

## The Effectiveness of the Master of Flood Preparedness (MOFP) in Elevating Malaysian Youths' Awareness of Flood Preparedness

Mohd Rozaimy Ridzuan<sup>1,2</sup>, Jamal Rizal Razali<sup>1</sup>, Soon-Yew, Ju<sup>2</sup>,  
Noor Amira Syazwani Abd Rahman<sup>2</sup>, Amirudin Mohd Zani<sup>3</sup>, Lai-  
Kuan, Kong<sup>4</sup>

<sup>1</sup>Centre for Human Sciences, Universiti Malaysia Pahang, Pahang Darul Makmur, Malaysia,

<sup>2</sup>Faculty of Administrative Science & Policy Studies, Universiti Teknologi MARA (UiTM)

Pahang Branch, Raub Campus, 27600 Raub, Pahang, Malaysia, <sup>3</sup>Faculty of Business and Management, Universiti Teknologi MARA (UiTM) Terengganu Branch, Dungun Campus, Terengganu, Malaysia, <sup>4</sup>Faculty of Business and Management, Universiti Teknologi MARA (UiTM) Pahang Branch, Raub Campus, 27600 Raub, Pahang, Malaysia.

To Link this Article: <http://dx.doi.org/10.6007/IJARBS/v13-i6/17774> DOI:10.6007/IJARBS/v13-i6/17774

**Published Date:** 22 June 2023

### Abstract

The frequency of floods in Malaysia is on the rise, leading to the loss of numerous lives and property. The youth population is particularly vulnerable and susceptible to the dangers posed by floods if they lack preparedness. Hence, they must enhance their level of preparedness to effectively mitigate the adverse consequences of floods. To address this need, the Master of Flood Preparedness (MOFP) was created to increase awareness of flood preparedness among young individuals. This game-based learning approach encompasses three key components: flood preparedness-related e-books, a game board, and play cards. These elements are integrated into a game format to deliver and enhance youth awareness of flood preparedness. Therefore, the primary objective of this study is to assess the impact of the MOFP on increasing flood preparedness awareness among Malaysian youth. The study employs purposive sampling, with 120 individuals aged between 15 to 40 years old serving as participants. Through a descriptive approach, the study reveals that a majority of the youth respondents hold a positive perception of the MOFP's usability. Furthermore, a notable percentage of the participants acknowledged the user-friendliness of the MOFP. Moreover, their levels of awareness experienced a substantial increase following their exposure to the MOFP, underscoring its effectiveness in augmenting youth awareness regarding flood preparedness. It is anticipated that this game-based learning approach will prove beneficial to various institutions, including schools, universities, policymakers, and individual youth, as it offers a means to deliver and enhance flood preparedness awareness among the youth population.

**Keywords:** Flood Preparedness Game, Flood Preparedness Awareness, Flood, Game-Based Learning, Youth.

### **Introduction**

Human life has been significantly impacted by climate change, as evidenced by the increased occurrence of various natural disasters like floods, landslides, earthquakes, droughts, hurricanes, and others. In comparison to the past few decades, these natural calamities have become more frequent. Regardless of whether a country is developed or developing, no nation is exempt from the effects of these disasters, despite efforts made to mitigate their impact. Malaysia, too, faces the risk of both natural and human-caused disasters, which can result in significant damages and losses. For an extended period, floods have been a significant natural catastrophe in Malaysia, causing numerous casualties and property damage. Among those most impacted by the looming danger of floods are the youth group, both in terms of their lives and psychological well-being. Clerveaux & Spence (2009) contend that the potential impact of catastrophes is greatly amplified in emerging societies because the majority of the population is comprised of the youngest age cohorts.

The country's youth is a key factor in molding the country's economic destiny. Youth can close the gap between knowledge and action by being encouraged to identify their part in prevention and preparedness (Faber et al., 2014). To effectively reduce social and economic loss from disasters, it is clear that raising awareness among youth is essential (Clerveaux & Spence, 2009). Flood disaster management requires youth involvement to construct an all-encompassing plan that meets countries' demands (Ridzuan et al., 2022a). Mitchell et al (2008); Khorram-Manesh (2017) suggest that young individuals should be motivated to enhance their readiness for disasters and spread this awareness among their peers, to diminish the risk of such events occurring in their residences. Previous research in Malaysia (e.g., D'Silva et al., 2012; Saroar & Routray, 2012) has shown that young people are less able to adjust to the effects of climate change than older generations. This is likely because young people often feel anxious, uncertain, and unprepared when confronting the effects of climate change.

Flood preparedness awareness is a prerequisite for the youth to embark on flood preparedness activities. It is crucial to inform the public about potential risks and the steps they should take to be better prepared. However, there is a dearth of evidence-based understanding of the mechanism by which public education information is translated into subsequent desired behavior change, despite the prevalence of information and communication about disaster preparedness (Wood et al., 2012). In addition, many developing countries have been slow to implement comprehensive disaster management due to a lack of mechanisms to effectively disseminate and incorporate catastrophe-related information (Clerveaux & Spence, 2009). Poverty, resource scarcity, restricted access to education, inadequate infrastructure, and a lack of awareness and understanding all have a role in making developing countries more vulnerable to catastrophes (Makwana, 2019).

