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AN EX POST FACTO STUDY ON DISASTER PREVENTION AND RISK REDUCTION EDUCATION IMPLEMENTATION IN SPECIAL EDUCATION SCHOOLS IN INDONESIA

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Abstract
Indonesia is taking proactive steps to enhance disaster resilience and safeguard its citizens through the implementation of the *Satuan Pendidikan Aman Bencana* (SPAB). However, in disaster contexts, children with special needs and disabilities (SEND) are frequently overlooked. To further improve SPAB implementation, this research aims to investigate the cause-and-effect relationships between the compliance-based status of disaster prevention and risk reduction education in special education schools, the challenges teachers face, and the strategies employed in teaching disaster education to children with special needs and disabilities. The study employed ex post facto research design to investigate the cause-and-effect relationships between variables. Data from interviews and brief surveys were analysed using the *phi* coefficient, a nonparametric tool that assesses the strength and direction of correlations between variables. The researchers collected information from twenty-three special education teachers, and thirteen school principals and public relations officers across twelve special education schools in the Special Region of Yogyakarta. The results suggest that compliance-based implementation has an inverse effect on the main challenges that teachers encounter. As the quality of compliance with the specific provisions in SPAB increases, the barriers to teaching disaster education among students with special needs and disabilities decrease. However, it is important to consider that not all challenges that emerged during the implementation of disaster education were influenced by mere compliance with the SPAB provisions.

Keywords: comprehensive school safety, disaster prevention, risk reduction education, special education school

Introduction
In a humanitarian setting, disability is an interdisciplinary concern that increases the risks for vulnerable individuals who are often neglected during emergencies. More than nine percent of Indonesia's population have disabilities since the country is prone to disaster persons with disabilities face more risks and

dangers in the event of a disaster. Unfortunately, an international survey highlighted the disproportionate impact on persons with disabilities (PWDs) during disasters. Their needs are often neglected in official disaster risk reduction and management planning processes, leading to increased vulnerability (UNISDR, 2013; Robinson & Kani, 2014).

Though Indonesia has been taking disaster management seriously since the devastating 2004 earthquake in Aceh, there remains a significant gap in its implementation. Inter-ministerial coordination is still the weak link in achieving the main goal of disability-inclusive disaster risk reduction and management. While national laws recognize persons with disabilities (PWDs) as vulnerable in disasters, local laws have only recently acknowledged their active role in disaster risk reduction. Despite this, the disability community remains at risk during disasters due to limited knowledge in managing PWDs before and after these events. Moreover, the persistent misconception that PWDs are inherently deficient and weak still prevails (Ayuningtyas et al., 2014; Pertiwi et al., 2020; Rahmat & Pernanda, 2020).

Disruptions caused by natural disasters result from interruptions to the educational opportunities for children. Learning of children is reduced after they experience natural calamity. School performance of children is negatively affected in different levels (Gibbs et al., 2019). In Indonesia, beyond fatalities, disasters caused infrastructure damages to public service facilities including those in the education sector (Badan Penanggulangan Bencana, 2016). Indonesia over the past 15 years faced 10 major and medium-scale disasters which damaged more than 47,000 schools. These disasters not only destroyed school buildings but also jeopardized the safety of the students, educators, and staff, disrupting student's learning and development and causing significant losses in the education sector (Ministry of Education and Culture, 2018). Moreover, Indonesia's previous disasters approximately damaged 1% of special education school facilities (Disaster Resilient Education, 2019). Following a disaster, the country's enrolment rates decrease, often exacerbated by poverty (Rush, 2018).

In Indonesia, about 0.8% of the population are school-age children with disabilities. These children additional challenges in disaster due to functional limitations and societal barriers, often experiencing rights violations like neglect and family separation. Greater exposure to hazards increases children with disabilities' vulnerability during emergencies. Despite the severe impact, the special education sector's involvement in disaster prevention and preparedness remains minimal (Peek & Stough, 2010; Schiariti, 2020; Torani et al., 2019). Children with disabilities are often neglected during a disaster, which makes them more vulnerable. Research shows that families of children with disabilities are not ready to accommodate the needs of the children with disabilities and ensure their safety. Especial treatment from the local government for persons with disabilities should increase (Riviwanto et al., 2021). Well-designed disaster education programs greatly impact children's contributions to household preparedness and safety, and shape how they'll respond to disasters as adults (Johsons et al., 2014).

