



RESEARCH ON TAIWANESE PEOPLE'S DISASTER LITERACY,  
SATISFACTION WITH DISASTER EDUCATION,  
AND COMMUNITY DISASTER PARTICIPATION

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Abstract

This study investigates the relationships and differences among disaster education satisfaction, disaster literacy, and the intention to participate in community disaster preparedness among individuals in Taiwan who have received disaster education.

Taiwan, located in the Pacific Ring of Fire and subject to a subtropical monsoon climate, is highly vulnerable to earthquakes, typhoons, floods, and landslides. As climate change intensifies the frequency and severity of natural disasters globally, disaster risk reduction has become increasingly critical. Since government efforts alone are insufficient to mitigate disaster impacts, enhancing public preparedness and promoting community-based self-help and

mutual aid have become essential. Disaster education plays a pivotal role in strengthening public awareness and response capabilities.

This study employed a questionnaire survey targeting individuals who had participated in disaster education programs. The instrument covered personal demographics, satisfaction with disaster education, disaster literacy, and willingness to engage in community disaster activities. Data analysis included descriptive statistics, reliability testing, independent samples t-tests, and ANOVA.

The results indicated that disaster education significantly enhances disaster literacy, which in turn positively influences community participation intention. Disaster education also has a direct effect on participation. Furthermore, significant differences in disaster education satisfaction and literacy were observed across various demographic groups.

These findings suggest the need for governments and relevant agencies to develop localized and diversified disaster education strategies tailored to different population segments, thereby improving public literacy and fostering a more resilient society.

**Key words:** Disaster Literacy, Disaster Education, Community Disaster Participation

## Introduction

### *Research Background and Motivation*

In recent years, the rapid acceleration of global climate change has intensified the frequency and severity of extreme weather events—such as typhoons, floods, and droughts—as well as geophysical disasters including earthquakes and volcanic eruptions. According to the 2022 report by the Intergovernmental Panel on Climate Change (IPCC), climate change has already led to irreversible environmental degradation and

has had far-reaching negative impacts on human societies and ecosystems worldwide, threatening the survival of numerous species. It is estimated that approximately 3.3 to 3.6 billion people currently reside in areas highly vulnerable to climate-related risks. The report underscores the urgent need for immediate and proactive global action.

Taiwan, located within the Pacific Ring of Fire and influenced by a subtropical monsoon climate, is particularly susceptible to natural disasters. Historical events such as the 1987 flood, the Baihe earthquake, the

921 Chi-Chi earthquake, and Typhoon Morakot have caused substantial human casualties and economic losses. These experiences have driven the continual refinement of Taiwan's disaster prevention and response systems. The Disaster Prevention and Protection Act, first enacted in 2000 and revised in 2010, established a comprehensive framework integrating central and local government efforts (Ministry of Education, 2015). Post-disaster recovery strategies have emphasized the importance of enhancing infrastructure resilience and strengthening recovery mechanisms. In addition, increased collaboration among central agencies, local governments, and civil society organizations has facilitated the development of more effective mechanisms to address compound and cascading disaster events. Learning from past disasters and continuously improving response frameworks is fundamental to achieving the core principle of disaster management: "prevention is better than rescue, and avoidance is preferable to mitigation" (Office of Disaster Management, 2022).

Governmental efforts alone, however, are insufficient to effectively reduce disaster-related losses. The experience of the Great Hanshin-Awaji Earthquake in Japan illustrated that most survivors relied on self-help and mutual assistance to escape danger, underscoring the critical role of

public disaster literacy and community-based support networks (Chen, 2019). Since 2018, Taiwan has drawn on the experiences of the United States and Japan to develop a nationwide disaster volunteer system and a certification program for Disaster Prevention Specialists. Disaster education, therefore, must extend beyond formal institutions and become a collective societal responsibility. Educational initiatives should involve not only schools, but also families and communities, to foster a culture of disaster resilience.

