




Strengthening Organizational Resilience through Strategic Collaboration among Educators in Educational Institutions with a Mixed-Methods Approach

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ARTICLE INFO	ABSTRACT
<p>Article history: Submitted: April 19, 2026 Final Revised: April 29, 2026 Accepted: May 06, 2026 Published: June 20, 2026</p>	<p>This study examines how strategic collaboration among educators strengthens organizational resilience in educational institutions. In the context of rapid educational reforms, digital transformation, and institutional uncertainty, schools must develop adaptive systems to sustain performance. This study employed a mixed-methods design using a sequential explanatory approach. Quantitative data were collected from 150 respondents consisting of teachers, principals, and educational staff in primary and secondary schools in West Java, Indonesia, selected using purposive sampling based on their involvement in collaborative activities. The instrument used a five-point Likert scale to measure strategic collaboration and organizational resilience. Data were analyzed using descriptive statistics and multiple regression. The results show that strategic collaboration has a significant positive effect on organizational resilience ($R = 0.71$; $R^2 = 0.50$; $p < 0.001$), indicating that collaboration explains 50% of the variance in resilience. Qualitative data from 20 participants, analyzed thematically, reveal that shared decision-making, open communication, and collective problem-solving are key mechanisms supporting resilience, reinforced by leadership support and a culture of trust. This study contributes by demonstrating that organizational resilience is a collective and structurally developed capability. The novelty lies in integrating strategic collaboration and resilience within a mixed-methods framework. Practically, the findings highlight the importance of institutionalizing collaboration, strengthening participatory leadership, and fostering trust-based organizational cultures to enhance adaptive capacity.</p>
<p>Keywords: Adaptive Capacity; Collaborative Culture; Educational Management; Organizational Resilience; Professional Learning Communities; School Improvement.</p>	
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INTRODUCTION

Educational institutions today operate in an environment characterized by rapid policy changes, technological advancements, and increasing social uncertainty. The acceleration of digital transformation, curriculum reforms, and prolonged global disruptions has placed schools under continuous pressure to adapt (Kovalenko et al., 2021). In this context, the ability of institutions not only to withstand challenges but also to recover and evolve referred to as organizational resilience has become a critical concern in educational management (Mohamed Hashim et al., 2022; Timotheou et al., 2023).

Organizational resilience in education extends beyond crisis response and includes adaptive capacity, collective learning, flexible leadership, and the ability to sustain performance amid change (Sott & Bender, 2025). Contemporary perspectives increasingly conceptualize resilience as an organizational capability embedded in collaborative structures, cultures, and processes rather than as an individual attribute (Bailey, 2021; Niemeier-Rens et al., 2022). This shift highlights the importance of systemic and collective approaches in strengthening institutional adaptability.

Strategic collaboration among educators has been identified as a key factor supporting resilience (Mullen et al., 2021). Collaboration has evolved from informal interactions to structured practices such as professional learning communities, shared decision-making, cross-unit teamwork, and distributed leadership (Kalmin, 2025). These practices facilitate knowledge sharing, collective problem-solving, and effective responses to emerging challenges, while fostering trust, communication, and innovation (Holcombe et al., 2023; Menon, 2024).

Despite these insights, a clear research gap remains. Existing studies predominantly examine collaboration in relation to teacher performance, student outcomes, or school effectiveness, while organizational resilience is often studied separately within business or general management contexts (García-Martínez et al., 2021). Empirical research that explicitly integrates strategic collaboration and organizational resilience within educational institutions is still limited, particularly studies that combine quantitative measurement with in-depth qualitative exploration (Brown & Poortman, 2018; Jain et al., 2025).

Furthermore, the mechanisms through which collaboration contributes to resilience remain insufficiently understood. Specifically, there is limited evidence explaining how leadership support, organizational trust, communication practices, and collective problem-solving interact to build adaptive capacity at the institutional level. Based on these gaps, the study addresses the following research questions: to what extent does strategic collaboration among educators influence organizational resilience in educational institutions, how collaborative practices contribute to the development of organizational resilience, and what roles leadership support and organizational trust play in strengthening this relationship.