As part of worldwide initiatives to ensure safe, equitable, and consistent access to high-quality education for all, the Global Alliance for Disaster Risk Reduction and Resilience in the Education Sector (GADRRRES) has created the Comprehensive School Safety Framework (CSS). This framework provides an

inclusive approach to enhancing resilience and safety in the face of various hazards and risks that impact the education and child protection sectors (GADRRRES, 2022). To enhance resilience in the face of disasters, the Ministry of Education and Culture in Indonesia has adopted the Comprehensive School Safety Framework (CSS), known locally as the Disaster Safe Educational Unit or "Satuan Pendidikan Aman Bencana" (SPAB). According to Ministerial Regulation No. 33 of 2019, the SPAB program is implemented during pre-disaster, disaster, and post-disaster phases. As part of the disaster risk reduction (DRR) education program, teachers and SPAB focal persons utilize various teaching media to enhance teaching and learning activities. The effective use of teaching media significantly impacts the sustainability of the SPAB program. Additionally, schools play a crucial role in realizing the three main pillars of the SPAB program: safe school facilities, disaster management within schools, and disaster prevention and risk reduction education (Disaster Resilient Education, 2019).

In the Special Region of Yogyakarta, which is one of the high-risk disaster areas in Indonesia, the *Satuan Pendidikan Aman Bencana* (SPAB) has been fully adopted through Governor Decree No. 89 of 2019. This decree outlines the responsibilities of local agencies in enhancing community resilience to disasters by providing disaster prevention and risk reduction education to all individuals, without discrimination (Badan Penangulangan Bencana Daerah DIY, 2021). To address various emergencies, including man-made disasters like COVID-19, the local government in the Special Region of Yogyakarta amended the law through Governor Decree No. 110 of 2021 (PerGub No.110, 2021).

The Special Region of Yogyakarta, situated on Java Island within the Indonesian archipelago of 17,508 islands, is recognized as one of the country's disaster-prone areas. Extensive research indicates that the region faces several hazards, each with the potential to escalate into a full-blown disaster. Based on the research, the region is at risk of several hazards that have huge potential of becoming a disaster. It includes earthquakes, flooding, landslides, strong wind, and fire (Lavigne, 1999; Muntafi, 2016).

Major disasters from previous years such as the 2006 Yogyakarta earthquake damaged and destroyed a total of 2,900 educational facilities (Disaster Resilient Education, 2019), and 949 of these were educational infrastructures. In the Bantul area, significant damage occurred among the districts in Yogyakarta. This had a severe impact on the continuity of schooling (BAPPENAS, 2006). During the previous eruption of Mount Merapi, schools were forced to close due to the damage. Additionally, in other regions, school facilities were repurposed as evacuation centers, which adversely affected education (Setiadi, 2014).

Following the 2006 earthquake, a range of measures were implemented by local government bodies in the Special Region of Yogyakarta alongside non-governmental organizations. These initiatives aimed to aid recovery and promote development. Notably, they included contingency planning and disaster education. The Provincial Disaster Mitigation Agency (BPBD) played a pivotal role in cultivating a resilient mindset regarding disasters. They facilitated school needs and empowered stakeholders through educational programs focused on disaster preparedness and response (Rifaldi et al., 2023). The regional disaster risk reduction forum has demonstrated effective coordination, characterized by clear objectives, a well-defined organizational framework, established roles, clear lines of authority,

and efficient communication channels (Fitriyanto et al., 2017). Meanwhile, the disaster education strategy for various special education schools in the Special Region of Yogyakarta remains in its infancy, largely attributed to the teachers' recent training in the SPAB program's procedures (Indriasari & Kusuma, 2019).

Studies indicate that several special education units in the Bantul district are at a moderate to high risk of incurring damage from earthquakes, thereby heightening the vulnerability of children with special needs and disabilities (SEND) during disasters. Furthermore, a significant disparity has been observed in the disaster prevention and risk reduction educational initiatives between public and private special education institutions (Badan Penangulangan Bencana Daerah DIY, 2021; Viana et al., 2022).

In the Sleman district, there's a scarcity of research on the adoption of the Disaster-Resilient Education Unit (SPAB) within special education settings. However, it has been discovered that many mainstream education institutions in the area possess a moderate to substantial level of preparedness for disaster situations (Kurniawan et al., 2021; Roswanto, 2022; Yugyasmono & Kurniawan, 2021) however, the effectiveness of the implementation is notably low (Wicaksono & Sibuea, 2022). According to the 2020 report by the Provincial Disaster Mitigation Agency (BPBD), merely three special education units across the districts of Bantul, Kulon Progo, and Sleman have been acknowledged as schools safe from disasters (Badan Penangulangan Bencana Daerah DIY, 2021).

