



Designing a Teacher Knowledge Measurement Tool for Child Safety Education in Disaster-Prepared Schools

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Abstract

Children in Indonesia spend around 7-8 hours at school; therefore, comprehensive child safety protection at schools is needed, and one of them is done through implementing the Disaster Preparedness and Safety Schools (SSSB) program. The authors carried out prior research about developing the Disaster Preparedness and Safety Schools model. To complement the development of the SSSB program done in the previous study (the first stage), this research (the second stage) was carried out. This research aimed to develop key indicators and measuring tools for assessing teacher knowledge about child safety education to support the implementation of the SSSB program. This research applied a literature study and a mixed-method approach with a mixed exploratory sequential design. The analysis of key indicators of teacher knowledge about child safety education was done qualitatively and analyzed using content analysis techniques. The validity and reliability of the instrument were assessed quantitatively. The Cronbach's Alpha value was 0.868, indicating that the measurement instrument is valid and has good reliability. These indicators are very important for building school resilience from multi-disaster risks in terms of teacher knowledge preparation.

INTRODUCTION

Children belong to a vulnerable group in society concerning disasters/accidents and acts of violence that can threaten their safety and lives (Widowati et al., 2019; Widowati, Koesyanto, et al., 2018a). When someone is at the age of a child, it will be easier for him to learn and absorb information, therefore it is considered the best time to give them safety education (Jatmiko, 2012), especially for elementary school-age children to form the basis for the development of thinking skills which will influence the formation of a culture of safety in a certain place (Widowati, Hendriyani, et al., 2018).

Elementary school children need to learn and understand all potential hazards that can

threaten their safety, both at schools and in their homes. Providing safety education as early as possible can contribute to preventing both minor and fatal accidents, which may cause injuries and death (Widowati, Koesyanto, et al., 2018b). Currently, the perspective of safety education for children in Indonesia is not aimed at promotive and preventive purposes. It is still mostly oriented towards disaster risk education. This requires the roles of all related parties, especially the government, in efforts to reduce disaster risks for children (Jatmiko, 2012). This is not only addressed to elementary schools but also to special schools because the level of preparedness for special schools in dealing with disasters is still relatively low (Novalita & Widowati, 2018). Schools

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are environments where children, teachers, and other staff members spend at least six hours each day. As one of the seven categories of public facilities, schools require particular attention in disaster risk reduction efforts due to their high occupancy and the potential for significant casualties and infrastructure damage during disasters (Ristianto, 2019). On the other hand, Indonesia's current condition of schools is not completely safe and child-friendly (Anisah & Sumarni, 2019).

A different situation is found in New Zealand, where most schools have carried out various emergency preparedness activities, including developing plans, directing exercises, and providing hazard education to students. However, a previous study about safety education at schools in New Zealand showed that there were differences among the existing schools in efforts to develop emergency preparedness, so it was still urgently needed to establish indicators as well as standard operating procedures. These are used for emergency preparedness activities to ensure consistency across schools and prioritize school-based emergency management efforts (Tipler et al., 2017).

Lack of awareness with respect to existing resources and the need for teacher training are the most significant barriers to leveraging existing schools' resources in Indonesia. Therefore, it is important to increase the use of resources in schools, such as the use of web-based technology for teacher trainings, integrating disaster preparedness concepts into children's programs, continuous evaluation systems, including disaster education content as a prerequisite in the curricula and adding voluntary teaching as one of the national strategies for curriculum integration in disaster education (Johnson et al., 2014). Previous research at one of the high schools in Indonesia showed that many teachers did not master safety education sufficiently (Sari & Widowati, 2020).

Disaster Preparedness and Safety Schools (SSSB) is a comprehensive child protection concept against multi-hazard threats so that children can be protected from any incidents that may bring harm to them, such as disasters and other incidents of violence (Widowati, Istiono, et al., 2021). The purpose of this study is to develop key indicators and measuring tools for assessing teacher knowledge about child safety education to support the implementation of the SSSB program. Teacher competence and knowledge about child safety education play important roles in supporting the implementation of child safety at schools in Indonesia. Teachers also have strategic

roles in exploring the content of teaching materials and in encouraging all students to utilize all safety resources in their schools optimally (Johnson et al., 2014; Widowati, Koesyanto, et al., 2018a).

