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School Heads' Leadership Experiences with Disaster Risk Reduction: A Mixed Methods Analysis of Public Schools DRRM Implementation

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ABSTRACT

This study examined the status of Disaster Risk Reduction and Management (DRRM) and explored school heads' leadership experiences in selected public schools to craft a contextualized handbook for strengthening school-based DRRM practices. This utilized the explanatory sequential mixed methods design. The quantitative data assessed the DRRM implementation across enabling environment domain and three pillars, whereas the qualitative data explored school heads' implementation challenges. The results showed that schools displayed strong performance in safe learning facilities, however, presented gaps in enabling environment, such as stakeholders' collaboration, preparedness systems, and instructional integration. Qualitative findings emphasized that effective DRRM extends beyond compliance, and requires leadership, decision-making, and proactive planning. Based on the integrated findings, a handbook was developed to provide practical tools, strategies, and best practices to address the identified gaps. Strengthening leadership capacity and institutional systems are salient in promoting safe, resilient, and disaster-ready schools while safeguarding learning continuity during emergencies.

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KEYWORDS:

DRRM implementation, learning continuity, school heads, school safety

1. INTRODUCTION

Schools play a vital role in safeguarding learners and communities against any disaster. As institutions of learning and centers of resilience, they are mandated to integrate disaster preparedness into the education landscape. DRRM is a salient component in ensuring safety and sustainable development in the Philippine Education System. The implementation of DRRM in schools is guided by the Comprehensive School Safety Framework institutionalized through DepEd Order No. 37, s. 2015.

In the Philippines, DRRM education is a mandated by national law and aligned with global sustainability objectives, such as SDG 11. Republic Act 10121 institutionalizes disaster preparedness in schools.). DRRM modules were devised based on Kolb's experiential model of learning introduced so that the application of the policies was student-centered (Agustin and Cabansag, 2023). In a related account, a disaster-prone school framework which enables learners to become resilient was proposed (Abregana, 2025). Building resilience at schools can be achieved by basing DRRM on legislation and SDGs. Through effective policy-based DRRM education, schools can meet national requirements and sustainability objectives at an international level.

Inclusion of DRRM in the curricula leads to increased awareness, preparedness and safety measures in the students. An increased level of preparedness in elementary schools with measures based on disasters has been reported (Faelangca et al., 2024). Likewise, it was noted that there is an increase in disaster-preparedness behaviors among high school students (Ventura and Madrigal, 2020). On a higher education level, DRRM implementation in building thought and behavioral outcomes has strengthened among teachers and students (Mendoza, 2025; Pili, 2023). These studies reveal the success of DRRM implementation in developing cognitive and behavioral outcomes. Schools are also training grounds of resilience besides being learning environments. Hence, the inclusion DRRM into school curricula develops both short-term and long-term resilience through training on safety-related skills.

There should be localized adaptation to community hazards and vulnerabilities to have a robust DRRM education. Disaster preparedness was enhanced through hazard mapping and budget allocations at Puerto Princesa schools (Arcegono et al. 2024). In Butuan City schools, Galvizo (2022), Luminarias (2025) focused on community-based DRRM, whereas Sumbillo and Madrigal (2020) concentrated on customized

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practices in Negros Island schools. Programs of higher education in Leyte have directly engaged young people in the implementation of DRRM (Cipres (2023). This research demonstrate that policy offers framework, but situational specific strategies lead to effectiveness. Local strategies enable DRRM to be sensitive to local hazards and social interaction. The involvement of the youth and local stakeholders makes the process sustainable even after the formal teaching.

The efficient application of DRRM in schools in the Philippines requires crisis-resistant leadership. According to Pagdilao and Paguyo (2023), school heads rapidly transitioned to management practices in face of the pandemic to ensure their learning continues. To manage a crisis effectively, the leaders must be participatory and responsive, i.e., they should engage various stakeholders in their decisions and allow them to share their concerns and suggestions that would enable them to overcome challenges and address emerging situations more flexibly (Guinsisana, 2025). An emergency leadership scale was developed to evaluate the skills that pertain to a specific crisis of school heads (Salibo, 2025), whereas resilience and innovativeness in post-pandemic recovery operations' significance was also discussed (Alonzo et al., 2024). According to other related studies, it is also indicated that flexible and creative leadership enhances immediate response to the crisis and resilience in the long run. Transformational and participatory leaders are better placed to mobilize their schools with the uncertainty. Good leadership therefore provides a platform on which programs can be maintained in schools to support DRRM. Thus, the presence of the crisis-resilient leadership largely defines the efficacy of DRRM in the Philippine schools.

Although the national policies on DRRM are very strong, the implementation of these policies in schools has not been consistent. The Philippine DRRM act of 2010 requires the inclusion of disaster preparedness in schools. The mean of implementation is diverse even if there are frameworks (Acierto et al., 2023. Also, a developed structured DRRM modules are applied differently based on the capacities of schools (Agustin and Cabansag, 2023). There are continued deficiencies in coordination and operational guidelines, undermining the resiliency of any school (Sumbillo and Madrigal, 2020). It was emphasized that legislative intent within a local context cannot work without some localization and restructuring so that even with the best written of laws and policies; they may not be effective and can even be ignored, leading to inconsistencies in implementation and responsiveness to the real needs of the community (Abregana, 2025). These results show that there is a policy-practice gap, which compromises the effectiveness of DRRM education. Although it is the direction that is given by structures, the way it really happens relies on the capacity of schools to create localized strategies. Better systems on capacity-building and monitoring should be established to close this gap. Hence, successful DRRM does not only need the establishment of policy but the continued implementation in practice by means of lucid guidelines and localization.

The lack of resources is a major problem that will hamper the implementation of DRRM programs in schools. The financial setbacks also affected the schools in Davao de Oro as they were unable to conduct timely disaster preparedness due to the shortcomings in the budget, which resulted in the lack of readiness gaps because of the delay in the timely implementation of the preparedness measures (Abenoja et al., 2023). Additionally, schools in Camarines Sur had no emergency equipment and infrastructure support (Jose, 2022). The environment issues that were caused by climate also created additional pressure on the finite resources (Genizera et al., 2022), and the public elementary schools frequently had problems related to the lack of human and financial resources (Bongayon et al., 2025). In addition to undermining preparedness, these limitations contribute to the psychological stressors in school heads who had to achieve DRRM objectives (Lucena, 2024). Schools in underprivileged regions are prone to failure without a fair distribution. Both material and psychosocial aspects need to be dealt with to be resilient in the long term. Hence, the allocation and support of resources should be better to allow schools to apply the DRRM programs.

