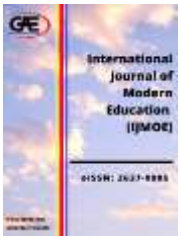
International Journal of Modern Education
EISSN: 2637-0905
Volume: 8 Issue: 29 (March 2026) PP. 827-840



INTERNATIONAL JOURNAL OF MODERN EDUCATION (IJMOE)
www.gaexcellence.com/ijmoe

DEVELOPING A RESILIENCE DESIGN CHECKLIST FOR SCHOOL-BASED DISASTER EVACUATION CENTRES IN MALAYSIA

Mohd Nasurudin Hasbullah[1]*, Mohamad Rusdi Mohd Nasir[2], Junainah Mohamad[3]

[1]Faculty of Architecture and Ekistics, Universiti Malaysia Kelantan, Malaysia
i21e005p@siswa.umk.edu.com https://orcid.org/0000-0002-7086-8927
[2]Faculty of Architecture and Ekistics, Universiti Malaysia Kelantan, Malaysia
rusdi.mn@umk.edu.my.com https://orcid.org/0000-0002-7583-8735
[3]Faculty of Built Environment, Universiti Teknologi MARA Perak Branch, Malaysia
mjunainah@gmail.com https://orcid.org/0000-0002-2274-5332
*Corresponding Author

Article Info:

Article history:
Received date: 20.01.2026
Revised date: 04.02.2026
Accepted date: 26.02.2026
Published date: 26.03.2026

To cite this document:

Hasbullah, M. N., Mohd Nasir, M. R., & Mohamad, J. (2026). Developing a Resilience Design Checklist for School-Based Disaster Evacuation Centres in Malaysia. *International Journal of Modern Education, 8*(29), 827-840.

Abstract:

Schools in Malaysia are frequently designated as temporary disaster evacuation centres during floods, landslides, and other climate-related hazards due to their accessibility and community familiarity. However, many schools were not originally designed to function as emergency shelters, resulting in challenges such as overcrowding, inadequate sanitation, limited accessibility, and insufficient space functionality. These shortcomings compromise evacuee safety, dignity, and well-being, particularly among vulnerable groups such as children, older persons, and persons with disabilities. This study aims to address these gaps by developing a Resilience Design Checklist for School-Based Disaster Evacuation Centres in Malaysia. The research adopts a qualitative approach through document analysis of national policies (NADMA, MKN, Ministry of Education, Ministry of Health) and international standards (Sphere Standards, Sendai Framework, IASC Guidelines). This is complemented by space provision assessment and content analysis using a structured questionnaire covering fifteen key design domains, including structural safety, space allocation, sanitation, accessibility, health and safety, education continuity, and sustainability. Findings reveal the absence of standardised minimum shelter design criteria and the prevalence of ad hoc adaptation of school facilities during emergencies. The proposed checklist translates international standards into a practical, context-sensitive tool that can guide assessment, retrofitting, and preparedness planning for Malaysian schools. This innovation supports Sustainable Development Goals

International Journal of Modern Education
EISSN: 2637-0905
IJMOE
Volume: 8 Issue: 29 (March 2026) PP. 827-840

(SDG 3, SDG 4, and SDG 11) and contributes towards building resilient, inclusive, and disaster-ready communities.

DOI: 10.35631/IJMOE.829049

Keyword:

Disaster Resilience; Disaster Risk Reduction; School-Based Evacuation Centres; Shelter Design

Introduction

Climate-related disasters have increased significantly in recent decades, particularly in Southeast Asia where floods, landslides, and extreme weather events frequently affect vulnerable communities. Malaysia experiences seasonal monsoon floods that regularly displace thousands of residents each year. During such emergencies, public buildings especially schools are commonly used as temporary evacuation centres due to their accessibility, available indoor spaces, and central location within residential areas (Chan, 2021; Nadzir et al., 2022).

Although schools provide practical locations for emergency shelter operations, most school facilities were originally designed exclusively for educational purposes. Consequently, when schools are converted into evacuation centres, several spatial and operational challenges often emerge. These include overcrowding, inadequate sanitation facilities, insufficient privacy for displaced families, and limited accessibility for elderly individuals and persons with disabilities. Such conditions can negatively affect the safety, health, and dignity of evacuees during prolonged displacement (Rahman et al., 2021; Sphere Association, 2021).