Background of the present study

In elementary schools, it is common for some students to get accidents in their schools, and sometimes they need to be referred to hospitals (Hutasoit & Widowati, 2017). Teachers have important roles in safety education, but the reality shows that elementary, junior, and senior high school teachers have limited knowledge about safety education (Sari & Widowati, 2020; Widowati, Koesyanto, et al., 2018b, 2018a). Besides, from the aspect of teaching materials, not all elementary schools' materials present safety education content, either explicitly or implicitly. Previous research showed that in grade one, only 60% of the 10 subjects presented safety education content in the teaching materials. In grade 2, only 14.3% or only 1 of 7 subjects covered knowledge about it. In grade 3, only 90% or 9 out of 10 subjects presented safety education content, except for arts and culture and skills subjects. In grade 4, 100% of 11 themes, in grade 5, around 87.5% or 7 of 8 subjects, and in grade 6, around 50% or 4 of 8 subjects presented safety education content (Widowati, Koesyanto, et al., 2018a).

Knowledge about safety education is obtained not only through education in the classrooms but also through video content for children. A research-based game called "safety education snakes and ladders," which presents 12 thematic images, was proven to be able to support children in increasing their knowledge by around 72.8% from the results of the pre- and post-test scores (Widowati, Hendriyani, et al., 2018). In addition, in another research-based game called "snake and ladder education on violence against children", it was proven to be able to support children in increasing their knowledge about child safety education in the aspect of preventing violence against children by around 150% from the pre and post test scores of the intervention group (Widowati et al., 2019).

METHOD

Research roadmap

This research used a research roadmap design for the development of the SSSB model as the model for comprehensive child safety education which was carried out for multi-years. In the first stage (the identification stage), the identification of child friendly disaster safety educati-

on models in Indonesia was carried out, starting from assessing the schools' commitment to child safety education, reviewing the existing teaching materials and analyzing the extent to which these teaching materials presented safety education for children comprehensively, describing the condition of existing infrastructures in schools (whether they had a safety perspective or not), and examining children's games that contained safety values for children. The second stage (the recognition stage) focused on assessing what had been and had not been done in schools related to child safety education in both public and private schools, as well as in special schools. Besides, explorations of incidents that had occurred in schools caused by multi-faceted threats were also conducted in the second stage.

The third stage, the development stage, is divided into two phases: the initial development phase and the final development phase. The initial development phase involved an exploratory study to determine key indicators for the SSSB system as a model that uses a comprehensive approach to providing safety education services for children in schools. In this initial phase, a Confirmatory Factor Analysis (CFA) test was conducted, and the results of the first phase of the research were published. Meanwhile, the final development phase of this publication is focused on developing key indicators at the education service provider level, namely teachers.

Research design

This research used a literature study and a mixed-method approach with a mixed exploratory sequential design. The process of analyzing key indicators used a qualitative approach, and the testing of the validity and reliability of the instruments used a quantitative approach through a cross-sectional study design.

Research procedure and participants

This study implemented purposive sampling (qualitative) and accidental/non-probability sampling (quantitative) techniques as the sampling techniques. Respondents (key informants) who possess knowledge about child safety education from multi-hazard threats were chosen in purposive sampling for qualitative data sources. The samples for collecting qualitative data were 21 key informants consisting of 1 respondent (5%) from the Regional Disaster Management Agency (BPDB) of the Special Region of Yogyakarta, as one of the provinces which is prone to disasters in Indonesia; 3 respondents (14%) from the Women Empowerment and Child Protection

Service who came from several disaster-prone areas in Indonesia such as Central Java Province, Yogyakarta Special Province and Semarang City; 3 respondents (14%) from the Education Authorities of Semarang City, Sleman Regency and Yogyakarta City; 3 respondents (14%) from the members of Non-Government Organizations (NGO) i.e., 2 people from UNICEF, and 1 person from the Association of Indonesian Health Consultants; 8 respondents (38%) from representatives of public elementary schools; and 3 respondents (14%) from private elementary schools.

