EPRA International Journal of Environmental Economics, Commerce and Educational Management
Journal DOI: 10.36713/epra0414 |ISI I.F Value: 0.815|SJIF Impact Factor (2025): 8.57 ISSN: 2348 – 814X
Volume: 12 | Issue:11 |November 2025 -Peer Reviewed Journal

DATA-DRIVEN STRATEGIC PLANNING IN RELATION TO SCHOOL IMPROVEMENT METRICS IN ELEMENTARY SCHOOLS

Marilou A. Carpentero
Master of Arts in Educational Management, Rizal Memorial Colleges, Inc.

Article DOI: https://doi.org/10.36713/epra25111
DOI No: 10.36713/epra25111

ABSTRACT

This study aimed to assess which domains of data-driven strategic planning significantly influenced school improvement metrics in Panabo North District using a non-experimental quantitative design with a descriptive-correlational method. A total of 168 public elementary teachers were selected through stratified random sampling, and data were gathered using validated and pilot-tested survey questionnaires. Results showed that data-driven strategic planning was extensively practiced in the district, with the implementation of data-informed interventions as the highest-rated indicator. However, engagement in continuous professional development was rated moderately extensive, signaling the need for more consistent teacher training. The extent of school improvement metrics was also extensive, particularly in student engagement and teacher collaboration, while parental involvement was rated only moderately extensive. A significant positive relationship was found between data-driven strategic planning and school improvement metrics, especially in the areas of continuous professional development, data utilization, and collaborative data interpretation. Continuous professional development emerged as the strongest predictor of school improvement. However, the implementation of data-informed interventions did not show significant influence on school metrics. These findings emphasize the value of strengthening teacher learning and parental involvement. They also suggest that reinforcing data-driven culture may lead to improved instructional practices and school outcomes.

KEYWORDS: *Data-Driven Strategic Planning; School Improvement Metrics; Continuous Professional Development; Student Performance Data; Collaboration*

INTRODUCTION

School improvement metrics are vital for monitoring teaching, learning, and management practices in public elementary schools. Yet many schools continue to experience low teacher collaboration, limited professional development, weak student engagement, and insufficient parental involvement—issues that hinder overall school performance. Despite ongoing initiatives, school leaders often lack clear, data-informed strategies to guide decision-making, highlighting the need to examine how data-driven strategic planning strengthens school improvement metrics.

International studies show similar concerns. Sun et al. (2020) note that narrow accountability measures overlook essential factors such as collaboration and engagement. Böse and Brauckmann-Sajkiewicz (2021) further emphasize leadership challenges that impede sustained school progress. In the UK, Skipp and Dommett (2021) and Gewirtz et al. (2021) report that rigid performance metrics and overreliance on test scores result in superficial gains while neglecting deeper instructional needs. In Asia, Qian and Walker (2022) and Aslam et al. (2019) identify inconsistent leadership, inadequate planning, and weak data-use practices as major barriers to improving school outcomes.

In the Philippine context, Generalao et al. (2022) highlight persistent gaps in teacher education that affect professional development and collaboration, while Behiga (2022) notes systemic issues linked to the National Achievement Test. These concerns extend to Panabo City, where studies point to challenges involving teacher satisfaction, organizational commitment, and the need for supportive work environments to enhance performance.

Despite increasing attention to data-driven decision-making, little localized research examines its direct influence on school improvement metrics in Philippine elementary schools, particularly in Panabo North District. Although schools collect data, the extent to which these practices lead to measurable improvements remains unclear. This gap underscores the need for a focused investigation to identify which data-driven strategies most effectively enhance teacher development, student engagement, and parental involvement.

Conducting this study in Panabo North District is essential for supporting continuous improvement and guiding evidence-based leadership. Localized findings can help schools allocate resources more efficiently, build sustainable systems for monitoring progress, and promote a culture of collaboration and responsiveness grounded in data use.

REVIEW OF SIGNIFICANT LITERATURE

This section provides a concise understanding of the key concepts and research findings on data-driven strategic planning and its influence on school improvement metrics. It outlines the main theoretical frameworks, empirical studies, and gaps in the literature to establish the foundation for the current research, emphasizing its significance in elementary school settings.

Data-Driven Strategic Planning

Data-driven strategic planning refers to the systematic use of data to guide decisions aimed at improving school performance. It involves collecting, analyzing, and applying data related to student outcomes, teacher effectiveness, and resource use to align school strategies with goals (Dogan & Demirbolat, 2021). Lempiäinen (2024) notes that this ensures decisions are evidence-based and interventions are targeted and measurable. Çevik and Dogan (2023) highlight that such planning helps schools identify improvement areas, manage resources efficiently, and support continuous improvement and accountability.

Cheng (2021) emphasized that knowledge management strengthens strategic planning by ensuring information is shared and used across the school. Luhangala and Anyieni (2019) similarly stressed that schools with moderate levels of strategic planning often struggle due to limited data use. Their findings reinforce the importance of integrating knowledge and data to enhance performance outcomes.

Schools with moderate data-driven strategic planning typically use data to identify broad trends but lack full integration of data into decision-making. Kharroub and Mansour (2019) observed that while student performance data is collected, infrastructure and training gaps hinder full implementation. Howes (2018) noted that these schools often miss deeper insights critical for shaping impactful strategies. Rompho (2020) and Namazi and Rezaei (2024) add that without a systematic approach, schools struggle to align resources and adapt to changing needs.

