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Collaborative Professional Development in Subject Teacher Forums: A Phenomenological Study of Science Teachers

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A B S T R A C T

Improving teachers' instructional performance is crucial for enhancing educational quality, especially during curriculum reforms. Musyawarah Guru Mata Pelajaran (MGMP) functions as a professional forum that supports collaborative learning and teacher development. This study examines the implementation of the science teachers' MGMP in Indragiri Hilir, Indonesia, identifies participation challenges, and explores its contribution to instructional performance. A qualitative phenomenological approach was employed using interviews, observations, and document analysis. Data were collected from ten informants, including three school principals, six science teachers, and one MGMP coordinator. Data credibility was ensured through triangulation, while thematic analysis was used to interpret participants' experiences. The findings show that MGMP is implemented through a hybrid model, enabling teacher participation despite geographical constraints. However, its effectiveness is affected by transportation difficulties, limited internet access, administrative workload, and uneven participation. MGMP contributes to improved lesson planning, instructional strategies, implementation of the Merdeka Curriculum, and contextual instructional innovation through collaborative learning and professional knowledge sharing. Teachers also demonstrate adaptive participation by engaging in self-directed learning and peer collaboration despite existing limitations. The study concludes that MGMP serves as a context-dependent professional learning community whose effectiveness is shaped by institutional support, contextual challenges, and teacher agency.

1. Introduction

Education plays a fundamental role in shaping individuals' intellectual, emotional, and moral capacities, enabling them to contribute meaningfully to society. In Indonesia, the National Education System Law No. 20 of 2003 emphasizes that education is a deliberate and systematic effort to create learning environments that

allow students to actively develop their potential. Achieving these educational goals requires not only curriculum reform and adequate facilities but also the effective performance of teachers as the main actors in classroom instruction.

Teacher performance is widely recognized as a decisive factor in determining educational quality. Performance reflects the extent to which individuals accomplish predetermined goals effectively and meaningfully. In the educational context, teacher performance includes pedagogical competence, professional mastery, classroom management, and reflective practice. The effectiveness of teaching is closely linked to teachers' ability to plan, implement, and evaluate learning activities in ways that support student achievement. Therefore, efforts to improve educational quality inevitably require strengthening teachers' professional competence.

One strategic effort to enhance teacher competence in Indonesia is through Musyawarah Guru Mata Pelajaran (MGMP), a professional forum for teachers of the same subject within a district or municipality. MGMP functions as a non-structural, collegial organization that facilitates collaboration, experience sharing, and joint problem-solving among teachers (Harlita & Ramadan, 2024). Conceptually, MGMP aligns with the idea of professional learning communities, in which teachers improve their competence through sustained collaboration and reflective dialogue.

Previous studies have demonstrated that effective MGMP implementation contributes positively to teacher professionalism and instructional quality. Fatmawati, Hasbi, and Nurdin K. (2020) found that MGMP activities improve teachers' skills in preparing lesson plans and implementing active learning models. Similarly, Hasanah et al. (2021) reported that MGMP strengthens teachers' understanding of curriculum implementation and innovative instructional strategies. Research by Rohimat, Kamil, and Saripah (2025) further shows that structured and collaborative MGMP activities significantly enhance pedagogical and reflective competencies. Moreover, Syuhada, Hartono, and Mudasir (2024) confirm that teacher participation in MGMP has a significant influence on improving teaching performance.

Despite these positive findings, several studies also highlight persistent challenges in MGMP implementation. Sumiyani (2023) identified limitations in time allocation, facilities, and institutional support as major barriers to effective MGMP activities. Makarim et al., (2025) emphasized that low participation rates are influenced by limited funding, weak school-level policy support, and teachers' workload. Hasanah et al. (2025) further argue that MGMP can only function optimally when supported by systematic planning, collegial collaboration, and strong instructional leadership from school principals. These findings indicate that the effectiveness of MGMP is highly context-dependent.

However, most previous studies have been conducted in relatively accessible regions with adequate infrastructure. Limited research has specifically examined MGMP implementation in geographically challenging areas where transportation

constraints, dispersed schools, and limited internet connectivity may significantly influence teacher participation. This gap is particularly relevant in districts such as Indragiri Hilir, where schools are spread across coastal and remote areas. In such contexts, geographical barriers, transportation costs, and limited digital access may affect both the continuity and quality of MGMP activities.