The schools in Philippines focus on continuity of learning by incorporating DRR frameworks in school curricula. The readiness of senior high school students was evaluated and emphasized the necessity to provide students with skills in emergency response (Cabuga and Canete, 2023). The inclusion of DRR in the higher education programs enhances shock resistance (Matunhay, 2022). Both lived experiences and formal education play an important role in disaster preparedness (Hoffmann and Muttarak, 2017). The operationalized DRR protocols under RA 10121 were applied in the public secondary schools (Lopez et al., 2018, and emphasized the importance of academic leaders in a quick recovery of the academic functions following the crisis (Lao et al., 2022). These investigations demonstrate that the integration of DRR at all the levels of education develops personal and organizational resiliency. In elementary and tertiary education, preparedness programs are beneficial in improving awareness and sustained learning. Educational leadership also makes the schools recover faster in case they are shaken. Therefore, sustainability of learning during disasters is dependent on the integration of DRR into learning programs and the school business processes at all levels.

Extensive structures and leadership approach aid in disaster preparedness and restoration of schools. According to Cresencio and Yabut (2023), the model simplified the application of school-based disaster risk reduction (DRR) management in coastal schools. The authors noted that the schools are the learning institutions and safe spaces that can be instrumental in recovering, responding, and preparing communities during the emergencies. Detailed frameworks were outlined to guide academic leaders to reinstate post-

disaster functions (Lao et al., 2022). The regulatory measures and the application of policy were in line with the standardized set of DRR practices, as they were following the standard procedures (Lopez et al., 2018). It was found out that long-term DRR plans in the private institutions favor physical and psychosocial resilience (Sumbillo and Madrigal, 2020). These findings demonstrate that it is the institutional structures that are significant in transforming policies into practices that can endure over time. It shows that, unless there are clear structures and systems, it is impossible to make sure that plans are not only implemented but also maintained in practice. Not only do schools meeting compliance requirements become more resilient, but long-term strategies also help them to do so. The key to transforming DRR into a long-lasting practice is dedicated to leadership and institutional commitment. Consequently, successful frameworks and leadership approaches will guarantee that the schools will cease to move towards compliance and move to long-term resilience to a disaster.

The use of technology and active learning strategies influences the improvement of the DRR education and guarantees the continuity of learning. A disaster preparedness module was created based on the experiential learning model developed by Kolb that puts more focus on direct learning (Agustin and Cabansag, 2023). In the process, students would become more likely to acquire practical skills and gain a better idea of disaster preparedness. Multimedia and extension programs were proposed to increase the level of disaster awareness within communities (Rogayan and Dollete, 2020). These strategies indicate that creative pedagogies can establish gaps between policy and practice as well as maintain engagement throughout disruptions. Creative pedagogy provides students with applicable knowledge and keeps them busy in times of crisis. DRR education is more inclusive and widespread when implemented using technology. The initiatives help in the wider objective of SDG 4 through continuity of quality education. Therefore, teacher-centered innovation plays a critical role in the continuity of DRR educational practice and academic continuity upon disaster.

Schools also promote resiliency of the community in that they are the centers of preparedness. According to Abas et al. (2024), schools also are central players in enhancing resilience of the community. The institutional DRR practices reported by Sumbillo and Madrigal (2020) developed physical and psychosocial resilience. Surveys that ensure compliance (Lopez et al., 2018) and insights that are offered by the leadership (Lao et al., 2022) prove that these initiatives of schools go beyond the classroom to the community. These studies show that schools are not learning institutions but also resilience centers in the communities. They engage the populace and financial means, and therefore the DRR practices go beyond the institutional levels. DRR education becomes more relevant with the involvement of the community. Thus, the DRR schemes in schools enhance resilience at the schools and in the community in general.

Objectives

This study examined the status of Disaster Risk Reduction and Management (DRRM) and explored school heads' leadership experiences in selected public schools to craft a contextualized handbook for strengthening school-based DRRM practices. Specifically, this research sought to (1) determine the status of DRRM implementation along (a) enabling environment, (b) safe learning facilities, (c) school disaster risk management, and (d) DRR in education; (2) describe the school heads leadership experiences on DRRM, and (3) describe the integration of the quantitative and qualitative findings as basis for the development of a contextualized DRRM handbook.

II. METHODOLOGY

Research Design

An Explanatory Sequential Mixed Methods (Cresswell, 2021; Creswell and Clark (2017) strategy (QUAN→qual) was used in this study. This design contains two phases. Quantitative data were collected and analyzed in the first phase. Following the analysis, the second phase was developed to collect qualitative data, providing a more in-depth explanation of the quantitative results from the first phase. This research design allows the study to quantitively assess the status of DRRM implementation across the pillar and domains and qualitatively explore the school heads' leadership experiences to explain the results. The integrated quantitative and qualitative findings served as a basis in developing a handbook.

Source of Data

The main source of data was documents submitted by the schools in the district. These school-level documents were based on the Comprehensive School Safety Checklist (CSSC) by National Disaster Risk Reduction and Management Council (NDRRMC) and DepEd Order 37 s.2015. The documents that were completed using the standardized CSSC which were duly accomplished by the school heads. Documents with complete ratings across the domain and three pillars were included. Outdated, incomplete, or unverified and non-CSSC records, also those from private schools, non-formal schools were excluded.

In the qualitative phase, 6 school heads were purposively selected based on the following criteria: (1) they must be officially designated as principals or teacher-in-charge of public elementary and secondary schools in Casiguran District, (2) they must be actively performing their DRRM leadership functions, (3) they must have rendered at least one year of continuous service as school head within the district, and (4) they must be voluntarily willing to participate in the semi-structured interviews and share their leadership practices and challenges. Moreover, the following were excluded, (1)

assistant principals, teachers, or other school personnel who were not formally designated as school heads, (2) the school heads who declined or withdrew from participating in the interviews, (3) school heads who were on leave, reassigned outside the district, or not directly involved in the DRRM implementation during the data collection period, and (4) the school heads with less than one year of service within the district.