Despite these efforts, confusion persists between disaster education and disaster drills, highlighting the need for clearer public communication to differentiate their purposes and roles. Comprehensive disaster education should encompass a broad range of topics, including the nature of various hazards, preparedness strategies, emergency response procedures, and post-disaster recovery processes. Diverse instructional methods—such as in-person training, online learning, drills, and simulation exercises—should be employed to engage learners effectively. In response, the Ministry of Education has implemented multiple initiatives aimed at cultivating disaster awareness and resilience among school communities (Lee, 2022).

Accordingly, this study examines dis-

aster literacy, satisfaction with disaster education, and the intention to participate in community-based disaster preparedness among individuals who have received such education in Taiwan. By analyzing the interrelationships among these dimensions and their variations across demographic subgroups, the study aims to offer actionable recommendations for policymakers and disaster management organizations seeking to strengthen public preparedness through targeted educational strategies and community engagement.

### *Research Objectives*

The primary objective of this study is to examine the perceptions of individuals who have participated in disaster education programs, specifically in relation to their satisfaction with the courses, their level of disaster literacy, and their willingness to engage in community-based disaster preparedness activities. Drawing upon these insights, the study aims to provide practical recommendations for both governmental and non-governmental organizations to support the effective planning and implementation of disaster education initiatives.

The specific research objectives are as follows:

1. To assess individuals' perceptions of disaster education, disaster literacy, and their willingness to participate in community disaster preparedness, and to identify differences based on demographic characteristics.
2. To investigate the relationships among disaster education, disaster literacy, and the intention to engage in community disaster preparedness.
3. To develop evidence-based recommendations to assist governmental and non-governmental institutions in designing and delivering disaster education and training programs for disaster prevention personnel.

### *Literature Review*

#### *Development of Disaster Education*

In recent years, the global rise in extreme weather events has significantly amplified the severity and frequency of natural disasters. Climate change poses escalating threats to economic, social, and environmental systems, highlighting the growing importance of disaster education. Its primary objective is to enhance public understanding and promote informed action before, during, and after disasters, thereby improving awareness, knowledge, skills, and coping capacity.

Taiwan has actively integrated technology into disaster education through virtual reality, serious games, and simulations to increase engagement. Since 2003, the Ministry of Education has introduced various initiatives, including talent development, experimental programs, localized curriculum design, and teacher training. In 2019, the government launched the “Project for Building Resilient Disaster Prevention Campuses,” aiming to strengthen disaster awareness and responsiveness among teachers and students (Chen et al., 2013).

Reflecting global shifts, Taiwan’s disaster education has evolved from rote instruction to a model that emphasizes judgment, situational awareness, and psychological resilience. It is now regarded as an essential life skill, with efforts directed toward cultivating disaster-resilient schools through safe learning environments, risk reduction strategies, and comprehensive disaster management instruction.

Effective disaster response during large-scale emergencies depends on self-help, mutual aid, and public cooperation. In line with this, the National Fire Agency initiated the “Deepening Disaster Prevention and Relief Project” and adopted community-based frameworks inspired by the U.S. and Japan. Since 2018, Taiwan has expanded its disaster volunteer system and imple-

mented a certification program for Disaster Prevention Specialists.

Disaster education must be a collective responsibility, extending beyond schools to families and communities. It should offer diverse formats—combining in-person instruction, online learning, drills, and simulations—to promote awareness, responsibility, and civic participation. These approaches contribute to long-term resilience and a more sustainable society.

Long-term commitment is crucial. While disaster risks cannot be entirely eliminated, effective education and mitigation strategies can reduce their impact and foster acceptance of risk as part of life. Realizing this goal requires integrating disaster education not only within schools but also across businesses and broader society.

Taiwan’s Disaster Prevention Specialist program involves a rigorous training and certification process. Its curriculum covers first aid, national disaster response systems, recent disaster trends, information management, community planning, household preparedness, and grassroots engagement. These programs enhance professional capabilities and strengthen Taiwan’s disaster response infrastructure. Certified specialists are equipped to manage all disaster phases, lead local planning, coordinate emergency

responses, and support community-based operations (Zeng & Shao, 2021).

knowledge, disaster attitudes, and disaster skills.

