

Development of a School Innovation Support Ecosystem Framework for School Heads in Resource-Constrained Contexts

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Abstract

Resource-constrained public schools continue to face difficulties in sustaining instructional, organizational, technological, and community-based innovation despite increasing expectations for educational improvement. This study examined teachers' perceptions of school heads' support for school innovation, the perceived necessity of strengthening innovation support systems, and the relationship between these variables among public schools in the Division of Siargao. Guided by Diffusion of Innovations Theory and supported by Transformational Leadership Theory, Distributed Leadership Theory, and the Resource-Based View, the study employed a sequential explanatory mixed-methods design. Quantitative data were gathered from 384 teacher-respondents using the researcher-developed and validated School Innovation Support Assessment Tool (SISAT), while qualitative data from school heads and open-ended responses were analyzed thematically. Results showed that teachers generally perceived school heads' support for innovation as high across the five support dimensions, with collaboration and community partnerships obtaining the highest rating and resource mobilization and management obtaining the lowest. Teachers also expressed a very high perceived necessity for strengthening innovation support, particularly in external partnerships, policy guidance, recognition systems, teacher support, and leadership development. A weak but statistically significant positive relationship was found between school heads' innovation support and teachers' perceived necessity for strengthening innovation support ($r = .20$, $p = .003$). Qualitative findings showed that innovation is enabled by supportive leadership, teacher collaboration, creativity, and community engagement but constrained by resource scarcity, workload, limited training, geographic isolation, weak connectivity, and policy limitations. Based on the integrated findings, the study proposes a School Innovation Support Ecosystem Framework for school heads in resource-constrained contexts.

Keywords: School Innovation, School Heads' Support, Resource-Constrained Schools, Educational Leadership, Resource Mobilization, Community Partnerships, School Innovation Support Framework

1. Introduction

Schools in geographically isolated and resource-constrained communities are increasingly expected to implement innovations that improve teaching, learning, organizational processes, and stakeholder participation. However, the capacity to innovate is often affected by limited funding, weak infrastructure, restricted internet connectivity, lack of professional development opportunities, and dependence on community partnerships. In such contexts, school heads are central actors because they influence how teachers understand innovation, access support, use limited resources, and sustain school-based improvement initiatives.

Educational innovation refers to the introduction, adaptation, or improvement of practices, processes, tools, or systems intended to strengthen school performance and learner outcomes. The OECD/Eurostat (2018) defines innovation as a new or improved product or process that differs significantly from previous practices and has been

brought into use. In public schools, innovation may involve learner-centered instructional strategies, contextualized learning materials, professional learning communities, technology-assisted instruction, resource mobilization, and partnerships with parents, local government units, and community organizations. UNESCO (2023) further emphasized that technology use in education must be appropriate, equitable, sustainable, and supportive of learners' best interests, a principle that is especially relevant in island and resource-constrained schools.

The rationale of this study lies in the persistent gap between the demand for school innovation and the limited support systems available to school heads and teachers. Although school leaders are expected to act as instructional leaders and agents of change, many operate in conditions where resources are scarce and access to external support is uneven. Leadership studies emphasize that school improvement depends on shared vision, collaboration, professional learning, and collective responsibility (Fullan, 2016; Hargreaves & Fullan, 2020; Ma & Marion, 2024). However, limited evidence explains how these leadership processes are perceived by teachers in resource-constrained public schools in island divisions such as Siargao.

The research gap addressed by this study concerns the limited localized evidence on how school heads support instructional, organizational, technological, and community-based innovation under resource constraints. Existing research has examined innovation leadership, teacher collaboration, and technology integration, but less attention has been given to how support mechanisms operate in geographically isolated schools where resource mobilization, policy clarity, workload, and community partnerships are decisive conditions. This study addresses the gap by examining teacher perceptions of school heads' innovation support, determining the perceived need for strengthening innovation support systems, and integrating qualitative explanations to develop an evidence-based support framework for resource-constrained contexts.