Considering these contextual challenges, examining MGMP effectiveness through a phenomenological approach becomes essential. A phenomenological perspective allows researchers to explore teachers' lived experiences, perceptions, and meanings attached to MGMP participation, rather than merely measuring outcomes quantitatively. Understanding how teachers interpret and experience MGMP activities provides deeper insight into its actual contribution to instructional performance within specific local conditions.

Therefore, this study aims to: (1) analyze and describe the implementation of MGMP activities for science teachers in Indragiri Hilir District; (2) identify and analyze the challenges faced by science teachers in participating in MGMP; and (3) examine the contribution of MGMP to improving the instructional performance of science teachers in the district.

2. Methodology

This study employed a qualitative research design using a phenomenological approach to explore science teachers' lived experiences in participating in Musyawarah Guru Mata Pelajaran (MGMP) and its contribution to their instructional performance. The phenomenological design was selected to capture participants' perceptions, meanings, and interpretations regarding MGMP implementation within their specific educational context (Moleong, 2017; Sugiyono, 2019, 2022). The analysis began with bracketing, in which the researchers consciously set aside personal assumptions and prior experiences related to MGMP implementation. Interview transcripts were then subjected to horizonalization, where significant statements relevant to participants' experiences were identified and treated with equal value.

These statements were subsequently grouped into meaning units and clustered into broader themes representing common patterns across participants' experiences. Finally, textual and structural descriptions were developed to capture both what participants experienced and how they experienced the phenomenon, leading to the construction of an essential description of MGMP implementation, challenges, and contributions to teaching performance. The study was conducted in three public junior high schools (SMPN) in Indragiri Hilir District, Indonesia, from October 2024 to January 2025. The district was chosen due to its geographically dispersed school locations and infrastructural challenges that potentially influence teachers' participation in professional development programs.

Participants were selected using purposive sampling based on their active involvement in MGMP activities and their experience in science education. A total

of ten informants participated in the study, consisting of three school principals, six science teachers, and one district-level MGMP coordinator. The inclusion of these participant groups enabled the study to capture multiple perspectives regarding the implementation, challenges, and contributions of MGMP in improving science teachers' teaching performance. Data collection continued until thematic saturation was achieved, as indicated by the recurrence of similar patterns and the absence of substantially new information across interviews.

The researcher served as the primary research instrument, supported by structured observation guides, interview protocols, and document analysis checklists. The observation guide focused on MGMP implementation processes, teacher participation patterns, and classroom instructional practices linked to MGMP discussions. The interview protocol covered themes such as experiences in MGMP participation, perceived challenges, institutional support, and changes in instructional practices. Document analysis included MGMP work programs, attendance lists, training materials, lesson plans, supervision reports, and school strategic documents.

Data were collected through non-participant observations, structured in-depth interviews, and document analysis. Observations were conducted during MGMP meetings and selected classroom sessions to identify connections between MGMP discussions and instructional practices. Interviews were conducted face-to-face, lasted approximately 45–60 minutes, and were audio-recorded and transcribed verbatim. Documents were analyzed to triangulate and validate information obtained from observations and interviews.

Data analysis followed Creswell's (2018) qualitative procedure and was conducted iteratively. The process included organizing and transcribing data, reading all transcripts to gain a comprehensive understanding, coding significant statements, grouping codes into categories, and developing overarching themes. In line with phenomenological analysis (Sukoharsono, 2017), the study produced textural descriptions (what participants experienced) and structural descriptions (how they experienced it), which were synthesized to construct the essence of MGMP effectiveness in improving instructional performance.

To ensure trustworthiness, the study applied credibility, transferability, dependability, and confirmability criteria (Sugiyono, 2022). Credibility was established through triangulation of data sources (principals, teachers, MGMP facilitators) and methods (observation, interviews, and documents). Detailed contextual descriptions were provided to support transferability. The research process was systematically documented to ensure dependability, and findings were grounded in empirical data to maintain confirmability and minimize researcher bias.

3. Results and Discussion

The findings of this study were generated through in-depth interviews with key informants directly involved in MGMP activities, supported by document analysis

and field observations. The research was conducted in three public junior high schools in Indragiri Hilir Regency: SMPN Satu Atap Kuala Sebatu, SMP Negeri 1 Batang Tuaka, and SMP Negeri 1 Tembilahan. These sites were intentionally selected to represent varying geographical conditions, access levels, and institutional contexts, enabling a more comprehensive understanding of MGMP effectiveness across different school environments.