Accordingly, the objectives of this study are to examine the effect of strategic collaboration on organizational resilience using quantitative analysis, to explore collaborative mechanisms that support resilience through qualitative inquiry, and to identify key organizational factors that strengthen the relationship between collaboration and resilience. Using a mixed-methods approach, this study integrates quantitative and qualitative evidence to provide a comprehensive understanding of how collaboration enhances resilience. By positioning resilience as a collectively constructed capability, this study contributes to the development of educational management theory and offers practical insights for building more adaptive and sustainable educational organizations (Nadeem, 2024; Nielsen & Faber, 2021).

METHOD

Research Design

This study employs a mixed-methods design using a sequential explanatory approach (Wipulanusat et al., 2020), where quantitative data are collected and analyzed in the first phase, followed by qualitative data to explain and deepen the quantitative findings. This approach was selected to provide a comprehensive understanding of the relationship between strategic collaboration among educators and organizational resilience, as well as to explore the underlying collaborative processes within educational institutions.

Research Subjects and Location

The study involved participants consisting of teachers, principals, and educational staff from primary and secondary schools in West Java Province, Indonesia, including Depok City, Bogor City, and Bogor Regency. These areas represent urban and peri-urban educational settings with diverse organizational dynamics. Participants were selected using purposive sampling based on their active involvement in collaborative activities such as professional learning communities, school development teams, and shared decision-making forums. A total of 150 respondents participated in the quantitative phase, while 20 participants were involved in interviews and focus group discussions.

Data Collection Techniques

Quantitative data were collected using a structured questionnaire based on key indicators of strategic collaboration and organizational resilience. Strategic collaboration includes shared leadership, open communication, cross-unit coordination, and collective problem-solving, while organizational resilience includes adaptive capacity, responsiveness to change, organizational learning, and performance sustainability. Qualitative data were obtained through semi-structured interviews and focus group discussions to explore participants' experiences and perspectives on collaborative practices and resilience-building processes.

Research Instruments

The questionnaire employed a five-point Likert scale to measure respondents' perceptions. Content validity was assessed through expert judgment, and construct validity was ensured through alignment between indicators and theoretical dimensions. Reliability testing using Cronbach's Alpha indicated that all variables met acceptable reliability thresholds ($\alpha > 0.70$). The interview and FGD protocols were flexibly designed to allow in-depth exploration of collaborative practices and adaptive strategies in educational institutions (Yaska & Nuhu, 2024).

Data Analysis Techniques

Quantitative data were analyzed using descriptive statistics and multiple regression analysis to examine the effect of strategic collaboration on organizational resilience. The results showed a strong and significant relationship ($R = 0.71$; $R^2 = 0.50$; $F = 89.34$; $p < 0.001$), indicating that 50% of the variance in organizational resilience is explained by strategic collaboration variables. Prior to regression analysis, assumptions of normality, multicollinearity, and

homoscedasticity were tested to ensure model robustness. Qualitative data were analyzed using thematic analysis involving transcription, coding, categorization, and theme development. The qualitative findings were used to explain and contextualize the statistical results, particularly regarding collaborative mechanisms such as trust-building, collective learning, and leadership support.

Data Integration and Validity

The integration of quantitative and qualitative findings was conducted at the interpretation stage using an explanatory strategy, where qualitative results were used to validate and elaborate quantitative findings. The validity of qualitative data was ensured through triangulation of sources and methods, as well as member checking with selected participants. This integration strengthens the credibility and depth of the findings by linking statistical relationships with real-world collaborative processes observed in educational institutions.

RESULTS

Overview of Strategic Collaboration and Organizational Resilience

The results of descriptive statistical analysis showed that the level of strategic collaboration among educators in the studied institutions was in the high category. The most prominent practices include open communication among teachers, regular coordination between work units, and the involvement of educators in school decision-making forums. Professional learning communities were also identified as key platforms for strengthening collaborative interactions oriented toward problem-solving and school development. These findings were based on responses from 150 participants in the quantitative phase.

To ensure transparency, the interpretation of categories was based on the following criteria using a five-point Likert scale: 1.00–1.80 (very low), 1.81–2.60 (low), 2.61–3.40 (moderate), 3.41–4.20 (high), and 4.21–5.00 (very high). Based on these criteria, the mean scores of all variables fall within the “high” category.