Meanwhile, the sampling technique for the quantitative approach used accidental/non-probability sampling techniques because the population size was not certainly recorded/known. They were teachers who worked in public and private elementary schools located in disaster-prone areas in Indonesia and were willing to participate in an online survey to collect research data. The quantitative sample in this study were 243 respondents from school representatives, 209 respondents (86.01%) from public elementary schools and 34 respondents (13.99%) from private elementary schools. All respondents, both teachers and key informants who participated in this study, had signed the consent forms before participating in this research. This research protocol was approved by the Health Research Ethics Committee of Universitas Negeri Semarang, Indonesia number 122/KEPK/EC/2021.

Data collection

The data collection process began with explaining the purpose and scope of the study to the respondents and then continued with signing the consent forms. The qualitative data collection technique for this research used an in-depth interview process using an interview guide for key informants. The data obtained were analyzed by using content analysis.

The quantitative data collection technique used in this study was questionnaires sent to the respondents through Google Forms. The internal consistency test used in this study was Cronbach's Alpha (alpha coefficient) through SPSS 20.00 version for Windows (IBM Corp., Chicago). The quantitative data analysis was carried out through a single test of reliability, i.e., a set of tests given to a group of subjects, so that the test resulted in only one set of data. The alpha coefficient categories were as follows (Azwar, 2018; Budiastuti & Bandur, 2018):

- 0 = Without reliability, there is no validity.
- > .70 = Acceptable reliability.

> .80 = Good reliability.
 .90 = Excellent reliability.
 1 = Perfect reliability.

Data analysis

Several stages were carried out to implement the data analysis processes. The first stage was a literature study using 13 main references to find the main indicators in assessing teacher knowledge about child safety education based on relevant references. The 13 main references used were: Law of the Republic of Indonesia Number 24 of 2007 concerning Disaster Management; Law of the Republic of Indonesia Number 35 of 2014 concerning Amendments to Law Number 23 of 2002 concerning Child Protection; The indicators in the Hyogo Framework for Action 2005-2015; Sendai Framework for Disaster Risk Reduction 2015-2030; Strategy for Mainstreaming Disaster Risk Reduction in Schools; Module 1 on Safe School Facilities; Module 2 on Disaster Management in Schools; Module 3 on Risk Reduction Education; Disaster Preparedness School Framework; Guidelines for Implementing Safe Schools/Madrasahs (Islamic schools) from Disasters; FRESH (Focusing Resources on Effective School Health); Child Friendly School Guidelines from the Ministry of Women's Empowerment and Child Protection; and Guidelines for Disaster Safe Education Unit (SPAB). The second stage was in-depth interviews using an interview guide through open-ended questions with key informants. The interviews were conducted separately and individually. This was done to reduce bias among the opinions of the interviewees. The results of these interviews were then recapitulated. The third stage focused on the content analysis process. The results of the literature study and the interviews of experts were analyzed in more detail and critically. The indicators were regrouped according to their close meanings, so the finalized key indicators were obtained. The fourth stage was about field trials. The trials were addressed to some groups of teachers. The quantitative data from these trials were analyzed using SPSS 20.00 version for Windows (IBM Corp., Chicago).

RESULT AND DISCUSSION

Results of respondents' characteristics from schools

A total of 243 respondents participated in this study. There were 62 male respondents (26%) and 181 female respondents (74%). There were 113 respondents (46.50%) who had the length of service under 10 years, 5 respondents

(2.06%) have worked for 10 years, 120 respondents (49.38%) have worked for more than 10 years and those who did not answer were 5 respondents (2.06%).

Results of the literature study and interviews with experts

Based on 21 expert opinions from public and private elementary schools, Regional Disaster Management Agency (BPDB), Women Empowerment and Child Protection Service, Education Authorities and Non-Government Organizations, a content analysis was conducted. The results were compared and validated with literature from 13 references used in this study to reduce bias in generating key indicators. 14 assessment parameters were produced with 80 questions that were used to measure teacher knowledge about child safety education to support the implementation of SSSB. These results were presented in Table 1. The parameters in this study were categorized through the System Building Approach (SBA) using three main components: norms, structure, and process.