Implementation of MGMP IPA in Indragiri Hilir Regency

The implementation of MGMP IPA in Indragiri Hilir reflects a structured professional forum designed to facilitate coordination, curriculum alignment, and instructional sharing among science teachers. However, the findings reveal five dominant patterns shaping its implementation: (1) centralized planning with limited member participation, (2) hybrid delivery (face-to-face and online), (3) varying intensity across regions, (4) a strong focus on curriculum and teaching instruments, and (5) institutional support that remains largely administrative rather than infrastructural.

Centralized Planning and Limited Member Participation

Planning mechanisms remain predominantly top-down, with most programs formulated at the district level by core MGMP administrators. Teachers, particularly those from remote schools, are more often positioned as recipients rather than co-designers of programs. A principal from a remote school explained: "Perencanaan kegiatan MGMP IPA masih bersifat terpusat di tingkat kabupaten dan belum sepenuhnya mempertimbangkan kondisi sekolah terpencil. Guru IPA di sekolah kami cenderung hanya menerima program yang sudah ditetapkan tanpa dilibatkan secara aktif." (KS-KSB-01). Similarly, a teacher noted: "*Program biasanya sudah disusun oleh pengurus. Kami diberi kesempatan menyampaikan usulan, tetapi agenda tetap dirangkum dan ditetapkan oleh pengurus kabupaten*." (GIPA-BTU-01) Although there is nominal space for input through meetings or communication groups, final decision-making authority remains centralized. This structural pattern limits distributed ownership and weakens the participatory character expected in collaborative professional forums.

Hybrid Implementation Model

MGMP activities are implemented through a hybrid model combining face-to-face and online sessions. For geographically distant schools, the online format provides critical access. A teacher from a remote school stated: "*Pelaksanaan daring sangat membantu karena jarak ke pusat kabupaten cukup jauh dan memerlukan biaya transportasi yang tidak sedikit*." (GIPA-KSB-02). However, unstable internet connectivity and transportation constraints continue to affect participation consistency. While the hybrid model increases flexibility, access remains uneven across regions, reinforcing disparities in engagement.

Variations in Implementation Intensity

The frequency and regularity of MGMP participation vary significantly across schools. Schools located near district centers tend to participate more consistently, while remote schools engage situationally depending on transportation, workload, and scheduling feasibility. A principal observed: "*Pelaksanaan MGMP dilakukan rutin, tetapi kehadiran guru sangat dipengaruhi jarak dan kondisi lapangan*." (KS-TBH-02). Thus, implementation intensity is not uniform but shaped by contextual constraints, affecting continuity and sustained professional learning.

Dominance of Curriculum and Teaching Instruments

MGMP discussions are strongly centered on curriculum implementation, particularly the Merdeka Curriculum, and the preparation of teaching instruments such as modules, lesson plans, and assessments. As one principal described: "*Kegiatan MGMP lebih banyak berupa diskusi penerapan Kurikulum Merdeka dan penyusunan perangkat ajar*." (KS-BTU-03). Teachers similarly emphasized that sessions are predominantly technical and practice-oriented. While this focus directly supports classroom needs, deeper professional development activities, such as research-based inquiry or intensive workshops, remain limited and largely dependent on external programs.

Institutional Support: Administrative but Not Structural

Schools and district authorities provide formal support in the form of permissions, scheduling adjustments, and policy directives. However, infrastructural support, transport funding, stable internet access, and operational resources, remains uneven. A principal from a remote school noted: "*Dukungan administratif sudah ada, tetapi fasilitasi transportasi dan akses digital masih sangat dibutuhkan*." (KS-KSB-04) Consequently, although MGMP is institutionally acknowledged, its operational sustainability is constrained by infrastructural disparities. Schools located farther from activity centers experience greater difficulty maintaining consistent engagement.

The findings indicate that the implementation of MGMP IPA in Indragiri Hilir reflects a structured yet uneven professional development mechanism. Although MGMP is formally established as a collaborative forum, its planning structure remains predominantly centralized at the district level. Teachers, particularly those from remote schools, are positioned more as program recipients than active co-designers of professional learning agendas. From a *Community of Practice* perspective (Wenger, 1998), effective professional communities require shared ownership and mutual engagement in defining learning goals. The limited participatory role of teachers in planning suggests that MGMP in this context has not fully realized the principle of distributed agency that characterizes mature professional communities.