### *Development of Disaster Literacy*

The term “literacy” originates from the Latin *litteratus*, referring to individuals with scholarly learning. In contemporary education, *core literacy* is defined as a combination of knowledge, competencies, and attitudes necessary for adapting to modern life and addressing future challenges (Guan, 2002). Literacy encompasses not only cognitive and practical abilities, but also emotional and attitudinal development, emphasizing continuous self-improvement and meaningful learning outcomes.

In disaster management, disaster literacy equips individuals to make informed decisions and take effective actions to mitigate risks. It empowers citizens, communities, and institutions to actively engage in preparedness and response efforts. According to Taiwan’s Ministry of Education, disaster literacy includes awareness of disaster threats, the ability to access relevant information, heightened risk sensitivity, proactive prevention attitudes, and practical response skills.

Disaster literacy is commonly categorized into three dimensions: disaster

1. Disaster knowledge refers to an individual’s understanding of disaster types, causes, impacts, and strategies for preparedness and response. This includes hazard recognition, knowledge of mitigation and planning, and familiarity with emergency procedures and recovery methods.
2. Disaster attitudes reflect concern about risks, the perceived importance of prevention, and a sense of civic responsibility. This dimension includes risk awareness, valuing disaster preparedness, and a personal commitment to supporting schools and communities in relief efforts.
3. Disaster skills comprise practical competencies needed across all disaster phases. These range from preparedness activities—such as evacuation planning, drills, and community education—to response actions like rescue coordination, emergency support, and leadership in local disaster operations.

Improving disaster literacy is critical not only for personal safety but also as a foundational pillar of national disaster risk reduction. Governments should promote targeted educational initiatives, training programs, and communication strategies to elevate public awareness and reinforce collective resilience (Yeh, 2017).

#### *Development of Community Disaster Participation*

The term “community” originates from Latin and refers to groups united by shared interests and resources. In sociology, it describes networks of relationships beyond individual households that provide mutual support and social cohesion. Communities not only offer essential infrastructure but also serve as critical sources of social capital, promoting both individual and collective well-being. During disasters, they play a vital role in mobilizing support, coordinating resources, and helping residents navigate crises (McMillan & Chavis, 1986).

Maskrey (1989) introduced the concept of community-based disaster risk management (CBDRM), which includes mitigation, emergency response, and post-disaster recovery. He emphasized that true disaster risk reduction depends on local ownership and public involvement. Building disaster-resilient communities requires not only formal

systems but also active participation in drills, risk assessments, educational initiatives, contingency planning, and local resource preparedness.

Liu & Chen (2015) advocate for a public-private partnership model to enhance Taiwan’s community resilience. This collaborative approach leverages professional expertise, local resources, and social networks to increase efficiency and reduce redundancy. Factors such as prior disaster experience and leadership style—especially that of village heads—can significantly influence residents’ willingness to participate. A greater sense of personal risk also tends to heighten engagement in preparedness efforts.

Top-down communication strategies, however, often fall short of maintaining long-term public interest, especially in remote or Indigenous communities where access to disaster information depends on media, social networks, or government outreach. Therefore, disaster education must be locally adapted to ensure relevance and effectiveness.

Developing disaster-resilient communities enhances not only public safety but also local identity and solidarity. Success requires multi-stakeholder collaboration including public institutions, local govern-

ments, civil society, and academic partners—and tailored communication strategies such as forming local task forces, hosting community events, and involving technical experts.

These expert teams play a crucial role in facilitating public dialogue, addressing diverse viewpoints, and guiding inclusive decision-making. In this study, community disaster participation is assessed through indicators such as involvement in drills, attendance at educational events, participation in local disaster organizations, dissemination of knowledge, provision of technical or material support, and financial contributions to preparedness initiatives.

