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Flood Preparedness Among Primary School Learners in Asian Monsoon Climate in Southern Thailand

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Abstract: The worsening of floods due to climate change is particularly affecting Asia's monsoon regions, where flood damage occurs frequently. While people are accustomed to floods, they must shift their mindset to recognize that floods now carry the risk of causing unprecedented damage. Otherwise, they will suffer significant harm and they are being forced to change their way of life. Therefore, enhanced disaster prevention strategies are essential to mitigate the impact of flood damage. This study aimed to evaluate the effect of disaster education on flood knowledge, flood risk perception, and flood preparedness among elementary school students aged 11–12 in Nakhon Si Thammarat Province, in Southern Thailand. Data were collected via questionnaires at three-time points: pre-test, post-test, and follow-up between August and October 2023. The results indicated that the flood education program significantly improved students' preparedness, though no significant differences in flood risk perception were observed between groups with and without intervention. The intervention highlighted the need to enhance students' understanding of local topography and flood hazard mapping. This study suggests integrating localized flood information into preparedness programs to improve knowledge, risk perception, and preparedness in classroom disaster education.

Keywords: Flood preparedness, Disaster education, Disaster prevention, Southern Thailand.

Introduction

In tropical climate regions, as climate change increases the frequency of extreme weather is increasing, making floods more likely to occur. Currently, children often instinctively walk through the water. However, this behavior is dangerous due to hidden hazards, especially extreme weather due to climate change. Children are particularly vulnerable to the adverse effects of disasters, emphasizing the need to educate them about flood risks and response measures so they can take swift and effective action in emergencies.

Current education mostly focuses solely on providing general flood knowledge, yet understanding the specific flood risks associated with local topography and the school's surroundings is essential for disaster preparedness. In this study, we examined whether conveying the disaster risks surrounding schools and their immediate vicinity through lessons contributes to strengthening disaster resilience, whether school education is effective in helping children develop preparedness skills for future disasters.

Method

In Thailand, the education system consists of 12 years of basic education: six years of primary education (Grades 1–6) and six years of secondary education (Grades 7–12). Children typically begin school at the age six, and according to the Ministry of Education's curriculum, students are introduced to natural disasters in Grade 6. This study involved Grade 6 primary school students who were unaware of their group assignments. These students were selected because, as final-year primary students, they possess the ability to answer questionnaires, grasp complex topics, and recall past experiences. A randomized, controlled, quasi-experimental design with three assessment points: pre-test, conducted before the intervention, immediately after the intervention, and one-month follow-up after the intervention.

The study area was set in Chawuat District, Nakhon Si Thammarat Province. This region experiences frequent flooding, which impacts schools. The sixth-grade student population is 214. This study will apply the program to the experimental group and compare its effects with those of the control group. A hypothesis test for the population mean will be applied, with the sample size set at 150.

Intervention

The intervention was tailored to the local context of the school, with instructional materials and slide presentations designed to meet specific learning objectives.

First Session: A slide presentation covered general flood knowledge, including causes, effects, and preparedness strategies. The session included a local topography map and students sharing personal experiences (Figure 1a).

Second Session: Focused on local flood history, hazard maps, and inundation depths. Students also participated in a Virtual Reality (VR) simulation using free software programs like Bosai AR to understand better appropriate flood levels and their implications for

real-world settings, including schools (Figure 1b). The Rainfall-Runoff-Inundation (RRI) free program model [1] was introduced to explain flood hazard mapping for children (Figure 1c). This essential hydraulic tool flooding by analyzing inundation levels and water discharge characteristics using datasets such as the Digital Elevation Model (DEM) and rainfall data, allowing adaptation to different geographical areas.

Third Session: A timeline workshop taught students what actions to take before, during, and after a flood. Practical activities included preparing emergency bags and hands-on flood safety drills.