Nouri et al. (2019) found that learning analytics offers actionable insights that support targeted interventions and school improvement. Van Dun (2022) emphasized that high-quality data advances continuous improvement, while Dahnke (2019) showed that data-driven planning enhances teacher collaboration, professional development, and student engagement. Together, these studies highlight the predictive power of data-driven planning on improvement metrics.

Teacher and principal leadership further strengthen the interpretation and application of data. Shen et al. (2020) found strong teacher leadership improves student achievement. Liebowitz and Porter (2019) showed that principal behavior significantly affects student, teacher, and school outcomes. Their findings align with the idea that leadership enhances data use, ultimately improving school-wide metrics.

Collaboration also enhances data interpretation. Oldac and Kondakci (2020) and Liljenberg and Andersson (2021) found that collaborative analysis improves decision-making, while Wise (2019) and Halliday & Meyer (2022) stressed that data-informed interventions improve instructional effectiveness and student engagement. Continuous professional development (CPD) similarly strengthens data use; studies by Yurkofsky et al. (2020) and Belay et al. (2022) confirm that CPD enhances teacher skills, collaboration, and student achievement.

Indicators of Data-Driven Strategic Planning

1.Utilization of Student Performance Data

This refers to how frequently teachers analyze and apply performance data to guide instruction (Dogan & Demirbolat, 2021). Ugboro et al. (2019) found that regular data analysis results in more targeted interventions. Huaisheng et al. (2019) and Osborne (2021) revealed that many schools still utilize data at a moderate level, limiting informed decisions. Aburizaizah, Kim, and Fuller (2019) and Yağcı (2022) noted that even moderate data use improves instructional quality but requires consistency. Bukoye (2019) and Ajibade et al. (2022) highlight that targeted, data-driven interventions significantly enhance academic outcomes.

2. Collaboration in Data Interpretation

This refers to teachers' collaborative discussions to interpret data and develop action plans. Hiim (2023) emphasized that collaboration strengthens analysis and relevance. Owan et al. (2022) and Sahlin (2019) noted that collaborative leadership and stakeholder engagement enhance data use. Liu et al. (2021) and Nguyen and Ng (2022) confirmed that involving multiple perspectives uncovers deeper insights and builds shared accountability. Schildkamp (2019) and Meyer et al. (2023) further stressed that leadership-supported collaboration leads to more effective school improvement strategies.

3. Implementation of Data-Informed Interventions
This refers to how consistently teachers implement strategies based on data (Dogan & Demirbolat, 2021). Pombo (2023) and Neal (2021) found that data-informed instruction improves outcomes but is often applied moderately. Karsten and van Zyl (2022) noted that context-sensitive initiatives remain limited. Ansyari et al. (2022) and St Croix (2019) showed that even moderate implementation improves engagement and adaptiveness. Mekhitarian (2022) and Marsh (2012) highlighted that timely, data-informed interventions are essential for addressing instructional needs.

4. Engagement in Continuous Professional Development (CPD)
This refers to participation in PD focused on data literacy. Genie Dessie (2024) noted that PD becomes more meaningful when based on identified data gaps. Faulkner et al. (2019) emphasized that data-informed CPD motivates teacher improvement. Studies by Osei-Owusu (2020), Duncan (2022), and Abakah et al. (2022) show that teachers participate in CPD but struggle to apply performance data, highlighting the need for stronger data-focused programs. Yurkofsky et al. (2020) and Cheeseman (2022) confirm that sustained CPD fosters a culture of continuous school improvement.

School Improvement Metrics
School improvement metrics are measurable indicators used to assess progress in academic and operational goals (Sahlin & Styf, 2021). Skourdoumbis and Rawolle (2020) note that moderate metrics help identify improvement areas but may not capture complexities of teaching. Leadership plays a central role; Robinson and Gray (2019) and Kılınç and Gümüş (2021) found that effective, data-driven leadership enhances student outcomes.

Moderate levels of improvement metrics help schools monitor realistic progress. Hellström and Hagquist (2021) emphasized that such metrics support gradual enhancement in leadership and teaching. Kumar and Thakur (2019) found that moderate indicators promote fair evaluations. Kivistö et al. (2019) and Sætnan et al. (2019) argued that moderate metrics maintain flexibility and avoid the pressure of high-stakes accountability, enabling schools to innovate while steadily improving.

STATEMENT OF THE PROBLEM
The aim of this study was to examine the influence of data-driven strategic planning in relation to school improvement metrics in elementary schools within the Panabo North District, Panabo City. More specifically, this research sought to address the following key questions:
1. What is the extent of data-driven strategic planning in terms of:
1.1 utilization of student performance data;
1.2 collaboration in data interpretation;
1.3 implementation of data-informed interventions; and
1.4 engagement in continuous professional development?
2. What is the status of school improvement metrics in terms of:
2.1 teacher collaboration frequency;
2.2 professional development participation;
2.3 student engagement strategies; and
2.4 parental involvement encouragement?
3. Is there a significant relationship between data-driven strategic planning and school improvement metrics?
4. Which among the domains of data-driven strategic planning have significant impact on the school improvement metrics in elementary schools?

METHODOLOGY
This section contains the research design, research respondents, ethical consideration, research instrument, data gathering procedure, data collection, and data analysis.