## Research Methodology

### *Research Framework*

Drawing on the literature review and research objectives, this study proposes a conceptual framework to examine the interrelationships among disaster education satisfaction, disaster literacy, and the willingness to participate in community disaster preparedness. The framework suggests that disaster education enhances disaster literacy—comprising knowledge, attitudes, and skills—which, in turn, increases individuals' engagement in preparedness activities such as drills, community programs, and

knowledge sharing. A direct pathway from disaster education to participation intention is also proposed, reflecting the role of education in fostering civic responsibility.

Moreover, the framework considers the moderating effects of demographic variables—including gender, age, occupation, education level, marital status, region, and previous disaster experience—on individuals' perceptions of disaster education, literacy levels, and community participation intentions. These personal characteristics may shape how people respond to and act upon disaster education initiatives.

Through empirical testing, the study aims to provide practical insights for tailoring disaster education to diverse populations, enhancing both individual preparedness and community resilience. This integrated approach supports broader disaster risk reduction goals by emphasizing the role of education in cultivating both personal competence and collective action.

### *Research Hypotheses*

In line with the research background, objectives, and theoretical framework, the following hypotheses were proposed:

H1: There are significant differences in perceptions of disaster education based



on personal demographic variables.

H2: There are significant differences in perceptions of disaster literacy based on personal demographic variables.

H3: Disaster education has a significant influence on disaster literacy.

H4: Disaster literacy has a significant influence on willingness to participate in community disaster preparedness.

H5: Disaster education has a significant influence on willingness to participate in community disaster preparedness.

#### *Questionnaire Design and Measurement Scales*

This study utilized a structured questionnaire survey to collect quantitative data from Taiwanese individuals who had previously participated in disaster education programs. The instrument comprised four main sections:

1. Personal Background Information: Captured demographic and experiential data, including gender, age, occupation, marital status, education level, region of residence, frequency of participation in disaster-related activities, Disaster Pre-

vention Specialist certification, prior disaster response experience, and preferred frequency of disaster education training.

2. Perceptions and Satisfaction with Disaster Education: Evaluated participants' experiences with their most recent disaster education course, focusing on instructor quality, content applicability, instructional material design, learning outcomes, and training environment.
3. Disaster Literacy Scale: Assessed participants' knowledge, skills, attitudes, and behaviors related to disaster preparedness and response, including risk awareness, sense of responsibility, and core disaster values.
4. Community Disaster Participation Willingness: Measured future intentions to engage in community-based disaster preparedness, such as participating in drills and seminars, joining local response groups, sharing knowledge, and providing technical or financial support.
5. All items were rated using a 7-point

Likert scale to facilitate statistical analysis and inference.

#### *Data Analysis and Interpretation*

A total of 407 valid responses were collected for this study. The sample was predominantly female (62.7%), with male respondents accounting for 37.3%. In terms of age distribution, the largest group fell within the 21–30 age range (29.0%), followed by individuals aged 51–60 (25.6%). Regarding occupational background, service industry workers represented the largest segment (26.5%), while public servants, military personnel, police officers, and healthcare professionals collectively comprised 16.7% of the respondents.

More than half of the participants (57.7%) were married. In terms of educational attainment, 53.8% held a bachelor's degree. Geographically, a majority resided in southern Taiwan (52.8%), with 27.3% living in the northern region.

As for disaster-related experience, 68.8% of respondents reported participating in such activities one to three times. Slightly less than half (48.2%) were certified Disaster Prevention Specialists, while the remainder (51.8%) were not. A notable portion (66.1%) had prior experience assisting in disaster response efforts. In terms of pre-

ferred training frequency, the most selected interval was every five to six months (42.8%), followed by a preference for once a year or more (26.0%).

#### *Descriptive Statistics*

The analysis of disaster education responses revealed a high and consistent level of perceived importance among participants. The average score was 6.08 out of 7, with a standard deviation of 0.795, indicating strong consensus on the value of disaster education.