Reflecting on the preceding discussions, multiple research gaps have been pinpointed. These include a lack of research into the implementation of the *Satuan Pendidikan Aman Bencana* (SPAB) program within special education units in the three districts of the Special Region of Yogyakarta most susceptible to disasters, a disparity in the application of disaster prevention and risk reduction education between the public and private special education realms, and the emerging state of disaster education programs in special education units, which is largely due to the recent training of educators. The study seeks to delve deeper into the gaps in the SPAB program's implementation in special education settings within the Special Region of Yogyakarta. Its goal is to identify the directional relationships of SPAB implementation to the challenges experienced and strategies adopted by the teachers.

Method

An ex post facto research design was employed in this study to investigate the cause-and-effect relationships between several variables, namely the implementation status of disaster education, teachers' challenges, and strategies in the implementation of disaster prevention and risk reduction education.

In undertaking this study, the researcher conducted in-depth interviews among the twenty-three (23) special education teachers, six (6) school principals, and seven (7) public relations officers from four (4) public and eight (8) private special education units around the disaster-prone districts in the Special Region of Yogyakarta.

Data gathering tools were a quick survey and interview questionnaire. A quick survey using Comprehensive School Safety (CSS) Checklist which was developed in line with the Law No 24 Year 2007 was used to assess the compliance-based status of the disaster education implementation. Meanwhile, interview

questionnaires were employed to determine the strategies and challenges that special education encounters during the disaster education implementation.

The qualitative data from the interview was quantified using thematic analysis and frequency tables. Using thematic analysis the researchers were able to determine patterns which were quantified based on the number of contributing participants. Using the CSS Checklist, there are two expected responses which were yes, and not yet. "Yes" responses were given a score of 1 and not yet responses received 0 score.

This study employed a quantitative method in analyzing the cause-and-effect relationship between variables. The research data were dichotomous categorical variables, and the sample size was randomly selected from the defined population, thus, the phi coefficient was adopted to analyze if the independent variable has a significant proportional or inverse effect on the dependent variables. The Phi coefficient is a non-parametric statistical tool designed to provide a correlation coefficient and significant results. Through phi, the strength and direction of the effect of the variables to each other can also be determined (Frey, 2018).

It used the cross-tabulated table of dichotomous variables.

Table 1. Cross-tabulated table

	y= 0	**y= 1**
x= 0	A	B
x= 1	C	D

The phi coefficient can be calculated using the formula below.

$\Phi = (AD-BC) / \sqrt{(A+B)(C+D)(A+C)(B+D)}$

Phi coefficient takes the values from 0 to +1.0, 1.0 means there is seamless 1-to-1 correlations between variables under investigation (Frey, 2018). Various studies have employed different values in interpreting the strength of association between variables. Thus, to guide this study the table below was used to determine the strength of a significant effect of the compliance-based implementation status of disaster prevention and risk reduction education to the teachers' challenges and change in strategies in teaching disaster education among the children with SEND.

Table 2. Correlation measures (Frey, 2018)

Range	Verbal Interpretation
0.00 to 0.19	No or Very Weak Correlation
0.20 to 0.29	Weak Correlation
0.30 to 0.49	Moderate Correlation
0.50 to 0.69	Strong Correlation
0.70 to 1.00	Very Strong Correlation

Data from the interviews were analyzed using content analysis method and quantified using frequency table. Below is the data analysis procedure used through the content analysis method of Bengtsson (2016); (1) decontextualization, (2) recontextualization, (3) categorization, and (4) compilation. After quantifying the interview data, the statistical instrument discussed beforehand was employed to determine the correlations between variables.

Findings and Discussion

Effect of implementation on challenges identified

Challenges in terms of teaching and learning processes

Table 3. Phi coefficient and *p*-value of DPRRE tasks and responsibilities related to the unsuitable instruction and complexity of modification learning instruction to teach with SEND

DPRRE Provisions/ Task and Responsibilities	phi coefficient value	Correlation Measures (+/-)	*p*-value < 0.05	Verbal Interpretation	Decision on Ho
Multi-hazard risk assessment	0.127	No/Very Weak Correlation	0.565	Not Significant	Accept Ho
Child-centered assessment and planning	0.230	Weak Correlation	0.291	Not Significant	Accept Ho
Teacher training and staff development	0.230	Weak Correlation	0.291	Not Significant	Accept Ho
Disaster Education	0.230	Weak Correlation	0.291	Not Significant	Accept Ho
Community-based extracurricular and informal education	0.353	Moderate Correlation	0.099	Not Significant	Accept Ho
Integrated into the curriculum	0.434	Moderate Correlation	0.039	Significant	Reject Ho
Key messages based on consensus	0.273	Weak Correlation	0.207	Not Significant	Accept Ho

Three primary challenges related to the teaching and learning process emerged from the responses of the respondents. Based on the result of the correlations test, with a phi coefficient value of 0.434 and p-value of 0.039, compliance in integrating DPRRE into the curriculum has a significant proportional effect to the unsuitable instruction and complexity of modification of the learning instruction specific to each student with SEND, one of the challenges identified by the respondents.

