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**DEVELOPMENT OF A GAMIFIED APPLICATION TO
ENHANCE COMMUNITY EDUCATION ON RISK-
SENSITIVE URBAN DEVELOPMENT**

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238017D

Master of Science (Major Component of Research)

Department of Town and Country Planning

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DECLARATION

I declare that this is my own work and this thesis/dissertation does not incorporate without acknowledgement any material previously submitted for a degree or diploma in any other University or Institute of higher learning and to the best of my knowledge and belief it does not contain any material previously published or written by another person except where the acknowledgement is made in the text. I retain the right to use this content in whole or part in future works (such as articles or books).

Signature:

Date: 20/03/2025

The above candidate has carried out research for the PhD/MPhil/Master's thesis/dissertation under my supervision. I confirm that the declaration made above by the student is true and correct.

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Signature of the Supervisor:

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ABSTRACT

Flooding is the most significant natural hazard that Sri Lankans experience annually. The education and awareness associated with it remain traditional, with teachers feeding students with their expertise. The traditional educational mode needs to change to a more exciting and engaging mode. Globally, disaster education has already upgraded to an interactive and innovative level. Use of gamification or serious gaming to provide disaster education to the children can be considered as an example for such innovative learning and teaching model. This model is successfully applied in disaster education in countries such as Australia, The United States of America, New Zealand, Japan, Philippines, Italy and many more. However, such gamified applications are either limited to board games or do not have comprehensive learning experience. Therefore, this study focuses on developing a desktop gamified application to improve flood disaster education for school children. The methodology was designed under four phases: (a) Initiation; (b) Production; (c) Testing and (d) Releasing. After the said four phases the developed game was tested using 175 children and youngsters as the sample. Two testing iterations have been completed on the game prototype and final game is developed for launch. More than 85% of the participants responded favorably to the gamified application, which also indicated that they had raised awareness of floods. This research contributes to the growing field of serious gaming and gamification in disaster education by integrating cognitive, behavioral, and experiential learning theories into an interactive digital platform. The study also provides an empirical framework for assessing the effectiveness of gamified applications in knowledge retention and user engagement. The project delivers an interactive, scalable, and replicable educational tool that can be adapted for broader disaster preparedness initiatives. The insights from this study can inform policymakers, educators, and game developers in designing effective, engaging, and context-specific disaster education programs for vulnerable communities.

Keywords: Gamification, Serious Gaming, Disaster Awareness, Flood Hazard, Child Education

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LIST OF ABBREVIATIONS

Abbreviation	Description
SG	Serious Game
AR	Augmented Reality
VR	Virtual Reality
XR	Mixed Reality
PC	Personal Computer
AI	Artificial Intelligence
PRISMA	Preferred Reporting Items for Systematic Reviews and Meta-Analyses
UNDRR	United Nations Office for Disaster Risk Reduction
UNISDR	Former United Nations Office for Disaster Risk Reduction
ADDIE	Analysis, Design, Development, Implementation, and Evaluation
PUN	Photon Unity Networking
NPC	Non-Player Character
GIS	Geographic Information System
QSH	Quake Safe House

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LIST OF PUBLICATIONS

Title	Journal	Progress
Development of Gamified Application to Enhance Flood Disaster Education	Urban Education	Under Review
Levelling Up Disaster Education: How Gamified Apps Empower Children and Youth—A Systematic Review	International Journal of Disaster Risk Reduction	Under Review
Use of gamification and serious games for disaster education; practices, trends and way forward	The 15 th International Conference on Sustainable Built Environment 2024	Presented the Full Paper Submitted