Research Design
In this study, the researcher employed a quantitative research approach, specifically utilizing the prescriptive-correlational technique to gather and analyze relevant data. Quantitative research was a systematic approach that involved collecting and analyzing numerical data to identify patterns, relationships, and trends. It allowed the researcher to quantify variables and apply statistical tools to draw conclusions about the research problem (Lazaraton, 2005). In conducting a study on the influence of data-driven strategic planning on school improvement metrics in elementary schools, a quantitative research approach was appropriate for measuring the impact of specific strategies on quantifiable outcomes. By utilizing surveys and performance data, the researcher was able to statistically assess the relationship between data-driven strategic planning and school improvement metrics. This approach also enabled the researcher to generalize findings to a broader population, providing a clearer understanding of how data-driven initiatives could enhance school improvement efforts.

Moreover, the descriptive research method was used to provide specific recommendations or solutions based on collected data and analysis to address a problem or improve a process. This approach focused on offering actionable guidance, rather

than just describing or exploring phenomena (Loeb et al., 2017). This method was appropriate for conducting a study on the influence of data-driven strategic planning on school improvement metrics in elementary schools because it allowed for the development of specific, evidence-based strategies to improve school performance by analyzing the relationship between current data-driven planning practices and school improvement metrics. The approach ensured that the study not only identified key factors influencing school success but also prescribed concrete actions that could be implemented to enhance achievement-driven strategic planning in elementary schools.

In addition, a correlational research design was used to examine the relationship between two or more variables to determine whether they were associated or correlated, without manipulating any variables. It was used to assess the strength and direction of relationships between variables based on naturally occurring data (Seeram, 2019). In this study, a correlational research design was appropriate for analyzing how these variables interacted. The researcher investigated whether increased utilization of data-driven strategies correlated with improved school performance outcomes, such as teacher collaboration and student engagement. This design allowed the researcher to explore the strength of these relationships and provide insights without altering any school practices.

Research Respondents

The respondents of this study were composed of 165 public elementary school teachers selected from an approximate population of 280 teachers in the North District of Panabo City. The sample size was determined using the Slovin's formula with a 5% margin of error to ensure accuracy and representativeness of the data. This number was deemed sufficient to generalize findings within the district while maintaining statistical reliability. Each respondent provided insight into the school's implementation of data-driven strategic planning and its relationship with school improvement metrics. The selected teachers represented a variety of grade levels and subject areas, offering diverse perspectives on the topic.

In setting the criteria for respondent selection, the researcher established specific inclusion parameters to ensure relevance and validity. Only permanent public elementary school teachers who had been employed in their respective schools for at least one school year were considered. Teachers involved in administrative positions, such as school heads and coordinators, were excluded to avoid biases related to leadership roles. Additionally, the respondents must have participated in school-based planning activities to ensure they had familiarity with data usage and improvement practices. These inclusion criteria helped ensure that all respondents had sufficient experience and knowledge to provide informed responses about data-driven strategic planning in their schools.

To ensure fair and proportional representation, the researcher employed a stratified random sampling technique. Stratified random sampling is a method where the population is divided into subgroups or "strata," and random samples are taken from each stratum (Singh et al., 1986). In this study, the stratification was based on the public elementary schools within the North District. Each school was treated as a separate stratum, and a proportionate number of respondents was randomly selected from each. This approach ensured that every school in the district had equitable representation in the sample, allowing for more balanced and comprehensive data collection.

Research Instrument

The study employed three questionnaires that fit the context of the respondents. The first part of the instrument focused on teacher persistence. This questionnaire was developed by Demir and Yildirim Doner (2019) and was measured in terms of consistent effort, resilience in adversity, commitment to professional growth, and dedication to student success. The Cronbach alpha value for this questionnaire is 0.922, described as excellent and interpreted as highly reliable and consistent. In responding to the questionnaire, the respondents used a 5-point Likert scale. As a guide in determining the extent of teacher persistence, the researcher utilized the range of means, descriptions, and interpretations as presented below:

Data Analysis

The following are the statistical tools that were utilized by the researcher in processing the gathered data:

Weighted Mean

This was useful in determining extents of teacher persistence, collaboration, and school improvement initiatives, allowing for the comparison of average levels.

Pearson Moment Product Correlation

This was employed to measure the strength and direction of the relationship between teacher persistence, teacher collaboration, and school improvement initiatives.

Regression Analysis

It was conducted to determine the predictive power of teacher persistence on teacher collaboration and school improvement initiatives.

EPRA International Journal of Environmental Economics, Commerce and Educational Management
Journal DOI: 10.36713/epra0414 |ISI I.F Value: 0.815|SJIF Impact Factor (2025): 8.57 ISSN: 2348 – 814X
Volume: 12 | Issue:11 |November 2025 -Peer Reviewed Journal

RESULTS AND DISCUSSIONS

This chapter presents the results generated from the data gathered. It is sequenced based on the objectives of the study as presented in the first chapter. Thus, it presents the extents of data-driven strategic planning and school improvement metrics; the significant relationship among these variables; and the influence of data-driven strategic planning in relation to school improvement metrics in elementary schools within the Panabo North District, Panabo City.