Sources that include official DepEd documents such as DepEd Orders, School Improvement Plans (SIP), strategic plans, and RA 10121, that provided legal and institutional guidance for DRRM practices was an integration of the outcome to develop a significant output that was drawn from both quantitative and qualitative findings, and the data from school heads served to validate and contextualize the proposed interventions.

This study was held and followed the strict compliance with the ethical standards. Participation was voluntary, and informed consent forms were obtained from the participants prior to their involvement. Confidentiality and anonymity were observed by using aliases or pseudonyms, and all participants were informed of their right to withdraw any time. These measures cover the informants' rights to comfort, self-determination, and the anonymity of their input in the research.

Research Instrument

The data were collected with two purposefully chosen instruments that have already undergone prior validation, thereby reducing the need for extensive reliability re-estimation.

An adopted questionnaire, the Comprehensive School Safety Checklist (CSSC), developed by the National Disaster Risk Reduction and Management Council (NDRRMC), and institutionalized by the DepEd through DepEd Order No. 37, s. 2015, was utilized to determine the status of DRRM compliance in the district. The CSSC is structured to assess schools the enabling environment domain and the three core pillars of the CSSC framework, namely: the Safe Learning Facilities, School Disaster Risk Management, and DRR in Education. These components collectively evaluated the structural safety, implemented DRRM systems and processes, and integrated DRR concepts into teaching and learning process.

Likewise, a semi-structured interview protocol adapted from established DRRM educational leadership frameworks guided the participants in sharing experiences in DRRM implementation.

Lastly, the integration of data was conducted using a joint display technique to combine both quantitative and qualitative findings. The joint display facilitated the alignment of statistical results on the status of DRRM implementation with the qualitative findings on school heads' leadership experiences. Through this procedure, the convergence, complementarity, and divergence were identified, permitting a comprehensive interpretation of results. This analysis served as the basis in developing a DRRM handbook.

Data Collection

In the first phase, the baseline quantitative data were collected directly from the District DRRM Coordinator, and the data were verified for completeness and accuracy before encoding for analysis. The researcher obtained the accomplished DRRM CSSC of the 23 public schools. This phase quantified the level of DRRM compliance across the schools in Casiguran and provided the baseline data necessary for purposive sampling in the qualitative phase.

Semi-structured interviews were conducted following the ethical standards. Then, the qualitative data were gathered from 6 purposively selected school heads through maximal variation sampling. Thus, the interview explored school heads' leadership practices and challenges in DRRM implementation.

The data collected from phases 1 and 2 were consolidated using joint display analysis and metainference. The procedure involved comparison of the statistical result with the emerging themes, classifying the convergence, divergence, and synthesizing the outcome to fulfill practical recommendations.

Data Analysis

The data were obtained from the accomplished CSSC through the district DRRM coordinator. The instrument is organized into the Enabling Environment (23 points), Pillar 1 (35 points), Pillar 2 (30 points), and Pillar 3 (12 points), with a total of 100 points. The indicators across the domain and pillars did not carry equal weights, a weighted scoring procedure was utilized to ensure accurate validation. The scores of the 23 schools for each indicator were first added, and then divided by the total number of schools, multiplied by the assigned weighted score of each indicator and converted into percentage form by multiplying by 100. The process generated comparable percentage scores across the domain and pillars. The computed percentage scores were interpreted using the rating scheme from the CSSC tool, rated as Excellent (91-100%), Very Good (81-90%), Good (71-80%), and Needs Improvement (61-70%). All indicators were evaluated using their respective total points, converted into percentages, and interpreted using the same rating scheme.

The semi-structured interviews in qualitative phase were then transcribed and analyzed (Braun & Clarke, 2006). The initial codes were generated, grouped into categories, and synthesized into overarching themes. The results were enriched by uncovering the experiences and constraints in leadership practices of school heads.

A joint display analysis was employed, where quantitative compliance scores were juxtaposed with qualitative themes, and the convergence and divergence findings were systematically identified (Cresswell & Clark 2018). The secondary data sources such as official DepEd

documents, SIPs, and other related official documents were further analyzed to triangulate findings and align them with policy standards (Fetters et al., 2013). The evidence-based recommendations for the development of DRRM handbook was developed form the integration of quantitative and qualitative data using joint display.

III. RESULTS

These quantitative and qualitative findings were presented in this section based on the analysis of data.

a. Status of DRRM Implementation in Enabling Environment

Table 1 shows that the Enabling Environment domain had mixed results. The highest-rated indicator was the presence of school partnerships that could support DRRM activities at 91%, followed by the formation of a School DRRM Team at 87%. Budget support, early warning systems, and completion of DRR-related data requirements were also rated within the "good" level.

However, the indicators on policy localization, integration of hazard mapping results into school plans, the presence of a comprehensive DRRM Plan, and the conduct of student-led hazard mapping were rated from 48% to 67%, all within the Needs Improvement range. Overall, the enabling conditions for sustained DRRM implementation were present only at a moderate level.

Table 1. Status of DRRM Implementation in the Enabling Environment Domain

Indicator	Verbal Description	F	%
School has partnerships that can support DRRM programs and activities	Excellent	19	91
Formed School DRRM Team with focal person and defined roles	Very Good	17	87%
School budget supports regular DRRM activities	Good	14	80%
Functional early warning system is established	Good	11	80%
100% completion of DRR-related questions in EMIS/EBEIS	Good	13	76%
Data collection and consolidation of DRRM programs and activities exist	Needs Improvement	10	70%
Adopted/adapted/localized at least three DRRM-related policies	Needs Improvement	4	67%
Hazard mapping results are incorporated in the School DRRM Plan, SIP, and AIP	Needs Improvement	6	66%
School has a comprehensive School DRRM Plan	Needs Improvement	21	54%
Conducted student-led school watching and hazard mapping at least once a year	Needs Improvement	10	48%
Overall for Enabling Environment	Needs Improvement		50%

b. Status of DRRM Implementation in Safe Learning Facilities

As shown in Table 2, Safe Learning Facilities was the strongest domain. The indicators on regular inspection and repair of facilities and clarity of school roles in camp management both obtained 100%. Appropriate action regarding unsafe buildings was rated 83%, while compliance with approved standards and the conduct of building risk assessments were rated 80% and 78%, respectively.