The study is anchored on Rogers' Diffusion of Innovations Theory, which explains how new practices are introduced, communicated, adopted, and sustained within a social system (Rogers, 2003). In this study, school heads are viewed as change agents who influence teachers' adoption of innovative practices. Transformational Leadership Theory explains how school heads motivate teachers, articulate vision, and encourage intellectual stimulation (Bass & Riggio, 2006), while Distributed Leadership Theory emphasizes collaboration, shared decision-making, and collective responsibility for improvement (Spillane, 2006). The Resource-Based View complements these leadership perspectives by explaining how organizations sustain advantage through the strategic use of available human, material, and social resources (Barney, 1991).

Conceptual Framework

The conceptual framework assumes that school heads' innovation support influences teachers' perceived need to strengthen innovation support systems and informs the development of a context-responsive framework. School heads' support is represented by five dimensions: vision and leadership for innovation, resource mobilization and management, support for teacher initiatives, organizational climate for innovation, and collaboration and community partnerships. The perceived necessity for strengthening innovation support reflects teachers' assessment of what systems, resources, policies, incentives, and partnerships are needed to sustain innovation. Qualitative explanatory factors, including geographic isolation, workload, resource scarcity, ICT limitations, policy support, and stakeholder engagement, clarify the statistical findings and inform the final framework.

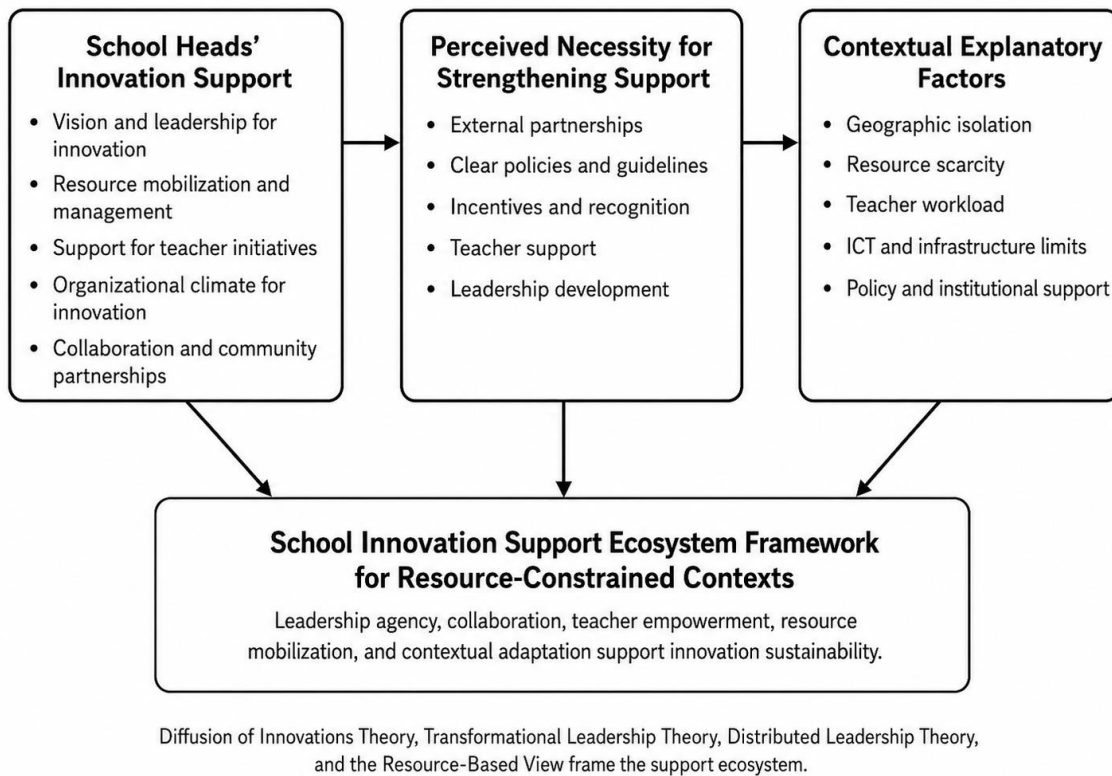


Figure 1. Conceptual framework of the School Innovation Support Ecosystem Framework.