International humanitarian guidelines emphasise that evacuation shelters should provide adequate living space, safe water supply, sanitation facilities, and protection measures for vulnerable populations. The Sphere Handbook, for instance, provides widely recognised standards for shelter planning and humanitarian response, including recommendations on minimum living space per person and sanitation provision (Sphere Association, 2021). Similarly, the Sendai Framework for Disaster Risk Reduction highlights the importance of strengthening infrastructure resilience and improving disaster preparedness to reduce disaster-related losses (UNDRR, 2020).

International Journal of Modern Education
EISSN: 2637-0905
IJMOE
Volume: 8 Issue: 29 (March 2026) PP. 827-840

Despite the availability of these international frameworks, their practical application to school facilities remains limited. In many cases, schools used as evacuation centres operate through temporary adaptations rather than structured planning. As a result, the suitability of school infrastructure for shelter functions varies widely across different locations.

Recent research also highlights the importance of strengthening institutional preparedness within educational systems. Educational leadership studies emphasise that schools increasingly face complex social and environmental challenges, including disaster preparedness and community resilience (Karakose et al., 2023). Strengthening the resilience of school infrastructure therefore requires both physical planning and institutional capacity building.

In Malaysia, evacuation centres are typically coordinated by the National Disaster Management Agency (NADMA) in collaboration with local authorities and school administrators. However, there is currently no standardised design framework specifically addressing the spatial and functional requirements of school-based evacuation centres. This gap creates challenges for both preparedness planning and infrastructure improvement.

Therefore, this study aims to develop a Resilience Design Checklist for School-Based Disaster Evacuation Centres in Malaysia. By synthesising international humanitarian standards, national disaster management policies, and expert knowledge, the proposed checklist provides a structured tool for assessing and improving the preparedness of school facilities used as evacuation centres.

Literature Review

Disaster Risk Reduction and Resilient Infrastructure

Disaster risk reduction (DRR) has become a global priority as the frequency and intensity of climate-related hazards continue to increase. The Sendai Framework for Disaster Risk Reduction highlights the importance of strengthening critical infrastructure to reduce disaster vulnerability and enhance community resilience (UNDRR, 2020). Infrastructure resilience refers to the capacity of built environments to withstand hazards, minimise damage, and maintain essential functions during emergencies (Bosher & Dainty, 2020).

Schools represent a critical component of community infrastructure because they often function not only as educational facilities but also as emergency shelters during disasters. Safe and resilient school buildings can significantly reduce disaster risks while providing temporary accommodation for displaced populations (Shaw et al., 2020).

International Standards for Emergency Shelter Design

International humanitarian organisations have developed guidelines to ensure that emergency shelters provide safe and dignified living conditions for displaced communities. The Sphere Handbook provides widely recognised standards for humanitarian shelter responses, including minimum living space requirements, sanitation facilities, and protection measures for vulnerable populations (Sphere Association, 2021).

International Journal of Modern Education
IJMOE
EISSN: 2637-0905
Volume: 8 Issue: 29 (March 2026) PP. 827-840

The Inter-Agency Standing Committee (IASC) also emphasises the importance of ensuring accessibility and protection for vulnerable groups in emergency shelters, including children, elderly persons, and individuals with disabilities (IASC, 2021). These guidelines highlight the need for gender-sensitive sanitation facilities, health protection measures, and privacy considerations within evacuation centres.

However, many of these humanitarian guidelines were originally developed for temporary camps or dedicated shelters rather than existing public facilities such as schools. Therefore, adapting these standards to school infrastructure requires careful consideration of spatial constraints and functional requirements.

School Leadership and Institutional Preparedness

Recent studies in educational research highlight the growing importance of leadership and institutional preparedness in addressing complex challenges within schools. Karakose et al. (2023) emphasise that modern educational leadership increasingly involves addressing social and environmental challenges, including disaster preparedness and community resilience.

