Study on the context of school-based disaster management

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A B S T R A C T

In recent years, the incidence and impact of natural disasters have drastically increased. Schools are responsible for not only teaching disaster management knowledge but also serving as evacuation shelters. Occurrences of disasters are highly unpredictable. If a disaster happens during school hours, schools must consider the risks that students are exposed to and respond early to such an event. Moreover, if schools can implement an all-hazards management approach by comprehensively organising practical environmental preparedness, software plans, and disaster drills, then injuries, deaths, and property damages can be effectively reduced and school resilience to disasters can successfully enhanced. Therefore, this study established an assessment framework for school disaster management involving concepts such as scenario setting, emergency thinking, and disaster psychology. School disaster management plans and the integrity and validity of disaster drills were used as the basis of evaluation. According to the existent schools in Taiwan, this study proposed indicators for five major assessment dimensions, which were environmental context, school capability, school disaster management map, related resource importation, and teaching material development and implementation. Finally, 35 schools were evaluated to verify that the proposed school disaster management indicator system can effectively distinguish and reflect the disaster management condition of each type of school. Additionally, this system can facilitate schools to regularly inspect and verify various disaster management tasks, thereby enhancing their capability in responding to disasters.

1. Research motivation

In the past few decades, the Earth has been exposed to the risks of rapid climate changes. Consequently, the incidence and impact of disasters have drastically increased. In the 1930s, sociologists re deliberated the relationship between mankind and environment and redefined the term "disaster": Specifically, a disaster is an inevitable process of social change; despite humans' endeavour to disaster management or technology advancement, some natural disasters are inevitable [3]. Disaster management pertains to a process of continual, dynamic management, and plan for responding to dangerous situations. According to the process of disaster occurrence, the stages of disaster management are categorised into mitigation, preparedness, response, and recovery. Pre-disaster operations include mitigation, risk reduction, prevention, and preparedness.

Peri-disaster operations are conducted during the response stage, and post-disaster operations involve recovery and reconstruction [18]. Serving as educational institutions, schools are responsible for providing adequate disaster management education, cultivating the disaster management awareness of society,

and reinforcing communities' disaster management capability [5]. Every school should have an effective, locality-specific school safety planning- from mitigation/prevention and preparedness planning, to response and recovery procedures in place [6]. There are six basic questions could help identify areas that have not been addressed by a school's safety plan: Who? What? Where? When? Why? How? [19] By taking the "All-Hazards" approach it shows that the preparation and planning is the same. If schools can implement an all-hazards management approach by comprehensively organising practical environmental preparedness, software plans, and disaster drills and establish a concretised, continuous, representative, and controllable school disaster management framework. No matter what the crisis situation suffered, schools can use the same preparation and planning to deal with the emergency by taking the all-hazards approach [7]. Then injuries, deaths, and property damages can be effectively reduced and school resilience to disasters can be successfully enhanced. From the perspective of whole-hazards management approach, this study investigated schools' responsibility regarding disaster management, implementation of school disaster management, and how schools can systematically carry out disaster management tasks.

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2. Literature review

Through education, disaster management concepts can be cultivated in young children, enabling them to establish correct understanding of related topics. Therefore, their disaster response capability and the overall disaster management capability of societies can be enhanced. Disaster management education has become a global trend. Schools also need to build resilience to emergencies and be prepared to manage their consequences, both to ensure that a response is effective and also that the business of education continues as quickly and efficiently as possible [9].

The Hyogo Framework for Action (HFA) proposed comprehensive strategies for disaster risk reduction (DRR), which involve five prioritised tasks. One of these tasks pertains to using knowledge, innovation, and education to cultivate various levels of safety and resilience cultures [1]. The successor instrument to the HFA is the Sendai Framework for Disaster Risk Reduction 2015–2030, which goal is:

"to prevent new and reduce existing disaster risk through the implementation of integrated and inclusive economic, structural, legal, social, health, cultural, educational, environmental, technological, political and institutional measures that prevent and reduce hazard exposure and vulnerability to disaster, increase preparedness for response and recovery, and thus strengthen resilience [17]."