It means that the higher the compliance in integrating disaster education into the curriculum the higher the chance that teachers identify and experience the complexity in modification of the learning instruction for the students with SEND. In the special education context, modification of learning instruction for students with SEND is expected depending on the specific needs of the student, thus, integration of disaster education into the main curriculum could increase the chance of challenge in modification. However, these proportional relationships can be a preferable situation for challenge-based learning to improve the quality of disaster education implementation plans.

Meanwhile, the other six tasks and responsibilities obtained p-values higher than 0.05, hence the relationships in terms of the identified challenge were not significant. The null hypotheses were accepted.

Table 4. Phi coefficient and *p*-value for the DPRRE tasks and responsibilities related to the limited physical, mental, and communication capability of children with SEND

DPRRE Provisions/ Task and Responsibilities	phi coefficient value	Correlation Measures (+/-)	p-value < 0.05	Verbal Interpretation	Decision on Ho
Multi-hazard risk assessment	0.292	Weak Correlation	0.220	Not Significant	Accept Ho
Child-centered assessment and planning	-0.012	No/Very Weak Correlation	0.835	Not Significant	Accept Ho
Teacher training and staff development	-0.012	No/Very Weak Correlation	0.835	Not Significant	Accept Ho
Disaster Education	-0.012	Weak Correlation	0.316	Not Significant	Accept Ho
Community-based extracurricular and informal education	-0.434	Moderate Correlation	0.022	Significant	Reject Ho
Integrated into the curriculum	-0.150	No/Very Weak Correlation	0.912	Not Significant	Accept Ho
Key messages based on consensus	-0.211	Weak Correlation	0.199	Not Significant	Accept Ho

Furthermore, based on the result of the correlations test shown on the table above, compliance to community-based extracurricular and informal education obtained a phi coefficient of -0.434 and a p-value of 0.022 indicating a significant inverse effect to the challenge identified about the limited physical, mental, and communication capability of children with SEND. The null hypothesis was rejected.

It means the higher the implementation of disaster education through community-based extracurricular and informal education the lower the challenge that teachers will experience in terms of the limited physical, mental, and communication capability of children with SEND. In the context of this study, it could mean that respondents who have a higher focus on the implementation of disaster education in a non-formal education setting had less challenging experiences with the limited physical, mental, and communication capability of children with SEND.

It can be associated with the increase of community awareness about the existence and special needs of children. Hence, the positive response of the community could decrease the teachers' burden about the limitations of their students.

On the other hand, even though other tasks and responsibilities have very weak to moderate correlations the obtained p-values were higher than 0.05 which means that the correlations are not significant. Thus, the null hypotheses were accepted.

It could mean that based on the experience of the teachers in the special education context, these tasks and responsibilities do not affect the challenge faced in terms of the limited physical, mental, and communication capability of children with SEND.

Table 51. Phi coefficient and *p*-value for the DPRRE tasks and responsibilities of the inadequate facilities supporting the learning instruction

DPRRE Provisions/ Task and Responsibilities	phi coefficient value	Correlation Measures (+/-)	p-value < 0.05	Verbal Interpretation	Decision on Ho
Multi-hazard risk assessment	-0.691	Strong Correlation	0.000	Significant	Reject Ho
Child-centered assessment and planning	-0.339	Moderate Correlation	0.114	Not Significant	Accept Ho
Teacher training and staff development	-0.339	Moderate Correlation	0.114	Not Significant	Accept Ho
Disaster Education	-0.339	Moderate Correlation	0.114	Not Significant	Accept Ho
Community-based extracurricular and informal education	0.183	No/very Weak Correlation	0.402	Not Significant	Accept Ho
Integrated into the curriculum	-0.423	Moderate Correlation	0.045	Significant	Reject Ho
Key messages based on consensus	-0.069	No/very Weak Correlation	0.755	Not Significant	Accept Ho

Based on the result of the correlations test shown on the table above, the compliance on DPRRE integration into the curriculum and on multi-hazard risk assessment has significant inverse effects on the challenge identified, inadequate facilities supporting the learning instruction, with phi coefficient of -0.691 and -0.423 and p-value of 0.000 and 0.045 respectively. Therefore, the null hypotheses were rejected.

It means that the challenge in terms of the inadequacy of facilities supporting the learning instructions decreased or was prevented when the participating schools' compliance with DPRRE integration into the curriculum and on multi-hazards risk assessment increased.