Figure 1 presents the conceptual framework of the study. The framework shows that school heads' innovation support, teachers' perceived necessity for strengthening support, and contextual explanatory factors converge into the proposed School Innovation Support Ecosystem Framework. The figure also emphasizes that innovation in resource-constrained schools is not shaped by leadership alone but by the interaction of leadership agency, teacher collaboration, resource mobilization, policy support, and contextual adaptation.

Aim of the Study

This study aimed to determine the level of school heads' support for school innovation and examine how such support relates to teachers' perceived necessity for strengthening school innovation support in resource-constrained public schools in the Division of Siargao. It further sought to explain the quantitative findings through qualitative themes and develop a School Innovation Support Ecosystem Framework for school heads in resource-constrained contexts.

Statement of the Problem

Specifically, this study sought to answer the following questions:

1. What is the perceived level of school heads' support for school innovation in resource-constrained schools in terms of vision and leadership for innovation, resource mobilization and management, support for teacher initiatives, organizational climate for innovation, and collaboration and community partnerships?
2. What is the perceived level of necessity of strengthening school innovation support in resource-constrained schools?

3. Is there a significant relationship between school heads' support for school innovation and the perceived necessity of strengthening innovation support?
4. What qualitative themes emerge regarding school innovation support in resource-constrained schools?
5. What School Innovation Support Ecosystem Framework can be developed based on the integrated quantitative and qualitative findings of the study?

Hypothesis

At the 0.05 level of significance, the study tested the null hypothesis that there is no significant relationship between school heads' support for school innovation and teachers' perceived necessity for strengthening school innovation support ecosystems.

2. Literature Review

School innovation is increasingly understood as a multidimensional process involving instructional, organizational, technological, and community-based improvements. Liu et al. (2024) emphasized the need for conceptual clarity in teacher innovation because innovation may refer to new teaching methods, adapted practices, interdisciplinary work, or locally responsive solutions. In resource-constrained schools, this distinction is important because innovation does not always require advanced technology or large funding. It may also occur through contextualized instruction, collaborative problem-solving, and low-cost strategies that respond to learners' needs.

Leadership remains a critical condition for innovation. Rogers' Diffusion of Innovations Theory explains that adoption depends on communication channels, perceived usefulness, social influence, and the capacity of actors to bring innovations into practice (Rogers, 2003). In schools, this process is mediated by the school head's ability to communicate a clear direction, build trust, support experimentation, and encourage teachers to adopt new practices. Röhl et al. (2024) showed that school leaders' innovation-related self-efficacy is associated with schools' innovative responses to change, suggesting that leadership confidence and capacity influence how innovation is supported.

Transformational and distributed leadership perspectives further explain the social and organizational conditions that support innovation. Transformational leadership highlights vision, motivation, intellectual stimulation, and individualized support (Bass & Riggio, 2006). Distributed leadership emphasizes that school improvement does not rest on one leader alone but depends on shared leadership, teacher collaboration, and collective responsibility (Spillane, 2006). Ma and Marion (2024) found that distributed leadership and innovative climate support teacher collaboration, which is central to school-level innovation. This is directly relevant to the present study because the highest-rated support dimension was collaboration and community partnerships, indicating that innovation in Siargao schools is strongly relational and collective.

Resource mobilization is also central to innovation sustainability. Barney's (1991) Resource-Based View explains that organizations can sustain performance by strategically using available resources and capabilities. For resource-constrained schools, this means that innovation depends not only on the number of resources available but also on how school heads mobilize human, material, financial, and social resources. The present study's finding that resource mobilization and management obtained the lowest rating is therefore theoretically significant. It suggests that while school heads may provide leadership and collaboration, innovation remains vulnerable when funding, equipment, infrastructure, and technology are limited.

