ISSN: 3116-3475
International Journal
of Education, Research, and Innovation Perspectives
Volume 2 Issue 9 (September 2026)

Coastal School Administration and Continuity Challenges during Environmental Pressure

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Date Submitted:
March 29, 2026

Date Accepted:
July 14, 2026

Date Published:
September 24, 2026

DOI:
10.5281/zenodo.22952230

ABSTRACT

This study investigated how coastal school administration influenced continuity challenges during periods of environmental pressure in Maconacon, Isabela. Using a cross-sectional explanatory resilience-mapping design, data were gathered from 45 administrative officers, school heads, and school personnel with direct responsibilities in school operations, disaster preparedness, communication, logistics, and continuity planning. A validated Coastal School Administration and Continuity Scale was used, with the data analyzed through robust descriptive statistics, Partial Least Squares Structural Equation Modeling, and Importance-Performance Map Analysis. Findings showed that anticipatory coordination and adaptive decision-making were relatively strong, while communication continuity and resource mobilization remained more constrained. Access and mobility emerged as the most serious continuity challenge, followed by facilities and utilities and workforce and logistical strain. The structural model explained 62% of the variance in continuity challenges, with communication continuity producing the strongest significant effect, followed by resource mobilization and adaptive decision-making. Importance-performance mapping further identified communication continuity as the highest administrative priority for improvement. The results indicated that coastal schools were generally capable of planning and making adaptive decisions, but their continuity capacity weakened when environmental conditions disrupted communication, transportation, utilities, and resource movement. Strengthening redundant communication systems, prepositioning essential resources, improving logistical coordination, and institutionalizing interagency support were therefore recommended to sustain school operations during environmental disruption.

Keywords: *administrative resilience; coastal schools; communication continuity; educational continuity; environmental pressure; school administration*

INTRODUCTION

Schools located along coastal areas operate under conditions where environmental threats can directly affect both administration and the continuity of education. Strong winds, heavy rainfall, flooding, storm surges, damaged access routes, power interruptions, and communication failures can alter normal school operations with little warning. Under these circumstances, school administration extends beyond routine supervision and resource management. Administrators must make decisions concerning safety, personnel deployment, facilities, communication, emergency procedures, and the continuation of essential educational services. Wang (2016) explained that effective school-based disaster management requires organized preparedness, emergency planning, and practical response mechanisms that allow schools to reduce disruption and strengthen institutional resilience.

The demands become more pronounced in coastal public schools because environmental exposure may affect facilities, transportation, access to supplies, and the movement of both personnel and learners. Philippine evidence shows that coastal schools require stronger attention to safe learning facilities, school disaster

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International Journal
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management, risk reduction education, and safety procedures specific to coastal hazards. Cresencio and Yabut (2023) found that coastal school safety procedures remained an area requiring improvement even where other components of school disaster risk reduction were being implemented. Such findings suggest that preparedness cannot be treated only as compliance with established plans. It must also reflect the physical location of the school, available resources, communication capacity, and the ability of personnel to maintain essential operations during periods of disruption.

Continuity becomes equally important because schools may assume several roles during emergencies. In the Philippines, school buildings can serve as evacuation shelters or distribution points, which may place additional pressure on facilities already intended for teaching and learning. Tsioulou et al. (2021) demonstrated that the suitability of schools during disasters depends not only on structural safety but also on accessibility, communication, available supplies, and the conditions experienced by people using the facilities. UNESCO (2024) likewise identifies school disaster management and resilient educational facilities as central to protecting learners and sustaining education when hazards occur. These responsibilities place administrative officers, school heads, and school personnel at the center of decisions that determine how quickly a school can adjust, protect its community, and restore normal functions.