Regarding disaster literacy, respondents demonstrated a moderate overall level across various subcomponents. The mean scores were as follows: 5.33 for disaster knowledge, 5.13 for preparedness knowledge, 5.06 for response knowledge, 5.00 for risk awareness, 4.94 for disaster values, 5.82 for sense of responsibility, 4.94 for preparedness activities, and 4.61 for response capacity. Notably, the sense of responsibility scored highest, reflecting a relatively strong personal commitment to disaster preparedness. In contrast, the lowest score was observed for response capacity, highlighting a potential gap in respondents' ability to execute practical disaster response measures effectively.

In terms of community disaster partic-

ipation willingness, respondents expressed a generally high level of intent to engage. The highest mean score was reported for the willingness to share disaster knowledge with others (6.04), followed by participation in disaster drills (5.98), attendance at disaster-related seminars or briefings (5.92), provision of equipment and technical support (5.86), and involvement in community disaster organizations (5.83). The lowest level of agreement was found in the willingness to provide financial support (5.43). These results suggest that respondents are more inclined to contribute through non-monetary means, particularly by sharing knowledge and participating directly in preparedness activities.

#### *Analysis of Differences by Demographic Variables*

Statistical analyses revealed significant variations in perceptions of disaster education and levels of disaster literacy across different demographic groups. Male respondents consistently reported higher scores across all dimensions of disaster literacy. Older participants exhibited greater satisfaction with disaster education and higher literacy levels, particularly in areas such as preparedness knowledge and sense of responsibility. Similarly, married individuals tended to score higher in both satisfaction and responsibility, which may reflect

a stronger inclination to protect and support family members during emergencies.

Occupational background also influenced respondents' perceptions, likely due to varying degrees of professional exposure to risk-related environments. Interestingly, participants with lower educational attainment (junior high school or below) sometimes demonstrated higher disaster literacy scores, potentially attributable to greater practical life experience or heightened sensitivity to risk. Regionally, respondents from northern Taiwan outperformed their southern counterparts, especially in disaster knowledge and response capacity, suggesting the influence of geographic and infrastructural disparities.

Moreover, individuals who held certification as Disaster Prevention Specialists or had prior experience in disaster response exhibited significantly higher literacy across most dimensions. Finally, respondents who advocated for more frequent disaster education training also showed markedly higher levels of disaster awareness, preparedness knowledge, and response capabilities, underscoring the importance of sustained and regular educational engagement in building disaster resilience.

#### *Correlation Analysis*

Pearson correlation analysis revealed several significant positive relationships among the study variables. Disaster education was positively and significantly associated with all components of disaster literacy, indicating that increased educational exposure contributes to improved disaster-related knowledge, attitudes, and skills. In turn, disaster literacy showed a significant positive correlation with community disaster participation willingness, suggesting that individuals with higher literacy are more inclined to engage in disaster-related community activities. Among these, the strongest correlation was found between sense of responsibility and participation willingness ( $r = 0.649$ ), underscoring the pivotal role of personal accountability in fostering engagement. Additionally, disaster education was directly and positively correlated with participation willingness, highlighting its influence not only through literacy enhancement but also in motivating civic action. These findings collectively support the study's theoretical model, in which education fosters literacy, which subsequently drives proactive community involvement.

## Conclusion and Recommendations

### *Conclusion*

This study aimed to investigate the relationships among disaster education satis-

faction, disaster literacy, and willingness to participate in community disaster preparedness among individuals who had attended disaster education courses. It also examined differences based on personal background variables.

The findings of this study supported the majority of the proposed hypotheses. Specifically, Hypotheses H3, H4, and H5 were fully supported by the empirical data. H3 confirmed that disaster education significantly enhances individuals' disaster literacy; H4 demonstrated that disaster literacy positively influences the willingness to participate in community disaster preparedness; and H5 showed that disaster education also directly contributes to participation willingness. In contrast, Hypotheses H1 and H2 were only partially supported, indicating that while demographic factors such as gender, age, and education level do influence perceptions of disaster education and literacy, their effects may not be uniform across all dimensions. Together, these results affirm the critical role of disaster education in strengthening public disaster literacy and promoting active engagement in community-level disaster preparedness efforts.