In light of this, it is crucial to teach young people about potential dangers and how to protect themselves and their communities from them so that they can grow up in a secure environment and reach their full potential. This goal cannot be reached unless the information being transmitted is presented in a way that is engaging, stimulating, and age-appropriate (Clerveaux & Spence, 2009). Learning how to stay safe during natural disasters is crucial for being prepared for any eventuality. There is also a dearth of natural disaster-themed educational game production and research (Rosli et al., 2017). They went on to point

out that while game-based learning is an engaging mode of education, there are surprisingly few games that focus on teaching people how to be safe during natural disasters. According to Chou et al (2012), there has not been enough work put into creating and studying educational games that are based on a natural catastrophe scenario. In order to make learning about natural disaster preparedness more engaging, especially in Malaysia (Rosli et al., 2017), game-based learning is required. Educators agree that games are a great way to get knowledge across to youth of all learning styles and levels, therefore it makes sense that game tactics could be used to gauge youth's flood disaster preparedness (Clerveaux & Spence, 2009). The Master of Flood Preparedness (MOFP) was designed for the promotion of flood preparedness awareness among youth, taking into account the considerations aforementioned. Therefore, this study aimed to investigate the effectiveness of a Master of Flood Preparedness in enhancing youth awareness of flood preparedness.

### **Literature Review**

Since disaster education helps society become more resilient to disasters more quickly, it is considered an important part of sustainable development (UNESCO, 2004). Education for establishing a culture of disaster resilience is an interactive process of reciprocal learning among people and institutions (Hyogo Framework for Action Report, 2005). More than just classroom instruction, it is a community-wide effort to break down barriers of ignorance, indifference, silos of authority, and lack of political will that touch every facet of daily life. Hoffmann et al (2020) argue that disaster education is one of the most efficient means of spreading catastrophe knowledge to the public. An individual's level of education determines the extent to which they are equipped with the knowledge, skills, and talents necessary to shape their own identity and the identities of those around them.

According to recent studies on flood readiness, the most important variables in being prepared for a flood include being aware of the problem and receiving relevant information (Promsri, 2017). People's preemptive readiness to deal with disasters is a crucial factor in reducing property loss and casualty counts after an emergency strikes. Before obtaining government aid, citizens must be knowledgeable about potential dangers to their lives and property and prepared to deal with them head-on. People need to increase their disaster preparedness consciousness to better deal with natural disasters (Promsri, 2017).

The amount of data at our fingertips is expanding at an exponential rate, and so are the channels through which it is disseminated and discussed. Wood et al. (2009) report a huge number of information campaigns designed to encourage public preparedness for risks across the country, while Wood et al (2012) report a growing range of venues for delivering such information. There are a wide variety of initiatives in Malaysia that aim to influence public flood preparedness behavior through information dissemination. Education, early warning, evacuation planning, and post-disaster relief are all greatly aided by effective communication of relevant information (Nielsen & Lidstone, 1998).

Community-based approaches rely on designing effective systems for the dissemination of disaster-related information to ensure that relevant data reaches as many people as possible (Clerveaux & Spence, 2009). The purpose of psychosocial intervention is to help people cope with the emotional and mental effects of a disaster, both immediately after it occurs and in the years leading up to it (Ubaidillah et al., 2022). These days, educational institutions frequently use game-based learning. Students' intrinsic motivation, socialization, and learning have all benefited from the proliferation of educational games in recent years (Rosli et al., 2017). The foundations of game-based education rest on two pillars. First, the game is

designed to improve the player's problem-solving abilities by incorporating learning materials into the action (Van Eck, 2006; Papastergiou, 2009). As a result, the learner's interest will be piqued, as game-based learning promotes dynamic, exploratory, and problem-based settings. When students are ready to go to the next level of learning, they must be motivated to review what they've already learned and absorb any new material (Tao et al., 2016).

Community and group models with a social diffusion perspective, such as diffusion of innovations (Oldenburg & Parcel, 2002; Parcel et al., 2003; Rogers, 2003), can be especially useful for guiding communication campaigns and mass media efforts to change health behavior. An innovation in the field of innovation diffusion is "the process by which an innovation is communicated through certain channels over time among members of a social system" (Rogers, 2003) to increase the impact of a given initiative. Because they can inform campaign structure and assist explain the process by which people acquire information and then respond by taking action, theories of the diffusion of innovations and communication can help direct information campaigns to drive readiness (Wood et al., 2012).

### **Materials and Methods**

The main goal of the MOFP educational disaster game technique is to raise flood preparedness awareness to identify and prioritize disaster education activities. In a study comparing the efficacy of game-based learning versus traditional instruction for third graders in Beserra et al (2014) found that the former produced better results. The evaluation process for MOFP is also designed to be entertaining and thought-provoking, to foster positive mitigation and response behaviors. It's a mash-up of many tools for getting youth ready for floods. These tools include an e-book on flood preparedness and a board game with related question cards to evaluate levels of awareness before and after exposure to the game.

The purpose of the e-book is to educate individuals about factual information on floods in Malaysia, including the various types of floods, steps for flood preparedness, and the contact details of government agencies involved in flood management. The e-book was created in an engaging format, featuring captivating graphics to attract young readers. As for the board game, it is designed for 2 to 4 players who must answer questions on colored cards while playing.

A reward will be provided to players who successfully answer the questions accurately, while a penalty will be imposed on those who fail to answer correctly. The players are allowed to refer to the e-book while attempting to answer the given questions, thereby enhancing their awareness of flood preparedness. The validation process involved two stages: the pre-game survey and the post-game survey. The purpose of the pre-game survey was to assess the current levels of disaster awareness among youth through a questionnaire. The post-game survey was conducted to evaluate the influence of MOFP on the level of flood preparedness awareness among the youth. Disaster education is MOFP's main draw. Awareness and risk reduction are minimal resource demand, simple technology, and cost-effective. The MOFP technique can be applied in resource-poor nations because the inputs are cheap and readily available. The MOFP promotes disaster education in a fun and casual manner. Although flexible, the play was limited to one hour to avoid boredom.