Other five tasks and responsibilities concerning the inadequacy of facilities supporting the learning instructions, even though very weak to moderate correlations, the p-values were higher than 0.05, hence, the correlations were not significant, and the null hypotheses were accepted.

It means that compliance of the special education units on child-centered assessment and planning, teacher training and staff development, disaster education, community-based extracurricular and informal education, and key messages based on consensus has no significant effect on the teachers' challenge about the inadequacy of facilities supporting the learning instructions.

Challenge in terms of teaching resources and material

Concerning teaching resources and materials a total of three challenges were implied from the responses of the respondents.

Table 6. Phi coefficient and *p*-value for the DPRRE tasks and responsibilities about the unavailability of DPRRE integrated module/teaching materials for students with SEND

DPRRE Provisions/ Task and Responsibilities	phi coefficient value	Correlation Measures (+/-)	p-value < 0.05	Verbal Interpretation	Decision on Ho
Multi-hazard risk assessment	0.127	Weak Correlation	0.565	Not Significant	Accept Ho
Child-centered assessment and planning	0.230	Weak Correlation	0.291	Not Significant	Accept Ho
Teacher training and staff development	0.230	Weak Correlation	0.291	Not Significant	Accept Ho
Disaster Education	0.230	Weak Correlation	0.291	Not Significant	Accept Ho
Community-based extracurricular and informal education	-0.098	No/Very Weak Correlation	0.656	Not Significant	Accept Ho
Integrated into the curriculum	0.226	Weak Correlation	0.300	Not Significant	Accept Ho
Key messages based on consensus	-0.335	Moderate Correlation	0.118	Not Significant	Accept Ho

Based on the result of the correlations test on the table 6, the obtained phi coefficient showed very weak to moderate correlations however, the p-values were higher than 0.05 which means that the correlations were not significant. Thus, the null hypotheses were accepted.

It only means that the compliance of the participating schools in terms of all the DPRRE tasks and responsibilities has no significant effect on increasing or decreasing the challenge about the unavailability of DPRRE integrated module/teaching materials for students with SEND based on the experience of the respondents.

Table 7. Phi coefficient and p-value for the DPRRE tasks and responsibilities in relation to the inadequate knowledge of special education teachers in developing teaching materials

DPRRE Provisions/ Task and Responsibilities	phi coefficient value	Correlation Measures (+/-)	p-value < 0.05	Verbal Interpretation	Decision on Ho
Multi-hazard risk assessment	-0.691	Strong Correlation	0.000	Significant	Reject Ho
Child-centered assessment and planning	-0.797	Very Strong Correlation	0.000	Significant	Reject Ho
Teacher training and staff development	0.120	No/ Very Weak Correlation	0.587	Not Significant	Accept Ho
Disaster Education	-0.797	Very Strong Correlation	0.000	Significant	Reject Ho
Community-based extracurricular and informal education	-0.898	Very Strong Correlation	0.443	No Significant	Accept Ho

DPRRE Provisions/ Task and Responsibilities	phi coefficient value	Correlation Measures (+/-)	p-value < 0.05	Verbal Interpretation	Decision on Ho
Integrated into the curriculum	-0.423	Moderate Correlation	0.045	Significant	Reject Ho
Key messages based on consensus	-0.385	Moderate Correlation	0.070	Not Significant	Accept Ho

Based on the correlations test shown in table 7, the compliance on multi-hazard risk assessment, child-centered assessment, and planning, providing disaster education, and integrating disaster education into the curriculum showed strong to moderate negative correlations, with values of -0.691, -0.797, -0.797, and -0.423 respectively. The obtained p-values for the compliance on multi-hazard risk assessment, child-centered assessment, and planning, providing disaster education, and integrating disaster education into the curriculum were less than 0.05 indicating significant correlations. Hence, null hypotheses were rejected.

It means that the mentioned tasks and responsibilities have a significant inverse effect on the challenge of the inadequacy of knowledge of special education teachers in developing disaster education teaching materials. Hence, it can be assumed that the higher the compliance with multi-hazard risk assessment, child-centered assessment and planning, providing disaster education, and integrating disaster education into the curriculum the challenge in relation to developing disaster education teaching materials could decrease or be prevented.

Furthermore, the phi coefficient of the three remaining tasks and responsibilities, teacher training and staff development, community-based extracurricular and informal education, and key messages based on consensus showed very weak to moderate correlations, however, with p-values of 0.587, 0.443, and 0.070 respectively, the relationships were not significant. Therefore, the null hypotheses were accepted.

In essence, since there were no significant relationships between the variables it can be concluded that the challenge of developing disaster education teaching materials was not caused or cannot be prevented by the compliance of the participating schools on teacher training and staff development, community-based extracurricular and informal education, and key messages based on consensus.