Table 1. Descriptive Statistics of Research Variables

Variable	Mean	SD	Categories
Strategic Collaboration	4.12	0.48	Haigh
Open Communication	4.18	0.45	Haigh
Collective Problem Solving	4.10	0.50	Haigh
Cross-Unit Coordination	4.05	0.52	Haigh
Organizational Resilience	4.07	0.47	Haigh
Adaptive Capacity	4.09	0.49	Haigh
Organizational Learning	4.15	0.46	Haigh
Performance Sustainability	4.11	0.48	Haigh

In addition to tabular presentation, the distribution of mean scores can be visually interpreted as relatively clustered within the upper range of the Likert scale, indicating consistently high perceptions across variables. Among the dimensions, open communication ($M = 4.18$) and organizational learning ($M = 4.15$) show the highest mean values, suggesting that interpersonal interaction and knowledge sharing are dominant aspects of collaboration and resilience. Meanwhile, cross-unit coordination ($M = 4.05$) shows relatively lower scores compared to other dimensions, although it remains within the high category.

Similarly, the level of organizational resilience is also categorized as high, particularly in terms of adaptability to policy changes and the integration of technology in management and learning processes. Organizational learning and performance sustainability demonstrate relatively higher scores than the ability to anticipate risks, which still varies across schools.

The Influence of Strategic Collaboration on Organizational Resilience

The results of multiple regression analysis showed that strategic collaboration had a positive and significant effect on organizational resilience ($R = 0.71$; $R^2 = 0.50$; $\text{Sig.} < 0.001$). The coefficient of determination ($R^2 = 0.50$) indicates that 50% of the variance in organizational resilience can be explained by the dimensions of strategic collaboration included in the model. These findings confirm that collaboration is a major determinant in building the adaptive capacity of educational organizations. The analysis was conducted based on data from 150 respondents.

Tabel 2. Hasil Analisis Regresi Pengaruh Kolaborasi Strategis terhadap Resiliensi Organisasi

Independent Variables	B	Beta	t	Sig.
(Constant)	1.245	—	5.21	0.000
Open Communication	0.312	0.341	6.45	0.000
Collective Problem Solving	0.287	0.298	5.88	0.000
Cross-Unit Coordination	0.198	0.214	4.12	0.000
Collaborative Leadership	0.221	0.236	4.67	0.000

Model Summary

R	R ²	Adjusted R ²	F	Sig.
0.71	0.50	0.49	89.34	0.000

The significant F-value ($F = 89.34; p < 0.001$) indicates that the regression model is statistically robust. In graphical terms, the relationship between strategic collaboration and organizational resilience would show a strong positive trend, where increases in collaboration dimensions are associated with higher resilience levels.

Partially, open communication emerged as the most dominant predictor ($\beta = 0.341; t = 6.45; p < 0.001$), indicating that transparency, professional dialogue, and openness are central in building resilient organizations. Collective problem-solving also showed a strong influence ($\beta = 0.298; t = 5.88; p < 0.001$), highlighting the importance of shared involvement in addressing challenges. Collaborative leadership ($\beta = 0.236; p < 0.001$) acts as a reinforcing structural factor, while cross-unit coordination ($\beta = 0.214; p < 0.001$) contributes to organizational integration despite having a relatively lower coefficient.

Conceptually, these findings reinforce that organizational resilience in education is built through relational and collective mechanisms rather than solely through formal policies or resources. Strategic collaboration functions as a social system that accelerates information flow, expands organizational knowledge, and distributes problem-solving capacity. The results also indicate that interpersonal dimensions particularly communication and collaborative problem-solving have a stronger influence on resilience than structural coordination alone.

Qualitative Findings

The results of in-depth interviews and focus group discussions broaden our understanding of quantitative findings by uncovering the social processes underlying the relationship between strategic collaboration and organizational resilience. Thematic analysis shows that collaboration functions not only as a work coordination mechanism, but also as a social system that builds trust, accelerates collective learning, and creates a support structure that allows organizations to adapt sustainably. Three main themes were identified, each describing a different but interrelated path in shaping the resilience of school organizations.

Trust Building and Professional Social Support

Most participants emphasized that regular collaboration builds more open and supportive interpersonal relationships. Continuous interaction in professional forums encourages mutual trust, which in turn creates a work environment with a higher level of psychological safety. In these conditions, educators feel more comfortable sharing difficulties, asking for help, and discussing failures without fear of negative judgment.