The questionnaire was designed to assess the youth's level of awareness before and after the introduction of MOFP. The questionnaire was also designed to assess the useability and the difficulty of the game (MOFP). The measurement and scales of the study were portrayed as follows

Table 1

*Measurements for the useability and difficulty of the MOFP*

Variable	Items	Scales	Sources
The useability of the MOFP	How would you rate the useability of this game?	<ol style="list-style-type: none"> <li>1. Easy to understand and use</li> <li>2. A little bit confusing or hard to use</li> <li>3. Very hard to understand or use</li> <li>4. Impossible to understand or use</li> </ol>	(Martin, 2012).
The difficulty level of the MOFP	How would you rate the difficulty of the game for you?	<ol style="list-style-type: none"> <li>1. Too easy</li> <li>2. Somewhat easy</li> <li>3. Just right</li> <li>4. Somewhat hard</li> <li>5. Too hard</li> </ol>	(Martin, 2012).

Three items were deployed to measure the youth's flood preparedness awareness.

Table 2

*Measurement for flood preparedness awareness*

Variable	Items	Scales	Sources
Flood preparedness awareness	I understand what to do to prepare for a flood	<ol style="list-style-type: none"> <li>1. Strongly disagree</li> <li>2. Disagree</li> <li>3. Neutral</li> <li>4. Agree</li> <li>5. Strongly agree</li> </ol>	(Clerveaux & Spence, 2009).
	I understand what to do to evacuate safely		
	I understand what to do to recover from the damage		

**Findings and Discussion**

Table 3

*Demographic profile of the respondents*

Variables	Frequency	Percentage (%)
Gender		
Male	56	46.7
Female	64	53.3
Age group		
15 - 25 years old	55	45.8
26 - 30 years old	21	17.5
31 - 35 years old	23	19.2
36 - 40 years old	21	17.5
Highest education attainment		
Schools	54	45.0
Certificates	16	13.3
Undergraduates	29	24.2
Postgraduates	21	17.5
Types of community		
Rural community	33	27.5
Semi-urban community	34	28.3
Urban community	53	44.2
Membership of Non-Government Association		
Yes	31	25.8
No	89	74.2

Table 3 presents the demographic profile of the respondents. Out of the total sample, 46.7% identified as male, while the remaining 53.3% identified as female. The largest proportion of respondents falls within the 15-25 years old category, constituting 45.8% of the total sample. Additionally, the majority of the respondents, 45.0%, reported having completed schooling as their highest education level. The variable capturing types of community sheds light on the residential backgrounds of the respondents. The data shows a fairly even distribution across three categories: rural community (27.5%), semi-urban community (28.3%), and urban community (44.2%). In terms of the membership of non-government organizations (NGOs), approximately 25.8% of the respondents reported being members of such associations, while the majority (74.2%) indicated no membership.