The analysis on the relationship between data-driven strategic planning and school improvement metrics in the elementary schools of Panabo North District, Panabo City, reveals substantial evidence of the interconnectedness between the two variables. A bivariate correlation analysis using the Pearson Product Moment Correlation was conducted to determine whether the components of data-driven strategic planning are significantly associated with the various indicators of school improvement. The results presented in Table 11 provide a comprehensive understanding of the influence that data-based practices exert on school-level improvements.

The findings indicate a strong positive correlation ($r = 0.710$, $p = 0.000$) between the overall level of data-driven strategic planning and the overall school improvement metrics, signifying that schools that extensively utilize data for planning, implementation, and decision-making are more likely to demonstrate stronger improvement indicators. The rejection of the null hypothesis further strengthens this conclusion, affirming the existence of a statistically significant relationship. This result aligns with the claim of van Dun (2022), who asserted that schools with a well-established data-driven culture foster a systematic environment in which decisions are guided by accurate, relevant, and timely information. Such an environment enables schools to craft strategic actions that directly respond to the actual needs of students, teachers, and the learning community.

Moreover, the strong correlation suggests that when data is effectively integrated into strategic planning—such as in identifying learning gaps, designing interventions, and monitoring school initiatives—schools are better positioned to achieve desirable outcomes. This includes improvements in instructional quality, stronger teacher collaboration, more consistent professional development engagement, and greater emphasis on student-centered learning practices. Data-driven planning therefore functions as a critical backbone that supports continuous school improvement.

Correlations of Individual Indicators

A deeper examination of the individual dimensions shows varying degrees of correlation strength, all of which are statistically significant. This indicates that each component of data-driven strategic planning contributes uniquely and meaningfully to school improvement metrics.

Engagement in Continuous Professional Development, with an r-value of 0.626 ($p = 0.000$), demonstrated the strongest relationship among the four strategic planning components. This moderate-to-strong correlation underscores the importance of teacher training and skills development in promoting school improvement. When teachers actively participate in data-related professional development activities—such as workshops, training sessions, and collaborative learning groups—their capacity to interpret, utilize, and act on data improves. As a result, instructional practices become more aligned with student needs, leading to more effective classroom interventions and better learning outcomes. The findings affirm the statements of Nouri et al. (2019), who emphasized that teacher competence in data analysis is a key predictor of successful school-wide implementation of improvement strategies.

The utilization of student performance data also exhibited a moderate correlation with school improvement metrics ($r = 0.497$, $p = 0.000$). This confirms that when teachers and school heads consistently analyze and interpret assessment results to identify trends and gaps, they are better equipped to formulate targeted instructional adjustments. Schools that regularly evaluate students' academic performance are able to develop more precise academic goals, implement responsive instruction, and monitor learner progress more effectively. Consistent with the views of Ugboro et al. (2019), data-informed practices promote instructional relevance, enabling educators to tailor teaching strategies according to the most pressing learning needs.

Similarly, collaboration in data interpretation showed a moderate relationship with school improvement metrics ($r = 0.357$, $p = 0.000$). The results suggest that teamwork and collegial discussions centered on data are essential elements in fostering shared responsibility for student learning. When teachers regularly engage in collaborative analysis sessions, they form a collective understanding of school issues and generate unified strategies for addressing them. This finding is in line with Sahlin (2019), who highlighted that collaborative data inquiry strengthens professional communities by encouraging open dialogue, reflective practice, and consistent follow-through of data-informed decisions.

The weakest, yet still significant, correlation was observed in the implementation of data-informed interventions, with an r-value of 0.216 ($p = 0.005$). Although the relationship is weaker compared to the other indicators, it nonetheless implies that acting on data remains a crucial component in school improvement. The relatively lower correlation may suggest inconsistencies in execution, variations in the quality of interventions, or challenges in monitoring and evaluating the outcomes of implemented strategies. However, the positive association indicates that even when intervention practices vary, relying on data to shape instructional decisions still contributes to improved school performance. Neal (2021) emphasized that while formulating interventions is important, ensuring their fidelity and effectiveness through consistent monitoring ultimately determines their impact on student outcomes.

Overall Interpretation
Overall, the results of the correlation analysis emphasize that data-driven strategic planning serves as a vital framework for continuous school improvement. Schools that engage deeply in data utilization, teacher collaboration, intervention design, and professional development are better poised to create sustainable learning environments that support both teacher effectiveness and student achievement. These findings highlight the value of embedding a data-informed culture across all levels of the educational system—from classroom instruction to school-wide planning and decision-making.

Furthermore, the significance of all indicators suggests that data-driven practices should not be viewed as isolated processes but rather as interconnected elements that collectively shape the direction of school improvement. For instance, teachers' capacity to analyze data is strengthened by professional development; collaborative data discussions help refine intervention strategies; and effective interventions reinforce the importance of continuous data review. These interconnected practices form a cycle that supports instructional improvement and enhances overall school performance.

The results strongly support the premise that fostering a data-driven school culture is essential for advancing educational quality. By prioritizing strategic planning based on accurate and meaningful data, schools in Panabo North District can continue to build more responsive, innovative, and effective learning environments.

CONCLUSIONS AND RECOMMENDATIONS

This part of the paper presents the conclusion and recommendation of the researcher. The discussion is supported by the literature presented in the first chapters and the conclusion is in accordance with statements of the problem presented in this study.