Table 2. Status of DRRM Implementation in Safe Learning Facilities

Indicator	Verbal Description	F	%
Regular inspection and repair of minor classroom/facility damages	Excellent	22	100%
School heads are clear with school roles in camp management	Excellent	22	100%
Appropriate action taken regarding unsafe school buildings	Very Good	15	83%
Building/classroom components follow approved standards and specifications	Good	12	80%
Risk assessment of buildings conducted with support of concerned offices/agencies	Good	14	78%
Overall, for Safe Learning Facilities	Excellent		98%

c. Status of DRRM Implementation in School Disaster Risk Management

Table 3 reveals that School Disaster Risk Management obtained an overall percentage of 71. The highest-rated indicators were the presence of trained first aid personnel at 100%, the identification of temporary learning spaces or shelters at 91%, and the school's participation in LGU DRRM activities at 91%.

Early warning systems, education continuity strategies, contingency planning, evacuation procedures, tracking systems, first aid kits, disaster equipment, psychosocial support personnel, and reunification plans, were mostly rated within the Good to Very Good range. However, stakeholder-inclusive drills, posting of hazard and evacuation maps, psychosocial interventions, family preparedness plans, and awareness-building for families and learners.

Table 3. Status of DRRM Implementation in School Disaster Risk Management

Indicator	Verbal Description	F	%
Trained personnel can administer first aid	Excellent	22	100%
Pre-identified spaces for temporary learning spaces/shelters	Excellent	22	91%
School participated in LGU DRRM/CCA/EiE activities	Excellent	20	91%
Functional early warning system is established	Very Good	17	85%
Ready resumption strategies and alternative delivery modes are available	Very Good	16	83%
School has a contingency plan	Excellent	15	80%
School has an evacuation plan and procedures	Good	18	80%
Learner and personnel tracking system/protocol is established	Good	16	76%
Adequate first aid kits are available in classrooms	Good	18	74%
Necessary disaster equipment is	Good	18	74%

available and functioning			
Trained teachers/personnel can provide psychosocial support	Good	16	74%
Student-family reunification plan is clearly disseminated	Good	15	74%
Regular hazard-specific drills are conducted with stakeholders	Needs Improvement	5	62%
Hazard and evacuation maps are posted in conspicuous places	Needs Improvement	15	61%
Psychosocial interventions for personnel and students are provided	Needs Improvement	12	57%
Students and families accomplished the Family Preparedness Plan	Needs Improvement	0	46%
Awareness and capacity-building for families and learners were conducted	Needs Improvement	0	45%
Overall for School Disaster Risk Mgt.	Good		71%

d. Status of DRRM Implementation in DRR in Education

Table 4 shows that DRR in Education had an overall rating of 74%. The highest-rated indicators were student participation and the presence of a capacity-building plan l, both of which obtained 100%. The indicators on the availability of DRRM resource materials and the integration of DRRM concepts in classroom subjects both fell within the "good" range. However, the presence of updated DRRM corners were both rated within Needs Improvement.

Furthermore, the results show that the status of DRRM implementation in the assessed schools was generally Good. The strongest domain was Safe Learning Facilities, followed by DRR in Education and School Disaster Risk Management, while Enabling Environment emerged as the weakest area. This pattern indicates that the schools were more consistent in structural safety and operational preparedness than in institutional planning, student-led risk assessment, family involvement, and classroom-based DRRM support. These findings provide the basis for the discussion on how existing DRRM strengths may be sustained and how weaker areas may be improved.

Table 4. Status of DRRM Implementation in DRR in Education

Indicator	Verbal Description	F	%
More than 75% of students actively participate in DRRM/CCA/EiE activities	Excellent	23	100%
School has a DRRM/CCA/EiE capacity-building plan for teachers and personnel	Excellent	23	100%
More than 10 DRRM/CCA/EiE resource materials are available in school	Good	11	74%
Key DRRM/CCA/EiE concepts are integrated in at least four subjects	Good	4	73%
School head and personnel received at least three DRRM/CCA/EiE trainings	Needs Improvement	4	64%
	Needs Improvement	13	57%

Presence of updated DRRM corners/IEC materials in every classroom Overall, for DRR in Education	Good		74%

Status of DRRM Implementation

The data in Table 5 show that the overall status of DRRM implementation was 75.98. The schools generally implemented DRRM measures. Among the four domains, Safe Learning Facilities obtained the highest result at 98%. DRR in Education with 74% and School Disaster Risk Management with 71%. In contrast, Enabling Environment obtained the lowest percentage at 50%.

The quantitative findings were further supported by the qualitative data to gather insights into DRRM Implementation. Through interview with the school heads, key themes were identified to explain and substantiate the results.

Table 5. Status of DRRM Implementation

Domain	Total Points	%	Verbal Description
Enabling Environment	23	50%	Needs Improvement
Pillar 1: Safe Learning Facilities	35	98%	Excellent
	30	71%	Good
Pillar 2: School Disaster Risk Management	12	74%	Good
Pillar 3: DRR in Education			Good
Overall	100	75.98%	

Leadership Experiences of School Heads on DRRM

In this study, the experiences of the school heads on DRRM implementation refer to their actual accounts, reflections, and practices in planning, organizing, deciding, coordinating, and responding to disaster risk reduction and management concerns in their schools. These experiences were drawn from the qualitative coding of the interview data and were organized into themes that reflect how school heads understand and carry out DRRM in their leadership work. Following the coding process, six major themes emerged: Collaboration in DRRM, Capacity Building in DRRM, Resource Constraints in DRRM, Challenges in Implementation, Ensuring Learning Continuity, and Preparedness and Response. Participant identifiers are presented as SH 1–SH 6.

Collaboration in DRRM. shows that school heads experienced DRRM as a shared responsibility that depends on strong partnerships with the LGU, community stakeholders, teachers, parents, and learners. The coded responses indicate that school heads did not view DRRM as something done by one person alone, but as a process that becomes stronger when school and community actors work together. One participant stated that challenges were addressed by "strengthening partnerships with the LGU and community stakeholders, integrating DRRM into the SIP, maximizing available human resources, and promoting a culture of shared responsibility" (SH 4). Another participant stressed the importance of community rapport by stating, "*Pag may good rapport ka sa community, kahit ano pang mahirap sa school, tutulong at tutulong ang mga tao… pag pinagsama mo yan, ang partnership ay mababuo"* (SH 1). These responses signifies that collaboration played an important role on how school heads experienced DRRM implementation.