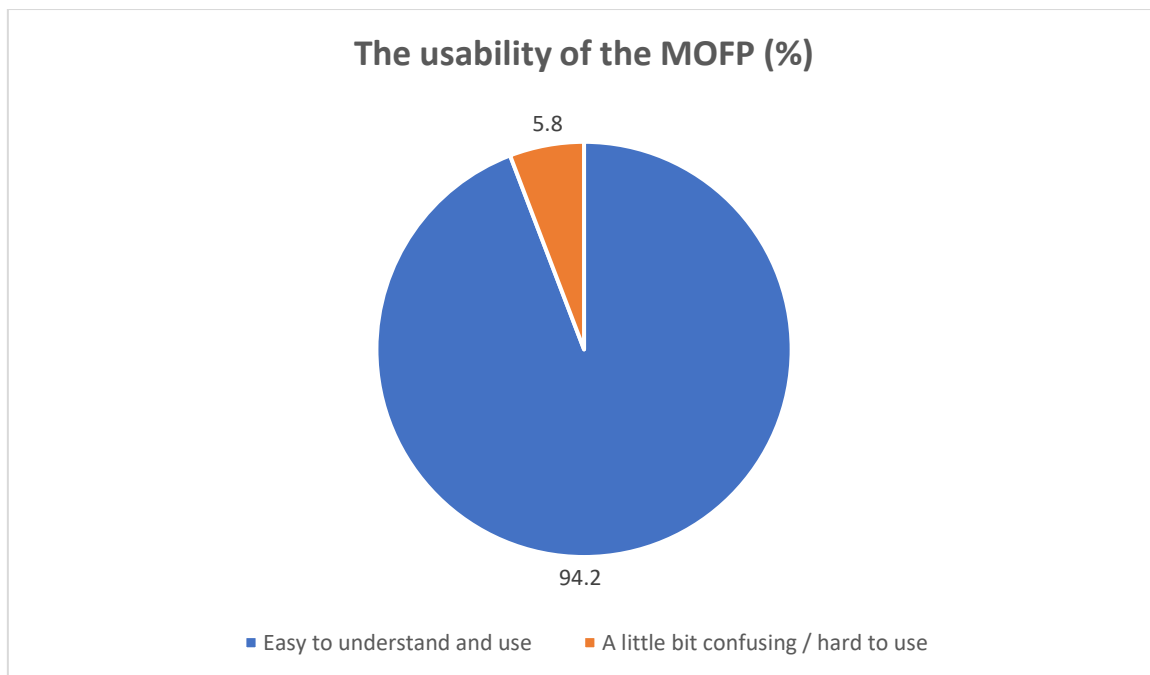


Figure 1. The usability of the MOFP

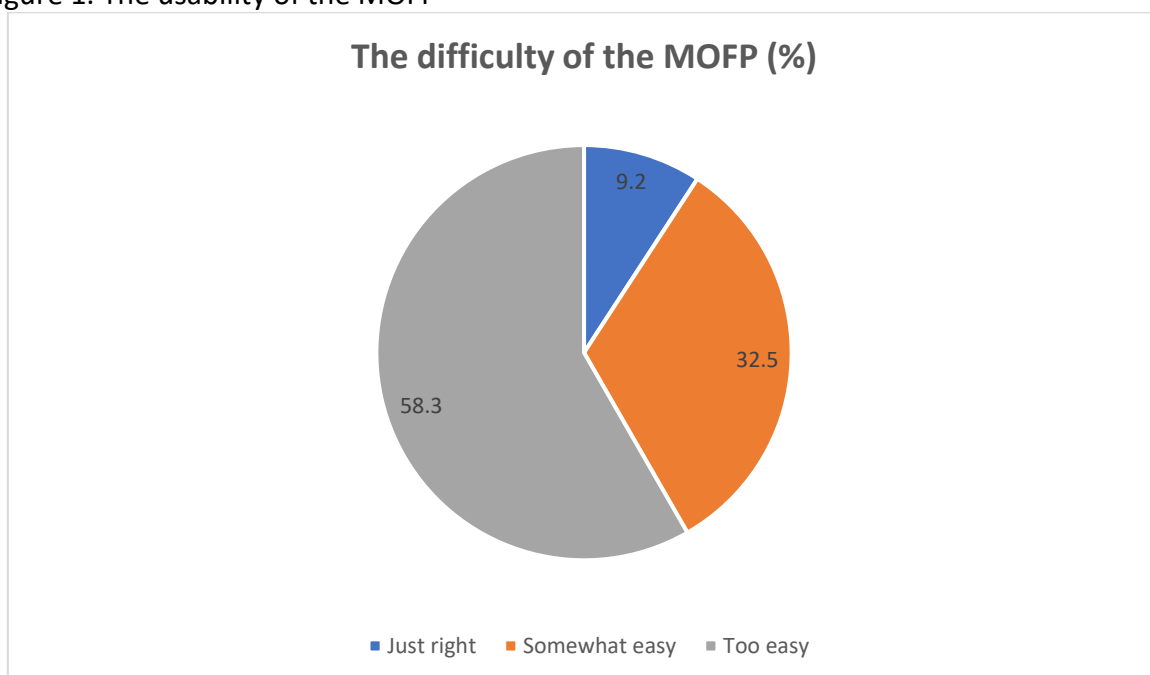


Figure 2. The difficulty of the MOFP

The usability of the MOFP was assessed among Malaysian youth, ranging from 15 to 40 years old. The results of this investigation indicate that most participants expressed a favorable perception of the usability of the MOFP (94.2 %). Additionally, a significant proportion of respondents agreed that the MOFP was user-friendly (58.3 percent believed the game was too easy and 32.5 percent believed it is somewhat easy). The MOFP incorporates well-defined game rules, ensuring that players can easily comprehend them. These rules are specifically crafted to accommodate youths of all age groups. The questions presented on the play cards are straightforward and serve the purpose of evaluating readers' awareness and knowledge regarding flood preparedness. If players desire accurate answers, they are permitted to refer to the e-book as a resource.

Awareness of flood preparedness (Before playing MOFP)