Table 8. Phi coefficient and p-value for the DPRRE tasks and responsibilities in relation to the limited disability-inclusive teaching resources and materials

DPRRE Provisions/ Task and Responsibilities	phi coefficient value	Correlation Measures (+/-)	p-value < 0.05	Verbal Interpretation	Decision on Ho
Multi-hazard risk assessment	0.243	Weak Correlation	0.264	Not Significant	Accept Ho
Child-centered assessment and planning	0.181	No/Very Weak Correlation	0.264	Not Significant	Accept Ho
Teacher training and staff development	-0.340	Moderate Correlation	0.408	Not Significant	Accept Ho

DPRRE Provisions/ Task and Responsibilities	phi coefficient value	Correlation Measures (+/-)	p-value < 0.05	Verbal Interpretation	Decision on Ho
Disaster Education	0.181	No/Very Weak Correlation	0.113	Not Significant	Accept Ho
Community-based extracurricular and informal education	0.078	No/Very Weak Correlation	0.723	Not Significant	Accept Ho
Integrated into the curriculum	-0.088	No/Very Weak Correlation	0.689	Not Significant	Accept Ho
Key messages based on consensus	0.375	Moderate Correlation	0.078	Not Significant	Accept Ho

The phi coefficient presented in Table 8 showed that compliance on all tasks and responsibilities under the DPRRE pillar has very weak to moderate correlations to the challenge of having limited disability-inclusive teaching resources and materials. In addition, all tasks and responsibilities obtained p-values higher than 0.05 which means that the relationships were not significant. Therefore, null hypotheses were accepted.

It could only mean that limited disability-inclusive teaching resources and materials are not notably related to the compliance of the participating special education schools in all the DPRRE tasks and responsibilities stated in the SPAB program guidelines implementation. Therefore, it can be assumed that being compliant or non-compliant with the DPRRE tasks and responsibilities does not cause nor prevent the scarcity of disability-inclusive teaching resources and materials.

Challenges in terms of teachers' knowledge of DRRM

Concerning teachers' knowledge of DRRM, a total of three challenges were implied from the responses of the respondents namely ambiguous and insufficient DRRM-related knowledge, limited opportunities in collaboration with other institutions to increase teachers' knowledge and capacity, and limited means and know-how to teach disaster education. The correlations between the compliance-based implementation status on disaster prevention and risk reduction education (DPRRE) tasks and responsibilities to the identified challenges were presented in the tables below.

Table 92. Phi coefficient and *p*-value for the DPRRE tasks and responsibilities in relation to the ambiguity and insufficiency of DRRM-related knowledge

DPRRE Provisions/ Task and Responsibilities	phi coefficient value	Correlation Measures (+/-)	p-value < 0.05	Verbal Interpretation	Decision on Ho
Multi-hazard risk assessment	0.266	Weak Correlation	0.220	Not Significant	Accept Ho
Child-centered assessment and planning	0.219	Weak Correlation	0.316	Not Significant	Accept Ho
Teacher training and staff development	0.219	Weak Correlation	0.316	Not Significant	Accept Ho

DPRRE Provisions/ Task and Responsibilities	phi coefficient value	Correlation Measures (+/-)	p-value < 0.05	Verbal Interpretation	Decision on Ho
Disaster Education	-0.046	No/Very Weak Correlation	0.835	Not Significant	Accept Ho
Community-based extracurricular and informal education	-0.071	No/Very Weak Correlation	0.749	Not Significant	Accept Ho
Integrated into the curriculum	-0.024	No/Very Weak Correlation	0.912	Not Significant	Accept Ho
Key messages based on consensus	-0.095	No/Very Weak Correlation	0.666	Not Significant	Accept Ho

Based on the result of the correlations test, there are very weak to weak correlations between compliance with DPRRE tasks and responsibilities and the challenge of the ambiguity and insufficiency of DRRM-related knowledge. Likewise, the p-values achieved were higher than 0.05, thus, the relationships between variables were not significant. Therefore, null hypotheses were accepted.

The compliance on multi-hazard risk assessment, child-centered assessment and planning, teacher training and staff development, providing disaster education, community-based extracurricular and informal education, integrating disaster education into the curriculum, and key messages based on consensus has no significant effect on the challenge about the ambiguity and insufficiency of DRRM-related knowledge. Being compliant or non-compliant with the special education units on all the DPRRE tasks and responsibilities does not cause nor prevent the identified challenge.

