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Research Article

Building Back Better Classrooms: Integrating Disaster Risk Reduction into National Education Frameworks. A Case Study of Swat, Khyber Pakhtunkhwa, Pakistan

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Abstract

Introduction: Even in developing countries, gender disparities in elementary education access and outcomes remain a persistent challenge. Female teachers are widely believed to create safer, more supportive learning environments, particularly for young girls, which can positively influence enrollment, retention, and learning outcomes.

Objective: This study assesses the effects of female-only teaching faculty in government primary schools in Peshawar on student enrollment, retention, and learning outcomes.

Method: A quasi-experimental, longitudinal design was employed, comparing student outcomes at the start and end of 2023 across 40 government primary schools. The sample included approximately 20–25 students per school in Grades 1–5. Propensity Score Matching (PSM) was used to ensure comparability across grades and school characteristics, while Difference-in-Differences (DiD) regression models with school fixed effects and clustered standard errors were applied to estimate the causal effects of female-only teaching staff on student outcomes, controlling for school-level variables such as pupil–teacher ratio, teacher qualifications, infrastructure, and socio-economic context. Supplementary qualitative data from interviews with teachers and focus group discussions with parents contextualized the quantitative findings.

Results: Female-only staffed schools demonstrated significant improvements in enrollment, particularly for girls, alongside higher attendance rates, lower dropout rates, and increased grade transition rates. Standardized learning assessments showed substantial gains in Mathematics, Reading/Language, and Environmental Studies over the study period. These effects were robust across multiple model specifications and subgroup analyses. The findings suggest that the presence of female teachers enhances academic achievement, engagement, and retention, thereby contributing to overall educational quality and gender equity.

Conclusion: The study provides strong evidence that female teachers in government primary schools improve student enrollment, retention, grade progression, and learning outcomes, with particularly strong benefits for girls. These findings highlight the policy importance of female teacher representation. Education authorities should prioritize recruiting, training, and equitably deploying qualified female teachers, especially in

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rural and underserved areas, while providing supportive working conditions and retention incentives. Future research should examine the long-term academic and socio-economic effects of female teacher representation and identify contextual factors that can strengthen these benefits.

Introduction

In recent years, the global education community has increasingly recognized that schools must serve not only as centers of learning but also as sanctuaries of safety during disasters (GADRRRES, 2017; UNICEF, 2022). The Sendai Framework for Disaster Risk Reduction 2015-2030 explicitly identifies education as a critical pillar for achieving resilience, urging member states to integrate risk-informed practices into school infrastructure, curricula, and teacher training programs (UNDRR, 2015). Yet, in many developing nations, this integration remains fragmented, leaving millions of children in hazard-exposed regions without adequate protection during emergencies (Bisri & Beniya, 2022; Izadkhah & Hosseini, 2023).

Pakistan's geographical and climatic vulnerability places it at the epicenter of disaster risk in South Asia. The catastrophic 2005 Kashmir earthquake, which claimed over 73,000 lives and destroyed more than 7,000 school buildings, exposed the lethal consequences of unsafe educational infrastructure (Khan et al., 2020; NDMA, 2007). Subsequent disasters, including the mega-floods of 2010 and the devastating deluge of 2022, repeatedly disrupted schooling for millions of children, particularly in the northern and western provinces (Khan et al., 2023; World Bank, 2022). Khyber Pakhtunkhwa, situated along the seismically active Himalayan thrust belt and drained by the flood-prone Swat River, represents one of the most hazard-exposed educational landscapes in the country (Ali et al., 2021; Geological Survey of Pakistan, 2019).

The district of Swat, often celebrated as the "Switzerland of Pakistan" for its scenic valleys, has endured a paradoxical relationship with disaster. While the region has made remarkable strides in educational enrollment since the post-conflict recovery period of 2009-2012, its schools remain acutely vulnerable to natural hazards (UNESCO, 2018). Many school buildings constructed before the 2005 earthquake lack seismic resistance, while others rebuilt after subsequent floods were not designed with climate-adaptive principles (Bari & Bari, 2022). The result is an educational landscape where progress in access coexists with persistent vulnerability.

The concept of "Build Back Better" has emerged as a guiding philosophy for post-disaster reconstruction, emphasizing that recovery efforts should not merely restore pre-disaster conditions but actively reduce future risk (Kennedy et al., 2008; Mannakkara & Wilkinson, 2014). In education, this translates to hazard-resistant school buildings, DRR-integrated curricula, trained teachers capable of managing emergencies, and psychosocial support systems for affected children (GADRRRES, 2017; Selby & Kagawa, 2018). However, translating these ideals into national education frameworks remains a formidable challenge, particularly in resource-constrained contexts where competing priorities often overshadow risk reduction investments (Bisri & Beniya, 2022; Wisner, 2021).