Similarly, Yirci et al. (2023) highlight the role of mentoring and professional development in strengthening the capacity of school administrators to manage institutional challenges effectively. Strong leadership and collaboration between schools and local authorities can significantly enhance disaster preparedness and response capabilities.

Technology and Innovation in Education and Disaster Preparedness

Technological advancements are increasingly influencing educational planning and disaster preparedness strategies. Emerging technologies such as artificial intelligence and digital platforms can support risk assessment, communication, and crisis management in educational settings (Ugras et al., 2024). These innovations highlight the potential for integrating digital tools with infrastructure planning to enhance school resilience.

Research Gap

Despite the growing body of research on disaster risk reduction and school resilience, limited studies have focused specifically on the design requirements of school-based evacuation centres. Existing humanitarian guidelines provide general shelter standards, but they do not offer detailed guidance on how school infrastructure can be adapted to meet these standards.
Furthermore, the Malaysian context presents unique challenges due to the frequent use of schools as evacuation centres during seasonal flooding. Therefore, a context-specific framework is needed to guide the design and assessment of school facilities used for disaster evacuation purposes.

Methodology

This study adopted a qualitative research approach to develop a resilience design checklist for school-based disaster evacuation centres in Malaysia. A qualitative design was selected because the objective of the study was exploratory and aimed at identifying, synthesising, and validating design indicators derived from policy documents, international humanitarian standards, and expert knowledge. Qualitative methods are widely used in built environment and disaster

International Journal of Modern Education
EISSN: 2637-0905
IJMOE
Volume: 8 Issue: 29 (March 2026) PP. 827-840

management research when the objective is to develop frameworks, guidelines, or conceptual tools rather than to test statistical relationships (Creswell & Creswell, 2018; Bowen, 2009).

The research methodology consisted of three main stages (i) document analysis, (ii) development of preliminary resilience design indicators, and (iii) expert validation using the Delphi method.

Document Analysis

The first stage involved a systematic document analysis of international guidelines, national disaster management policies, and relevant academic literature related to evacuation shelters and resilient infrastructure. Document analysis is a qualitative research method used to review and interpret documents to identify meaningful themes and patterns relevant to a research problem (Bowen, 2009).

The documents analysed in this study included (i) Sphere Handbook: Humanitarian Charter and Minimum Standards in Humanitarian Response, (ii) Sendai Framework for Disaster Risk Reduction 2015–2030, (iii) Malaysian National Disaster Management Agency (NADMA) guidelines, (iv) National Security Council Directive No. 20 (MKN Directive 20), (v) Ministry of Education Malaysia infrastructure guidelines and (vi) Relevant academic studies on disaster shelters and school resilience.

Content analysis was conducted to extract design-related criteria such as spatial requirements, sanitation standards, accessibility, safety provisions, and emergency operational facilities. These criteria were coded and grouped into thematic categories representing key domains of evacuation centre design.

Thematic categorisation allowed the identification of recurring design principles across international and national guidelines. Similar approaches have been widely used in disaster management research to synthesise policy and guideline documents into operational frameworks (Nowell et al., 2017; UNDRR, 2020).

Development of Preliminary Resilience Design Indicators

Based on the document analysis, a preliminary resilience design checklist was developed. The checklist consisted of multiple design indicators organised into thematic domains related to evacuation centre planning. These domains included aspects such as:

- Structural safety
- Spatial capacity and living space allocation
- Accessibility for vulnerable groups
- Water supply and sanitation facilities
- Health and medical support spaces
- Privacy and protection measures
- Child-friendly and family spaces
- Environmental sustainability
- Emergency access and circulation

International Journal of Modern Education
EISSN: 2637-0905
IJMOE
Volume: 8 Issue: 29 (March 2026) PP. 827-840

Each indicator was formulated to reflect minimum design considerations derived from international humanitarian standards and Malaysian policy documents. The checklist therefore serves as a practical translation of policy and humanitarian guidelines into measurable design criteria suitable for school facilities.

Expert Validation Using the Delphi Method

To ensure the relevance and applicability of the checklist, the preliminary indicators were validated using the Delphi method. The Delphi technique is a structured qualitative method used to obtain consensus among experts through iterative rounds of consultation (Hsu & Sandford, 2007). It is commonly used in built environment research for developing guidelines, frameworks, and evaluation criteria.