Findings

The primary objective of this study was to evaluate which domains of data-driven strategic planning significantly influence the school improvement metrics in elementary schools utilizing non-experimental quantitative design using descriptive-correlation technique. The researcher selected the 168 Public Elementary School teachers within the Panabo North District in Panabo City as the respondents through stratified random sampling method. The researcher made use of modified and enhanced adapted survey questionnaires which was pilot tested in a nearby school to ensure high reliability and internal consistency of the items in the instrument.

First, findings reveal that the overall extent of data-driven strategic planning in Panabo North District is described as extensive, indicating that such practices are oftentimes observed across schools. Among the indicators, implementation of data-informed interventions emerged as the most extensively practiced, followed closely by utilization of student performance data and collaboration in data interpretation. However, engagement in continuous professional development was only moderately extensive, suggesting the need for greater emphasis on sustained teacher learning to fully support data-driven initiatives.

Second, the extent of school improvement metrics in Panabo North District is extensive, showing that key practices are oftentimes observed in the schools. Student engagement strategies recorded the highest level of implementation, followed closely by teacher collaboration and participation in professional development activities. In contrast, parental involvement encouragement was only moderately extensive, highlighting a need to strengthen partnerships between schools and families.

Third, it was reveal a significant positive relationship between data-driven strategic planning and school improvement metrics in Panabo North District. Among the indicators, engagement in continuous professional development showed the strongest correlation, followed by utilization of student performance data and collaboration in data interpretation. These results suggest that schools practicing data-informed strategies tend to experience improved outcomes in collaboration, instructional practices, and student engagement.

Lastly, the results show that data-driven strategic planning significantly influences school improvement metrics in Panabo North District, particularly in the areas of continuous professional development, utilization of student performance data, and collaboration in data interpretation. Among the indicators, engagement in continuous professional development emerges as the strongest predictor of school improvement outcomes. However, implementation of data-informed interventions does not show a significant influence on school improvement metrics.

Conclusions

Based on the findings of this study several conclusions were generated:
It is concluded in this study that data-driven strategic planning is extensively practiced in Panabo North District, particularly in implementing data-informed interventions and utilizing student performance data. However, engagement in continuous professional development is only moderately extensive, suggesting a need for more sustained training efforts. This implies that while data usage is well integrated, enhancing teacher capacity through ongoing development programs may further strengthen data-driven practices in schools.

Moreover, school improvement metrics in Panabo North District are extensively observed, particularly in student engagement strategies and teacher collaboration. However, parental involvement encouragement is only moderately extensive, indicating a gap in family-school partnerships. This implies that while internal school practices are strong, there is a need to enhance strategies that actively involve parents to fully support student development.

Further, a significant and positive relationship between data-driven strategic planning and school improvement metrics in Panabo North District is found in this study, highlighting indicators such as utilization of student performance data, collaboration in data interpretation, and continuous professional development. These results imply that schools that actively use data in decision-making processes are more likely to achieve better outcomes in collaboration, teaching practices, and learner engagement. Strengthening these data-driven practices may further improve overall school effectiveness and instructional quality.

Furthermore, data-driven strategic planning significantly influences school improvement metrics, particularly through the utilization of student performance data, collaboration in data interpretation, and engagement in continuous professional development. These predictors contribute meaningfully to enhancing instructional practices and institutional outcomes, underscoring the importance of data literacy and collaborative capacity-building among educators. Strengthening these areas may lead to more responsive and effective school improvement strategies in Panabo North District.

Recommendations

Based on the findings and conclusions generated from the study, the researcher recommends the following:

Schools should enhance the continuous professional development of teachers by offering more accessible and relevant training sessions focused on data use in teaching. Teachers may be encouraged to join professional learning communities where they can exchange ideas and best practices for data interpretation and application. School leaders should allocate time and resources for regular capacity-building that improves data literacy. Moreover, integrating reflection and sharing of learning from development sessions may strengthen engagement and promote deeper understanding of data-driven strategies.

Further, school leaders should establish stronger communication channels between teachers and parents to keep them informed about their children's progress. Activities such as parenting seminars and learning-at-home workshops may be organized to equip parents with strategies to support their children's education. Teachers may also encourage parents to take part in school events and classroom initiatives to strengthen collaboration. Increasing parental involvement should be a priority to foster a supportive learning environment that contributes to school improvement.

Furthermore, teachers should be trained on how to design and execute data-informed interventions that directly address student needs. The school may set clear guidelines for monitoring and evaluating the effectiveness of these interventions to ensure alignment with improvement goals. Collaboration among teachers during the planning and review process may enhance the relevance and impact of such interventions. Strengthening follow-through and accountability mechanisms may help improve the implementation and maximize its contribution to school performance.