The integration of disaster risk reduction into education presents both transformative opportunities and complex challenges. On one hand, schools that embrace DRR principles can function as community resilience hubs, equipping students with life-saving knowledge while providing physically safe environments (Izadkhah & Hosseini, 2023; Wisner, 2021). On the other hand, the task demands substantial financial investment, technical expertise, and sustained political commitment, commodities that remain scarce in developing regions (Khan et al., 2023; Ullah et al., 2024). Furthermore, there exists a persistent tension between rapid reconstruction, which prioritizes speed and cost, and resilient reconstruction, which demands quality, safety, and future-proofing (Mannakkara & Wilkinson, 2014).

In Pakistan, the National Disaster Management Authority (NDMA) and its provincial counterpart in Khyber Pakhtunkhwa have developed school safety guidelines and hazard vulnerability assessments (NDMA, 2007, 2014). However,

implementation at the district level remains uneven, with rural areas like Swat often falling through the gaps of centralized planning (Ali et al., 2021; Khan et al., 2020). Teachers, who constitute the frontline of school-based DRR, frequently lack the training, resources, and institutional support necessary to translate policy into practice (Bari & Bari, 2022; Ullah et al., 2024). This disconnects between national frameworks and classroom realities represents the central challenge addressed by this study.

For this reason, embedding DRR into education requires more than infrastructural retrofitting. Teachers must be equipped with pedagogical tools that make risk reduction meaningful and age-appropriate, while administrators need clear protocols for preparedness, response, and recovery (GADRRRES, 2017; Selby & Kagawa, 2018). Instead of viewing DRR as an external imposition, educators can frame it as an extension of their existing commitment to student welfare, thereby creating school environments where safety and learning reinforce each other (Izadkhah & Hosseini, 2023; Wisner, 2021). This approach aligns with the idea of collaborative resilience-building, where schools, communities, and government agencies work together to create hazard-responsive educational ecosystems.

In Khyber Pakhtunkhwa, the integration of DRR into education presents both significant opportunities and notable challenges. Issues such as inadequate funding, limited technical capacity, and the digital divide are critical to ensuring equitable access to safe learning environments for all students (Khan et al., 2023; Ullah et al., 2024). Protecting school infrastructure and reducing hazard exposure are essential to creating inclusive educational spaces that benefit everyone. Moreover, as Pakistani educational institutions increasingly face climate-related disruptions, it becomes vital to balance reconstruction with risk-informed planning. While DRR can improve educational continuity and student well-being, it also requires careful implementation to avoid risks like excessive dependence on external aid or unequal distribution of safety resources across urban and rural schools (Bisri & Beniya, 2022; Wisner, 2021). Therefore, implementing DRR in education should be guided by a critical approach that emphasizes equity, local context, and student-centered resilience.

Significance of the Study

The significance of this study lies in its focus on how teachers, administrators, and disaster management officials in Swat perceive, implement, and experience disaster risk reduction within educational settings. By identifying the gaps between national policy and local practice, the research provides valuable insights for policymakers, school leaders, and teacher training institutions about the required support for resilient education in hazard-prone regions. Moreover, the results can help educators integrate DRR not as an isolated emergency protocol but as an everyday pedagogical practice, leading to safer, more equitable, and sustainable teaching and learning environments in Pakistan.

Problem Statement

Although disaster risk reduction has gained recognition as a national priority in Pakistan, its integration into primary and secondary education frameworks, especially in disaster-affected districts like Swat, remains limited and poorly understood. Schools face challenges such as unsafe infrastructure, lack of teacher training in emergency preparedness, poor access to DRR resources, and little awareness of psychosocial support needs. Because of these issues, it is not clear how DRR can be effectively woven into national education frameworks without overwhelming teachers, disrupting curricula, or creating inequitable safety standards between urban and rural institutions.

Research Questions

How aware are teachers and administrators of disaster risk reduction, and how do they currently implement it in their schools?

What benefits and challenges do stakeholders face when integrating DRR into educational practices in Swat?

Research Objectives

To explore how teachers, administrators, and disaster management officials currently understand and implement disaster risk reduction in schools.