The description of validity, reliability and the calculation of measuring instruments' test results

In this study, a qualitative analysis was carried out using content analysis which was compared with the results of literature studies, so that in the next stage it was only strengthened by validity and reliability tests using SPSS software. The validity of the measuring instrument was emphasized through the value of $r_{\text{count}} > r_{\text{table}}$, r_{table} for a total sample was equal to 0.138. Of the 80 item questions available in the item total statistics (corrected item-total correlation) table, it could be seen that 29 (36%) items had an r below 0.138, so it was declared invalid. Therefore, it could be said that only 51 question items (64%), according to statistical tests using SPSS software, were declared valid. While the 29 item questions were P1, P5, P16, P17, P19, P20, P23, P24, P25, P26, P27, P28, P29, P31, P32, P33, P35, P36, P37, P41, P47, P48, P51, P55, P60, P64, P74, P79, P80 must be removed from the list of measuring instrument questions so that one parameter must be dropped, i.e., the recovery of post-disaster education services by schools. This is shown in Table 2.

Meanwhile, the results from the Cronbach's Alpha (r_{count}) value were 0.868. To measure whether this measuring instrument was reliable or not, the results of the Cronbach's Alpha value (r_{count}) were compared to the r_{table} value. Because the r_{count} was greater than the r_{table}

Table 1. Early Indicator Design

No.	Components	Parameters	Number of Question
A	Norm	2 Parameters	16
1		Policy	10
		Child friendly school policy	6
B	Structure	3 Parameters	22
1		Institutional	4
2		Child participation	2
3		Infrastructure and facilities	16
C	Proses	9 Parameters	42
1		Teaching and learning process	9
2		Disaster mitigation plan	7
3		Procedure	4
4		Disaster program in schools	6
		Protection implementation program	1
5		Simulation and trainings	5
6		Monitoring	4
7		Partnerships	4
8		Post-disaster education service recovery by schools*	2
	3 Components	14 Parameters	80

* - Parameters which were declared statistically invalid and deleted from the measuring instrument parameters

for an error level of 5 % (0.138), it could be concluded that all valid items (51 items) for this measuring instrument were also reliable and could be used for assessment. The Cronbach's Alpha value of 0.868 corresponded to the alpha coefficient category which meant it had good reliability because it was more than ($> .80$). Therefore, it could be said that of the 80 item questions only 51 items (64%) were stated to be statistically valid and had good reliability so that the measuring instrument could be used to measure teacher knowledge about child safety education to support the implementation of SSSB.

After testing the validity and reliability, the next step was determining the category of the level of teacher knowledge. In this study, it was divided into four levels of categories, namely poor (score 0-13), adequate (score 14-26), good (score 27-39), and very good (score 40-51). The ways to determine the score for the level of knowledge were as follows:

Determining the class range (after validity and reliability tests).

The class range = maximum score – minimum score.

The class range = $51 - 0 = 51$.

Determining the class intervals by using four

ranking categories.

Determining the range.

$R = 51/4 = 12,75 \approx 13$

Each indicator point was given the same weight, namely 1, and the total points were calculated by adding up the correct answers on the list of questions that had been prepared (Table 3.).

School challenges during the pandemic (for example, biological hazards) as part of non-natural disaster mitigation

Good knowledge about child safety education against multi-hazard threats is very important for teachers and is urgently needed in all schools. This includes threats and risks from biological hazards, such as the SARS-CoV-2 Virus. When COVID-19 became a pandemic, the perception of its risks and spread played important roles in self-protection and prevention (Y. Chen et al., 2021). One of the challenges faced by school principals and teachers was mainly related to distance learning programs (Constantia et al., 2023). Online teaching was carried out on a large scale during the COVID-19 pandemic worldwide (Zou et al., 2021). This was done to prevent the transmission of COVID-19. Almost all educational institutions were closed and advised to switch