The broader literature on teacher innovation also shows that innovative behavior depends on supportive school climate, professional learning, and psychological safety. Vermeulen et al. (2022) found that transformational leadership, leader-member exchange, and school learning climate affect teachers' innovative behavior. Hargreaves and Fullan (2020) also argued that professional capital and teacher collaboration are essential for meaningful

school improvement, especially during periods of disruption. These studies support the present study's focus on organizational climate, teacher initiatives, and professional collaboration as key dimensions of innovation support.

Technology is an important but context-sensitive component of innovation. UNESCO (2023) cautioned that educational technology should be used in ways that are equitable, appropriate, scalable, and sustainable. This is especially relevant in Siargao, where poor connectivity and limited devices may restrict technology-assisted innovation. The present study therefore treats technological innovation not as a universal solution but as one element of a larger support ecosystem that must be aligned with local infrastructure, teacher competence, and available resources.

Finally, the literature suggests that school innovation in disadvantaged contexts requires integration of leadership, collaboration, community engagement, professional development, policy support, and resource management. However, many studies examine these factors separately and often in better-resourced environments. The present study contributes to the literature by generating localized mixed-methods evidence from resource-constrained public schools in the Division of Siargao and by developing a framework that reflects the interaction between leadership agency and contextual constraints.

3. Methodology

The study employed a sequential explanatory mixed-methods design, with quantitative data collection and analysis conducted first and qualitative inquiry conducted afterward to explain and deepen the statistical findings. This design was appropriate because the study first measured teachers' perceptions of school heads' innovation support and the perceived necessity for strengthening support systems, then used qualitative data to explain the contextual meanings behind the numerical patterns. Mixed-methods integration occurred during interpretation and framework development.

The study was conducted in the Division of Siargao, Philippines, involving public elementary, secondary, and senior high schools operating in geographically isolated and resource-constrained contexts. These schools face recurring limitations in financial resources, facilities, instructional materials, connectivity, professional development access, and external support. The setting was appropriate for examining how school heads support innovation under real-world constraints.

For the quantitative phase, 384 teachers were selected from a population of 1,413 using proportional stratified random sampling across districts and teaching positions. Cochran's Formula and finite population correction were used to determine the sample size. The stratification ensured proportional representation of Teacher I, Teacher II, Teacher III, Head Teachers, Master Teachers, and Principals across the division. For the qualitative phase, 32 school heads were selected through purposive sampling based on their experience in implementing school innovation in resource-constrained settings. Data saturation was reached during the interview process.

The primary quantitative instrument was the School Innovation Support Assessment Tool (SISAT), a researcher-developed instrument measuring teachers' perceptions of school heads' support for school innovation and the perceived necessity of strengthening innovation support. The instrument covered five support dimensions: vision and leadership for innovation, resource mobilization and management, support for teacher initiatives, organizational climate for innovation, and collaboration and community partnerships. It also included a needs assessment section on leadership training, teacher support, clear policies, incentives, and external partnerships.

Table 1. Validation and Reliability of the School Innovation Support Assessment Tool

SISAT Dimension	No. of Items	Cronbach's Alpha	Interpretation
Vision and Leadership for Innovation	4	0.904	Excellent
Resource Mobilization and Management	4	0.860	Good
Support for Teacher Initiatives	4	0.850	Good
Organizational Climate for Innovation	4	0.814	Good
Collaboration and Community Partnerships	4	0.920	Excellent
Needs Assessment	5	0.871	Good
Overall SISAT	25	0.938	Excellent

Table 1 shows that the SISAT demonstrated excellent overall internal consistency, with an overall Cronbach's alpha of 0.938. The instrument also obtained an overall content validity index of 0.938 based on expert validation, indicating that the items were appropriate for measuring perceived innovation-support mechanisms and institutional support needs.