Capacity Building in DRRM. School heads described DRRM as a method that must be learned, practiced, and reinforced through meetings, training activities, and practical involvement of teachers, parents, and students. One of the participants commented, "If there's a concern, we send the teachers to trainings… We determine what materials or equipment should be purchased so that in case of an emergency, we are prepared" (SH 2). Similarly, another participant highlighted that "Continuous training since DRRM is not just about compliance but about being ready and competent" (SH 4). These implies that school heads perceive DRRM as a practice that depends on constant professional and stakeholder development.

Resource Constraints in DRRM. The ability of schools to sustain preparedness materials, repairs, and trainings, were affected by financial limitations. One of the participants stated, "One of the main challenges I have experienced in sustaining DRRM programs is limited financial resources, especially when MOOE must cover multiple school priorities" (SH 4). Furthermore, another participant described how DRRM needs had to be inserted into the APP and admitted that sometimes essential items had to be provided personally because of shortages, saying that "being a school head, *kailangan maging resourceful*" (SH 6). These statements show that resource

limitations were a recurring part of the school heads' experiences on DRRM implementation.

Challenges in Implementation. The outcome shows that school heads experienced DRRM implementation as requiring quick yet careful judgment, especially when balancing safety, communication, property protection, and continuity of classes. One of the participants stated, "I have learned to act promptly yet carefully during emergencies by balancing safety, communication, and continuity of learning. I also ensure that decisions are data-informed, based on risk assessments and consultations with the School DRRM Team and community stakeholders" (SH 3). Another participant added that even simple equipment needs become difficult to address when they are not included in the APP, and school heads sometimes face situations where school safety needs exceed available resources (SH 6). These emphasizes responsibility and pressure in actual DRRM situations.

Ensuring Learning Continuity. School heads mentioned that they did not separate DRRM from the school's instructional function but instead connected disaster response with the learning continuity. One participant described how the school activated its learning continuity plan by preparing self-learning modules in advance, coordinating distribution and retrieval, and communicating closely with parents through group chats and text brigades, while also prioritizing at-risk learners and implementing remediation after class resumption (SH 4). Another participant stated, "We implement modular learning, blended approaches, and make-up classes when necessary. Teachers prepare emergency lesson plans and alternative delivery modes" (SH 5). These responses show that school heads experienced DRRM not only as safety management, but also as maintaining educational continuity during disruptions.

Preparedness and Response. As part of standard school processes, school heads regularly engaged in drills, facility monitoring, emergency planning, inventory work, and reporting. One participant explained that DRRM had become integrated into daily routines through "regular drills, monitoring of facilities, updating contact directories, and maintaining emergency supplies" (SH 3). Also, another participant described conducting earthquake drills, preparing contingency plans, identifying the most common hazards in the area, following up teachers, and completing inventories and reports before and after disaster events (SH 1). These responses show that preparedness and response were experienced as regular leadership practices embedded in school operations.

The findings indicate that the experiences of the school heads on DRRM implementation were characterized by six themes such as collaboration, capacity building, resource constraints, implementation challenges, learning continuity, and preparedness and response. These themes suggest that school heads experienced DRRM as a broad leadership responsibility that goes beyond compliance. Their experiences show that DRRM implementation involves working with stakeholders, strengthening competence, managing limited resources, making urgent decisions, protecting the continuity of learning, and embedding preparedness into everyday school practice.

These findings provide the basis for discussing how school heads make sense of DRRM implementation and what these experiences imply for school leadership and disaster preparedness.

Table 6. School Heads' Experiences on DRRM Implementation

Theme	Description	Verbatim Responses
Collaboration	School Heads emphasize the importance of strong partnerships with external and internal stakeholders in implementing DRRM programs.	SH4: "Despite these challenges, I address them by strengthening partnerships with the LGU and community stakeholders..." SH1: "Pag may good rapport ka sa community and partnership ay *mabubuo*... Leadership kasi is a two-way process…" SH2: "All of the external and internal stakeholders should be involved… *Kaya dapat as a school head, magaling ka sa community…"*
Capacity Building	Continuous training and skills development of teachers and personnel are essential in ensuring preparedness and effective DRRM Implementation.	SH2: "If there's a concern, we send the teachers to trainings...we determine what materials or equipment should be purchased…" SH4: "Continuous training is very important because DRRM is not just about compliance but

		about being ready and competent."
Resource Constraints	Limited financial resources and insufficient materials pose challenges in sustaining DRRM programs, requiring school heads to be resourceful and do strategic planning	SH4: "Limited financial resources, especially when MOOE must cover multiple school priorities. Sometimes, funds intended for preparedness materials, repairs, or training are insufficient, particularly after consecutive disasters."
		SH6: "Limited ang resources… *kailangan naka-plan sa APP… minsan* from my own pocket, *kailangan maging resourceful..."* SH6: "In making my APP… *nilalagay ko doon yung mga kailangan sa DRRM… hindi ka makakabili kung wala sa APP…*
Implementation Challenges	School Heads meet difficulties in sustaining DRRM efforts due to competing priorities, limited funds, and the need for careful planning and decision-making.	SH4: "MOOE must cover multiple school priorities…" SH6: "And it is very hard for us, *na kapag kailangan mo, simple equipment na kailangan mo, wala doon*… so, you need to provide. You need to *minsan nga, ginagawa ako.* From my own pocket…
Learning Continuity	Schools implement flexible learning strategies such as modular learning, blended approaches, and remediation to have learning continuity during disasters.	SH4: "We activated our learning continuity plan by preparing self-learning modules in advance, organizing scheduled distribution and retrieval systems, and coordinating closely with parents through group chats and text brigades…" SH5: "We implement modular learning, blended approaches, and make-up classes when necessary. Teachers prepare emergency lesson plans and alternative delivery modes…"
Preparedness and Response	School Heads apply data-driven and participatory decision-making to ensure safety, continuity, and effective DRRM Implementation.	SH3: "In terms of decision-making, I have learned to act promptly yet carefully during emergencies—balancing safety, communication, and continuity of learning. I also ensure that decisions are data-informed, based on risk assessments and consultations with the School DRRM Team and community stakeholders. Operationally, DRRM has been integrated into our daily routines. Regular drills, monitoring of facilities, updating contact directories, and maintaining emergency supplies are now part of our standard school processes". SH1 "First, before disasters happen, we conduct earthquake

		drill- National simultaneous drill. We have preparations in case this happens, *tinuturo natin yan. May ginawa tayong contingency plan, kasi yung plan doon mo malalaman ano ba yung mga palaging dumarating na disaster sa lugar…"*

Joint Display Analysis of Integrated Findings as Basis for DRRM Handbook Development

The integration of quantitative findings and qualitative findings was carried out using a joint display to provide comprehensive understanding of DRRM implementation in schools. The quantitative results across the domain and three pillars were aligned with the qualitative themes derived from the school heads' leadership experiences. This process facilitated identification of areas of convergence, complementarity, and divergence between statistical trends, therefore enhancing the interpretation of results.