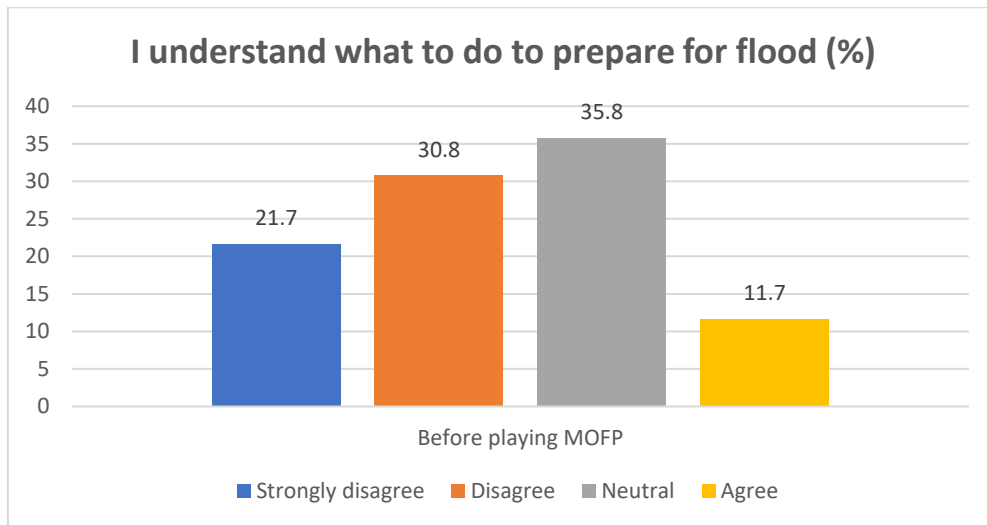


Figure 3. I understand what to do to prepare for flood

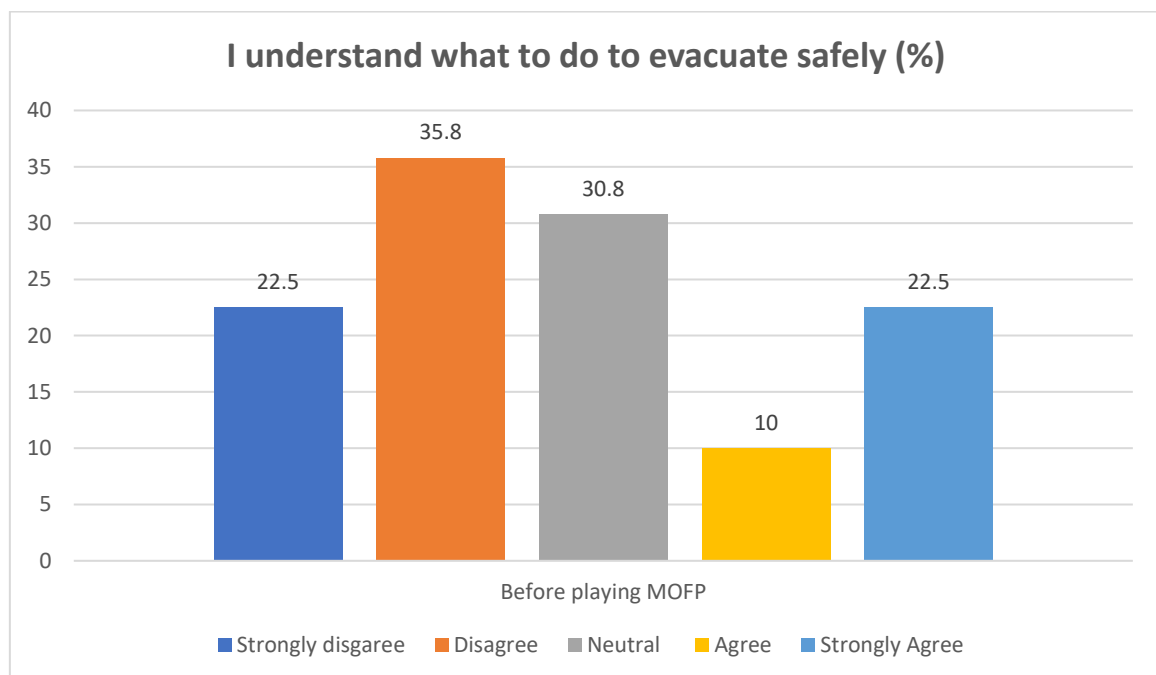


Figure 4. I understand what to do to evacuate safely



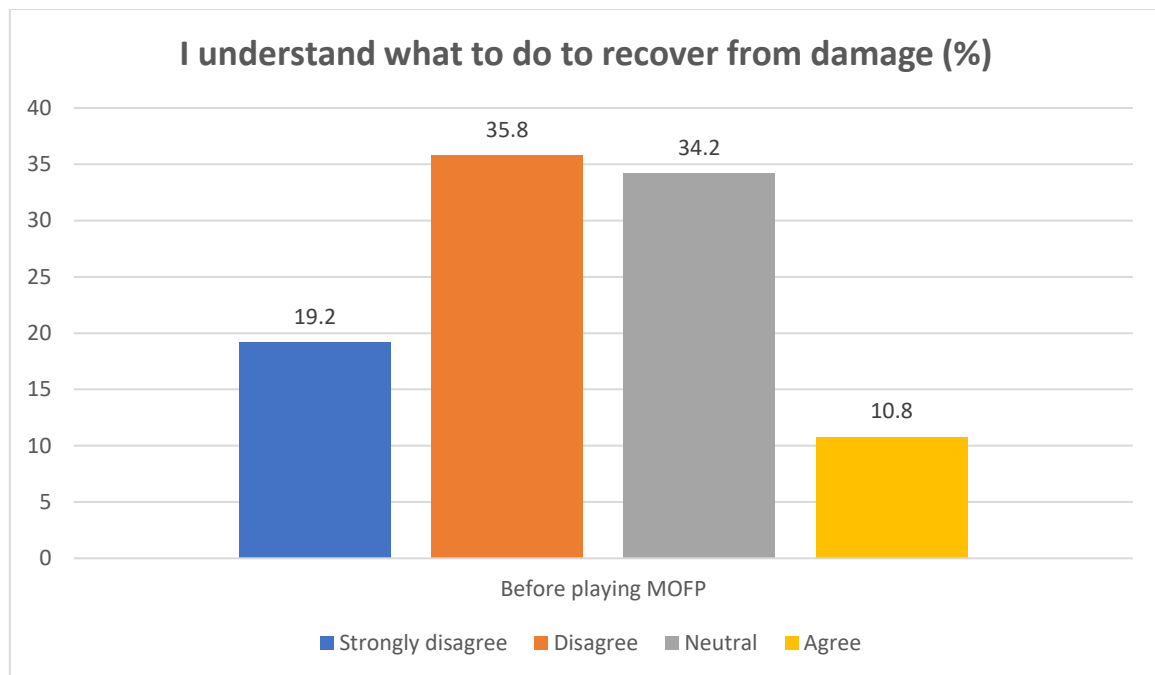


Figure 5. I understand what to do to recover from damage

Regarding the awareness of flood preparedness, most participants had limited awareness before engaging with the MOFP (Refer to figures 3 to 5). However, their levels of awareness significantly improved after being exposed to the MOFP, indicating its effectiveness in enhancing youth awareness of flood preparedness (Refer to figures 6 to 8). The e-book's content is presented in a straightforward, concise, and informative manner. Additionally, the e-book incorporates graphics to complement the explanations and further enhance readers' understanding and awareness of flood preparedness.