This concern is particularly relevant to Maconacon, Isabela, a coastal municipality exposed to severe weather and rough sea conditions. In July 2026, provincial disaster authorities identified Maconacon among Isabela's coastal municipalities requiring priority attention because of gale warnings and risks associated with a strong tropical cyclone (Philippine Information Agency, 2026). The Department of Education has also strengthened its policy on Learning and Service Continuity Plans, requiring schools to prepare appropriate measures and alternative delivery arrangements during typhoons, flooding, extreme weather, power interruptions, and other emergencies (Department of Education, 2024). These conditions point to the need to examine how coastal public schools actually manage environmental pressure at the administrative level. Thus, Coastal School Administration and Continuity Challenges during Environmental Pressure seeks to examine administrative practices and continuity challenges as experienced by administrative officers, school heads, and school personnel in the coastal public schools of Maconacon, Isabela. The study may provide a grounded basis for strengthening school-level administrative preparedness and sustaining essential educational operations when environmental conditions place normal schooling under pressure.

Literature Review

Administrative Leadership during Environmental Disruption

School leadership becomes more demanding when environmental hazards interrupt normal routines and require immediate administrative judgment. School leaders may need to coordinate personnel, communicate with families and government agencies, assess damage, allocate limited resources, and decide when and how school operations can resume. Potter et al. (2021) emphasized that disaster situations place principals in complex managerial and logistical roles where rapid communication, resource coordination, and community engagement become essential. Philippine school leadership also reflects this pressure. Reyes et al. (2022) found that school leaders working amid disasters and material constraints often assume forms of crisis leadership shaped by limited resources and persistent operational difficulties. These findings support the need to examine how administrative officers, school heads, and personnel manage decisions when environmental conditions place coastal schools under sustained pressure.

Educational Continuity and Operational Preparedness

Educational continuity requires schools to prepare not only for immediate safety but also for maintaining essential functions when regular operations become difficult or impossible. The Global Alliance for Disaster Risk Reduction and Resilience in the Education Sector (GADRRRES, 2022) identifies school safety and educational continuity management as a major component of resilient education systems. Its framework highlights risk

ISSN: 3116-3475
International Journal
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assessment, response preparedness, contingency planning, standard operating procedures, and continuity measures as responsibilities that should be embedded in school management. Such preparation is especially relevant to geographically exposed schools because environmental disturbances may simultaneously affect facilities, transportation, communication, staffing, and access to learning resources. Continuity therefore depends on whether school personnel have workable arrangements that can be activated when ordinary administrative procedures are disrupted.

School Resilience and Institutional Capacity

Resilience in schools involves the capacity to withstand disruption, adapt operations, and restore essential functions while protecting learners and personnel. It is broader than emergency response because it includes physical conditions, available equipment, organizational functions, education, and safety mechanisms. Mirzaei et al. (2021) identified functional, architectural, equipment-related, educational, and safety dimensions as important components of school resilience during emergencies and disasters. Their findings indicate that institutional resilience results from the interaction of physical resources and organizational capability rather than from preparedness plans alone. For coastal public schools, this perspective is important because continuity may depend on the readiness of facilities, the availability of supplies, staff coordination, communication systems, and the capacity of personnel to adjust responsibilities as conditions change.

Coastal Environmental Pressure and School Vulnerability

Coastal communities face environmental conditions that can place public services under repeated strain. The Philippines is highly exposed to tropical cyclones, heavy rainfall, flooding, storm surges, and sea-level rise because of its geographic and climatic characteristics. The World Bank Group and Asian Development Bank (2021) reported that Philippine coastal areas are particularly vulnerable to climate-related hazards and that such risks may intensify with changing climatic conditions. For schools situated in coastal municipalities, these pressures can affect access roads, buildings, electricity, communication, movement of personnel, and the availability of supplies needed for daily operations. Environmental exposure therefore becomes an administrative concern because maintaining school functions requires decisions that respond to both immediate hazards and recurring limitations associated with geographical location. This provides a strong basis for examining continuity challenges among coastal public schools in Maconacon, Isabela.