As shown in table 7, the Enabling Environment domain as the weakest domain, which was further reiterated in the qualitative insights, denoting the concerns in policy localization, DRRM planning, and student-led hazard mapping, dependence on Local Government Units (LGU) support and funding allocation. This implies that DRRM require stronger system-level support.

On the other hand, Safe Learning Facilities emerged as the strongest domain, which converged with the school heads' focus on routine inspections, hazard identification, and safety measures. This suggests that schools are effective in implementing DRRM when it is visible, concrete, and operational.

The Disaster Risk Reduction and Management garnered a quantitative rating of good and was expanded by the qualitative results showing emergency response practices, data informed decisions, and rapid assessment. Yet, gaps in family preparedness and psychosocial support, indicating the need for sustained training, and additional support beyond the school's internal operations.

Correspondingly, DRR in Education was rated good with qualitative data showing that while learning continuity are implemented, teacher training and classroom support materials are insufficient. This relationship suggests that the integration of DRRM into instructional practices remains partial and requires further enhancement.

The integration of the findings indicates that DRRM implementation in schools is functional but uneven, its implementation is stronger in areas that were immediate, visible, and operational than in areas requiring deeper institutional support, sustained training, and broader participation.

These integrated findings present a development of a DRRM handbook by identifying priority areas for improvement. Explicitly, the gaps in Enabling Environment guided the inclusion of institutional planning, stakeholder engagement, and hazard mapping. The weaknesses in SDRRM justified a need for development on family preparedness and psychosocial support. Furthermore, the limitations in DRR in Education led to the inclusion of support materials and teacher training. This alignment will serve as the basis to address the strengths and identified gaps, making it relevant and responsive to the actual needs of schools.

Table 7. Joint Display Analysis

Quantitative Results (Objective 1)	Qualitative Follow-up (Objective 2)	Integrated Interpretation/Meta Inference
Enabling Environment was the weakest domain (50%, Needs Improvement), especially in policy localization, comprehensive DRRM planning, and student-led hazard mapping	School heads explained that DRRM depends on LGU and stakeholder partnerships, but also noted limited funds, the need to insert DRRM items in the APP, and the difficulty of making urgent decisions when information is delayed or changing.	Weak institutional systems appear to be linked to the fact that enabling tasks are more complex, planning-based, and resource-dependent than routine operational tasks.
Safe Learning Facilities was the strongest domain (98%, Excellent).	School heads described routine inspections, hazard identification, contingency planning, safety signage, and pre-emptive	The very high rating for physical safety is explained by the school heads' strong focus on concrete and observable protective actions.

	preparation before typhoons.	
School Disaster Risk Management was Good (71%), but weaker in family preparedness, psychosocial interventions, and awareness-building for families and learners.	School heads described active school-based response through rapid assessment, coordination, drills, emergency protocols, and data-informed decisions, yet also emphasized the need for more regular training, resource support, and better stakeholder readiness.	School-based emergency response is functioning, but family-linked and psychosocial components remain less developed because they require wider coordination, sustained training, and additional support beyond the school's internal operations.
DRR in Education was Good (74%), with strong student participation and planning,	School heads described DRRM as part of instructional leadership through alternative delivery modes, modular learning, blended approaches, remediations	DRRM in the schools is understood not only as safety management but also as learning continuity management. However, instructional DRRM remains uneven when teacher training

Table 7. Joint Display Analysis

Quantitative Results (Objective 1)	Qualitative Follow-up (Objective 2)	Integrated Interpretation/Meta Inference
but weaker in actual personnel training exposure and classroom DRRM corners/IEC materials.	and continuity planning during disruptions.	and classroom support materials are insufficient.
The overall status of DRRM implementation was Good (75.98%), but the pattern was uneven across domains.	School heads described DRRM as involving collaboration, capacity building, preparedness, learning continuity, urgent decision-making, and resource constraints.	The school system already had a working DRRM structure, but implementation was stronger in areas that were immediate, visible, and operational than in areas requiring deeper institutional support, sustained training, and broader participation.
Across the variables, strong indicators were mostly operational, while weak indicators were often institutional, psychosocial, or community linked.	The qualitative themes consistently showed that school heads act as coordinators, decision-makers, resource managers, and continuity planners under constrained conditions.	The experiences of school heads help explain why implementation is stronger in domains that can be acted on immediately and more weakly developed in domains that require system-level support, long-term planning, and wider engagement.

IV. DISCUSSION

This section discussed the findings related to the research objectives and existing literature on DRRM implementation within the schools in Casiguran. The outcomes are interpreted to explain how school heads implement DRRM practices and address challenges in their respective schools. This connects the study's findings with relevant theories, policies, and previous research to provide a deeper understanding of DRRRM implementation in public elementary and secondary schools in the district.

DRRM Implementation was functional, but its strength was uneven across domains

The integration of the outcomes of objectives 1 & 2 shows that DRRM implementation in the assessed schools was already functional, nonetheless, its level of development differs across different areas. The quantitative results offered a good implementation, which means that DRRM measures were already existent in the school setting. Nevertheless, qualitative

results show that the experiences of school heads are carried out under conditions that require coordination, improvisation, training, judgment, and prioritization. When these two strands are considered together, they suggest that the schools had already moved beyond minimal compliance yet had not fully achieved a balanced and comprehensive DRRM system. Creswell (2021) stated that in an explanatory sequential mixed method, integration is important because the qualitative findings help explain the pattern found in the quantitative strand rather than merely repeat it.