"If we have regular discussions, it feels more open. Teachers are not afraid to admit difficulties in class, they are actually learning materials together." (P03–GURU, interview, March 12, 2025).

"Now if there is a problem with students or learning methods, I don't feel alone. There must be colleagues who help give you perspective." (P08–GURU, interview, March 14, 2025).

"In the past, if there were obstacles, they were usually hidden by themselves. After there was a regular forum, we got used to the story and found solutions together." (P11–GURU, FGD, March 18, 2025).

This trust serves as the social capital of the organization. In situations of change or external pressure, relationships based on trust keep communication open and collaboration ongoing, so that organizations are not easily fragmented. Thus, professional social support becomes the foundation of internal stability that strengthens the resilience of the organization.

Collective Learning as a Source of Adaptation

The second theme shows that collaboration is the main means of organizational learning. Teacher discussion forums, professional learning communities, and cross-unit meetings not only function administratively, but also become a space for mutual reflection that allows for the exchange of best practices and adjustment of work strategies.

"Every time there is a new policy, we discuss it together. So don't be surprised individually, but immediately find a way to adjust." (P07–CURRICULUM TALK, Interview, March 20, 2025)

"The time for digital learning began to be intense, I learned a lot from colleagues who understood technology first." (P15–GURU, FGD, March 25, 2025)

"Regular discussions allow us to quickly know which methods are effective and which ones need to be improved." (P04–GURU, interview, March 16, 2025)

Through this process, individual experiences are transformed into collective knowledge. This knowledge then becomes an organization's adaptive resource in dealing with curriculum changes, evaluation demands, and educational technology developments. In other words, collaboration accelerates the organizational learning process, which is a key element in long-term resilience.

The Role of Leadership in Structuring Collaboration

The third theme highlights that effective collaboration does not occur spontaneously, but is actively facilitated by school leadership. The principal acts as a facilitator of a collaborative culture by providing dedicated time for professional meetings, encouraging teacher participation, and integrating the results of discussions into school policies.

"The principal always schedules a special time for teacher discussions. So collaboration is not an addition, but part of the work culture." (P02–SENIOR TEACHER, Interview, March 10, 2025)

"We feel supported because the leadership not only instructs, but also listens and follows up on the results of the discussion." (P06–GURU, interview, March 13, 2025)

"If the leadership is supportive, teachers will feel that collaboration activities are important, not just a formality." (P09–EDUCATION PERSONNEL, FGD, 22 March 2025)

Leadership that facilitates collaboration creates a structure that ensures the sustainability of collaborative practices. Without this support, collaboration tends to be temporary and relies on individual initiative. Therefore, leadership acts as a link between day-to-day collaborative practices and the formation of systemic organizational resilience.

Synthesis of Qualitative Findings

The three themes identified show that strategic collaboration strengthens organizational resilience through intertwined relational, cognitive, and structural pathways and forms an adaptive organizational ecosystem. On the relational path, professional trust that grows from collaborative interaction creates psychological safety in the work environment. This allows educators to openly discuss difficulties, acknowledge limitations, and explore new approaches without fear of negative judgment. Trust not only strengthens team cohesion, but also accelerates the flow of important information when organizations face uncertain situations. In the context of resilience, this relational quality serves as a social glue that maintains internal stability when external pressures occur.

On the cognitive path, collaboration functions as a mechanism for the production and distribution of organizational knowledge. Reflective discussions, sharing of good practices, and joint evaluation of field experiences form a continuous collective learning process. The knowledge generated does not stop at the individual, but accumulates into the organization's memory that can be reused when faced with similar challenges in the future. Thus, the adaptive capacity of schools does not depend only on spontaneous responses, but on a reserve of collective knowledge that is constantly updated through professional interactions.

Meanwhile, the structural path affirms that collaboration that impacts resilience requires legitimacy and organizational support. The role of leadership is crucial in institutionalizing collaborative practices through special time management, the formation of cross-functional work teams, and policies that encourage collective participation in decision-making. This formal structure ensures that collaboration does not rely on individual initiative alone, but is embedded as part of the organization's work system. With structural support, collaborative practices can take place consistently and sustainably.