Data were gathered after securing administrative permission and informed consent. The validated SISAT was administered using printed and digital formats to ensure accessibility across geographically dispersed schools. Quantitative data were analyzed using weighted mean, standard deviation, and Pearson product-moment correlation. Qualitative data from interviews and open-ended responses were analyzed using Braun and Clarke's thematic analysis, including familiarization, coding, category development, theme generation, and integration with quantitative findings. Ethical safeguards included voluntary participation, anonymity, confidentiality, secure data handling, and aggregate reporting.

4. Results/Findings

Table 2. Perceived Level of School Heads' Support for School Innovation

Dimension	Mean	SD	Interpretation
Vision and Leadership for Innovation	4.32	0.75	Strongly Agree
Resource Mobilization and Management	4.13	0.79	Agree
Support for Teacher Initiatives	4.28	0.73	Strongly Agree
Organizational Climate for Innovation	4.22	0.69	Strongly Agree
Collaboration and Community Partnerships	4.38	0.68	Strongly Agree

Table 2 shows that teachers generally perceived school heads' support for school innovation positively across all dimensions. Collaboration and community partnerships obtained the highest rating ($M = 4.38$, $SD = 0.68$), followed by vision and leadership for innovation ($M = 4.32$, $SD = 0.75$), support for teacher initiatives ($M = 4.28$, $SD = 0.73$), and organizational climate for innovation ($M = 4.22$, $SD = 0.69$). Resource mobilization and management obtained the lowest mean ($M = 4.13$, $SD = 0.79$), indicating that resource-related support remains the most constrained dimension despite generally favorable perceptions of leadership support.

Table 3. Perceived Necessity of Strengthening School Innovation Support

Indicator	Mean	SD	Interpretation
School heads need further training in innovation leadership.	4.21	0.80	Strongly Agree
Teachers need more support to implement innovative practices.	4.52	0.68	Strongly Agree
Clear policies are needed to guide innovation initiatives.	4.53	0.65	Strongly Agree
Incentives or recognition would encourage innovation.	4.55	0.65	Strongly Agree
Collaboration with external partners is necessary for sustained innovation.	4.60	0.58	Strongly Agree
Overall	4.48	0.67	Strongly Agree

Table 3 indicates a very high perceived necessity for strengthening school innovation support, with an overall mean of 4.48. The highest-rated need was collaboration with external partners ($M = 4.60$, $SD = 0.58$), followed by incentives or recognition ($M = 4.55$, $SD = 0.65$), clear policies ($M = 4.53$, $SD = 0.65$), and teacher support ($M = 4.52$, $SD = 0.68$). Although leadership training obtained the lowest mean ($M = 4.21$, $SD = 0.80$), it remained within the Strongly Agree category, confirming that teachers perceive both leadership development and system-level support as necessary for sustained innovation.

Table 4. Relationship Between School Heads' Support and Perceived Necessity of Strengthening Innovation Support

Variables	Pearson's r	df	p-value	Decision	Interpretation
School Heads' Support for School Innovation and Perceived Necessity of Strengthening Innovation Support	0.20	213	0.003	Reject H_0	Weak positive, statistically significant relationship

Table 4 shows a weak but statistically significant positive relationship between school heads' support for school innovation and the perceived necessity of strengthening innovation support ($r = .20$, $p = .003$). The null hypothesis was rejected. Although the correlation was weak, the significant result suggests that teachers who perceived higher support from school heads also tended to recognize a greater need for stronger innovation support systems. This finding implies that existing support may increase teachers' awareness of continuing gaps rather than fully reducing their perceived needs.

Table 5. Qualitative Themes on Facilitators of School Innovation

Major Theme	Frequency	Interpretation
Leadership and Institutional Support	12	Supportive leadership, monitoring, feedback, and alignment with school goals enabled innovation.
Teacher Collaboration and Professional Culture	9	Peer support, sharing of practices, and collective problem-solving supported innovation.
Teacher Creativity and Resourcefulness	9	Teachers used improvisation, low-cost materials, adaptability, and commitment to sustain innovation.
Community and Stakeholder Support	9	Parents, partners, and community stakeholders helped supplement limited school resources.
Technology and Learning Resources	4	ICT and learning resources contributed to innovation when available but remained limited.