Disaster risk reduction is proposed through three areas of development that have been evolving and maturing as key courses of action: curriculum; educational infrastructure, including structural and non-structural safety; and school safety preparedness and plans [20]. Strategies specifically designed for education departments involve (a) integrating and incorporating DRR-related knowledge into polices and measures facilitating the sustainable development of education departments; (b) developing robust systems, mechanisms, and capabilities to cultivate the resilience of central, regional, and district education departments; and (c) systematically incorporating DRR methods into the emergency preparedness, response, and recovery programs implemented by education departments [16]. The school-based disaster risk reduction education is crucial to optimize the use of both internal and external school resources in effective way to minimize and reduce negative impacts of natural disasters, and contribute to the enhanced resilience for the education sector and for the community as a whole [15].

According to the HFA framework, the United Nations Educational, Scientific, and Cultural Organization developed the Comprehensive School Safety framework that enables education departments and associated partners to effectively execute disaster management tasks. The three main themes of this framework [16] are *safe learning facilities, school disaster management, and DRR and resilience education*. For *safe learning facilities*, safe environments are provided to the various stages of facility construction including site selection, plan, design, construction, and maintenance (including continual assessment of safety and facility); for *school disaster management*, safe learning environments are maintained and continuing education is planned by the combination of central and regional education departments, communities, and disaster management units; and for *DRR and resilience education*, community safety and resilience culture are cultivated. The content of the Comprehensive School Safety framework includes conducting participatory vulnerability analysis; integrating students, teachers, parents, school managers, regional government, and other key actors; investing in the fundamental facilities of schools to enhance the safety of school buildings and surrounding environments; using schools as community action centres for training and

coordinating DRR tasks; and enhancing students' and communities' understanding of climate changes, disaster prevention, and related relief tasks [1]. Effectiveness of DRR curricula can be inspected through six dimensions, namely curriculum content, teaching methods, student assessments, teachers' professional development, learning outcomes, and curriculum integration [14]. Action Aid's five-year Disaster Risk Reduction through Schools project have been implemented in Bangladesh, India, Nepal, Ghana, Malawi, Kenya, Haiti, Congo, and Zambia, converting more than 100 schools to community disaster management centres.

School disaster management pertains to formulating related plans for ensuring personnel safety and assessing resilience to disasters. Its purpose are (a) protecting students and teachers from harms, (b) minimising the effect of damage and ensuring that children can continually receive education, and (c) cultivating and sustaining safety culture [12]. The process of school disaster management is described as follows:

(a) Assessments and plans: Establish or cultivate school disaster management committees; assess risks, disasters, vulnerability, capability, and resources; and formulate response plans and communication schemes for continuing education. Creation of a comprehensive school-based emergency response plan requires approval, commitment, and support from the highest levels of school leadership; the process must take a top-down approach [2]. The stakeholders such as local government, experts, NGOs, and local community should be included into schools annual action plan [15].
(b) Actual and environmental protection: Alleviate actual disaster risks through structural safety maintenance, regional basic facilities, and environmental DRR. Conduct non-structural DRR through constructing and maintaining safety facilities and firefighting equipment.
(c) Resilience development: Reinforce organisational and resilience capabilities through formulating and executing standard operation procedures (SOPs), response and preventive measures, and training programs.
(d) Drills, monitoring, and improvement: Regularly host situational simulation drills. Formulate assessment indicators for school disaster management through drills, tests, reflection, DRR updates, and preparation plans. A reality-based, scenario-driven approach to school disaster situational simulation drills will contribute to formulate the school-related disaster management measures [8].

School safety and education continuity requires the dynamic and continual participations of managers and all interested parties. The disaster management committee of a school requires a strong leader (the principle or vice principle) and members comprising all interested parties. In addition to school staff, teachers, students, community, and parents, paediatricians, other health care professionals, first responders, public health officials, the media, and school nurses, all need to be unified in their efforts to support schools in the prevention of, preparedness for, response to, and recovery from a disaster [10]. Disaster risk assessment should first involve identifying potential disasters faced by schools and communities, followed by discussing the disaster incidence rates. According to various dimensions (e.g., personnel, actual environments, social culture, economy, environment, social psychology, and education), various types of potential loss faced by schools and communities must be considered to assess the impact of each type of disaster. Multiplying the disaster probability and impact enables determining the disaster risk levels; hence, more severe types of disaster can be prioritised accordingly. Different schools might involve dissimilar levels of disaster preparedness. The locations, designs, and constructions of school buildings might increase or