This joint display finding is in line with earlier school DRRM studies in the Philippines, where implementation has often been presented as present and generally positive, but not equally strong across all required indicators (Acierto et al., 2023; Cresencio & Yabut, 2023; Cruz & Ormilla, 2022). In the present study, the qualitative themes make this unevenness easier to understand. School heads described DRRM as part of their daily leadership, but they also pointed out the resource limitations, dependency on external partnerships, and urgent decision-making. This means that the "good" overall rating should not be interpreted as consistent strength in all DRRM areas, rather, it reflects a system that is already active, but whose stronger and weaker parts are shaped by the practical realities of school leadership.

A useful integrated insight from the two results is that DRRM implementation seems to develop in layers. The first layer includes visible and immediate functions such as safety inspection, basic preparedness, drills, and emergency response. The second layer involves more demanding institutional functions such as policy localization, participatory planning, psychosocial support, and family-centered preparedness. The results suggest that the first layer is more established than the second. This layered pattern helps explain why the schools could score high in facility-related safety while still showing weaker performance in enabling systems and family-linked preparedness.

a. The Enabling Environment emerged as the weakest domain

The weakest quantitative finding was Enabling Environment, which was rated Needs Improvement. This domain included weaker indicators in comprehensive DRRM planning, policy localization, integration of hazard mapping into school plans, and student-led hazard mapping. A clearer explanation emerges when these results are linked to the qualitative findings as school heads repeatedly mentioned the importance of collaboration, but they also enumerate limited resources, difficulty of inserting DRRM needs into the APP, and challenge of making timely decisions when information or communication is incomplete. These help explain why the enabling environment lags the more operational domains.

This integrated pattern suggests that the issue is not an absence of DRRM concern among school heads. Instead, it is the difficulty of embedding DRRM into a deeply institutionalized school system when resources are limited and other school priorities are urgent. Enabling tasks are more complicated as they involve policy work, documentation, long-range planning, stakeholder participation, and integration into regular school operations. Abejuela et al. (2021) pointed the continuing gaps in DRRM support and training, while Cruz and Ormilla (2022) emphasized the value of regular evaluation and stronger linkages to improve implementation. Corpuz (2019) also described disaster preparedness as including planning, organizing, hazard mapping, and public information, processes which necessitate time, coordination, and support.

b. Safe Learning Facilities emerged as the strongest domain

The Excellent result in Safe Learning Facilities becomes clearer when viewed alongside the qualitative themes of Preparedness and Response and Challenges in Implementation. This strongest domain means that the schools performed best in structural and facility-related safety. This reflected in the experiences of school heads as they described DRRM in practical ways such as conducting inspections, identifying hazards, preparing contingency plans, checking signage, securing important documents before typhoons, and monitoring school facilities. Safe Learning Facilities was the highest-rated domain, since these actions correspondingly align with the indicators in this pillar.

School Heads are confident in DRRM areas that are visible, immediate, and operational. Facility safety is easier to observe, easier to monitor, and easier to organize than more abstract elements such as policy embedding or psychosocial recovery. This is consistent with Cresencio and Yabut (2023), who also found strong emphasis on physical safety in school disaster risk reduction, and with Acierto et al. (2023), who pointed to the value of organized safety procedures and contingency systems in school DRRM. In the present study, school heads' experiences explained that physical safety is an area of active leadership rather than compliance.

c. School Disaster Risk Management was good in school-based operations, but weaker in psychosocial and family-linked dimensions

The quantitative result for School DRRM was rated good, yet, several indicators presented weaker performance such as family preparedness plans, psychosocial interventions, awareness-building for families and students, and the visibility of hazard and evacuation maps. The qualitative findings improved this pattern by presenting that school heads are more active in direct school-based response than in broader community-linked and psychosocial dimensions. They described rapid assessment, coordination with the LGU, data-informed decisions, emergency protocols, and continued monitoring of school conditions. These clearly support the stronger operational indicators in the quantitative results.

Similarly, the qualitative themes of Resource Constraints, Capacity Building, and Collaboration also

describe why some parts of this domain were less developed. Family preparedness and psychosocial response require more than internal school routines. They require sustained communication with households, school personnel training, visible information materials, and often stronger external support. Rico (2022) highlighted the importance of school-community collaboration in resilience-building, while Corpuz (2019) stressed that disaster education and preparedness should extend to include families and communities, not solely on students. These studies helped explain the outcome why internal preparedness and community preparedness are not always developed at the same pace.

Psychosocial interventions were among the weaker indicators in this pillar. School heads themselves emphasized to the need for trainings, including psychological first aid (PFA). This is consistent with Sijbrandij et al. (2020), who described PFA as an approach for assisting people in the aftermath of crisis, and with Wang et al. (2021), who noted that PFA training can strengthen frontline workers' knowledge and immediate support capacity. Thus, the mixed methods result suggest that school DRRM must be widened from emergency operations to include family communication, psychosocial readiness, and recovery support if it is to become more complete.

d. DRR in Education was explained by the school heads' orientation toward learning continuity, but training and classroom support remained uneven

The quantitative results showed that DRR in Education was Good, with particularly strong results in student participation and in the presence of a capacity-building plan, but weaker results in actual training exposure of personnel and the presence of updated DRRM corners or classroom IEC materials. School heads described DRRM as part of instructional leadership, not only as safety management. They mentioned modular learning, blended approaches, alternative delivery modes, make-up classes, remediation, parent coordination, and continuity plans during typhoons and other disruptions. These responses showed that school heads know that DRRM and learning continuity are interrelated.

This interpretation is consistent with the existing literatures on DRR and education in emergencies. Cabilao-Valencia et al. (2019) argued the integration of disaster risk reduction into educational settings, while Aguilar and Heusser (2022) stressed that education in emergencies includes readiness for school reopening and learning continuity. Cvetković et al. (2024) also highlighted the important role of schools in passing disaster-related knowledge to learners and their communities. These studies support the understanding that schools become more resilient when DRRM is integrated into teaching, school routines, and educational continuity planning.

However, the mixed methods integration shows a gap between planning for DRR in education and fully supporting it in classroom practice. The school heads' experiences show that efforts are sustained during emergencies, however, weaker quantitative indicators in personnel training and classroom IEC visibility suggest that DRRM is not yet reinforced as consistently at the classroom level as it is at the school-management level. DRRM becomes part of daily learning, instead of being addressed only during drills or emergency situations.

