strongly Agree

The overall mean score of 4.70 falls under Strongly Agree, indicating that respondents strongly agree that the system is safe to use. This result means it can effectively guides learners during simulations and encourages correct safety behaviors during emergencies. Overall, the findings show that the application successfully delivers earthquake preparedness lessons in a safe and child-appropriate manner.

3.9 Summary

Table 11 presents the overall summary of software acceptability based on its evaluated characteristics, namely functionality, reliability, performance efficiency, compatibility, interaction capability, security, flexibility, and safety. The table consolidates the mean ratings provided by Grade 3 students, IT professionals, and LDRRM representatives, offering a comprehensive view of the system's overall quality and acceptance from both end-users and technical experts. This summary serves as an assessment of how well the application meets its intended educational and technical objectives.

Table 11
Summary of Software Acceptability Based on Its Characteristics.

Characteristics	Mean	Interpretation
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Functionality	4.77	Strongly Agree
Reliability	4.77	Strongly Agree
Performance Efficiency	4.66	Strongly Agree
Compatibility	4.94	Strongly Agree
Interaction Capability	4.82	Strongly Agree
Security	4.63	Strongly Agree
Flexibility	4.56	Strongly Agree
Safety	4.70	Strongly Agree
Overall Mean	4.73	Strongly Agree

The overall mean score of 4.73, interpreted as Strongly Agree, indicates a very high level of acceptability across all evaluated characteristics. Overall, these findings confirm that the system is a well-designed, reliable, and effective educational tool that is suitable for implementation as a supplementary learning resource for earthquake preparedness among Grade 3 students.

4. SUMMARY OF FINDINGS, CONCLUSION, AND RECOMMENDATION

4.1 Summary of Findings

The study evaluated the E-Drill: A Disaster Preparedness Learning Application for Young Learners using feedback from Grade 3 students, IT professionals, and LDRRM representatives. The evaluation was based on selected software quality characteristics adapted from the ISO/IEC 25010 model, including functionality, reliability, performance efficiency, compatibility, interaction capability, security, flexibility, and safety. The results were interpreted using the mean range scale to determine the level of agreement of the respondents.

The findings revealed that the system performed very well across all evaluated characteristics. The functionality results showed that the application provided complete educational features and accurate disaster preparedness simulations. The reliability and performance efficiency assessments indicated that the system operated consistently, maintained learner progress, and ran smoothly with minimal delays. High ratings in compatibility and interaction capability showed that the system was easy to use, worked well on supported devices, and was suitable for young learners. Furthermore, the security, flexibility, and safety results confirmed that the system protects users, supports future updates, and presents

disaster scenarios in a safe and child-appropriate manner. Overall, all characteristics received interpretations under Strongly Agree, indicating high user acceptance and system quality.

4.2 Conclusion

Based on the objectives of the study and the results of the comprehensive system evaluation, the following conclusions are drawn:

1. The application has successfully achieved its primary objective of providing an effective, interactive, and child-appropriate learning tool for earthquake preparedness among Grade 3 learners. The integration of simulations, quizzes, and guided activities allowed learners to practice proper disaster response behaviors in a safe and controlled virtual environment.

The system demonstrated consistently high performance across all evaluated software quality characteristics, including functionality, reliability, performance efficiency, compatibility, interaction capability, security, flexibility, and safety. The high mean scores obtained in each category, interpreted under the “Strongly Agree” range, indicate that the system performed as intended and met the expected technical and educational standards. The positive evaluations provided by Grade 3 students, IT professionals, and LDRRM representatives indicate strong acceptance of the system from both end-users and domain experts. These results suggest that the system is not only technically sound but also educationally relevant and suitable for its target users.

2. The findings confirm that the application is an acceptable and reliable supplementary learning tool for disaster preparedness education. Its design, functionality, and performance support its potential use in educational settings as an aid to traditional earthquake drills, contributing to improved learner awareness and preparedness.

4.3 Recommendations

Based on the findings and conclusions of the study, the following recommendations are proposed to further enhance the E-Drill application and guide future research and development:

1. Additional disaster preparedness scenarios, such as fire, flood, or typhoon simulations, may be integrated into the system to broaden its educational scope and provide learners with a more comprehensive understanding of different emergencies.
2. An option to select player characters, such as choosing between a boy or girl avatar, may be added

to increase learner engagement, personalization, and inclusivity, making the learning experience more enjoyable for young users.

3. Future improvements may focus on optimizing the system to support easier content updates and feature expansions without affecting existing functionalities, ensuring long-term usability and adaptability of the application.
4. Developers may also consider adapting the system for other platforms, such as mobile or web-based environments, to increase accessibility and allow wider implementation in different educational settings.

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