METHODS

Research Design

The study employed a cross-sectional explanatory resilience-mapping design, which combined structured assessment with predictive modeling to determine how administrative capacities were associated with continuity challenges under environmental pressure. Rather than limiting the analysis to descriptions of administrative practices, the design examined which dimensions of school administration carried the greatest influence on the capacity to sustain essential school functions. Administrative coordination, resource mobilization, communication continuity, and adaptive decision-making were treated as explanatory constructs, while operational continuity challenges served as the principal outcome. This design was appropriate because the study sought to locate both areas of administrative strength and points where environmental pressure created operational vulnerability.

Research Locale

The study was conducted in the coastal public-school setting of Maconacon, Isabela. The Philippine Statistics Authority recorded Maconacon as a municipality with a 2024 population of 4,252 distributed across 10 barangays, while the Provincial Government of Isabela identifies the municipality as part of the province's coastal marine ecosystem (Philippine Statistics Authority, 2025). The area is geographically separated from inland Isabela, and provincial records recognize accessibility and delivery of basic services as continuing concerns

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International Journal
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among the province's coastal municipalities (Provincial Government of Isabela, 2026). These characteristics made Maconacon an appropriate setting for examining school administration where environmental exposure, transportation limitations, and service interruptions could affect educational continuity.

Participants and Sampling Technique

The study involved 45 administrative officers, school heads, and school personnel whose assignments included responsibilities related to school operations, disaster preparedness, facilities, communication, logistics, learner services, or continuity planning. Participants were selected through criterion-based purposive sampling because direct knowledge of administrative and continuity processes was necessary for meaningful assessment. Personnel were included when they had served in their present coastal-school assignment for one complete school year and had direct involvement in operational decisions or continuity-related activities. No respondent profile variables were collected because the analysis centered on institutional practices and continuity conditions rather than personal characteristics. The participant size was kept focused because Maconacon is a small municipality and the study targeted personnel with direct operational knowledge rather than the entire teaching workforce.

Research Instrument

Data were gathered using the researcher-developed Coastal School Administration and Continuity Scale, consisting of 44 statements rated on a five-point response scale. The first section measured administrative capacity through anticipatory coordination, resource mobilization, communication continuity, and adaptive decision-making. The second section assessed continuity challenges involving access and mobility, facilities and utilities, workforce and logistical strain, and continuity of educational services. Five specialists in educational administration, disaster risk reduction, research measurement, and school management reviewed the instrument for relevance, clarity, and construct representation. Using the content validity index procedure described by Yusoff (2019), the instrument obtained an S-CVI/Ave of .94, with item-level indices ranging from .80 to 1.00. A pilot administration involving 20 public-school personnel from a comparable coastal setting outside Maconacon yielded a Cronbach's alpha of .92 for school administration, .90 for continuity challenges, and .94 for the entire instrument. These coefficients indicated strong internal consistency based on the interpretation of reliability coefficients discussed by Taber (2018). Minor wording revisions were made before the final administration.

Data Gathering

Formal authorization was secured from the appropriate education authorities before data collection. Eligible participants were identified according to the established inclusion criteria and were provided with an explanation of the study, consent form, and questionnaire. The instrument was administered personally whenever access permitted, while secured electronic copies were used when transportation or weather conditions restricted physical distribution. Completed questionnaires were checked only for completeness and were coded without names or individually identifying information. Responses were encoded, verified against the original forms, and prepared for statistical analysis after data cleaning.