The hybrid implementation model (face-to-face and online) demonstrates institutional adaptability in addressing geographical constraints. This aligns with

the flexibility principle of *Professional Learning Communities* (Hord & Shirley, 1997), where collaborative learning structures adapt to contextual needs. However, unstable internet connectivity and unequal infrastructural support reduce the inclusivity of the hybrid approach. Rather than eliminating access disparities, digital delivery partially reproduces structural inequities in different forms. This finding suggests that technological integration alone is insufficient without equitable infrastructural readiness.

Variation in participation intensity across regions further reveals contextual disparities. Schools located near activity centers tend to demonstrate more consistent engagement, while remote schools participate situationally. According to DuFour (2006), sustained improvement within professional learning communities depends on regular interaction and collective inquiry. Irregular participation weakens the continuity of shared learning and limits cumulative professional growth. Therefore, frequency and consistency are not merely administrative concerns but critical determinants of MGMP effectiveness.

The dominant focus of MGMP activities on curriculum implementation, particularly the Merdeka Curriculum, and teaching instrument preparation reflects responsiveness to immediate instructional demands. This technical orientation strengthens teachers' procedural competence. However, the limited emphasis on deeper reflective practices, action research, or systematic instructional inquiry indicates that MGMP remains largely practice-oriented rather than inquiry-driven. Wenger (1998) emphasizes that communities of practice evolve through joint enterprise and knowledge co-construction; thus, expanding MGMP activities beyond technical alignment toward reflective and research-based dialogue may enhance its transformative capacity.

Institutional support from principals and the district office is evident in administrative facilitation, including scheduling adjustments and formal permissions. Nevertheless, infrastructural support, transportation funding, digital access, and operational resources, remains uneven. This imbalance reflects a structural gap between policy endorsement and resource provision. As previous research suggests (Fatmawati et al., 2020; D. Rohimat et al., 2025), leadership support and sustained participation significantly influence MGMP effectiveness. The present findings extend this understanding by highlighting how geographical and infrastructural disparities moderate that effectiveness, particularly in peripheral regions.

Overall, MGMP implementation in Indragiri Hilir demonstrates institutional commitment and pedagogical relevance but remains constrained by centralized planning patterns and unequal infrastructural access. While it functions as a professional coordination mechanism, its potential as a fully participatory and transformative professional learning community is not yet optimally realized. Strengthening participatory planning, ensuring infrastructural equity, and expanding reflective dimensions of practice may enhance its sustainability and impact across diverse school contexts.

Constraints Faced by Science Teachers in Participating in MGMP

Although MGMP IPA is institutionally recognized as a professional development forum, its implementation is constrained by structural and contextual barriers. Five major constraints emerged from the data: (1) geographical and transportation barriers, (2) unstable internet connectivity, (3) high teacher workload, (4) coordination and scheduling issues, and (5) fluctuating motivation under contextual pressure. These factors collectively shape the level and consistency of teacher participation.

Geographical and Transportation Barriers

Distance, travel time, and transportation costs represent the most persistent obstacles, particularly for teachers in remote schools. A principal from a one-roof school emphasized: "*Kendala utama yang dihadapi guru IPA adalah jarak, kondisi geografis, serta beban kerja yang tinggi. Kondisi ini menyebabkan guru tidak dapat mengikuti MGMP secara konsisten*." (KS-KSB-06). Similarly, another principal stated: "*Faktor jarak dan transportasi menjadi hambatan utama, terutama bagi sekolah yang cukup jauh dari pusat kegiatan MGMP*." (KS-BTU-06)
These statements indicate that physical accessibility significantly affects participation consistency. Teachers in geographically distant schools must allocate additional time and financial resources, often making attendance situational rather than routine.

Internet Connectivity Constraints

While the hybrid model aims to address geographical barriers, unstable internet connectivity limits the effectiveness of online sessions. A teacher explained: *"Fasilitas saat kegiatan daring terkadang kurang optimal karena jaringan internet tidak selalu stabil."* (GIPA-BTU-06). Another teacher from a remote school added: "*Keterbatasan jaringan internet menjadi kendala saat mengikuti kegiatan daring*." (GIPA-KSB-06). Thus, the shift toward digital delivery does not fully resolve access inequities. Instead, digital infrastructure gaps reproduce participation disparities in a different form.