Table 5 presents the qualitative facilitators of innovation. Leadership and institutional support emerged most frequently, followed by teacher collaboration, teacher creativity, and community support. These findings explain why teachers rated collaboration and leadership dimensions highly. They also show that innovation in resource-constrained schools is sustained through human agency, relationships, and adaptive practices rather than through abundant material resources alone.

Table 6. Qualitative Themes on Barriers and Contextual Constraints

Major Theme	Frequency	Interpretation
Resource and Financial Constraints	12	Limited funds, materials, equipment, infrastructure, and connectivity constrained innovation implementation.
Time and Workload Constraints	9	Heavy workload, overlapping tasks, and limited planning time reduced innovation capacity.
Training and Capacity Gaps	9	Insufficient training and technical support limited teachers' confidence and implementation skill.
Institutional and Leadership Barriers	9	Unclear policies, weak facilitation, and bureaucratic processes hindered innovation.
Social and Cultural Barriers	5	Resistance to change and varying stakeholder commitment affected innovation uptake.

Table 6 indicates that innovation barriers were multidimensional. Resource and financial constraints were the most frequently mentioned, confirming the quantitative finding that resource mobilization and management was the lowest-rated support dimension. Workload, training gaps, institutional barriers, and social-cultural factors further show that innovation support requires structural and policy-level mechanisms in addition to school-level encouragement.

Table 7. Qualitative Themes on Support Requirements for Innovation

Major Theme	Frequency	Interpretation
Professional Development and Training Support	9	Teachers and school heads need relevant, continuous, skills-based training and coaching.
Financial and Material Resource Support	10	Innovation requires funding, materials, equipment, technology access, and facilities.
Leadership and Administrative Support	7	Recognition, facilitation, monitoring, and policy support are needed.
Time and Workload Support	7	Planning time and workload adjustments are necessary for implementation.
Collaboration and Support Systems	7	Partnerships, community engagement, and peer networks should be formalized.

Table 7 shows that the strongest qualitative support requirement was financial and material support, followed by professional development and training. These themes support the very high ratings in the needs assessment and indicate that the proposed framework should combine leadership capacity, resources, policy guidance, workload support, and community partnerships.

5. Discussion

The findings demonstrate that school heads in resource-constrained public schools in the Division of Siargao are generally perceived as supportive of school innovation. The strongest support dimension was collaboration and community partnerships, suggesting that school heads rely on collective action, stakeholder engagement, and community participation to sustain innovation. This supports distributed leadership perspectives, which view school improvement as a collective process rather than the work of a single administrator (Spillane, 2006; Ma & Marion, 2024).

The lowest-rated support dimension was resource mobilization and management. This finding is important because it reveals the structural limits of school innovation in disadvantaged contexts. Even when school heads provide vision, encouragement, and collaboration, innovation remains difficult to sustain without funding, materials, infrastructure, technology, and external support. This aligns with the Resource-Based View, which

emphasizes the strategic use of available resources and capabilities (Barney, 1991), but the present findings show that resourcefulness alone may not fully compensate for persistent scarcity.

The weak but significant relationship between school heads' support and the perceived necessity of strengthening innovation support suggests that teachers recognize the value of existing leadership practices while also identifying continuing gaps. This result should not be interpreted as a contradiction. Instead, it suggests that stronger exposure to leadership support may help teachers identify what remains lacking, particularly in policies, incentives, training, and partnerships. The result also confirms that leadership support is necessary but insufficient without institutionalized systems.