Table 2. The results of the validity of measuring instrument tests

No of item	Corrected item-total correlation value (r count)	r table value	No of item	Corrected item-total correlation value (r count)	r table value
P1*	0,000	0,138	P41*	,125	0,138
P2	,426	0,138	P42	,443	0,138
P3	,226	0,138	P43	,197	0,138
P4	,197	0,138	P44	,548	0,138
P5*	-,044	0,138	P45	,261	0,138
P6	,539	0,138	P46	,274	0,138
P7	,163	0,138	P47*	-,074	0,138
P8	,581	0,138	P48*	,111	0,138
P9	,435	0,138	P49	,182	0,138
P10	,535	0,138	P50	,226	0,138
P11	,141	0,138	P51*	,133	0,138
P12	,423	0,138	P52	,249	0,138
P13	,409	0,138	P53	,143	0,138
P14	,265	0,138	P54	,491	0,138
P15	,550	0,138	P55*	0,000	0,138
P16*	,107	0,138	P56	,483	0,138
P17*	,117	0,138	P57	,517	0,138
P18	,344	0,138	P58	,612	0,138
P19*	,014	0,138	P59	,185	0,138
P20*	,123	0,138	P60*	,080	0,138
P21	,443	0,138	P61	,485	0,138
P22	,417	0,138	P62	,264	0,138
P23*	0,000	0,138	P63	,538	0,138
P24*	-,006	0,138	P64*	,018	0,138
P25*	-,372	0,138	P65	,514	0,138
P26*	,083	0,138	P66	,265	0,138
P27*	,112	0,138	P67	,182	0,138
P28*	,070	0,138	P68	,568	0,138
P29*	,013	0,138	P69	,182	0,138
P30	,231	0,138	P70	,222	0,138
P31*	,132	0,138	P71	,237	0,138
P32*	-,046	0,138	P72	,607	0,138
P33*	,072	0,138	P73	,566	0,138
P34	,235	0,138	P74*	,113	0,138
P35*	,035	0,138	P75	,491	0,138
P36*	-,082	0,138	P76	,525	0,138
P37*	0,000	0,138	P77	,449	0,138
P38	,450	0,138	P78	,202	0,138
P39	,514	0,138	P79*	-,077	0,138
P40	,242	0,138	P80*	,090	0,138

* - Items which were declared statistically invalid

Table 3. Measuring tool for assessing teacher knowledge about child safety education to support the implementation of the Disaster Preparedness and Safety Schools

Parameters	Number of Question	Question Code (P)	Measuring tool assessment questions	Status F/NF Score
Answer the questions below by choosing "correct" or "incorrect"				*F / Correct = 1 *F / Incorrect = 0 **NF / Correct = 0 **NF / Incorrect = 1
Policy	8	2	Schools are not required to have regulations related to disaster risk reduction efforts in schools because disaster risk reduction efforts are not included in the academic contexts.	NF
		3	School policy documents containing requirements for disaster-safe building construction are only needed to be kept at the education authorities/foundation.	NF
		4	Each school needs to have a decree or document stating the integration of disaster preparedness and accident prevention materials into relevant compulsory lessons, local content subjects and extra-curricular activities.	F
		6	There is no need for policies related to schools services in multi-disaster emergency situations because disaster-related policies are sufficiently implemented by the Regional Disaster Management Agency (Badan Penanggulangan Bencana Daerah /BPBD).	NF
		7	It is necessary to determine the assignment letter for educators and education staff in the implementation of educational services in multi-disaster emergency situations.	F
		8	School policies do not need to accommodate child perspectives because they only regulate normative rules that focus on improving students' academic achievement.	NF
		9	Knowledge about physical, psychological violence, sexual crimes and other crimes against children do not need to be given at schools because they are included in the non-academic contexts.	NF
		10	Schools have limited budgets therefore schools do not need to allocate a certain budget to support preparedness activities in anticipating disasters and threats from multi-hazards.	NF
		11	Schools need to have an anti-violence policy where the drafting process must also involve the students.	F
Child friendly school policy	5	12	Preventing students from dropping out of schools is purely the responsibility of the parents of students and not the responsibility of the schools.	NF
		13	Training on child rights and child friendly schools (Sekolah Ramah Anak/SRA) for educators and education staff is not really needed because it can be easily understood.	NF
		14	Schools are required to ensure the mainstreaming of Disaster Risk Reduction (DRR) and accident prevention in the teaching and learning process.	F
		15	Health materials do not need to be integrated into the teaching and learning process but are sufficiently included in extracurricular activities.	NF
		18	It is sufficient for the disaster preparedness team at schools to be managed by active school teachers and chaired by the school principal.	NF
Institutional SSSB	1	21	In developing school policies and regulations there is no need to involve students because they have been represented by the existence of the school committee.	NF
		22	It is quite dangerous for students to be included as the members of the child friendly schools (Sekolah Ramah Anak/ SRA) team.	NF
Child participation	2	30	Light fire extinguisher (Alat Pemadam Api Ringan/ APAR) must be placed centrally in the teacher's room so that it is easy and fast to use.	NF
		34	There is no need to separate the access distance between the toilets for male and female students as long as their toilets are separated.	NF
		38	Schools do not need to have grievance boxes for students because counseling services are available at schools.	NF
Teaching and learning process	7	39	There is no obligation for schools to provide an introduction and understanding to students regarding exposure to hazards, vulnerabilities, risks, types of disasters, sources, magnitude of disaster hazards and types of efforts can be made to reduce the risks of hazards and disasters because these are only supporting teaching and learning activities at schools.	NF
		40	Schools are required to carry out practice or simulation before (pre) disaster, when disaster occurs, and after (post) disaster periodically and is attended by all school members.	F
		42	Reproductive health education is not needed to be taught in schools because students are still underage.	NF
		43	It is necessary to integrate materials on disaster preparedness and anticipating threats from multi-hazards into relevant compulsory subjects, local content subjects and extra-curricular activities.	F
		44	No effort is needed to compile preparedness competency standards in anticipating multi-disaster threats into the syllabus and lesson plans because hazard and disaster risk reduction are only extracurricular.	NF
		45	Efforts are needed to evaluate preparedness lessons and activities in accordance with the indicators set out in the competency standards.	F
		46	Assessment process through comparing one student with another is important to increase children's motivation in learning.	NF