Selection of Expert Panel

A purposive sampling strategy was used to select experts with relevant professional experience in disaster management, architecture, public health, and educational administration. The final Delphi panel consisted of seven experts, including (i) Built environment and architecture specialists, (ii) Disaster management practitioners, (iii) Public health professionals and (iv) School administration representatives.

Previous studies suggest that Delphi panels typically range from five to fifteen experts when the objective is exploratory framework development (Hsu & Sandford, 2007; Okoli & Pawlowski, 2004).

Delphi Rounds

The Delphi process consisted of two rounds of expert consultation.

Round One

In the first round of the Delphi process, the expert panel was invited to review the preliminary resilience design checklist developed from the document analysis. The experts were asked to evaluate the relevance of each proposed design indicator, assess the clarity of the indicator descriptions, and determine their applicability to the Malaysian school context when used as evacuation centres. In addition, the experts were encouraged to identify any missing indicators and suggest modifications where necessary. Qualitative feedback provided by the experts was systematically analysed and used to refine the checklist indicators, improve the wording of the items, and ensure that the proposed design framework reflected practical considerations relevant to disaster evacuation centres in Malaysian schools.

Round Two

In the second round, the revised checklist was redistributed to the experts for further evaluation. The purpose of this round was to confirm expert agreement and achieve consensus regarding the final set of design indicators. The iterative Delphi process allowed the refinement of the checklist while incorporating diverse professional perspectives.

International Journal of Modern Education
EISSN: 2637-0905
IJMOE
Volume: 8 Issue: 29 (March 2026) PP. 827-840

Data Analysis

Qualitative data obtained from document analysis and expert feedback were analysed using thematic analysis. Thematic analysis is a widely used qualitative technique for identifying patterns, themes, and relationships within qualitative data (Braun & Clarke, 2006).
The analysis process involved several stages:

i. Familiarisation with documents and expert feedback
ii. Coding of key design indicators
iii. Categorisation of indicators into thematic domains
iv. Refinement of domains based on expert validation
v. Development of the final resilience design checklist

Through this process, the study identified a set of design domains and indicators that represent essential considerations for school-based evacuation centres.

Findings

Expert Panel Profile

The Delphi validation involved seven experts selected through purposive sampling based on their professional experience in disaster management, architecture, public health, and educational administration. Expert consultation is commonly used in framework development studies where specialised knowledge is required to validate proposed indicators (Hsu & Sandford, 2007; Okoli & Pawlowski, 2004).

The composition of the expert panel is presented in Table 1.

Table 1: Profile of Delphi Expert Panel

Expert Code	Professional Background	Institution/ Organisation	Years of Experience
E1	Architect / Built Environment	University	15
E2	Disaster Management Officer	NADMA	12
E3	Public Health Specialist	Ministry of Health	14
E4	School Administrator	Ministry of Education	18
E5	Urban Planner	Local Authority	11
E6	Civil Engineer	Infrastructure Agency	13
E7	Disaster Risk Researcher	University	10

Source: Author's analysis

Delphi Validation Results

Experts evaluated the relevance of each design indicator using a five-point Likert scale:
1 – Strongly Disagree
2 – Disagree

International Journal of Modern Education
EISSN: 2637-0905
IJMOE
Volume: 8 Issue: 29 (March 2026) PP. 827-840

3 – Undecided
4 – Agree
5 – Strongly Agree

Mean scores and standard deviation values were calculated to determine the level of expert agreement. Indicators with mean scores ≥3.50 were considered acceptable and retained in the final checklist. Similar thresholds have been used in Delphi-based framework development studies (Hsu & Sandford, 2007).