High Workload and Administrative Burden

Teachers reported that heavy administrative responsibilities and, in some cases, teaching multiple subjects reduce their capacity to engage consistently in MGMP activities. As noted by a principal: "*Beban administrasi guru juga mempengaruhi kehadiran mereka dalam kegiatan MGMP."* (KS-TBH-06). This highlights a structural tension between professional development expectations and institutional workload demands. Even when teachers recognize the value of MGMP, competing responsibilities often take precedence.

Coordination and Short-Notice Scheduling

Coordination and communication issues further complicate participation. Information about MGMP activities is frequently delivered close to the implementation date, limiting teachers' ability to reorganize teaching schedules. A teacher remarked: "*Informasi kegiatan disampaikan mendekati waktu pelaksanaan, sehingga kami sulit mengatur jadwal mengajar*." (GIPA-BTU-08) A principal similarly noted: "*Informasi jadwal terkadang mendadak dan belum sepenuhnya mempertimbangkan kondisi sekolah terpencil*." (KS-KSB-08). These coordination gaps reduce the effectiveness of MGMP as a structured professional learning mechanism and contribute to irregular participation patterns.

Sustained but Contextually Fluctuating Motivation

Despite these constraints, teachers consistently expressed strong intrinsic motivation to participate. One teacher stated: "*Motivasi saya mengikuti MGMP cukup tinggi karena kegiatan ini membantu dalam pembelajaran IPA*." (GIPA-TBH-07). However, motivation is not immune to contextual pressures. As another teacher explained: "*Ketika beban kerja cukup banyak, terkadang kami harus memilih prioritas*." (GIPA-BTU-07). These findings reveal a paradox: professional commitment remains strong, yet structural barriers limit sustained engagement. Teachers perceive MGMP as essential for competency development, but participation stability depends heavily on infrastructural support and workload balance.

Overall, the constraints faced by science teachers in Indragiri Hilir are not primarily motivational but structural. Geographical distance, limited infrastructure, administrative burden, and coordination inefficiencies collectively shape uneven participation. While teachers demonstrate high professional awareness and commitment, institutional and systemic improvements, particularly in infrastructure, scheduling management, and workload regulation, are necessary to enhance the sustainability and equity of MGMP participation. The findings indicate that constraints in MGMP participation are largely structural rather than motivational. Geographical distance, transportation costs, unstable internet access, heavy workload, and coordination issues collectively shape uneven engagement among science teachers in Indragiri Hilir.

Geographical and transportation barriers remain the most dominant obstacles, particularly for teachers in remote schools. Long travel distances, extended travel time, and additional financial burdens make participation situational rather than routine. From a *Professional Learning Community* perspective (DuFour, 2004), sustained collaboration requires regular and consistent interaction. When attendance is dependent on logistical feasibility, the continuity necessary for cumulative professional learning becomes weakened. Although the hybrid model was introduced to address distance constraints, digital inequality presents a new layer of limitation. Unstable internet connectivity in remote areas reduces the effectiveness of online sessions and limits meaningful engagement. This suggests that technological adaptation alone is insufficient without equitable infrastructural

readiness. Access disparities continue to influence participation consistency and depth of involvement.

High administrative workload and, in some cases, teachers' dual teaching responsibilities further restrict their capacity to engage in MGMP activities. Excessive professional demands reduce the time and energy available for collaborative learning. In Wenger's (1998) *Community of Practice* framework, mutual engagement requires sustained participation and shared investment. Structural workload pressures therefore constrain the development of a fully functioning professional learning community. Coordination and scheduling issues also contribute to irregular participation. Information about MGMP activities is sometimes delivered close to implementation dates, limiting teachers' ability to reorganize teaching schedules and administrative responsibilities. Such short-notice communication reinforces reactive participation rather than structured and well-prepared professional engagement.

Despite these constraints, teachers demonstrate strong intrinsic motivation to participate in MGMP because they recognize its importance for improving instructional competence. However, this motivation fluctuates under contextual pressures, particularly when workload and logistical challenges intensify. This reveals a professional paradox: while commitment remains high, systemic and infrastructural barriers moderate sustained engagement. Overall, the constraints identified in this study highlight that improving MGMP effectiveness requires structural interventions rather than motivational reinforcement. Strengthening infrastructural support, improving scheduling coordination, and managing teacher workload are essential steps to ensure more equitable and sustainable participation within MGMP as a professional learning community.

Contribution of MGMP to Improving Science Teachers' Teaching Performance

This section examines how MGMP contributes to improving science teachers' instructional performance. Although various structural constraints exist, the findings indicate that MGMP plays a meaningful role in strengthening pedagogical competence, encouraging contextual innovation, supporting Merdeka Curriculum implementation, gradually improving instructional quality, and being perceived as a strategic professional development platform.