REFERENCES

1. *Abakah, E., Widin, J., & Ameyaw, E. K. (2022). Continuing professional development (CPD) practices among basic school teachers in the central region of Ghana. Sage Open, 12(2), 21582440221094597.*
2. *Aburizaizah, S., Kim, Y., & Fuller, B. (2019). Principal leadership and student achievement: Decentralising school management in Saudi Arabia. Compare: A Journal of Comparative and International Education.*
3. *Ajibade, S. S. M., Dayupay, J., Ngo-Hoang, D. L., Oyebode, O. J., & Sasan, J. M. (2022). Utilization of ensemble techniques for prediction of the academic performance of students. Journal of Optoelectronics Laser, 41(6), 48-54.*
4. *Admiraal, W., Schenke, W., De Jong, L., Emmelot, Y., & Sligte, H. (2021). Schools as professional learning communities: what can schools do to support professional development of their teachers?. Professional development in education, 47(4), 684-698. https://www.tandfonline.com/doi/full/10.1080/19415257.2019.166 5573*
5. *Ansyari, M. F., Groot, W., & De Witte, K. (2022). A systematic review and meta-analysis of data use professional development interventions. Journal of Professional Capital and Community, 7(3), 256-289. https://www.emerald.com/insight/content/doi/10.1108/JPCC-09-2021-0055/full/html*
6. *Aslam, M., Malik, R., Rawal, S., Rose, P., & Vignoles, A. (2019). Do government schools improve learning for poor students? Evidence from rural Pakistan. Oxford Review of Education, 45(6), 802-824.*
7. *Belay, S., Melese, S., & Seifu, A. (2022). Elevating teachers' professional capital: effects of teachers' engagement in professional learning and job satisfaction, Awi District, Ethiopia. SAGE Open, 12(2), 21582440221094592.*
8. *Bellibaş, M. Ş., Gümüş, S., & Liu, Y. (2021). Does school leadership matter for teachers' classroom practice? The influence of instructional leadership and distributed leadership on instructional quality. School effectiveness and school improvement, 32(3), 387-412.*
9. *Böse, S., & Brauckmann-Sajkiewicz, S. (2021). (In) effective leadership? Exploring the interplay of challenges, goals and measures in the context of school improvement. Journal of Educational Administration, 59(4), 454-471.*

10. *Bukoye, R. O. (2019). Utilization of instruction materials as tools for effective academic performance of students: Implications for counselling. In Proceedings (Vol. 2, No. 21, p. 1395). MDPI.*
11. *Çevik, M. S., & Dogan, E. (2023). The Mediating and Moderating Effects of Knowledge Management in the Relationship between Technological Leadership Behaviors of School Principals and Data-Driven Decision-Making. Educational Policy Analysis and Strategic Research, 18(1), 50-76.*
12. *Cheeseman, M. F. (2022). Changing School Improvement Team Behaviors: The Influence and Impact of Engaging School Improvement Teams in Professional Learning Cycles as a Measure to Achieve Schoolwide Academic Growth. East Carolina University.*
13. *Cheng, E. C. (2021). Knowledge management for improving school strategic planning. Educational Management Administration & Leadership, 49(5), 824-840. https://journals.sagepub.com/doi/abs/10.1177/1741143220918255*
14. *Chukwuka-Eze, M. I. (2024). Scholarly Inquiry on Parents' Mental Health in Predicting Parental Involvement: A Focus on United States of America Public Elementary Schools (Doctoral dissertation, Morgan State University). https://www.proquest.com/openview/0e228ff803da8985f57a506d08922c95/1?pq-origsite=gscholar&cbl=18750&diss=y*
15. *Çopur, A., & Demirel, M. (2022). The impact of professional learning communities on social studies teachers' professional development and student academic achievement. The Social Studies, 113(6), 300-318.*
16. *Dahnke, C. C. (2019). Utilizing Strategic Planning and performance metrics to deliver on continuous improvement efforts in large urban school districts (Doctoral dissertation, Harvard University). https://www.proquest.com/openview/d026056c0b12724bfffd169ea1a71110/1?pq-origsite=gscholar&cbl=44156*
17. *Didion, L., Toste, J. R., & Filderman, M. J. (2020). Teacher professional development and student reading achievement: A meta-analytic review of the effects. Journal of Research on Educational Effectiveness, 13(1), 29-66. https://www.tandfonline.com/doi/abs/10.1080/19345747.2019.1670884*