Consensus Results for Resilience Design Domains

Table 2: Delphi Consensus Results for Resilience Design Domains

Domain	Description	Mean	SD	Consensus
Structural Safety	Building strength and hazard resistance	4.71	0.48	Accepted
Spatial Capacity	Adequate living space allocation	4.57	0.53	Accepted
Accessibility	Facilities for elderly and disabled evacuees	4.43	0.53	Accepted
Water Supply	Adequate drinking and domestic water	4.57	0.53	Accepted
Sanitation Facilities	Toilets and hygiene facilities	4.71	0.49	Accepted
Health and Medical Support	First aid and medical support areas	4.43	0.53	Accepted
Food Preparation Areas	Cooking and food distribution spaces	4.29	0.49	Accepted
Privacy and Protection	Gender and family privacy considerations	4.57	0.53	Accepted
Child-Friendly Spaces	Safe spaces for children	4.29	0.49	Accepted
Education Continuity	Temporary learning arrangements	4.14	0.69	Accepted
Waste Management	Solid waste and hygiene management	4.43	0.53	Accepted
Environmental Sustainability	Ventilation and environmental quality	4.29	0.49	Accepted
Emergency Circulation	Access routes and evacuation paths	4.57	0.53	Accepted
Communication Facilities	Information and communication access	4.14	0.69	Accepted
Security and Management	Shelter management and safety control	4.43	0.53	Accepted

Source: Delphi Survey Results

The results demonstrate strong consensus among the experts regarding the relevance of the proposed resilience design domains. All domains achieved mean scores above the acceptance threshold, indicating agreement that these components are essential for the design and evaluation of school-based evacuation centres.

International Journal of Modern Education
EISSN: 2637-0905
IJMOE
Volume: 8 Issue: 29 (March 2026) PP. 827-840

Based on document analysis and expert validation, a Resilience Design Checklist consisting of fifteen domains and corresponding indicators was developed.

Table 3: Resilience Design Checklist for School-Based Disaster Evacuation Centres

Domain	Design Indicators
Structural Safety	Building structure resistant to local hazards such as floods and strong winds; compliance with national building codes
Spatial Capacity	Minimum floor area per evacuee; adequate indoor sleeping space; flexible use of classrooms and halls
Accessibility	Ramps and barrier-free access; accessible toilets; safe circulation for elderly and disabled evacuees
Water Supply	Reliable water source; sufficient drinking water; emergency water storage
Sanitation Facilities	Adequate number of toilets; gender-segregated sanitation facilities; handwashing stations
Health and Medical Support	First aid room; isolation area for sick evacuees; medical assistance access
Food Preparation Areas	Kitchen or food distribution space; safe food storage; cooking facilities
Privacy and Protection	Family partition spaces; gender-sensitive areas; protection for vulnerable groups
Child-Friendly Spaces	Safe play areas; psychological support space for children
Education Continuity	Temporary learning space; storage for educational materials
Waste Management	Waste collection areas; proper waste disposal system
Environmental Sustainability	Natural ventilation; daylight access; thermal comfort
Emergency Circulation	Clear evacuation routes: accessible entry and exit points; emergency vehicle access
Communication Facilities	Public information board; communication equipment; emergency alerts
Security and Management	Security personnel; shelter management office; controlled entry points

Source: Sphere Standards, Sendai Framework, and NADMA Guidelines

Discussion

The Delphi validation results indicate that experts strongly support the inclusion of multiple spatial, functional, and safety domains within the resilience design checklist. Structural safety, sanitation facilities, and spatial capacity received the highest mean scores, highlighting their importance in ensuring safe and dignified evacuation shelter conditions.

These findings are consistent with international humanitarian guidelines that emphasise adequate living space, sanitation provision, and protection of vulnerable populations in emergency shelters (Sphere Association, 2021). Furthermore, the emphasis on accessibility and child-friendly spaces reflects growing recognition of inclusive disaster management practices.

International Journal of Modern Education
EISSN: 2637-0905
IJMOE
Volume: 8 Issue: 29 (March 2026) PP. 827-840

The checklist developed in this study therefore provides a practical tool that can assist policymakers, architects, and school administrators in evaluating and improving the preparedness of school facilities used as evacuation centres.

Conclusion

This study developed a Resilience Design Checklist for School-Based Disaster Evacuation Centres in Malaysia through document analysis and expert validation using the Delphi method. The findings highlight the need for structured guidelines to ensure that schools used as evacuation centres can provide safe, dignified, and functional temporary shelter for displaced communities.