Table 10. Phi coefficient and *p*-value of DPRRE tasks and responsibilities in relation to the limited opportunity to collaborate with other institutions to increasing teachers' knowledge and capacity

DPRRE Provisions/ Task and Responsibilities	phi coefficient value	Correlation Measures (+/-)	p-value < 0.05	Verbal Interpretation	Decision on Ho
Multi-hazard risk assessment	0.066	No/Very Weak Correlation	0.765	Not Significant	Accept Ho
Child-centered assessment and planning	0.120	No/Very Weak Correlation	0.587	Not Significant	Accept Ho
Teacher training and staff development	0.120	No/Very Weak Correlation	0.587	Not Significant	Accept Ho
Disaster Education	0.120	No/Very Weak Correlation	0.587	Not Significant	Accept Ho
Community-based extracurricular and informal education	0.183	No/Very Weak Correlation	0.587	Not Significant	Accept Ho
Integrated into the curriculum	0.225	Moderate Correlation	0.301	Not Significant	Accept Ho
Key messages based on consensus	0.247	Moderate Correlation	0.255	Not Significant	Accept Ho

Moreover, based on the result of the correlations test, it can be observed that the phi coefficient illustrated very weak to moderate correlations between the

challenge of limited opportunity to collaborate with other institutions to increase teachers' knowledge and capacity and compliance to the DPRRE tasks and responsibilities. Nevertheless, the p-values obtained were higher than 0.05, which means that the correlations were not significant. Therefore, null hypotheses were accepted.

The variables have no significant relationships to each other which means that the compliance of the special education units to the DPRRE tasks and responsibilities does not cause nor prevent the identified challenge of limited opportunity to collaborate with other institutions to increase teachers' knowledge and capacity.

SPAB program is divided into three pillars, collaboration tasks, and responsibilities under the school disaster management pillar, which can be associated with why the cause-and-effect relationship with the compliance on disaster prevention and risk reduction education tasks and responsibilities was weak or not significant at all.

Table 11. Phi coefficient and p-value for the DPRRE tasks and responsibilities in relation to the limited means and know-how in teaching disaster education

DPRRE Provisions/ Task and Responsibilities	phi coefficient value	Correlation Measures (+/-)	p-value < 0.05	Verbal Interpretation	Decision on Ho
Multi-hazard risk assessment	-0.405	Moderate Correlation	0.056	Not Significant	Accept Ho
Child-centered assessment and planning	-0.109	No/Very Weak Correlation	0.621	Not Significant	Accept Ho
Teacher training and staff development	-0.422	Moderate Correlation	0.045	Significant	Reject Ho
Disaster Education	-0.109	No/Very Weak Correlation	0.621	Not Significant	Accept Ho
Community-based extracurricular and informal education	0.073	No/Very Weak Correlation	0.740	Not Significant	Accept Ho
Integrated into the curriculum	-0.279	Weak Correlation	0.197	Not Significant	Accept Ho
Key messages based on consensus	-0.279	Weak Correlation	0.966	Not Significant	Accept Ho

Lastly, with a phi coefficient of -0.422 and a p-value of 0.045, it can be concluded that the challenge of limited means and know-how in teaching disaster education and the compliance on teacher training and staff development have significant inverse correlations. Thus, the null hypothesis was rejected.

In the context of this research, it means that the higher the compliance of the special education units in terms of teacher training and staff development, the challenge of limited means and know-how in teaching disaster education decreases. It can be assumed that the frequent provision of teacher's training or re-echoing of any DRRM-related training to other teachers in the education units means that the challenge of limited means and know-how in teaching disaster education can be prevented or resolved.

On the contrary, the phi coefficient showed very weak to moderate correlations for the remaining six DPRRE tasks and responsibilities in relation to the challenge of limited means and know-how in teaching disaster education, however, the p-values gained were higher than 0.05. Thus, it means that correlations between variables were not significant, and null hypotheses were accepted.

It can only mean that compliance on multi-hazard risk assessment, child-centered assessment, and planning, providing disaster education, community-based extracurricular and informal education, integrating disaster education into the curriculum, and key messages based on consensus has no significant effect or influence on the challenge of limited means and know-how in teaching disaster education. In the case of the experience of the special education teachers who participated in this study, compliance with the DPRRE tasks and responsibilities does not cause nor prevent the identified challenge.

Effect of implementation status on the change of teachers' strategies

Five strategies emerged from the responses from teachers. It includes experiential learning, classroom technology, traditional learning, visual learning, and student-focused learning. The teachers were asked if there were changes in teaching strategies during the period of SPAB program implementation. It was identified that most special education teachers adjusted the strategies to ensure the suitability of the instructional method and evaluation-related efforts (student-focused).