Parameters	Number of Question	Question Code (P)	Measuring tool assessment questions	Status F/NF Score
Answer the questions below by choosing "correct" or "incorrect"				*F / Correct = 1 *F / Incorrect = 0 **NF / Correct = 0 **NF / Incorrect = 1
Disaster Mitigation Plan	5	49	It is necessary to conduct the process of organizing, counseling, training, and rehearsal related to the emergency response mechanism.	F
		50	The development of school buildings, adding/reducing classes and the adding other buildings need to be supported by medium-term planning and adjusted to the safe school facilities standards.	F
		52	School operational contingency plans must consider those with disabilities, distance and access to transportation.	F
		53	The early warning system must be understood by all school members, including students.	F
		54	Schools do not need to make copies/ duplicates of important documents that must be kept in a safe place because there are so many school documents.	NF
Procedure	3	56	The standard operating procedure documents and/ or contingency plans and evacuation procedures that have been prepared previously do not have to be reviewed and updated periodically because they are relatively stable (do not experience significant changes).	NF
		57	Schools are not required to develop accident prevention procedures and disaster warnings system that explain disaster warning signs/sounds, warning activation mechanisms, warning cancellations and safe conditions after the disaster ends because schools are not workplaces that have a high hazard factor at schools.	NF
		58	Job descriptions and work procedures for disaster preparedness groups in schools do not need to be prepared because schools are very simple units.	NF
Disaster program in schools	4	59	Schools have an obligation to carry out outreach activities related to accident prevention systems, disaster warnings in schools to all school members to increase knowledge of multi-hazard risk reduction and preparedness.	F
		61	Schools are not required to evaluate the level of security and preparedness on a regular basis because they do not have this capacity.	NF
		62	Schools make an annual report on the implementation of multi-hazard risk reduction programs and disaster events in their respective education units to the regional government (education authorities).	F
		63	Activities that need psychosocial support are not too urgent to be integrated into learning activities in a disaster emergency because the most important one is to build the physical resilience of schools to withstand natural disasters.	NF
Protection Implementation Program	1	65	There is no need for cross-sectoral coordination with related institutions in implementing child protection in schools because child protection issues in schools are only the domain of schools and school committees.	NF
Simulation and Trainings	5	66	The availability of school information media such as wall magazines, libraries, books, modules containing knowledge and information on multi-hazard risk reduction does not play an important role in increasing the capacity of school members regarding multi-hazard risk reduction.	NF
		67	Schools need to carry out disaster simulation or drilling activities regularly by involving the surrounding community.	F
		68	Schools do not need to carry out multi-hazard risk reduction training that is integrated with the educational unit level curriculum because this activity is outside the school's academic curriculum.	NF
		69	Schools are required to hold first aid training assisted by relevant agencies such as the Red Cross, community health centres/ health authorities.	F
		70	Educators and school staff must be trained for convention of the rights of the child.	F
Monitoring	3	71	The school has a participatory monitoring and evaluation system related to multi-hazard management in schools.	F
		72	Schools do not need to carry out monitoring and supervision of the implementation of child protection in their schools because this is outside the main duties and functions of them.	NF
		73	For schools that have never experienced a disaster in their areas, there is no need to have a monitoring and evaluation mechanism for school preparedness and safety.	NF
Partnerships	4	75	Schools do not need to cooperate with Regional Disaster Management Agency (Badan Penanggulangan Bencana Daerah/BPBD), social service agency/ disaster preparedness cadets (Taruna Siaga Bencana/ TAGANA), fire departments, community health services, Indonesian national army, Police and other government agencies to support the implementation of disaster risk reduction in schools because schools have an official main agency, namely the education authorities.	NF
		76	Schools do not need to cooperate with local parties (such as villages and sub-district officials) in implementing disaster management because they are outside the school system.	NF
		77	Schools only need to develop cooperation with disaster and education monitoring institutions, such as the Red Cross and Scouts to support the implementation of disaster mitigation in schools through extracurricular activities.	NF
		78	Schools need to create communication access to official disaster warning information from Meteorology Climatology and Geophysics Council/ (Badan Meteorologi, Klimatologi, dan Geofisika/ BMKG, Regional Disaster Management Agency (Badan Penanggulangan Bencana Daerah/ BPBD), local government and the media.	F