18. *DiIorio, D. (2022). See Me, Hear Me, Teach Me: Addressing Equity, Diversity, and Student Engagement through Culturally Responsive Teaching. https://digitalcommons.sacredheart.edu/edd/14/*
19. *Dogan, E., & Demirbolat, A. O. (2021). Data-Driven Decision-Making in Schools Scale: A Study of Validity and Reliability. International Journal of Curriculum and Instruction, 13(1), 507-523. https://eric.ed.gov/?id=EJ1285547*
20. *Duncan, J. (2022). Exploring practitioners' views on the purpose of continuous professional development and the barriers to engagement.*
21. *Faulkner, F., Kenny, J., Campbell, C., & Crisan, C. (2019). Teacher learning and continuous professional development. Examining the Phenomenon of "Teaching Out-of-field" International Perspectives on Teaching as a*
22. *Non-specialist,269-308. https://link.springer.com/chapter/10.1007/978-981-13-3366-8_11*
23. *Generalao, I. N., Ducanes, G., Yee, K. M., & David, C. C. (2022). Teacher education in the Philippines: Are we meeting the demand for quality. Retrieved May, 20, 2022.*
24. *Genie Dessie, H. (2024). The relationship between teachers' engagement in school-based continuous professional development and their readiness for change in the Injibara City Administration primary schools of Ethiopia. Education 3-13, 1-14. https://www.tandfonline.com/doi/abs/10.1080/03004279.2024.2378872*
25. *Gewirtz, S., Maguire, M., Neumann, E., & Towers, E. (2021). What's wrong with 'deliverology'? Performance measurement, accountability and quality improvement in English secondary education. Journal of Education Policy, 36(4), 504-529.*
26. *Goodman, T. Q. (2019). The Effect of Parental Involvement on Rising Fifth Grade Math Student's Academic Achievement. Trevecca NazareneUniversity.https://www.proquest.com/openview/32b7d6f3c3789a4510bd43fb8226a4d6/1?pq-origsite=gscholar&cbl=18750&diss=y*
27. *Gümüş, S., & Bellibaş, M. Ş. (2020). The relationship between professional development and school principals' leadership practices: the mediating role of self-efficacy. International journal of educational management, 34(7), 1155-1170.https://www.emerald.com/insight/content/doi/10.1108/IJEM-10-2019-0380/full/html*
28. *Halliday, D., & Meyer, J. H. F. Evaluating the student experience of the Durham GCRF PhD program: Theoretical perspectives, methodology, and actionable-data informed interventions. https://gcrf-cdt.webspace.durham.ac.uk/wp-content/uploads/sites/143/2022/04/Halliday-and-Meyer-Conference-Paper-Final-Web.pdf*
29. *Hellström, L., & Hagquist, C. (2021). School effectiveness in Sweden: psychometric properties of an instrument to measure pedagogical and social climate (PESOC) focusing on pedagogical leadership. International Journal of Leadership in Education, 24(6), 855-875. https://www.tandfonline.com/doi/full/10.1080/13603124.2019.1623921*
30. *Hiim, H. (2023). How can collaboration between schools and workplaces contribute to relevant vocational education? Results of an action research project in the school-based part of Norwegian vocational education and training. Vocations and Learning, 16(1), 1-21.*
31. *Howes, T. (2018). Effective strategic planning in Australian universities: How good are we and how do we know?. Journal of Higher Education Policy and Management, 40(5), 442-457.*
32. *Huaisheng, Z., Manu, B. D., Mensah, I. A., Mingyue, F., & Oduro, D. (2019). Exploring the effect of school management functions on student's academic performance: A dilemma from public senior high schools in Ghana. Journal of arts and humanities, 8(6), 33-45.*
33. *Jackson, K. (2021). The Implementation of Higher-Order Thinking Strategies to Increase Student Engagement and Academic Achievement. Trevecca Nazarene University.*
34. *Karsten, I., & van Zyl, A. Create Context-Sensitive and Data-Informed Student Success Initiatives.*
35. *Katsigianni, E. A., & Ifanti, A. A. (2023). Investigating the triangle: The school principal's role, term of office, and school improvement in Greece. Educational Management Administration & Leadership, 51(4), 912-931.*
36. *Kharroub, A. O., & Mansour, M. M. (2019). The impact of strategic planning in Palestinian municipalities on the quality of service provided to its citizens. International Business Research, 12(5), 69-85.*
37. *Kılınç, A. Ç., & Gümüş, S. (2021). What do we know about novice school principals? A systematic review of existing international literature. Educational Management Administration & Leadership, 49(1), 54-75.*