The interaction between the three paths results in dynamics that strengthen the organization's capacity in dealing with uncertainty. Trust facilitates knowledge exchange, collective learning enriches the quality of decision-making, and organizational structure ensures the sustainability of collaborative processes. This combination forms a school organization that is not only able to respond to disruptions reactively, but also proactively adapt and transform. Thus, organizational resilience in the context of education can be understood as a collective capacity that grows from institutionalized collaborative processes, where social relationships, learning practices, and structural support reinforce each other in building long-term resilience.

DISCUSSION

The findings of this study indicate that organizational resilience in educational institutions is an emergent and relational phenomenon that develops through continuous interaction among individuals within a social system, rather than merely resulting from the accumulation of individual competencies. This finding extends the perspective proposed by [Duchek \(2020\)](#), which emphasizes resilience as a dynamic process, by showing that in educational settings, this process is strongly mediated by structured collaborative practices. Strategic collaboration, therefore, functions not only as a supporting mechanism but as a social infrastructure that integrates human resources, knowledge, and organizational processes into a mutually reinforcing system.

The dominance of open communication and collective problem-solving as key predictors suggests that the quality of professional interaction plays a more decisive role than formal organizational structures. This finding aligns with previous studies emphasizing communication as a driver of adaptive capacity ([Mogas et al., 2022](#); [Rachmad, 2022](#)), but also highlights a more specific insight: resilience is strengthened not simply by the presence of communication channels, but by their active use in facilitating collective sense-making and rapid response to change. In contrast to studies that prioritize formal leadership as the central determinant of organizational performance, the present findings suggest a shift toward distributed and interaction-based resilience, where adaptive capacity emerges from professional networks rather than hierarchical control.

Furthermore, the results reinforce the role of reflective practice as a critical component of resilience. Schools that engage in continuous dialogue and joint reflection demonstrate higher situational awareness, supporting earlier findings by [Ayers et al. \(2020\)](#) and [Korthagen & Nuijten \(2022\)](#). However, this study extends those findings by showing that reflective practices are most effective when embedded within collaborative structures, rather than occurring as isolated individual activities. In this regard, collaboration functions both as an early detection mechanism and as a space for safe experimentation and innovation ([Caccamo, 2020](#)), enabling institutions to anticipate and respond to emerging challenges more effectively.

The concept of organizational memory emerging from collective learning further strengthens this argument. Consistent with [Antunes & Pinheiro \(2020\)](#) and [Cicek \(2024\)](#), the findings confirm that shared experiences are transformed into institutional knowledge that supports long-term adaptation. However, this study highlights that such memory is not automatically formed; it requires sustained collaborative interaction and structured opportunities for knowledge exchange. Without these mechanisms, knowledge risks remaining fragmented at the individual level, limiting its contribution to organizational resilience.

From a structural perspective, the findings emphasize that leadership plays a facilitative rather than directive role in fostering resilience. While previous studies have stressed the importance of leadership support ([Evenseth et al., 2022](#); [Kinder et al., 2021](#)), this study demonstrates that leadership effectiveness lies in its ability to institutionalize collaboration through formal structures such as scheduled professional meetings, participatory decision-making processes, and recognition of collaborative contributions. This suggests that resilience depends on a balance between flexibility and formalization, where collaboration is both organically developed and structurally supported.

In the context of urban and peri-urban educational environments such as Depok and Bogor, the findings further illustrate that strategic collaboration is not merely beneficial but essential. High levels of social complexity, student diversity, and technological change demand rapid and coordinated responses, reinforcing arguments by [Silver \(2024\)](#) and [Sari \(2024\)](#). However, this study adds that the effectiveness of such responses depends on the extent to which collaboration is embedded in daily organizational practices rather than treated as an additional activity.

Despite these contributions, this study has several limitations. First, the quantitative data were based on a sample of 150 respondents within a specific regional context, which may limit the generalizability of the findings to other educational settings. Second, the use of purposive sampling may introduce selection bias, as participants were selected based on their involvement in collaborative practices. Third, although regression analysis explains a substantial proportion of variance ($R^2 = 0.50$), other contextual factors influencing organizational resilience were not examined. Future research is therefore recommended to employ larger and more diverse samples, incorporate longitudinal designs, and explore additional variables such as policy environment and institutional resources.