----*F: Favourable and **NF: Unfavourable

to online learning/platforms (Twinamasiko et al., 2021). The pandemic has not only significantly reduced student mobility but also the flow of student mobility, especially international students (Mok et al., 2021). The concept of blended learning, which combines online and face-to-face learning, has become popular in the educational environment (Ashraf et al., 2021). In addition, the selection of digital content has also been a challenge faced for several decades (Zhong et al., 2021). People's fears relating to COVID-19 seem to be increasing due to misinformation spread across all types of media, especially through social media (Superio et al., 2021).

The existing schools have been able to deal with rapidly changing circumstances to continue providing education services to their students without significant interruption, even though their approaches might vary (Ermenc et al., 2021). For example, by making some adjustments to the system/curriculum design to help remove barriers in online learning, including helping students with disabilities to be able to access e-learning during the pandemic (Mohammed Ali, 2021).

Preparedness through the EWS/Early Warning System to anticipate the emergence of future spread of COVID-19 was also an important strategy that must be considered (Fearnley & Dixon, 2020). This can be done by including building school resilience through a multi-hazard approach (Widowati, Istiono, et al., 2021), building a multi-hazard application system (Dallo & Marti, 2021), and using social media wisely can also be an alternative to build a disaster preparedness system in the future (M. Sakurai & Adu-Gyamfi, 2020).

The urgency of implementing a multi-hazard mitigation system in schools

Ideally, schools should implement disaster risk reduction policies by integrating disaster prevention education into the school curricula (Baytiyeh & Naja, 2014; C. Y. Chen & Lee, 2012). However, disaster risk reduction policies alone are not enough, considering that children are not only exposed to disaster risks but also to acts of violence against them at schools. Therefore, schools should ideally implement anti-bullying policies because there are fewer reports of bullying incidents at schools that implement anti-bullying policies (up to 8.4%) than those without these policies (Nikolaou, 2017). Those circumstances show that the implementation of the SSSB program with a multi-hazard approach is very important to be implemented in schools.

To support the implementation of the

SSSB program, schools were also required to have an annual plan and budget to carry out various exercises. For example, to increase teacher knowledge, at least once a year, it was necessary to carry out evacuation drills and practices and establish coordination with relevant stakeholders (A. Sakurai et al., 2018). Disaster Risk Reduction/DRR training was compulsory to be integrated into the school curriculum (International Federation of Red Cross and Red Crescent Societies, 2015). This training, including emergency evacuation drills and strengthening emergency response teams, also included training for teachers, students, and parents/committees (C. Y. Chen & Lee, 2012; Hosseini & Izadkhah, 2006). Providing safety education materials would also help them control emergency situations effectively, including designs for psychological recovery after disasters (C. Y. Chen & Lee, 2012; Hosseini & Izadkhah, 2006).