The proposed checklist translates international humanitarian standards into practical design indicators that are suitable for the Malaysian context. The checklist can support policymakers, architects, and disaster management agencies in assessing and improving school facilities used as evacuation centres.

From a theoretical perspective, this study contributes to disaster resilience research by integrating humanitarian shelter standards with educational infrastructure planning. From a practical perspective, the checklist offers a structured tool for improving disaster preparedness and infrastructure resilience within educational institutions.

Future studies should involve large-scale field testing of the checklist across different regions in Malaysia to further validate its applicability and support the development of national guidelines for school-based evacuation centres.

Acknowledgements: The authors would like to express their sincere appreciation to all individuals and organisations who contributed to the completion of this study. Special thanks are extended to the National Disaster Management Agency (NADMA), the Ministry of Education Malaysia, and the Ministry of Health Malaysia for providing valuable policy documents and guidance relevant to this research. The authors also acknowledge the support and cooperation of school administrators and practitioners who shared their insights and experiences. Finally, heartfelt gratitude is conveyed to colleagues and supervisors for their continuous encouragement, constructive feedback, and academic support throughout the research process.

Funding Statement: This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Conflict of Interest Statement: The authors declare that there is no conflict of interest regarding the publication of this paper. All authors have contributed to this work and approved the final version of the manuscript for submission to the International Journal of Modern Education (IJMOE).

International Journal of Modern Education
EISSN: 2637-0905
IJMOE
Volume: 8 Issue: 29 (March 2026) PP. 827-840

Ethics Statement: This study was conducted in accordance with ethical research standards. All procedures involving human participants were reviewed and approved by the Universiti Malaysia Kelantan Research Ethics Committee and Ministry of Education Malaysia, Educational Planning and Policy Research Division *(Bahagian Perancangan dan Penyelidikan Dasar Pendidikan)*. All expert participants were informed about the objectives of the study and voluntarily agreed to participate. Confidentiality and anonymity of participants were maintained throughout the research process. Informed consent was obtained from all participants prior to data collection. The collected data were used solely for academic research purposes.

Author Contribution Statement: Mohd Nasurudin Hasbullah contributed to the conceptualisation, methodology development, data analysis, and manuscript preparation. Mohamad Rusdi Mohd Nasir supervised the research and provided guidance on research design and interpretation of findings. Junainah Mohamad contributed to the literature review, data interpretation, and manuscript revision. All authors reviewed and approved the final manuscript.

International Journal of Modern Education
EISSN: 2637-0905
IJMOE
Volume: 8 Issue: 29 (March 2026) PP. 827-840

References

Bosher, L., & Dainty, A. (2020). Disaster risk reduction and "built-in" resilience: Towards overarching principles for construction practice. *Disasters, 44*(2), 227–247.

Bowen, G. A. (2009). Document analysis as a qualitative research method. *Qualitative Research Journal, 9*(2), 27–40.

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology, 3*(2), 77–101.

Chan, N. W. (2021). Impacts of disasters and disaster risk management in Malaysia: The case of floods. *International Journal of Disaster Risk Reduction, 59*, 102247.

Creswell, J. W., & Creswell, J. D. (2018). *Research design: Qualitative, quantitative, and mixed methods approach* (5th ed.). Sage Publications.

Hsu, C. C., & Sandford, B. A. (2007). The Delphi technique: Making sense of consensus. *Practical Assessment, Research & Evaluation, 12*(10), 1–8.

IASC. (2021). *Guidelines on the protection of displaced populations in emergency shelters.* Inter-Agency Standing Committee.

Karakose, T., Tulubas, T., & Papadakis, S. (2023). The scientific evolution of social justice leadership in education: Structural and longitudinal analysis of the existing knowledge base (2003–2022). *Frontiers in Education, 8*, 1139648.

Nadzir, N., Ibrahim, A., & Yusoff, N. (2022). Flood disaster management and community resilience in Malaysia. *International Journal of Disaster Risk Reduction, 77*, 103085.

Nowell, L. S., Norris, J. M., White, D. E., & Moules, N. J. (2017). Thematic analysis: Striving to meet the trustworthiness criteria. *International Journal of Qualitative Methods, 16*(1), 1–13.