Table 12. Phi coefficient and p-value for the DPRRE tasks and responsibilities regarding the change in teachers' strategies

DPRRE Provisions/ Task and Responsibilities	phi coefficient value	Correlation Measures (+/-)	*p*-value < 0.05	Verbal Interpretation	Decision on Ho
Multi-hazard risk assessment	0.322	Moderate Correlation	0.134	Not Significant	Accept Ho
Child-centered assessment and planning	0.024	No/Very Weak Correlation	0.912	Not Significant	Accept Ho
Teacher training and staff development	0.024	No/Very Weak Correlation	0.912	Not Significant	Accept Ho
Disaster Education	0.024	No/Very Weak Correlation	0.912	Not Significant	Accept Ho
Community-based extracurricular and informal education	-0.393	Moderate Correlation	0.064	Not Significant	Accept Ho
Integrated into the curriculum	-0.086	No/Very Weak Correlation	0.696	Not Significant	Accept Ho
Key messages based on consensus	0.051	No/Very Weak Correlation	0.819	Not Significant	Accept Ho

Based on the result of the correlations test, the phi coefficient provides very weak to moderate correlations for all the tasks and responsibilities in relation to the

change in teachers' strategies, however, the p-values gained were higher than 0.05. Thus, the correlations between variables and null hypotheses were accepted.

It means that compliance with the DPRRE tasks and responsibilities has no significant effect on the change in disaster education teaching strategies. In the context of this study, even though there were changes identified in teaching strategies, the compliance of the special education schools on DPRRE tasks and responsibilities does not cause changes in disaster education teaching strategies among children with SEND.

According to the research, the program was in place for a longer period in public schools for special education than in private units. Most private education sectors had the program for a year or less or just over a year. The latest training for all education sectors helped them follow the SPAB implementation in the special education sector more closely. However, the results also showed that there was still a difference in how public and private education units implemented the program.

The research gave an updated view of how the SPAB program was carried out in the special education setting. The findings revealed that there were still difficulties in putting disaster prevention and risk reduction education into practice. The research also showed how the challenges were influenced by the level of adherence to the DPRRE implementation.

The research showed that the more the special education schools followed the specific DPREE duties and obligations, the fewer challenges they faced. The study argued that the better the adherence to the SPAB rules, the fewer or no challenges the teachers would have or prevented.

It was found that the increase in community-based extracurricular and informal education related to disaster safety could lessen the capability-related burden or challenge among the teachers in handling children with SEND. The study provided empirical evidence that the social participation of students with SEND inside and outside the school setting has a notable impact on the education providers (Ison et al., 2010). It can be attributed to the increase in community awareness about the existence and special needs of children. Exposure of the children with SEND to the community, could decrease the negative conceptions about them and increase help from outside school settings (Hayward et al., 2021).

Generally, this study provided empirical evidence of the current progress of disaster prevention and risk reduction education implementation in the context of special education units in the Special Region of Yogyakarta. Previous studies focused on three pillars of SPAB. Contrary to the previous studies, the current study focused on evaluating the compliance-based implementation of the specific disaster education-related provisions of SPAB and its impact on the teachers' challenges encountered in providing disaster education among children with SEND. The study emphasized that the higher the compliance to the specific disaster education-related provisions of SPAB, the more barriers that teachers encountered during the implementation could be prevented or reduced.

Conclusion

Based on the results of this study, the compliance-based implementation of DPRRE tasks and responsibilities could be reduced or prevented by several teachers' challenges mentioned above. The identified challenges have an inverse association with compliance including unsuitable instruction and complexity of

modification of the learning instruction specific to each student with SEND, limited physical, mental, and communication capability of children with SEND, inadequate facilities supporting the learning instruction, inadequate knowledge of special education teachers in developing teaching materials, limited means and know-how in teaching disaster education. Thus, this study suggests that there is a strong opposite relationship between compliance and the challenges that teachers encounter. As compliance with the provisions increases, then the challenges decrease. Nevertheless, compliance with the provisions does not guarantee that all changes can be reduced. For instance, the study found that the challenge of limited disability-inclusive teaching materials in DRRM was not influenced by the schools' compliance. A future study could focus on determining the cause of other challenges that emerged during disaster education implementation.

However, it is important to consider that not all the challenges that emerged during the implementation of disaster education were caused by non-compliance with the SPAB program. Therefore, external collaboration should be increased. The results build the evidence that amidst the country's efforts over the past decades, children with special needs and disabilities (SEND) remain susceptible to disaster due to its recent implementation progress and the existing gap persists between public and private special education units' compliance with the SPAB provisions. The findings also suggest a need for future researchers to identify effective strategies for teaching disaster education among students with special needs and disability. In general compliance with SPAB provisions ensures the effectiveness of disaster education and increases the safety level of the students with special needs and disabilities in disaster.

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