Data Analysis

The analysis used a combination of robust descriptive statistics and Partial Least Squares Structural Equation Modeling with Importance-Performance Map Analysis (PLS-SEM-IPMA). Median and interquartile range were used to summarize the administrative and continuity indicators because the responses were ordinal and the participant group was relatively compact. PLS-SEM then estimated how administrative coordination, resource mobilization, communication continuity, and adaptive decision-making predicted continuity challenges. Measurement quality was examined through indicator loadings, composite reliability, average variance extracted, and discriminant validity. Structural relationships were evaluated using path coefficients, R^2, f^2, and Q^2, with significance determined through 10,000 bootstrap resamples. Finally, IPMA identified administrative dimensions that combined high importance with comparatively weaker performance, allowing the analysis to locate priority

ISSN: 3116-3475
International Journal
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areas for administrative intervention rather than relying only on statistical significance. The procedure followed contemporary PLS-SEM recommendations of Hair et al. (2022), while sample adequacy was considered using the principles proposed by Kock and Hadaya (2018).

RESULTS AND DISCUSSION

Table 1. *Administrative Capacity and Continuity Challenges under Environmental Pressure*

Dimension	Median	IQR	Interpretation
Administrative Capacity			
Anticipatory Coordination	3.80	0.70	Strong
Resource Mobilization	3.20	0.80	Moderate
Communication Continuity	3.00	0.90	Moderate
Adaptive Decision-Making	3.70	0.70	Strong
Continuity Challenges			
Access and Mobility	4.10	0.80	High Challenge
Facilities and Utilities	3.90	0.90	High Challenge
Workforce and Logistical Strain	3.60	0.80	Considerable Challenge
Continuity of Educational Services	3.40	0.70	Considerable Challenge

Note. Higher scores for continuity challenges indicate greater operational difficulty.

Table 1 presents a clear contrast between the schools' capacity to make administrative decisions and their ability to maintain the systems needed for uninterrupted operations. Anticipatory coordination obtained the strongest median rating at 3.80, followed closely by adaptive decision-making at 3.70. This indicates that personnel were generally capable of organizing responsibilities and adjusting decisions as conditions changed. The weaker areas were communication continuity and resource mobilization, with medians of 3.00 and 3.20. On the challenge side, access and mobility emerged as the most serious difficulty with a median of 4.10, followed by facilities and utilities at 3.90. The pattern suggests that the central problem was not an absence of administrative action, but the physical and logistical conditions that restricted what administrators could accomplish during environmental pressure. This distinction is important because disruption to school access and services can extend the educational effects of disasters beyond the immediate event, particularly when normal operations cannot be restored promptly (Segarra et al., 2022).

Table 2. *Reliability and Convergent Validity of the PLS-SEM Measurement Model*

Construct	Loading Range	Cronbach's α	rho_A	Composite Reliability	AVE
Anticipatory Coordination	.72-.86	.88	.89	.91	.63
Resource Mobilization	.71-.84	.86	.87	.90	.60
Communication Continuity	.76-.88	.90	.91	.93	.68
Adaptive Decision-Making	.73-.85	.87	.88	.91	.62
Continuity Challenges	.75-.90	.92	.93	.94	.66

Note. Maximum HTMT = .84. Inner VIF values ranged from 1.48 to 2.12.

Table 2 shows that the measurement model demonstrated satisfactory internal consistency and construct quality. Indicator loadings ranged from .71 to .90, while composite reliability values ranged from .90 to .94. Average variance extracted ranged from .60 to .68, indicating that each construct captured a substantial proportion of the variance represented by its indicators. The maximum HTMT value of .84 also indicated sufficient separation

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International Journal
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among the constructs. Inner VIF values remained between 1.48 and 2.12, showing that the administrative dimensions represented related but sufficiently distinct aspects of coastal school administration. These results supported proceeding to the structural model because the observed relationships were unlikely to have been driven by weak construct measurement or excessive overlap among predictors.

Table 3. *PLS-SEM Structural Model Predicting Continuity Challenges*

Administrative Dimension	β	t	p	f^2	Decision
Anticipatory Coordination → Continuity Challenges	-.17	1.54	.124	.05	Not Significant
Resource Mobilization → Continuity Challenges	-.29	2.58	.010	.15	Significant
Communication Continuity → Continuity Challenges	-.38	3.41	.001	.24	Significant
Adaptive Decision-Making → Continuity Challenges	-.22	2.05	.040	.10	Significant

Model Summary: R^2 = .62; Adjusted R^2 = .58; Q^2 = .40; SRMR = .067; Bootstrap resamples = 10,000.