To identify the benefits and challenges stakeholders face when integrating DRR into educational frameworks in Swat, Khyber Pakhtunkhwa.

Materials and Methods

This study employed a cross-sectional descriptive design to explore the integration of disaster risk reduction into national education frameworks through the lens of school-level practices in Swat. A mixed-methods approach was adopted, combining survey-based quantitative data with qualitative insights from open-ended responses and semi-structured interviews. This design allowed for both the measurement of trends and the deeper exploration of stakeholders' perspectives.

The study was conducted in 12 government schools across Swat district, Khyber Pakhtunkhwa, Pakistan, between November 2025 and January 2026. A total of 120 participants were recruited using purposive sampling: 80 classroom teachers, 25 school administrators (head teachers and principals), and 15 district-level disaster management officials. Schools from both primary and secondary levels were included to ensure representation across teaching stages. Eligible participants were those currently engaged in educational roles with at least one year of experience in Swat district and who consented to participate voluntarily. Those on extended leave, in purely administrative roles without classroom contact, or unwilling to participate were excluded.

The required sample size was calculated using the single population proportion formula:

$$\boldsymbol{n = (Z^2 \times p \times (1-p)) / d^2}$$

Where n is the required sample size, Z is the Z value at a 95% confidence level (1.96), p is the estimated proportion of educators familiar with DRR principles (assumed to be 0.5 in the absence of prior data, which maximizes sample size), and d is the margin of error (set at 0.09). Substituting these values:

n = (1.96) ² × 0.5 × (1-0.5) / (0.09) ² n = 3.8416 × 0.25 / 0.0081 n = 0.9604 / 0.0081

n = 118.57

Thus, a final sample size of 120 participants was considered sufficient for the study.

Data were collected through a structured, self-administered questionnaire that was developed after reviewing relevant literature on school safety, DRR education, and post-disaster reconstruction (GADRRRES, 2017; Wisner, 2021). The instrument consisted of six sections: demographic details, awareness and knowledge of DRR, current DRR practices in schools, perceived benefits of DRR integration, challenges and limitations, and open-ended items for qualitative insights. The questionnaire included both Likert-scale items, rated on a five-point scale (1 = strongly disagree, 5 = strongly agree), and open-ended questions. A pilot test was conducted with 12 educators outside the study sample to ensure clarity and feasibility, and necessary modifications were made before the final administration.

Content validity was established through expert review by three educationists, two disaster management specialists, and one structural engineer, who confirmed the relevance and clarity of the items. Reliability was assessed using Cronbach's alpha, and a score of 0.7 or above was considered acceptable for internal consistency. The pilot test yielded an alpha coefficient of 0.84, and the revised questionnaire was subsequently used for data collection.

Permission to conduct the study was obtained from the District Education Office Swat and from the principals of the participating schools. Participants were informed about the objectives of the research, the voluntary nature of their participation, and the assurance of confidentiality and anonymity. Questionnaires were distributed during staff meetings and collected within two weeks. Informed consent was obtained from all participants, and their anonymity was preserved to reduce social desirability bias and encourage honest responses.

Semi-structured interviews were conducted with 15 key informants, including 5 head teachers, 5 disaster management officials, and 5 representatives from local education committees. Interviews lasted between 25 and 45 minutes and were audio-recorded with permission. These interviews explored in-depth perspectives on policy implementation, resource allocation, and community participation in school-based DRR.

Quantitative data were entered and analyzed using SPSS version 26. Descriptive statistics, including frequencies, percentages, means, and standard deviations, were used to summarize the data. Inferential statistics, such as independent sample t-tests and one-way ANOVA, were

applied to compare responses across groups (e.g., primary versus secondary teachers, reconstructed versus non-reconstructed schools), with a significance threshold set at $p < 0.05$. Qualitative responses from open-ended items and interview transcripts were subjected to thematic content analysis. Two researchers independently coded the responses to identify recurring themes and subthemes, and discrepancies were resolved through discussion to minimize researcher bias.

Bias reduction was carefully considered throughout the study. Selection bias was minimized by including participants from multiple schools and across different professional roles. Response bias was addressed by assuring participants that their responses would remain anonymous and would not affect their professional status. Researcher bias was reduced through independent coding of qualitative data by two analysts and the use of a coding framework developed before data analysis. These strategies ensured that the study maintained methodological rigor and produced findings that were both reliable and credible.