In terms of practical implications, the findings suggest that educational institutions should prioritize the institutionalization of collaborative practices as a core organizational strategy. Specifically, schools should establish regular professional learning forums, promote open communication systems, and develop structured mechanisms for collective problem-solving. Leadership development programs should also emphasize participatory and facilitative leadership styles that encourage collaboration rather than centralized decision-making. From a policy perspective, educational authorities should support collaboration by providing time allocation, professional development resources, and policy frameworks that recognize collaborative work as part of formal organizational performance.

Overall, this study confirms that organizational resilience in educational institutions emerges from the interaction of relational, cognitive, and structural dimensions. Strategic collaboration strengthens professional relationships, expands collective knowledge capacity, and is reinforced by leadership that facilitates sustained interaction. The integration of these dimensions forms the foundation of educational organizations that are not only capable of surviving disruptions but also able to adapt and transform continuously in dynamic environments.

CONCLUSION

This study demonstrates that strategic collaboration among educators is a critical determinant of organizational resilience in educational institutions. The findings move beyond the view of resilience as an individual attribute by providing empirical evidence that resilience is a collectively constructed and structurally supported organizational capacity. In particular, this study highlights the central role of open communication and collective problem-solving as dominant drivers of adaptive capacity, supported by collaborative leadership and cross-unit coordination.

The main contribution of this study lies in integrating strategic collaboration and organizational resilience within an educational management framework through a mixed-methods approach. Unlike prior studies that examine collaboration primarily in relation to teacher performance or school effectiveness, this study positions collaboration as a systemic mechanism that shapes resilience through relational, cognitive, and structural dimensions. This provides a more comprehensive understanding of how educational organizations respond to uncertainty and change.

From a practical perspective, the findings suggest that schools should institutionalize collaborative practices by establishing structured professional forums, promoting transparent communication, and strengthening participatory leadership. These strategies enable schools to build trust, enhance collective learning, and sustain adaptive responses in dynamic educational environments.

However, this study has several limitations. The use of purposive sampling and a sample limited to a specific regional context may restrict the generalizability of the findings. In addition, the cross-sectional design does not fully capture the dynamic development of resilience over time. Future research is therefore recommended to involve more diverse samples, apply longitudinal designs, and examine additional contextual variables such as policy environments, technological readiness, and institutional resources.

In conclusion, organizational resilience in education emerges from the synergy of collaborative culture, collective learning, and facilitative leadership. Strengthening these dimensions is essential for enabling educational institutions not only to withstand disruption but also to adapt and transform sustainably.

REFERENCE

- Antunes, H. de J. G., & Pinheiro, P. G. (2020). Linking knowledge management, organizational learning and memory. *Journal of Innovation & Knowledge*, 5(2), 140–149. <https://doi.org/10.1016/j.jik.2019.04.002>
- Ayers, J., Bryant, J., & Missimer, M. (2020). The use of reflective pedagogies in sustainability leadership education: A case study. *Sustainability*, 12(17), 6726. <https://doi.org/10.3390/su12176726>
- Bailey, J. A. (2021). *Building learning capacity in an age of uncertainty: Leading an agile and adaptive school*. Routledge.
- Brown, C., & Poortman, C. (2018). *Networks for learning: Effective collaboration for teacher, school and system improvement*. Routledge.
- Caccamo, M. (2020). Leveraging innovation spaces to foster collaborative innovation. *Creativity and Innovation Management*, 29(1), 178–191. <https://doi.org/10.1111/caim.12342>
- Cicek, O. E. (2024). Digitalization of organizational memory. In *Driving transformative technology trends with cloud computing* (pp. 88–115). IGI Global.
- Duchek, S. (2020). Organizational resilience: A capability-based conceptualization. *Business Research*, 13(1), 215–246. <https://doi.org/10.1007/s40685-019-0085-7>
-