Besides, schools were also required to have infrastructure related to multi-hazard risk reduction; for example, there must always be an emergency response team available in schools (O'Connor, 2013), and disaster prevention maps must also be available (C. Y. Chen & Lee, 2012). Schools were also required to have more than one emergency evacuation area that were agreed upon and known by everyone (O'Connor, 2013) and an emergency communication system so that they could easily send messages to all parents to inform them about what was happening at schools (O'Connor, 2013).

In addition to curriculum, training and infrastructure, schools must also have DRR implementation guidelines (International Federation of Red Cross and Red Crescent Societies, 2015). One of them was a guide to measure the level of teacher knowledge about implementing multi-hazard risk reduction in schools to reduce the risk of serious impacts. Evaluation tools or systems must cover at least aspects of school infrastructure safety, security, vulnerability and risk assessment (C. Y. Chen & Lee, 2012). Technical assistance should also be available for regular assessments of school management (i.e., teachers, principals and school committees) to assist them in understanding school safety status (A. Sakurai et al., 2018).

Teachers must be given professional development about crisis management to be better prepared to deal with any possible risks (Mutch, 2015). This teacher knowledge assessment tool assisted schools and supporting agencies, for example, the Education Authorities and BPBD, in developing program plans and activities that

were more appropriate for capacity building through intervention programs for teachers, principals and all other education staff, including support staff such as security and cleaning teams. One of them was by providing various information to teachers and staff in schools to improve their competence about safety aspects, because this information led them to be more familiar with emergency protocols, so the emergency procedures can be managed if an actual disaster occurred (Schmidt, 2018). Post-disaster recovery was one of the crucial aspects of disaster mitigation. However, the results of the statistical tests conducted in this study indicate that the assessment items related to the post-disaster recovery aspect indicators are not statistically valid. This is likely because the prevailing paradigm regarding disaster management is still dominated by pre-disaster preparation and what to do during a disaster, while still under-emphasizing what to do after a disaster occurs.

The role of teachers in multi-hazard reduction in schools

The COVID-19 pandemic impacted countries worldwide and called for an urgent need to enhance individual and societal capacity and even public health interventions to respond to the disease outbreak (Madan et al., 2021). Teachers were important actors in providing knowledge for children to form good practices in dealing with multi-hazard threats, including COVID-19. Understanding various practices at the individual level was important for reducing the transmission of the disease at the community level (Madan et al., 2021). This could improve how the community, especially students, prepare themselves to respond more quickly, effectively and proactively to the new outbreaks of infectious diseases that may emerge (Reddin et al., 2021). This emphasizes that teachers were not only required to possess knowledge about child safety education but also to update their knowledge according to existing environmental conditions. To enhance school resilience in the face of multi-hazard threats, schools must be able to integrate their commitment into the curriculum—including the provision of safety information, facilities and infrastructure, and preparedness and monitoring systems—to continuously build the capacity of the school community (Widowati, Sutomo, et al., 2021).

Implications

The roadmap of this research has shown that research on preparing the SSSB model has

only reached the first stage (preparing a model of services and systems in schools). The second stage (preparing key indicators measuring teachers' understanding regarding the comprehensive approach to safety education in schools) is still needed for further research (stage 3). The third stage needs to focus on developing a measuring instrument for assessing the knowledge of students and parents/committees about multi-hazard threats to measure the mirror effects on the availability of a comprehensive safety system in schools, and good knowledge of teachers about child safety education. This instrument is very useful in supporting the government, especially the education authorities and schools, in implementing the SSSB program and conducting self-assessments to build school resilience from multi-hazard threats/risks.

CONCLUSION

This instrument is very useful to help schools in identifying the level of teacher knowledge regarding the concept and application of child safety in the context of disaster risk reduction, so that schools can design the need for teacher capacity building by utilizing various resources effectively and efficiently. Furthermore, this instrument can be used as input in developing plans for the implementation of disaster-safe schools through the development of team capacity building designs, procedures, educational media, and evaluation media that can assess the extent of school efforts in implementing comprehensive disaster preparedness. The assessment results from this instrument can support evidence-based policy making for continuous improvement efforts. Therefore, this instrument can complement preparedness assessment instruments at the school level and can contribute to building safety awareness and safety culture in schools.

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DECLARATION OF GENERATIVE AI

This manuscript received limited assistance from an AI-based language tool (Quillbot and ChatGPT) for language refinement and grammar checking. The authors critically reviewed and fi-

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DECLARATION OF COMPETING INTEREST

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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