Improvement of Pedagogical and Professional Competence (Uneven Impact)

MGMP contributes positively to teachers' pedagogical and professional development, particularly in lesson planning, instructional strategies, and assessment design. A principal noted: "*MGMP memberikan dampak positif terhadap peningkatan kompetensi pedagogik dan profesional guru IPA, terutama dalam perencanaan pembelajaran dan pengembangan asesmen."* (KS-TBH-11)
Similarly, a teacher stated: "*MGMP membantu meningkatkan kompetensi saya dalam penyusunan perangkat ajar dan pemilihan metode pembelajaran*." (GIPA-TBH-11)

However, the impact is not evenly distributed. Participation intensity significantly influences outcomes. As another principal explained: "*Peningkatan tersebut masih belum merata karena intensitas keikutsertaan guru yang berbeda-beda."* (KS-BTU-11). Teachers who attend consistently report clearer improvements in instructional readiness, while those with irregular participation experience more limited benefits. Thus, MGMP has strong developmental potential, but its effectiveness depends heavily on sustained engagement.

Contribution to Contextual and Practical Innovation

MGMP encourages the development of contextual and feasible instructional innovations, especially in schools with limited facilities. A principal observed: "*MGMP membantu guru mengenal metode pembelajaran IPA yang lebih kontekstual dan sederhana, sehingga dapat diterapkan di sekolah dengan sarana terbatas*." (KS-KSB-12). Teachers reported experimenting with group discussions, simple project-based learning, and environment-based learning strategies. One teacher explained: "*Saya mendapatkan ide pembelajaran berbasis proyek sederhana dan penggunaan media yang mudah dijangkau."* (GIPA-BTU-12). Rather than promoting highly sophisticated innovations, MGMP fosters adaptable and context-sensitive practices. This practical orientation increases applicability, especially in resource-constrained settings.

Strengthening the Implementation of the Merdeka Curriculum

MGMP plays a critical role in assisting teachers' understanding of the Merdeka Curriculum, particularly in differentiated instruction and diagnostic assessment. A principal emphasized: "*MGMP sangat membantu guru dalam memahami Kurikulum Merdeka, terutama pembelajaran berdiferensiasi dan asesmen diagnostik*." (KS-KSB-13). Teachers similarly acknowledged that discussions within MGMP increase their confidence in applying curriculum principles: "*Diskusi dengan sesama guru membuat saya lebih yakin menerapkan Kurikulum Merdeka di kelas."* (GIPA-TBH-13). However, implementation remains gradual and requires continuous mentoring. MGMP provides conceptual clarity and peer support, but classroom adaptation still depends on local resources and teacher readiness.

Gradual Improvement of Instructional Quality

Changes in teaching performance do not occur instantly but evolve progressively. Several principals observed visible improvements in planning and instructional variety. For example: "*Terdapat perubahan positif dalam variasi metode mengajar dan penyesuaian perangkat ajar, meskipun berlangsung secara bertahap*." (KS-BTU-14). Teachers also noted increased student engagement: "*Siswa terlihat lebih aktif dibandingkan sebelumnya*." (GIPA-TBH-14). Observation data support these claims, particularly in lesson plans (RPP/modul ajar) and supervisory reports that reflect better-structured planning and more diverse instructional strategies. Nevertheless, consistency across teachers remains uneven, indicating that MGMP functions as a catalyst rather than an immediate transformer of practice.

MGMP as a Strategic Professional Learning Platform

Beyond technical contributions, MGMP is widely perceived as a strategic professional learning space. A principal from a remote school stated: "*MGMP menjadi jembatan utama untuk mengakses informasi dan meningkatkan profesionalisme guru*." (KS-KSB-15). Teachers echoed this view: "*MGMP adalah wadah penting untuk belajar bersama dan memperbaiki pembelajaran secara bertahap*." (GIPA-TBH-15). This perception highlights MGMP's role not merely as an administrative forum but as a collaborative environment that supports reflection, collegial learning, and sustained professional growth. Even when implementation challenges exist, teachers regard MGMP as an essential mechanism for maintaining professional standards. Overall, MGMP contributes positively to the improvement of science teachers' instructional performance in Indragiri Hilir. Its most visible impacts are found in strengthened pedagogical competence, contextual instructional innovation, and enhanced understanding of the Merdeka Curriculum. However, the magnitude of impact varies depending on participation intensity, infrastructural access, and institutional support. Improvements in teaching quality occur progressively rather than instantaneously, suggesting that MGMP functions as a sustained professional learning mechanism rather than a short-term intervention.