**Awareness of flood preparedness (After playing MOFP)**

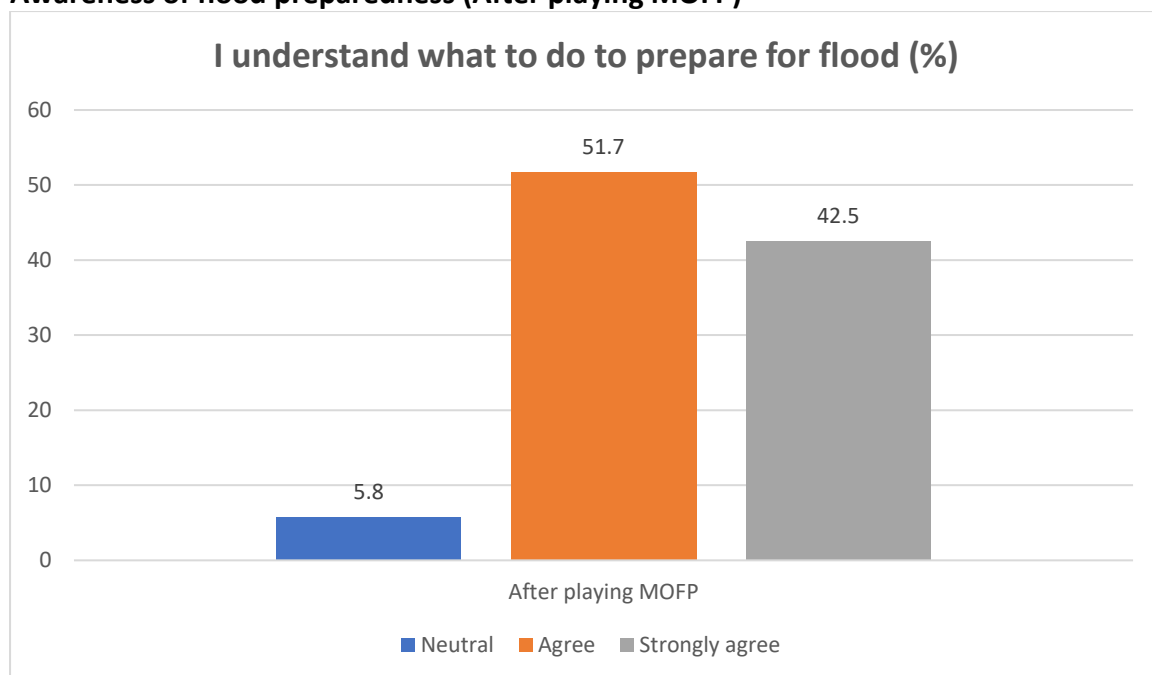


Figure 6. I understand what to do to prepare for a flood

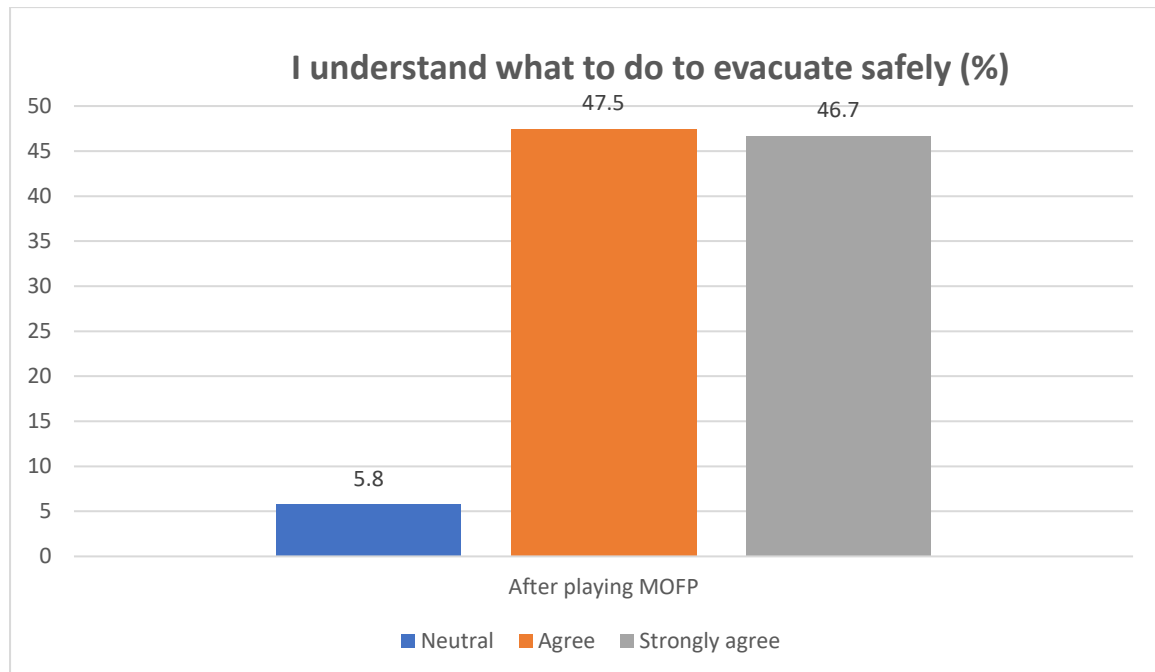


Figure 7. I understand what to do to evacuate safely

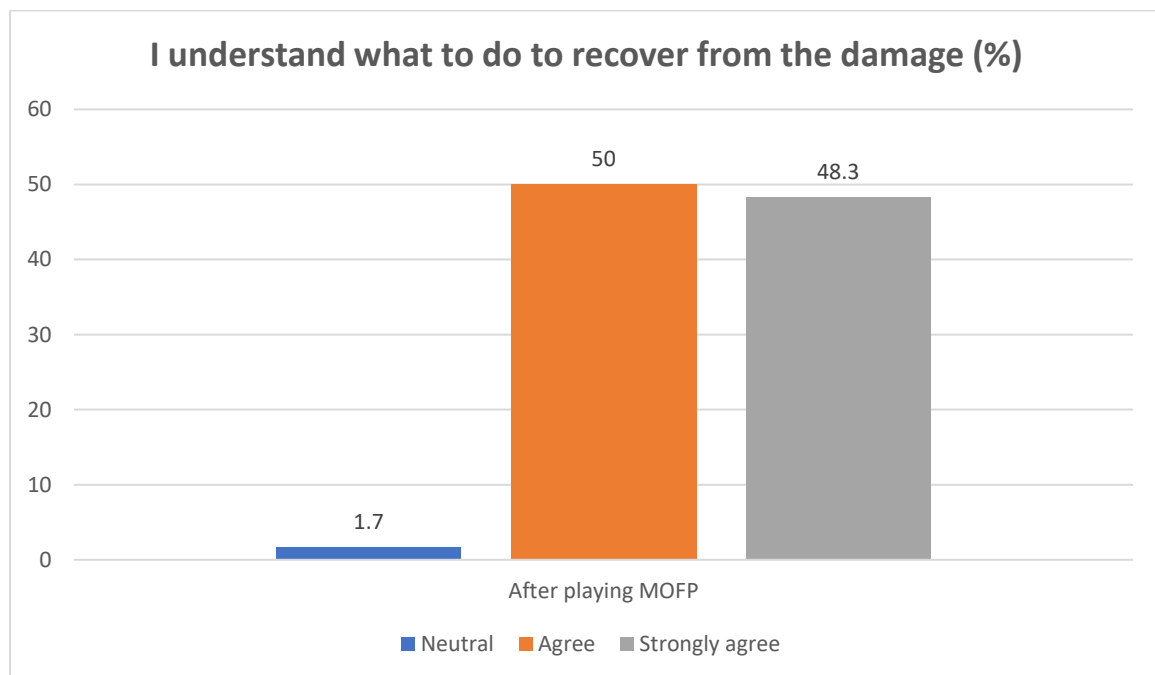


Figure 8. I understand what to do to recover from the damage

### Conclusion

A flood preparedness awareness campaign is important to guarantee that people know what to do before the event of a flood disaster. Hence, it is recommended that all stakeholders, including academics and universities, participate in university social responsibility by developing inventive or/and innovative products to raise public awareness of flood preparedness (Ridzuan et al., 2022b). Hence, the MOFP was designed with due consideration to the specific needs of youth in terms of the provision of disaster information and knowledge.

The game can be used as a tool for the identification and prioritization of interventions for promoting disaster awareness. Catastrophe risk reduction is not solely the purview of authorities but rather the product of collaborative efforts from a wide range of stakeholders (Ubaidillah et al., 2022). Hence, it is suggested that all parties including the schools, non-governmental organizations, private sectors, and the community need to double up their efforts to enhance youth's awareness of flood preparedness. The management of the schools can utilize the MOFP to enhance the school's students' level of awareness of flood preparedness. Traditional methods of disseminating campaigns, such as distributing pamphlets and brochures, have been commonly employed by government and school authorities. Despite these efforts, students' awareness levels remain low. As a solution, an engaging and informative learning approach called MOFP is expected to assist schools in delivering flood preparedness information in an enjoyable and captivating manner. Moreover, it is essential to introduce MOFP at