School Heads' Experiences in implementing DRRM

The expriences of school heads are formed by collaboration, capacity-building, resource management, decision-making, learning continuity, and preparedness practices. These reflect that DRRM Implementation in schools is not merely procedural but is deeply rooted in leadership practices and institutional realities.

Collaboration is understood as shared responsibility that requires active engagement of stakeholders, including the teachers, parents, learners, and LGUs. This multi-stakeholder approach ensures comprehensive disaster preparedness and response mechanisms, fostering a collective resilience within the educational community (Garcia & Espiritu, 2025). School heads emphasize the importance of building relationships with the community and collaborating with them. Leaders who work together with the wider community are better prepared for disasters and can respond to them immediately.

School heads recommended that constant training, drills, and professional development are essential to maintain preparedness and competence among the personnel. This supports the idea that organizational readiness is sustained through continuous learning and skill enhancement (Bass, 1985). The participants' experiences implied that DRRM is an evolving practice that depends on strengthening human resource. This is consistent with the view that leadership plays a key role in fostering a culture of preparedness and professional growth within schools.

It was revealed that resource limitations remain a challenge in sustaining DRRM initiatives. DRRM programs cannot be fully implemented due to limited financial resources, different school priorities, and insufficient materials. This is further intensified by a lack of human capital and fragmented systems, which collectively impede the systematic integration of DRRM strategies within the educational framework (Baluran, 2023). School heads often compensate for these limitations through strategic planning and personal initiative, emphasizing that gap between policy expectations and actual realities at school-level.

Similarly, the implementation challenges exposed the demanding nature of decision-making during emergencies, thus, necessitates an understanding of situational dynamics and ability to adapt to protocols under pressure, underscoring the critical role of strategic leadership in disaster response (Valenzuela & Buenvinida, 2021). The data presents that school heads act as frontliners who must translate DRRM

policies into action, even under uncertainty and compelled situations.

DRRM implementation is linked to the core function of education. The learning continues despite disruptions through alternative delivery modes (ADM), modular instruction, and remediation strategies. This proactive approach reflects a commitment to minimizing educational loss during crises and emphasizes on the importance of adaptability in disaster-prone areas. Pant (2024) supported the critical importance of baseline information in developing and implementing comprehensive continuity plans to ensure ongoing school operations in the face of natural hazards. DRRM includes maintaining instructional delivery during crises and not limited to emergency response.

Ultimately, preparedness and response surfaced as routine and proactive practices rooted in school operations. Through regular drills, contingency planning, hazard identification, and monitoring systems, DRRM is integrated into daily school management. This supports the notion that preparedness is a continuous process that enhances institutional resilience and reduces disaster risks (Alexander, 2013). School heads play a crucial role in institutionalizing these practices, ensuring that DRRM becomes part of the school culture.

The study found that DRRM works best when people work together, when school heads are trained and have the resources they need when they can make decisions when classes are not interrupted and when they are prepared for disasters. Moreover, the study highlights the need to strengthen institutional support systems to address gaps in resources, training, and stakeholder involvement, therefore, enhancing overall effectiveness of DRRM implementation in basic education.

Integration of Findings and their Application in Handbook Development

The integration of the findings resulted in identification of priority areas where interventions are most needed. The quantitative results provided measurable evidence of strengths and gaps across the domain and three pillars, while qualitative data explained the factors behind these patterns. The weak performance in enabling environment domain was identified through low quantitative ratings but was further explained by qualitative data highlighting challenges in policy localization, planning, and dependency on external resources. This necessitated the inclusion of structured planning guides, decision-making frameworks, policy alignment, and stakeholder engagement in the handbook to address gap between policy and actual implementation.

The results implied that school heads are more confident and consistent in implementing visible and routine safety procedures sice safe learning facilities showed strong performance, and it is suggested to standardize these practices rather than introduce entirely new interventions. The principle of sustaining what already works while responding to the identified gaps guided the development of handbook. It provides a structured approach to integrate DRRM into school-based management frameworks, offering best practices, assessment processes, and stakeholder engagement strategies (Manallo & Chua, 2024).

DRRM implementation is not evenly experienced across domains, instead, it depends on whether the tasks are operational, institutional, or community linked. The stronger areas are those requiring immediate and observable actions, and weaker areas are those requiring long-term planning, coordination, and external support.

Furthermore, the integrated findings also highlighted that school leaders function as agents of DRRM implementation by being coordinators, decision-makers, and continuity planners. Hence, the handbook was designed as a support tool to improve school head's ability to make informed and context-responsive decisions rather than providing general information.

V. CONCLUSION

The paper finds that the DRRM in the public schools in Casiguran District is, overall, good which implies that the schools do practice the key DRRM measures, but the extent of their implementation is uneven. The quantitative data demonstrate that the most implemented area is Safe Learning Facilities and the least is Enabling Environment which proves that schools are more uniform in visible and operational safety measures as compared to planning, policy localization and systems of institutional support. The qualitative results also demonstrate that school heads implement DRRM by collaborating, building capacity, preparedness and response, learning continuity, resource limitation, and implementation challenges. Collectively, these results indicate that the school heads are the key stakeholders in the implementation of the DRRM policies in real school setting. The study, thus, indicates that DRRM application in schools is already operational, though it is still disparate since higher performance is observed in immediate and visible preparedness measures, whereas lesser performance is evident in institutional preparedness plans, psychosocial preparedness and family/community preparedness. The integration of the quantitative and qualitative data facilitated a basis for the development of a DRRM handbook that directly addresses the identified strengths, and gaps in school-level DRRM implementation.

Based on these conclusions, the research suggests that schools and authorities in the field of education could utilize the handbook as practical reference in improving the enabling environment through better policy localization, incorporating results of hazard mapping into school policies, and maintaining participatory processes of DRRM involving teachers, learners, parents, and community participation. The personnel and school heads may use the handbook to be equipped with ongoing and pertinent capacity-building exercises on DRRM, such as psychosocial support, emergency decision-making, and continuity planning of learning. Preparedness of communities

and families in schools is also an area that needs to be strengthened by regular drills, sensitization, and increased LGU involvement and stakeholder. Along with it, more permanent and coherent school-level support of DRRM resources can be offered so that to overcome the equipment limitations, the material limitations, and the preparedness actions. Further research can also investigate other variables that determine the implementation of DRRM and might involve broader samples or comparative context to enhance the knowledge of DRRM implementation in schools.

VII. DISCLOSURE

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

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