The qualitative findings deepen this interpretation. Innovation was enabled by supportive leadership, teacher collaboration, creativity, and community engagement, but constrained by resource scarcity, workload, capacity gaps, connectivity limitations, and geographic isolation. This means that school innovation in resource-constrained contexts is shaped by the interaction of agency and structure. School heads and teachers may have commitment and creativity, but institutional and contextual constraints determine whether innovation can be implemented, scaled, and sustained over time.

Overall, the study supports the development of a School Innovation Support Ecosystem Framework that integrates leadership agency, resource mobilization, teacher empowerment, professional learning, collaboration, policy support, and contextual adaptation. The framework should not treat innovation as an isolated school project but as an ecosystem of relationships, structures, resources, and support mechanisms that enable schools to innovate despite constraints.

6. Conclusion and Recommendations

6.1 Conclusion

The study concludes that school heads in resource-constrained public schools in the Division of Siargao are generally perceived by teachers as supportive of school innovation, particularly in collaboration and community partnerships, vision and leadership, teacher initiatives, and organizational climate. However, resource mobilization and management remain the most constrained support dimension, indicating that innovation is still limited by funding, materials, facilities, technology access, and external support. Teachers also reported a very high perceived necessity for strengthening innovation support systems, especially through external partnerships, clear policies, recognition mechanisms, teacher support, and leadership development. The weak but significant correlation between school heads' support and perceived necessity for strengthening support suggests that leadership practices are present but insufficient to address systemic innovation needs. The qualitative findings confirm that innovation in resource-constrained schools depends on supportive leadership, teacher collaboration, creativity, and community participation, but is hindered by workload, limited training, geographic isolation, weak connectivity, and resource scarcity. Therefore, sustained school innovation requires an ecosystem framework that integrates leadership, teacher empowerment, resource mobilization, policy support, collaboration, and contextual adaptation.

6.2 Recommendations

Based on the findings and conclusions, the Schools Division Office, district supervisors, and school heads should prioritize strengthening resource mobilization and management because it obtained the lowest support rating. A division-level school innovation policy may be developed to provide clear guidelines for planning, implementing, monitoring, documenting, and evaluating innovation initiatives. A school innovation fund or micro-grant scheme may also be established to support teacher-led projects, contextualized instructional materials, technology-supported teaching, and locally responsive improvement initiatives. School heads should adopt transparent resource allocation systems, integrate innovation activities into the School Improvement Plan, organize school-

based innovation teams, and institutionalize recognition mechanisms for teacher-led innovations. Professional Learning Communities focused on low-cost innovation should be strengthened, and teachers should receive training in innovation design, classroom-based action research, contextualized materials development, and technology-supported instruction. Partnerships with local government units, barangays, non-government organizations, alumni associations, parent groups, and community stakeholders should be formalized through written agreements. Future studies may compare school heads' self-assessments with teachers' assessments, include classroom observations and innovation portfolio reviews, examine links between innovation support and student outcomes, and evaluate the implementation of the proposed School Innovation Support Ecosystem Framework after adoption.

Declarations

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CRedit Authorship Contribution Statement

Jacqueline Enhaynes-Gubaton: Conceptualization, Methodology, Investigation, Data Collection, Formal Analysis, Writing - Original Draft, and Project Administration. Rene Y. Paquibut, PhD-EM, PhD-RD: Supervision, Validation, Technical Review, and Writing - Review.

Ethical Statement

The study obtained the necessary permissions from relevant school and division authorities before data collection. Informed consent was secured from participants. Participation was voluntary, and confidentiality, anonymity, and data privacy were maintained throughout the research process.

Declaration of Competing Interest

The authors declare no competing financial, personal, institutional, or professional interests that may have influenced the conduct or findings of this research.

Data Availability Statement

Data supporting the findings of this study are available from the authors upon reasonable request, subject to institutional approval and applicable data privacy requirements.

AI Usage Disclosure

AI-assisted tools were used for language refinement, organization, and formatting support. The authors reviewed, verified, and approved the final content of the manuscript and remain responsible for its accuracy and integrity.

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