The findings confirmed key hypotheses of the study: H3 established that disaster education significantly enhances individuals'

disaster literacy; H4 verified that disaster literacy has a significant impact on the willingness to participate in community disaster preparedness; and H5 demonstrated that disaster education also directly influences participation willingness. Collectively, these results underscore the crucial role of disaster education not only in improving public disaster literacy but also in fostering active civic engagement in community-level risk reduction initiatives, thereby contributing to greater overall disaster resilience.

Demographic factors—including gender, age, marital status, occupation, education level, region of residence, certification as a Disaster Prevention Specialist, prior disaster response experience, and preferred training frequency—were found to significantly influence participants' perceptions of disaster education and literacy. For instance, married individuals demonstrated higher satisfaction and a stronger sense of disaster responsibility, while those with lower educational attainment at times exhibited greater disaster literacy, potentially due to life experiences and heightened risk awareness. Participants residing in northern Taiwan generally held more favorable perceptions than those in the south, particularly regarding disaster knowledge and response capacity. Moreover, certified individuals and those with hands-on disaster response experience consistently scored higher across

most literacy dimensions. Those who supported more frequent training also showed greater awareness and proficiency in disaster-related competencies. These findings highlight the importance of tailoring disaster education strategies to specific demographic groups to enhance their relevance and effectiveness.

### Recommendations

Based on empirical findings and hypothesis validation, the following practical recommendations are proposed to enhance disaster preparedness at both individual and community levels in Taiwan:

1. Strengthen and diversify disaster education programs  
Given the demonstrated impact of education on both disaster literacy and participation, government agencies should continue to enhance the quality and relevance of disaster education initiatives. Incorporating innovative methods such as experiential learning, gamification, and virtual reality—similar to Japan's Disaster Prevention Museums—can significantly improve engagement and retention.
2. Expand access to disaster knowledge resources

As the study revealed relatively low scores in risk awareness and response capacity, it is essential to provide clear, user-friendly learning resources. These may include online platforms, printed community handbooks, and localized workshops designed to help citizens better understand various disaster types, appropriate emergency responses, and the use of essential safety equipment.

3. Tailor educational strategies to demographic differences

The partial support for Hypotheses H1 and H2 indicates that demographic factors influence disaster education outcomes. Younger individuals may benefit from socially integrated and lifestyle-oriented approaches, while older adults may prefer content that emphasizes technical knowledge and practical application. Married individuals and residents of northern Taiwan might benefit from advanced modules, whereas unmarried individuals or those in the south may require more foundational or context-specific content.

4. Promote pre-disaster awareness and preventive measures

Preventive education before disasters remains underemphasized. Public campaigns should focus on raising awareness of early warning systems,

household readiness, and proactive community-wide measures to mitigate disaster risks at their source.

5. Leverage community resources and encourage participation

In light of findings supporting H4 and H5, community organizations should play an active role in encouraging participation in drills and disaster preparedness programs. Public-private collaborations—particularly those involving certified Disaster Prevention Specialists and experienced responders—can enhance capacity. Community-specific disaster response plans and simulation-based exercises are vital components of this strategy.

6. Cultivate a culture of disaster awareness nationwide

Disaster preparedness should be embedded as a core element of civic culture. Sustained public education efforts—through mass media, local events, and institutional campaigns—are necessary to normalize disaster awareness and promote long-term behavioral change.

In conclusion, advancing disaster resilience in Taiwan requires a holistic and inclusive approach that combines high-quality education, targeted literacy development,

and active community involvement. Tailoring strategies to demographic diversity and ensuring sustained public engagement will be key to building a safer and more resilient society.

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