Table 3 reveals that the four administrative dimensions collectively explained 62% of the variance in continuity challenges, indicating substantial explanatory capacity for a school-level administrative model. Communication continuity produced the strongest effect, β = -.38, p = .001, showing that stronger communication arrangements were associated with substantially fewer continuity difficulties. Resource mobilization was the second strongest predictor, β = -.29, p = .010, followed by adaptive decision-making, β = -.22, p = .040. Anticipatory coordination did not independently reach statistical significance, β = -.17, p = .124. This result suggests that planning and coordination alone were insufficient when communication channels, transportation, utilities, or deployable resources were compromised. The model's Q^2 of .40 further indicated meaningful predictive relevance. The prominence of communication and adaptive action is consistent with Striepe and Cunningham's (2022) review, which identified multidimensional communication, collaborative action, contextual responsiveness, and complex decision-making as defining features of educational leadership during crises.

Table 4. *Importance-Performance Map for Reducing Continuity Challenges*

Administrative Dimension	Importance	Performance Index	Priority Rank
Communication Continuity	.38	49.80	1
Resource Mobilization	.29	54.20	2
Adaptive Decision-Making	.22	68.10	3
Anticipatory Coordination	.17	71.50	4

Note. Performance scores were transformed to a 0-100 scale. Higher importance indicates a greater contribution to reducing continuity challenges.

Table 4 provides the clearest administrative implication of the findings. Communication continuity emerged as the primary intervention priority because it had the greatest importance in reducing continuity challenges while recording the lowest performance score of 49.80. Resource mobilization followed with an importance value of .29 and a performance index of 54.20. In contrast, anticipatory coordination showed the highest performance at 71.50 but the lowest relative importance in explaining variation in continuity challenges. This means that further improvement in planning alone would probably produce smaller gains than strengthening backup communication, information relay procedures, alternative contact systems, resource prepositioning, and logistical arrangements. The combined findings therefore show a specific vulnerability pattern in coastal school administration: personnel were able to plan and make adaptive decisions, yet environmental pressure exposed weaknesses in the systems needed to communicate, mobilize resources, maintain access, and sustain essential operations. The administrative challenge in Maconacon was therefore less about knowing what action was required and more about maintaining the operational means to carry that action through.

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CONCLUSION

Coastal public schools in Maconacon, Isabela possessed workable administrative capacity, particularly in anticipatory coordination and adaptive decision-making, yet continuity remained vulnerable when environmental pressure disrupted communication, transportation, utilities, and resource movement. Communication continuity emerged as the strongest administrative factor associated with reduced continuity challenges and was also identified as the highest priority for improvement, while access and mobility and facilities and utilities represented the most serious operational difficulties. These results suggest that preparedness plans alone are insufficient when the systems needed to implement them become unreliable during severe environmental conditions. It is therefore recommended that coastal school administrators strengthen redundant communication channels, establish alternative information relay procedures, preposition essential supplies, improve resource mobilization protocols, and develop continuity arrangements that remain functional during transport and power interruptions. Coordination with local government units, disaster risk reduction offices, and community partners should also be institutionalized to support faster response and recovery. Regular simulation exercises and periodic review of continuity plans should be conducted to ensure that procedures remain practical, responsive, and suited to the environmental realities of coastal schooling.remain effective across subjects, longer instructional periods, and different groups of secondary learners.

References

Cresencio, M., & Yabut, E. (2023). Implementation of school disaster risk reduction in coastal schools: Basis for a plan of action. *Journal of Education and e-Learning Research, 10*(2), 270-277. https://doi.org/10.20448/jeelr.v10i2.4592

Department of Education. (2024, December 27). *DepEd pushes for learning continuity amid disasters, updates class suspension guidelines*. Department of Education, Republic of the Philippines.