Results

The demographic characteristics of the participating educators are presented in Table 1. Out of 120 participants, 58 were male (48.3%), and 62 were female (51.7%). The majority of teachers (36%) were between 35-44 years of age, followed by 28% in the 25-34 group. Nearly half of the teacher participants (51%) taught at the secondary level, while 49% taught at the primary level. Teaching experience was relatively well distributed, with 30% having 6-10 years of experience, 26% with 11-15 years, and 24% with more than 15 years, whereas 20% had less than five years of experience. Among administrators, 64% had served in leadership roles for more than five years. This diversity provided a balanced perspective across age, teaching level, and professional experience.

Table 1: Demographic characteristics of participating educators (n = 120)

Variable	Categories	Frequency (n)	Percentage (%)
Gender	Male	58	48.3
	Female	62	51.7
Age (years)	< 25	8	6.7
	25-34	34	28.3
	35-44	43	35.8
	45-54	28	23.3
	≥ 55	7	5.8
Role	Classroom Teacher	80	66.7
	School Administrator	25	20.8
	Disaster Official	15	12.5
Teaching Level (Teachers only)	Primary	39	48.8
	Secondary	41	51.2
Teaching Experience	< 5 years	24	20.0
	5-10 years	36	30.0
	11-15 years	31	26.0
	> 15 years	29	24.0

Educators' awareness and engagement with DRR principles are shown in Table 2. Most participants reported being moderately familiar with the concept of disaster risk reduction (mean = 3.5 ± 0.9). However, fewer had received formal training on DRR in education (mean = 2.4 ± 1.1). Despite this gap, many educators reported active implementation of some DRR measures in their schools (mean = 3.1 ± 1.0), suggesting that practical engagement is occurring even in the absence of structured training.

Table 2: Educators' awareness and engagement with DRR (Likert-scale mean scores)

Item	Mean ± SD
Familiar with the concept of Disaster Risk Reduction (DRR)	3.5 ± 0.9
Received formal training on DRR for schools	2.4 ± 1.1

Currently implement DRR measures in school	3.1 ± 1.0
Aware of national school safety guidelines	2.9 ± 1.0
School has an emergency evacuation plan	3.3 ± 1.1

Teachers and administrators reported using DRR-related practices for a variety of purposes, as summarized in Table 3. The most frequent activity was conducting basic emergency drills (62%), followed by hazard identification around school premises (51%) and first-aid awareness sessions (44%). Around 38% reported integrating DRR concepts into classroom discussions, while 33% had participated in post-disaster psychosocial support training. Relatively fewer educators reported involvement in school infrastructure assessment (27%) or coordination with district disaster management authorities (24%). These findings highlight that DRR is predominantly practiced through informal, school-level initiatives rather than systematic, policy-driven frameworks.

Table 3: DRR-related practices reported by educators (n = 120)

Practice	Frequency (n)	Percentage (%)
Conducting emergency evacuation drills	74	61.7
Identifying hazards around school premises	61	50.8
Organizing first-aid awareness sessions	53	44.2
Integrating DRR concepts into classroom teaching	46	38.3
Participating in psychosocial support training	40	33.3
Assessing school infrastructure safety	32	26.7
Coordinating with district disaster authorities	29	24.2

With respect to perceived benefits of DRR integration, educators agreed that DRR improves student safety during emergencies (mean = 4.3 ± 0.6), enhances community resilience (mean = 4.1 ± 0.7), and supports educational continuity (mean = 4.0 ± 0.8). Reduction of teacher anxiety during disasters was rated somewhat lower (mean = 3.5 ± 0.9), indicating that educators primarily value DRR for its protective and social functions rather than its psychological benefits for staff.

Table 4: Perceived benefits of DRR integration in schools (Likert-scale mean scores)

Benefit Item	Mean ± SD
DRR improves student safety during emergencies	4.3 ± 0.6
DRR enhances community resilience	4.1 ± 0.7
DRR supports educational continuity after disasters	4.0 ± 0.8
DRR reduces teacher anxiety during emergencies	3.5 ± 0.9
DRR improves school infrastructure quality	3.7 ± 0.9

Perceived challenges are summarized in Table 5. Limited funding for safety measures emerged as the strongest barrier (mean = 4.4 ± 0.7), followed by lack of teacher training (mean = 4.2 ± 0.8). Educators also raised concerns about inadequate infrastructure (mean = 4.0 ± 0.8) and absence of DRR content in national curricula (mean = 3.9 ± 0.9). Poor coordination between education and disaster management departments was noted as a significant structural obstacle (mean = 3.8 ± 1.0). These findings underscore that structural, financial, and institutional challenges must be addressed for effective DRR adoption.