the university level as well. It is widely known that many university students actively participate in volunteer activities to aid flood victims, which is commendable. However, it is crucial to emphasize the importance of flood preparedness, as numerous young individuals lack knowledge about necessary actions before a flood occurs.

### **Acknowledgment**

This research is not under a specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

### **Corresponding Author**

Jamal Rizal Razali

Centre for Human Sciences, Universiti Malaysia Pahang, Pahang Darul Makmur, Malaysia.

Email: jamalrizal@ump.edu.my

### **References**

- Beserra, V., Nussbaum, M., Zeni, R., Rodriguez, W., & Wurman, G. (2014). Practising arithmetic using educational video games with an interpersonal computer. *Educational Technology & Society, 17*(3), 343–358.
- Chou, Y. S., Hou, H. T., Yu, M. C., Lee, H. J., Wu, H. S., Yang, Y. T., & Liao, Y. J. (2012). Running Tommy: Developing a digital adventure game based on situated learning to promote learners' concepts of earthquake escape. Proceedings 2012 4th IEEE International Conference on Digital Game and Intelligent Toy Enhanced Learning, DIGITEL 2012, 156–158.
- Clark, D. B., Tanner-Smith, E., & Killingsworth, S. (2016). Digital games, design, and learning: A systematic review and meta-analysis. *Review of Educational Research, 86*(1), 79–122. <https://doi.org/10.3102/0034654315582065>
- Clerveaux, V., & Spence, B. (2009). The Communication of Disaster Information and Knowledge to Children Using Game Technique: The Disaster Awareness Game. *Int. J. Environ. Res., 3*(2), 209-222.
- D'Silva, J. L., Shaffril, H. A. M., Samah, B. A., Uli, J. (2012). Assessment of social adaptation capacity of Malaysian fishermen to climate change. *J. Appl. Sci. 12*, 876–881.
- Faber, M. H., Giuliani, L., Revez, A., Jayasena, S., Sparf, J., & Mendez, J. M. (2014). Interdisciplinary approach to disaster resilience education and research. *Procedia Economics and Finance, 18*, 601–9.