Global Alliance for Disaster Risk Reduction and Resilience in the Education Sector. (2022). *Comprehensive school safety framework 2022–2030 for child rights and resilience in the education sector*.

Hair, J. F., Hult, G. T. M., Ringle, C. M., & Sarstedt, M. (2022). *A primer on partial least squares structural equation modeling (PLS-SEM)* (3rd ed.). SAGE Publications.

Kock, N., & Hadaya, P. (2018). Minimum sample size estimation in PLS-SEM: The inverse square root and gamma-exponential methods. *Information Systems Journal, 28*(1), 227–261. https://doi.org/10.1111/isj.12131

Mirzaei, S., Mohammadinia, L., Nasiriani, K., Dehghani Tafti, A. A., Rahaei, Z., Falahzade, H., Amiri, H. R., Sharif Nia, H., & Dehghani, M. H. (2021). Design and psychometric evaluation of schools' resilience tool in emergencies and disasters: A mixed-method. *PLOS ONE, 16*(7), e0253906. https://doi.org/10.1371/journal.pone.0253906

Philippine Information Agency. (2026, July 10). *Isabela DRRM council on full alert, prepositioning emergency resources ahead of typhoon*. Philippine Information Agency.

Philippine Statistics Authority. (2025). *Municipality of Maconacon: Philippine Standard Geographic Code*. Philippine Statistics Authority.

Potter, P. D., Pavlakis, A. E., & Roberts, J. K. (2021). Calming the storm: Natural disasters, crisis management, and school leadership. *Journal of Cases in Educational Leadership, 24*(2), 96–111. https://doi.org/10.1177/1555458920973695

Provincial Government of Isabela. (2026). *Municipality of Maconacon*. Provincial Government of Isabela.

Reyes, V. C., Hamid, O., & Hardy, I. (2022). When reforms make things worse: School leadership responses to poverty, disasters, and cultures of crises in the Philippine education system. *International Journal of Leadership in Education, 25*(2), 331–344. https://doi.org/10.1080/13603124.2021.2009038

Segarra, E., Caraballo-Cueto, J., Cordero-Nieves, Y., & Cordero, H. (2022). The effect of consecutive disasters on educational outcomes. *International Journal of Disaster Risk Reduction, 83*, 103398. https://doi.org/10.1016/j.ijdrr.2022.103398

Striepe, M., & Cunningham, C. (2022). Understanding educational leadership during times of crises: A scoping review. *Journal of Educational Administration, 60*(2), 133-147. https://doi.org/10.1108/JEA-03-2021-0057

Taber, K. S. (2018). The use of Cronbach's alpha when developing and reporting research instruments in science education. *Research in Science Education, 48*, 1273–1296. https://doi.org/10.1007/s11165-016-9602-2

Tsioulou, A., Faure Walker, J., Lo, D. S., & Yore, R. (2021). A method for determining the suitability of schools as evacuation shelters and aid distribution hubs following disasters: Case study from Cagayan de Oro, Philippines. *Natural Hazards, 105*, 1835-1859. https://doi.org/10.1007/s11069-020-04380-3

UNESCO. (2024). *Education and school safety*. United Nations Educational, Scientific and Cultural Organization.

Wang, J.-J. (2016). Study on the context of school-based disaster management. *International Journal of Disaster Risk Reduction, 19*, 224-234. https://doi.org/10.1016/j.ijdrr.2016.08.005

World Bank Group, & Asian Development Bank. (2021). *Climate risk country profile: Philippines*. World Bank Group and Asian Development Bank.

Yusoff, M. S. B. (2019). ABC of content validation and content validity index calculation. *Education in Medicine Journal, 11*(2), 49–54. https://doi.org/10.21315/eimj2019.11.2.6