Table 5: Perceived challenges in DRR integration (Likert-scale mean scores)

Challenge Item	Mean ± SD
Limited funding prevents effective DRR implementation	4.4 ± 0.7
Lack of training is a barrier to using DRR effectively	4.2 ± 0.8
School infrastructure is inadequate for hazard resilience	4.0 ± 0.8
National curriculum lacks DRR content	3.9 ± 0.9
Poor coordination between education and disaster agencies	3.8 ± 1.0

A comparison of DRR implementation between schools reconstructed under Build Back Better principles and non-reconstructed schools is presented in Table 6. Statistically significant differences were observed in infrastructure resilience ($p = 0.003$), availability of emergency supplies ($p = 0.012$), and teacher confidence in managing emergencies ($p = 0.021$), with reconstructed schools reporting higher mean scores in each case. No significant difference was noted in curricular integration of DRR ($p = 0.142$), suggesting that infrastructure improvements have outpaced pedagogical advancements.

Table 6: Comparison of DRR indicators between reconstructed and non-reconstructed schools

Indicator	Reconstructed Schools (Mean ± SD)	Non-Reconstructed Schools (Mean ± SD)	p-value
Infrastructure resilience	4.2 ± 0.7	3.4 ± 0.9	0.003
Emergency supplies availability	3.9 ± 0.8	3.2 ± 1.0	0.012
Teacher confidence in emergencies	3.7 ± 0.9	3.1 ± 1.0	0.021
Curricular integration of DRR	2.8 ± 1.0	2.5 ± 1.1	0.142

Qualitative findings from open-ended responses and interviews revealed three overarching themes. First, participants consistently described a "policy-practice chasm," whereby national DRR guidelines existed on paper but rarely translated into actionable school-level protocols. Second, teachers emphasized the emotional dimension of disaster, noting that students in flood-affected areas exhibited signs of trauma and anxiety that standard curricula did not address. Third, community involvement was identified as both a strength and a gap: while local communities often mobilized spontaneously during disasters, systematic partnerships between schools, parents, and disaster authorities were largely absent.

Discussion

The findings of this study provide valuable insights into how educators and disaster management officials in Swat perceive and implement disaster risk reduction within their schools, while also highlighting key challenges that shape adoption. The demographic diversity of participants, spanning gender, age, professional role, and institutional context, ensured that perspectives were well balanced, reflecting broader trends in the educational and disaster management workforce.

One of the central findings was that educators are moderately familiar with DRR concepts (mean = 3.5 ± 0.9), yet formal training remains strikingly limited (mean = 2.4 ± 1.1). Despite this gap, teachers actively incorporate basic DRR measures such as drills and hazard identification (mean = 3.1 ± 1.0). This aligns with prior research (Izadkhah & Hosseini, 2023; Wisner, 2021), which noted that educators in hazard-prone regions often experiment with safety practices even without structured training, driven by lived experience and community pressure. However, the lack of training resonates with Bari and Bari (2022), who emphasized that professional development remains the most critical factor for sustainable DRR integration in schools.

In terms of practices, the dominance of emergency drills (reported by 62% of educators) is notable, yet the relatively low engagement with infrastructure assessment (27%) and inter-agency coordination (24%) reveals an incomplete understanding of comprehensive school safety. This figure aligns with studies from developing-country contexts, where school-based DRR tends to emphasize visible activities like drills while neglecting structural and systemic dimensions (Bisri & Beniya, 2022; GADRRRES, 2017). The finding suggests that in resource-constrained settings like Swat, DRR is often practiced as a series of disconnected safety activities rather than an integrated institutional framework.

Regarding instructional purposes, educators most frequently used DRR practices for emergency preparedness (drills, first aid) and hazard identification. This aligns with studies in disaster-exposed contexts (Khan et al., 2020), where immediate life-saving skills take precedence over long-term resilience-building. Similarly, the use of DRR for psychosocial support (33%) is consistent with findings by Peek et al. (2018), who argued

that post-disaster mental health interventions are essential yet frequently overlooked in educational planning. However, relatively fewer educators employed DRR for curricular integration (38%) or infrastructure advocacy (27%), suggesting that DRR is perceived primarily as an emergency protocol rather than a pedagogical or developmental priority.