- Hoffmann, R., & Blecha, D. (2020). Education and Disaster Vulnerability in Southeast Asia: Evidence and Policy Implications. *Sustainability*, 12(4), 1401.
- Hyogo Framework for Action (2007). Building the Resilience of Nations and Communities to Disasters. International Strategy for Disaster Reduction (I S D R) Retrieved from [www.unisdr.org/wcdr](http://www.unisdr.org/wcdr)
- Khorram-Manesh, A. (2017). Youth Are Our Future Assets in Emergency and Disaster Management. *Bulletin of emergency and trauma*, 5(1), 1–3.
- Martin, M. W. (2012). Serious Game Design Principles: The Impact of Game Design on Learning Outcomes. Doctor of Philosophy (PhD), Dissertation, Computational Modeling & Simulation Engineering, Old Dominion University.
- Mitchell, T., Haynes, K., Hall, N., Choong, W., & Oven, K. (2008). The Role of Children and Youth in Communicating Disaster Risk. *Children. Youth and Environments*, 18.
- Nielsen, S., and Lidstone, J. (1998). Public Education and Disaster management: Is there any Guiding Theory? *Australian Journal of Emergency Management*, 13(3), 14-19.
- Oldenburg, B., & Parcel, G. S. (2002). *Diffusion of innovations*. Pp. 312–334 in Glanz K, Rimer BK, Lewis FM (eds). *Health Behavior and Health Education: Theory, Research, and Practice (3rd edition)*. San Francisco, CA: Jossey-Bass.
- Papastergiou, M. (2009). Digital Game-Based Learning in high school Computer Science education: Impact on educational effectiveness and student motivation, *Computers & Education*, 52(1), 1-12.
- Parcel, G. S., Perry, C. I., Taylor, W. C. (2003). *Beyond demonstration: Diffusion of health promotion innovations*. Pp. 229–251 in Bracht N (ed). *Health Promotion at the Community Level*. Newbury Park, CA: Sage, 1990.
- Promsri, C. (2017). Exploring Flood Disaster Preparedness Awareness Factors through Historical Flood Victims in Bangkok Metropolitan and Vicinity by Using Factor Analysis. *International Journal of Academic Research in Business and Social Sciences*, 7(5), 1-7. <http://dx.doi.org/10.6007/IJARBS/v7-i5/2868>.
- Ridzuan, M. R., Razali, J. R., Soon Yew, J., & Rahman, N. A. S. A. (2022b). An Analysis of Malaysian Public Policy in Disaster Risk Reduction: An Endeavour of Mitigating the Impacts of Flood in Malaysia. *International Journal of Academic Research in Business and Social Sciences*, 12(7), 2006 – 2021.
- Ridzuan, M. R., Razali, J. R., Rahman, N. A. S. A., & Soon Yew, J. (2022a). Youth Engagement in Flood Disaster Management in Malaysia. *International Journal of Academic Research in Business and Social Sciences*, 12(5), 846-857.
- Rogers, E. M. (2003). *Diffusion of Innovations (5th edition)*. New York: Free Press.
- Rosli, M. S., Mangshor, N. N. A., Sabri, N., & Ibrahim, Z. (2017). Educational game as interactive learning for hurricane safety. 2017 7th IEEE International Conference on System Engineering and Technology (ICSET). doi:10.1109/icsengt.2017.8123447.
- Saroar, M. M., Routray, J. K. (2012). Impacts of climatic disasters in coastal Bangladesh: why does private adaptive capacity differ. 12, 169–190.
- Tao, S., Huang, Y., & Tsai, M. (2016). Applying the Flipped Classroom with Game-based Learning in Elementary School Student's English Learning, International Conference on Educational Innovation through Technology, 59-63.
- Ubaidillah, N. Z., Khalid, F. D., Hamdan, R., & Liwan, A. (2022). Investigating Behavioural Determinants For Disaster Preparedness Among Youth In Malaysia. *ABAC Journal*, 42(3), 99-115.

- UNESCO. (2004). APELL for Schools and Educational Buildings: A community-based approach for school safety and education for disaster reduction. Retrieved from [www.unesco.org/science/disaster/apell\\_schools.pdg](http://www.unesco.org/science/disaster/apell_schools.pdg)
- Van Eck, R. (2006). Digital game-based learning: It's not just the digital natives who are restless, *in EDUCAUSE review*, 41(2), 16.
- Wood M. M., Kano, M., Mileti, D. S., & Bourque, L. B. (2009). Reconceptualizing household disaster readiness: The "Get Ready" pyramid. *Journal of Emergency Management*, 7(1), 25–37.
- Wood, M. M., Mileti, D. S., Kano, M., Kelley, M. M., Regan, R., & Bourque, L. B. (2012). Communicating Actionable Risk for Terrorism and Other Hazards. *Risk Analysis*, 1-15, [https://doi: 10.1111/j.1539-6924.2011.01645.x](https://doi.org/10.1111/j.1539-6924.2011.01645.x)