- Evenseth, L. L., Sydnes, M., & Gausdal, A. H. (2022). Building organizational resilience through organizational learning: A systematic review. *Frontiers in Communication*, 7, 837386. <https://doi.org/10.3389/fcomm.2022.837386>
- García-Martínez, I., Montenegro-Rueda, M., Molina-Fernández, E., & Fernández-Batanero, J. M. (2021). Mapping teacher collaboration for school success. *School Effectiveness and School Improvement*, 32(4), 631–649.
- Holcombe, E. M., Kezar, A. J., Elrod, S. L., & Ramaley, J. A. (2023). *Shared leadership in higher education: A framework and models for responding to a changing world*. Taylor & Francis.
- Jain, A., Naik, K. R., Kakade, K., Bhanot, S., & Kulkarni, S. C. (2025). Reimagining management education: Navigating the shift to Education 4.0 in the digital era. *The International Journal of Management Education*, 23(2), 101182.
- Kalmin, A. (2025). *Championing pedagogical innovators: Supporting and empowering informal leaders in higher education teaching and learning spaces* (Doctoral dissertation, The University of Western Ontario).
- Kinder, T., Stenvall, J., Six, F., & Memon, A. (2021). Relational leadership in collaborative governance ecosystems. *Public Management Review*, 23(11), 1612–1639.
- Korthagen, F., & Nuijten, E. (2022). *The power of reflection in teacher education and professional development: Strategies for in-depth teacher learning*. Routledge.
- Kovalenko, M., Lomonosova, O., & Rusnak, A. (2021). Strategies and technologies of adaptive management of higher education institutions in a rapidly changing external environment. *Baltic Journal of Economic Studies*, 7(2), 118–128.
- Menon, R. (2024). *Strategic innovation management: Building resilient organizations through adaptive leadership and collaborative frameworks*.
- Mogas, J., Palau, R., Fuentes, M., & Cebrián, G. (2022). Smart schools on the way: How school principals from Catalonia approach the future of education within the fourth industrial revolution. *Learning Environments Research*, 25(3), 875–893.
- Mohamed Hashim, M. A., Tlemsani, I., & Matthews, R. (2022). Higher education strategy in digital transformation. *Education and Information Technologies*, 27(3), 3171–3195.
- Mullen, C. A., Shields, L. B., & Tienken, C. H. (2021). Developing teacher resilience and resilient school cultures. *Journal of Scholarship & Practice*, 18(1), 8–24.
- Nadeem, M. (2024). Distributed leadership in educational contexts: A catalyst for school improvement. *Social Sciences & Humanities Open*, 9, 100835.
- Nielsen, L., & Faber, M. H. (2021). Impacts of sustainability and resilience research on risk governance, management and education. *Sustainable and Resilient Infrastructure*, 6(6), 339–384.
- Niemeyer-Rens, R. F., Sullivan, G., & Self, S. W. (2022). Leadership adaptability within higher education. *Journal of Higher Education Theory & Practice*, 22(9).
- Rachmad, Y. E. (2022). *Learning flexibility theory*. Publicaciones Internacionales.
- Sari, I. D. R. (2024). *A study of professional connectedness and isolation in the learning lives of remote and peri-urban primary school teachers in Indonesia* (Doctoral dissertation, University of Sussex).
- Silver, C. (2024). Rapid urbanization: The challenges and opportunities for planning in Indonesian cities. In *The Indonesian economy and the surrounding regions in the 21st century: Essays in honor of Iwan Jaya Azis* (pp. 35–48).
- Sott, M. K., & Bender, M. S. (2025). The role of adaptive leadership in times of crisis: A systematic review and conceptual framework. *Merits*, 5(1), 2.
- Timotheou, S., Miliou, O., Dimitriadis, Y., Sobrino, S. V., Giannoutsou, N., Cachia, R., Monés, A. M., & Ioannou, A. (2023). Impacts of digital technologies on education and factors influencing schools' digital capacity and transformation: A literature review. *Education and Information Technologies*, 28(6), 6695–6726.
- Wipulanusat, W., Panuwatwanich, K., Stewart, R. A., & Sunkpho, J. (2020). Applying mixed methods sequential explanatory design to innovation management. In *Proceedings of the 10th International Conference on Engineering, Project, and Production Management* (pp. 485–495).
- Yaska, M., & Nuhu, B. M. (2024). Assessment of measures of central tendency and dispersion using Likert-type scale. *African Journal of Advances in Science and Technology Research*, 16(1), 33–45.

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AUTHOR CONTRIBUTION STATEMENT

Pierre Marcello Lopulalan contributed to the conceptualization, research design, data collection, data analysis, and manuscript writing. The author has read and approved the final version of the manuscript.

AI DISCLOSURE STATEMENT

The author declares that artificial intelligence (AI) tools were used in a limited capacity to assist in language editing and improving the clarity of the manuscript. All ideas, analyses, and conclusions presented in this study are the original work of the author, who takes full responsibility for the content of this manuscript.

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