38. *Kivistö, J., Pekkola, E., Berg, L. N., Hansen, H. F., Geschwind, L., & Lyytinen, A.(2019). Performance in higher education institutions and its variations in Nordic policy. Reforms, organizational change and performance in higher education: A comparative account from the Nordic countries, 37-67.*
39. *Kumar, A., & Thakur, R. R. (2019). Objectivity in performance ranking of higher education institutions using dynamic data envelopment analysis. International Journal of Productivity and Performance Management, 68(4), 774-796.*
40. *Lazaraton, A. (2005). Quantitative research methods. In Handbook of research in second language teaching and learning (pp. 209-224). Routledge. https://www.taylorfrancis.com/chapters/edit/10.4324/9781410612700-16/quantitative-research-methods-anne-lazaraton*
41. *Lempiäinen, E. (2024). Towards data-driven decision-making: how to measure organization's readiness for data-driven strategic decision-making. https://lutpub.lut.fi/handle/10024/167935*
42. *Liebowitz, D. D., & Porter, L. (2019). The effect of principal behaviors on student, teacher, and school outcomes: A systematic review and meta-analysis of the empirical literature. Review of Educational Research, 89(5), 785-827. https://journals.sagepub.com/doi/abs/10.3102/0034654319866133*
43. *Liljenberg, M., & Andersson, K. (2021). Relations between an improving Swedish LEA and school principals with joint quality and improvement responsibilities. Education Inquiry, 12(2), 147-162.*
44. *Liu, B., & Cheng, H. (2022). A stratified sampling method for teaching evaluation of curriculum ideological and political for higher education. In 2022 3rd International Conference on Education, Knowledge and Information Management (ICEKIM) (pp. 115-119). IEEE*
45. *Liu, Y., Bellibaş, M. Ş., & Gümüş, S. (2021). The effect of instructional leadership and distributed leadership on teacher self-efficacy and job satisfaction: Mediating roles of supportive school culture and teacher collaboration. EducationalManagement Administration & Leadership, 49(3), 430-453. https://journals.sagepub.com/doi/abs/10.1177/1741143220910438*
46. *Loeb, S., Dynarski, S., McFarland, D., Morris, P., Reardon, S., & Reber, S. (2017). Descriptive Analysis in Education: A Guide for Researchers. NCEE 2017-4023. National Center for Education Evaluation and Regional Assistance. https://eric.ed.gov/?id=ED573325*
47. *Luhangala, H. M., & Anyieni, A. (2019). Strategy implementation on organisation performance: A case of public secondary schools Nyamira County, Kenya. International Academic Journal of Human Resource and Business Administration, 3(5), 394-410.*
48. *Marsh, J. A. (2012). Interventions promoting educators' use of data: Research insights and gaps. Teachers College Record, 114(11), 1-48.*
49. *Marsh, J. A., & Farrell, C. (2021). Supporting school improvement through data-driven decision-making. Educational Leadership, 78(5), 42-46.*
50. *Maxwell, M. (2023). School Improvement Through Deeper Learning: Using Targeted Professional Development on Blended Learning to Increase Student Engagement. https://ttu-ir.tdl.org/items/7521df76-37b7-4933-8d31-b423d858f9ad*
51. *Mekhitarian, S. (2022). Harnessing Formative Data for K-12 Leaders: Real-time Approaches to School Improvement. Routledge.*
52. *Meyer, A., Hartung-Beck, V., Gronostaj, A., Krüger, S., & Richter, D. (2023). How can principal leadership practices promote teacher collaboration and organizational change? A longitudinal multiple case study of three school improvement initiatives. Journal of Educational Change, 24(3), 425-455.*
53. *Mora-Ruano, J. G., Heine, J. H., & Gebhardt, M. (2019, August). Does teacher collaboration improve student achievement? Analysis of the German PISA 2012 sample. In Frontiers in Education (Vol. 4, p. 85). Frontiers Media SA. https://www.frontiersin.org/journals/education/articles/10.3389/feduc.2019.00085/full*
54. *Neal, B. C. (2021). The Effect of Transformational School Leadership on Data-Informed Instruction and Student Achievement. The University of Alabama.*
55. *Nguyen, D., & Ng, D. (2022). Teacher collaboration for change: Sharing, improving, and spreading. In Leadership for Professional Learning (pp. 178-191). Routledge. https://www.taylorfrancis.com/chapters/edit/10.4324/9781003357384-12/teacher-collaboration-change-sharing-improving-spreading-dong-nguyen-david-ng*
56. *Nouri, J., Ebner, M., Ifenthaler, D., Sqr, M., Malmberg, J., Khalil, M., ... & Berthelsen, U. D. (2019). Efforts in Europe for Data-Driven Improvement of Education–A review of learning analytics research in six countries. https://bora.uib.no/bora-xmlui/handle/1956/23178*
57. *Oldac, Y. I., & Kondakci, Y. (2020). Multilevel analysis of the relationship between school-level variables and student achievement. Educational Management Administration & Leadership, 48(4), 762-780. https://journals.sagepub.com/doi/abs/10.1177/1741143219827303*
58. *Osborne, A. (2021). Strategic spatial planning in Aotearoa New Zealand: an appraisal of lessons learned and what we should apply to future planning: A dissertation submitted in partial fulfilment of the requirements for the Degree of Master of Planning at Lincoln University (Doctoral dissertation, Lincoln University).*
59. *Osei-Owusu, A. B. I. G. A. I. L. (2020). Assessment of continuous professional development needs among teachers of twi in the senior high schools. Unpublished manuscript), Cape Coast.*
60. *Owan, V. J., Asuquo, M. E., & Etudo-Eyor, E. (2022). Leadership styles, public relation skills and School-community collaboration: A quantitative analysis of the perception of stakeholders. International Journal of Leadership in Education, 1-23.*
61. *Polatcan, M. (2024). An exploration of the relationship between distributed leadership, teacher agency, and professional learning in Turkey. Professional Development in Education, 50(4), 789-803. https://www.tandfonline.com/doi/abs/10.1080/19415257.2021.1905050*
62. *Pombo, L. M. (2023). Retaining and Supporting Effective Elementary School Principals Through Collaborative Teams and Data-Informed-Decision-Making (Doctoral dissertation, Arizona State University). https://www.proquest.com/openview/1bb636c00071465be1ca87804e83d5b7/1?pq-origsite=gscholar&cbl=18750&diss=y*
63. *Qian, H., & Walker, A. (2022). Leading Quality Education in the Asia-Pacific. In International Handbook on Education Development in Asia-Pacific (pp. 1-19). Singapore: Springer Nature Singapore.*

64. *Robinson, V., & Gray, E. (2019). What difference does school leadership make to student outcomes?. Journal of the Royal Society of New Zealand, 49(2), 171-187. https://www.tandfonline.com/doi/full/10.1080/03036758.2019.1582075*
65. *Sætnan, A. R., Tøndel, G., & Rasmussen, B. (2019). Does counting change what is counted? Potential for paradigm change through performance metrics. Research Evaluation, 28(1), 73-83. https://academic.oup.com/rev/article-abstract/28/1/73/5280611*
66. *Sahlin, S. (2019). Collaboration with private companies as a vehicle for school improvement: Principals' experiences and sensemaking. Journal of Professional Capital and Community, 4(1), 15-35. https://www.emerald.com/insight/content/doi/10.1108/JPCC-03-2018-0013/full/html*
67. *Sahlin, S., & Styf, M. (2021). Internationalization as an internal capacity builder for school improvement: a case study. International Journal of Leadership in Education.*
68. *Schildkamp, K. (2019). Data-based decision-making for school improvement: Research insights and gaps. Educational research, 61(3), 257-273.*