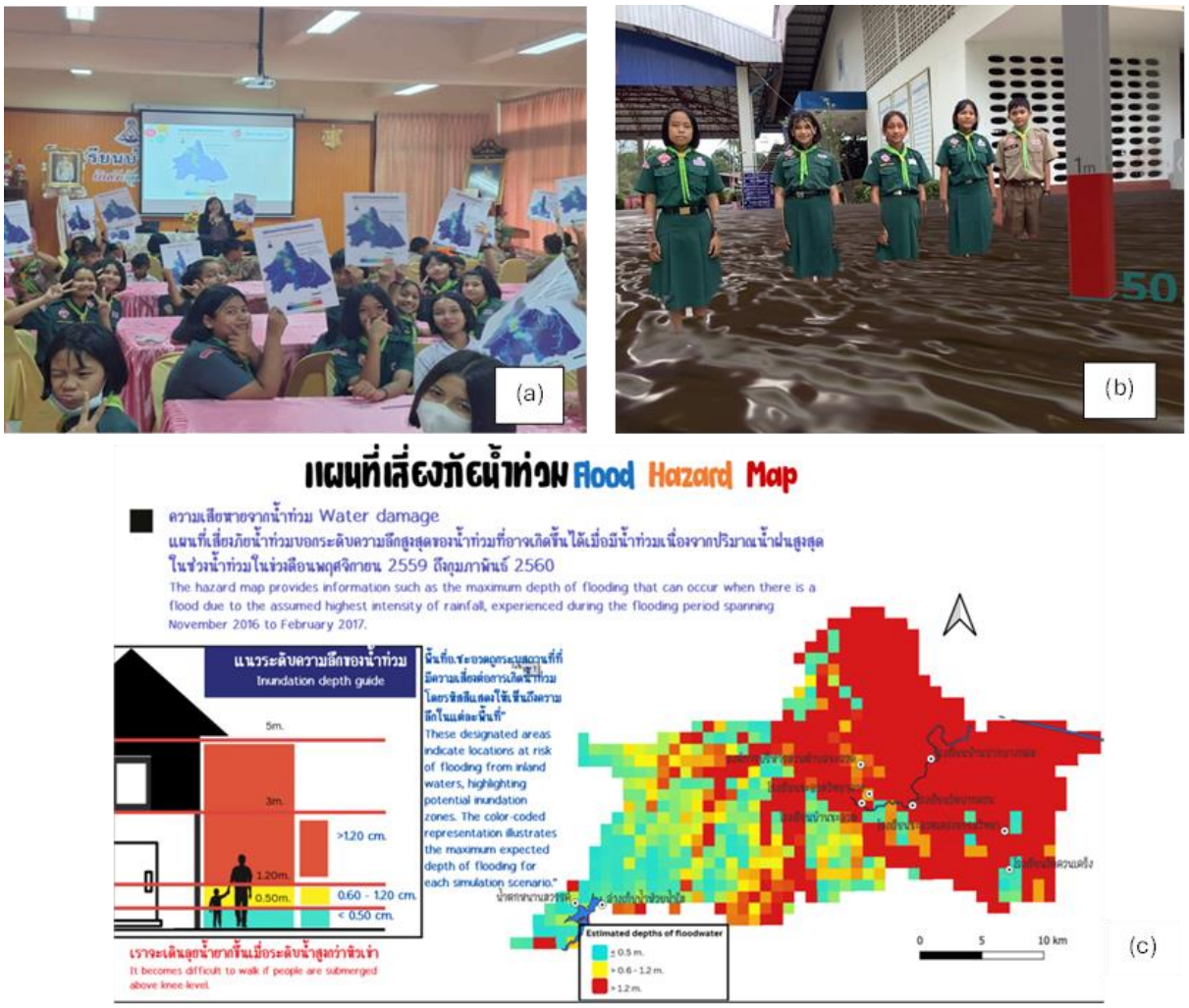

Figure 1, Intervention materials (a) Topography map with children (b) Flood experience with AR (c) Hazard map based on RRI simulation.

Results

This study introduced content distinct from traditional classroom settings, focusing on local topography and flood risk. Students learned to visually identify areas with differing flood risks using local topographic maps illustrating how elevation and terrain influence flooding. Through these maps, they deepened their understanding of the vulnerability of low-lying areas and valleys to flooding and gained recognition of potential hazard zones. Color-coded flood hazard maps—green for low risk, yellow for medium risk, and red for high risk—simplified complex information, making it easier for children to understand. Students further experienced flooding in the school's surrounding area through VR simulations, enhancing realism and immersion. Following the lecture, a discussion session was held where students shared their flood experiences and identified hazardous locations within and around the school. This interactive session strengthened understanding of local flood risks and motivated the application of new knowledge in real life.

Conclusion

By embedding these strategies into the curriculum, students will gain practical skills and a deeper awareness of flood risks, ultimately promoting long-term disaster preparedness.

References

ICHARM, 2014, Rainfall-Runoff-Inundation (RRI) Model, Technical Manual. Available at: https://thesis.pwri.go.jp/files/doken_shiryou_4277_00.pdf