Okoli, C., & Pawlowski, S. (2004). The Delphi method as a research tool: An example, design considerations and applications. *Information & Management, 42*(1), 15–29.

Rahman, M. M., Sakurai, A., & Shaw, R. (2021). Flood evacuation shelters and risk management: Lessons from Southeast Asia. *Progress in Disaster Science, 10*, 100161.

Shaw, R., Shiwaku, K., Kobayashi, H., & Kobayashi, M. (2020). Linking experience, education, perception and earthquake preparedness. *Disaster Prevention and Management, 29*(3), 295–308.

Sphere Association. (2021). *The Sphere handbook: Humanitarian charter and minimum standards in humanitarian response.*

Ugras, H., Ugras, M., Papadakis, S., & Kalogiannakis, M. (2024). ChatGPT-supported education in primary schools: The potential of ChatGPT for sustainable practices. *Sustainability, 16*(22), 9855.

United Nations Office for Disaster Risk Reduction. (2020). *Sendai framework for disaster risk reduction 2015–2030.*

Yirci, R., Karakose, T., Kocabas, I., Tulubas, T., & Papadakis, S. (2023). A bibliometric review of mentoring for the professional development of school administrators. *Sustainability, 15*(4), 3027.

International Journal of Modern Education
EISSN: 2637-0905
IJMOE
Volume: X Issue: X (September 2020) PP. 827-840

Appendix

UNIVERSITI MALAYSIA KELANTAN
Kampus Bachok
Beg Berkunci No. 01,
16300 Bachok, Kelantan

EXPERT VALIDATION SURVEY

Research Topic :

DEVELOPING A RESILIENCE DESIGN CHECKLIST FOR SCHOOL-BASED DISASTER EVACUATION CENTRE IN MALAYSIA

Objective: to validate reslience design variable from document analysis and theoretical synthesis.

A. DEMOGRAPHIC BACKGROUND	
Name of Validator / *Nama Penilai*	:
Position / *Jawatan*	:
Engagement (year) / *Penglibatan*	:

B. DESIGN VARIABLE AND ATTRIBUTE OF RESILIENCE

Expert Validation Instruction / *Arahan kepada Penilai*

Please rate each statement according to your level of agreement based on experience or observation.

Sila nilaikan setiap pernyataan yang diberikan mengikut tahap persetujuan berdasarkan pengalaman atau pemerhatian anda.

Scale / *Skala*

1 = Strongly Disagree / *Sangat Tidak Bersetuju*
2 = Disagree / *Tidak Bersetuju*
3 = Undecided / *Tidak Pasti*
4 = Agree / *Bersetuju*
5 = Strongly Agree / *Sangat Bersetuju*

No	Theme	Code	Design Variable	Attribute	Rating				
F01	Spatial Planning and Habitation Standards *Perancangan Fizikal dan Piawaian Penempatan*	A01	**Space Allocation** *Peruntukan Ruang*	Is there enough space per person (minimum 3.5m²) for sleeping and movement? *Adakah terdapat ruang yang mencukupi bagi setiap orang (minimum 3.5m²) untuk tidur dan pergerakan?*	1	2	3	4	5
		A02	**Privacy & Protection** *Privasi & Perlindungan*	Are modular partitions or temporary divider provided? *Adakah disediakan sekatan modular atau pembahagi sementara?*	1	2	3	4	5
		A03	**Ventilation & Lighting** *Pengudaraan & Pencahayaan*	Is there adequate natural ventilation and lighting? *Adakah terdapat pengudaraan dan pencahayaan semula jadi yang mencukupi?*	1	2	3	4	5
		A04	**Health & Safety** *Kesihatan & Keselamatan*	Are fire exits, first aid kits and infection control measures available? *Adakah pintu keluar untuk kegunaan kebakaran, peti pertolongan cemas dan prosedur kawalan jangkitan tersedia?*	1	2	3	4	5
		A05	**Comments / Others** *Ulasan Lain*		1	2	3	4	5
F02	Water, Sanitation, Hygiene (WASH) and Environmental Health *Air, Sanitasi, Kebersihan dan Kesihatan Persekitaran*	B01	**Sanitation & Hygiene** *Sanitasi & Kebersihan*	Are toilets, showers and handwashing facilities adequate? Are they gender-segregated? *Adakah tandas, pancuran mandian dan kemudahan mencuci tangan mencukupi? Adakah mereka diasingkan mengikut jantina?*	1	2	3	4	5
		B02	**Water Supply** *Bekalan Air*	Is potable water available (at least 15L/person/day)? *Adakah air yang boleh diminum tersedia dengan mencukupi (sekurang-kurangnya 15L/orang/hari)?*	1	2	3	4	5
		B03	**Waste Management** *Pengurusan Sisa*	Is there a refuse bin or disposal pit provided based on population size? *Adakah terdapat tong sampah atau lubang pelupusan yang disediakan berdasarkan keperluan populasi?*	1	2	3	4	5
		B04	**Comments / Others** *Ulasan Lain*		1	2	3	4	5