The perceived benefits further strengthen this observation: educators rated student safety (mean = 4.3 ± 0.6) and community resilience (mean = 4.1 ± 0.7) more highly than teacher psychological well-being (mean = 3.5 ± 0.9) or infrastructure quality (mean = 3.7 ± 0.9). This finding resonates with Wisner (2021), who emphasized that DRR's greatest potential lies in protecting lives and fostering social cohesion rather than merely retrofitting buildings. Importantly, statistically significant differences were found between reconstructed and non-reconstructed schools, with rebuilt institutions reporting higher resilience across infrastructure, supplies, and teacher confidence ($p < 0.05$). This may reflect the success of post-disaster reconstruction programs that adopted Build Back Better principles, as highlighted in previous work by Mannakkara and Wilkinson (2014) and Kennedy et al. (2008).

On the other hand, challenges remain substantial. Limited funding (mean = 4.4 ± 0.7) and lack of training (mean = 4.2 ± 0.8) were the most prominent barriers, echoing findings from developing-country contexts (Khan et al., 2023; Ullah et al., 2024). Structural concerns, including inadequate infrastructure (mean = 4.0 ± 0.8) and curriculum gaps (mean = 3.9 ± 0.9), also emerged prominently. This supports concerns raised in UNESCO's (2018) report on education in emergencies, which cautioned that without systematic integration into national curricula, DRR remains dependent on individual teacher initiative and thus unsustainable.

The qualitative findings revealed a critical insight: teachers viewed psychosocial support and hazard-responsive infrastructure as more urgently needed than curricular additions alone. This perspective challenges top-down approaches that prioritize policy documents over classroom realities. Educators described how students in repeatedly flooded areas displayed persistent anxiety during monsoon seasons, yet no formal mechanisms existed to address these emotional needs. This aligns with the work of Peek et al. (2018) and Pfeffer Baum et al. (2022), who emphasized that children's mental health in disaster contexts requires structured, school-based interventions rather than ad hoc responses.

Overall, the results underscore a paradox: educators clearly recognize the protective value of DRR, particularly for student safety and community resilience, yet face systemic barriers such as insufficient funding, limited training, and weak institutional coordination. Integrating DRR into national education frameworks, therefore, requires not only infrastructural investment but also curricular reform, teacher capacity-building, and policies that safeguard child-centered, hazard-responsive pedagogy.

Strengths and Limitations

One of the main strengths of this study is its mixed-methods methodology, in which quantitative data combined with qualitative insights to present an in-depth view of stakeholders' perceptions. The study ensured a broad sample that truly represented a variety of professional experiences by including teachers, administrators, and disaster management officials across multiple government schools in Swat. The findings of the study became more reliable by the use of validated tools and statistical data to show reliability. Moreover, by independent coding of qualitative responses, the study addressed researcher bias, which strengthened the overall authenticity of the analysis.

Alongside these strengths, there are some limitations. First, the study was restricted to a single district, because of which the results may not be generalizable to other districts of Khyber Pakhtunkhwa or Pakistan. Furthermore, although the study examined educators' opinions and practices, it did not measure student outcomes or conduct structural engineering assessments of school buildings directly, which would offer a deeper understanding of the effectiveness of DRR integration. Additionally, the cross-sectional design captures perceptions at a single point in time and cannot track changes in DRR implementation over successive disaster seasons.

Future Perspective

Looking forward, education in Pakistan and other disaster-prone regions could be significantly changed by integrating disaster risk reduction

into national education frameworks. To fulfill this achievement, policymakers and administrators must give priority to the development of national DRR curriculum guidelines, dedicated teacher training programs, and equitable access to hazard-resistant school infrastructure. Future researchers should emphasize maintaining the human characteristics of education, such as empathy, psychological safety, and cultural sensitivity, all of which are crucial for effective pedagogy in disaster contexts, rather than focusing solely on infrastructural standards. By establishing integrated models that allow DRR to support rather than burden teachers, education systems can create a more resilient, inclusive, and adaptive learning environment in the future.

Conclusion

This study underscores that the inclusion of disaster risk reduction into education frameworks can significantly increase school safety and educational continuity when it is kept balanced with the human-centered principles of pedagogy. Educators in Swat showed awareness of DRR's importance and informed active use of basic safety practices such as drills and hazard identification. While possible benefits were identified in terms of student protection and community resilience, challenges such as limited funding, lack of proper training, inadequate infrastructure, and weak inter-agency coordination remain crucial. The findings emphasized that DRR is important when it is used as a supportive framework by educators in their professional context, not as an external burden. With accurate guidelines, resources, and proper training, the integration of disaster risk reduction and education can make way for a more resilient and equitable educational future.

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