International Journal of Modern Education
EISSN: 2637-0905
IJMOE
Volume: X Issue: X (September 2020) PP. 827-840

F03	**Inclusive Design and Social Protection** *Reka Bentuk Inklusif dan Perlindungan Sosial*	C01	**Accessibility & Inclusion** *Ketercapaian & Persepaduan*	Are there ramps, accessible toilets, and barrier-free access for disabled persons? *Adakah terdapat tanjakan, tandas yang boleh diakses dan akses tanpa halangan untuk orang kelainan upaya?*	1	2	3	4	5
		C02	**Privacy & Protection** *Privasi & Perlindungan*	Are partitions provided to ensure privacy and gender safety? *Adakah terdapat pengasingan untuk memastikan privasi dan keselamatan jantina?*	1	2	3	4	5
		C03	**Communication & Coordination** *Komunikasi & Penyelarasan*	Is there signage, PA system and communication coordination mechanism? *Adakah terdapat papan tanda, sistem siar raya dan mekanisma untuk menyelaraskan komunikasi?*	1	2	3	4	5
		C04	**Comments / Others** *Ulasan Lain*		1	2	3	4	5
F04	**Structural Resilience and Operational Continuity** *Ketahanan Struktur dan Pengoperasian Lanjutan*	D01	**Site Location & Accessibility** *Lokasi Tapak dan Kebolehcapaian*	Is the location safe from hazards and accessible by emergency vehicles? *Adakah lokasi selamat daripada bahaya dan boleh diakses oleh kenderaan kecemasan?*	1	2	3	4	5
		D02	**Structural Safety** *Keselamatan Struktur*	Can the building withstand local hazards such as flood, strong wind or seismic activity? *Bolehkah bangunan tersebut menahan bahaya tempatan seperti banjir, angin kencang atau aktiviti seismik?*	1	2	3	4	5
		D03	**Energy Supply** *Bekalan Tenaga*	Is electricity, backup generator or solar power available? *Adakah tenaga elektrik, penjana kuasa sandaran atau kuasa solar tersedia?*	1	2	3	4	5
		D04	**Logistics & Storage** *Logistik & Penstoran*	Is there storage space for food, equipment and supplies? *Adakah terdapat ruang penyimpanan untuk makanan, peralatan dan bekalan?*	1	2	3	4	5
		D05	**Education Continuity** *Pendidikan Lanjutan*	Can education continue temporarily through digital or alternative methods? *Bolehkah pendidikan diteruskan buat sementara waktu melalui kaedah digital atau alternatif?*	1	2	3	4	5
		D06	**Sustainability & Resilience** *Kemampanan & Ketahanan*	Are green materials used, and maintenance done for resilience? *Adakah bahan teknologi hijau digunakan, dan penyelenggaraan dibuat secara berkala untuk daya tahan?*	1	2	3	4	5
		D07	**Comments / Others** *Ulasan Lain*		1	2	3	4	5

OVERALL COMMENTS AND SUGGESTIONS / ULASAN DAN CADANGAN KESELURUHAN
Kindly state on the areas of improvement in the instruments / *Sila berikan sebarang cadangan atau ulasan tambahan:*

Validated by / *Dinilai oleh :*
(sign) / (tandatangan)

Name / *Nama*

Date / *Tarikh*