The findings indicate that MGMP contributes positively to improving science teachers' instructional performance in Indragiri Hilir, although the impact varies depending on participation intensity and school context. MGMP functions as a professional learning platform that strengthens pedagogical and professional competence, particularly in lesson planning, instructional strategy selection, development of teaching instruments, and understanding of the Merdeka Curriculum. Through collaborative discussions, teachers gain updated knowledge, exchange practical experiences, and align their instructional approaches with current educational policies.

However, the benefits of MGMP are not distributed evenly. Teachers who participate more consistently demonstrate clearer improvements in instructional readiness and classroom implementation, while those with limited participation, often due to geographical and logistical constraints, experience more modest gains. This confirms that sustained engagement is a key determinant of professional growth, consistent with the *Community of Practice* framework (Wenger, 1998), which emphasizes ongoing mutual engagement as the foundation of collective learning. MGMP also contributes to the development of contextual and practical instructional innovation. Teachers, particularly in resource-limited schools, report adopting simpler and more adaptable strategies, including environment-based learning and context-sensitive approaches. Rather than promoting highly technical innovation, MGMP encourages feasible practices aligned with local realities. This aligns with findings by Makarim et al. (2025), who highlight the role of collaborative professional communities in strengthening pedagogical competence even under infrastructural constraints.

In addition, MGMP plays a strategic role in supporting the implementation of the Merdeka Curriculum. Teachers gain clearer understanding of differentiated instruction, diagnostic assessment, and modular lesson design. However, effective classroom application still requires continued mentoring and institutional support. This suggests that MGMP provides conceptual and collaborative reinforcement, but sustained impact depends on structured follow-up and contextual adaptation. Improvements in instructional quality are also reported to occur gradually rather than instantaneously. Teachers note better lesson planning, more varied instructional methods, and increased student engagement, yet these changes develop progressively and depend on experience and consistency. This pattern reflects the nature of professional learning communities as long-term developmental processes rather than short-term interventions (DuFour, R., et al., 2006).

Furthermore, teachers widely perceive MGMP as a strategic space for reflection, collaboration, and continuous professional growth. This perception reinforces its function as a professional learning community, consistent with Harlita and Ramadan (2024), who emphasize that collaborative forums strengthen teaching quality through shared reflection and dialogue. Overall, MGMP demonstrates meaningful contributions to improving science teachers' instructional performance in Indragiri Hilir. Its impact is most evident in strengthened pedagogical competence, contextual innovation, and curriculum alignment. However, the magnitude and sustainability of its influence depend on participation consistency, infrastructural support, and systematic follow-up mechanisms. Strengthening these aspects will enable MGMP to function more optimally as a transformative professional learning community. To provide a more systematic understanding of the relationships among the themes identified in this study, a thematic map was developed based on the results of the interviews, observations, and document analysis. The thematic map synthesizes how MGMP implementation, contextual challenges, and professional outcomes interact in shaping the effectiveness of MGMP activities for science teachers, as seen ini Figure 1.

Figure 1 illustrates the thematic relationships emerging from the study. The findings indicate that MGMP implementation serves as the central mechanism supporting teacher professional development through curriculum discussions, collaborative learning, and professional exchange. However, the effectiveness of these activities is influenced by contextual challenges, including geographical distance, transportation barriers, internet limitations, administrative workload, and scheduling constraints. Despite these challenges, teachers demonstrate strong professional commitment and continue to participate in MGMP through adaptive strategies such as self-directed learning, peer collaboration, and flexible engagement in both online and face-to-face activities. These adaptive responses contribute to improvements in pedagogical competence, professional competence, curriculum implementation, instructional innovation, and overall teaching performance.

The thematic map suggests that MGMP effectiveness should not be viewed as a direct outcome of program participation alone. Instead, it emerges from the

interaction between institutional support, contextual conditions, and teachers' adaptive capacities. This finding provides the basis for the subsequent discussion regarding the role of MGMP as a context-dependent professional learning community in geographically constrained educational settings. Beyond participants' perceptions, documentary evidence and classroom observations indicate several concrete changes in teaching practices following MGMP participation.

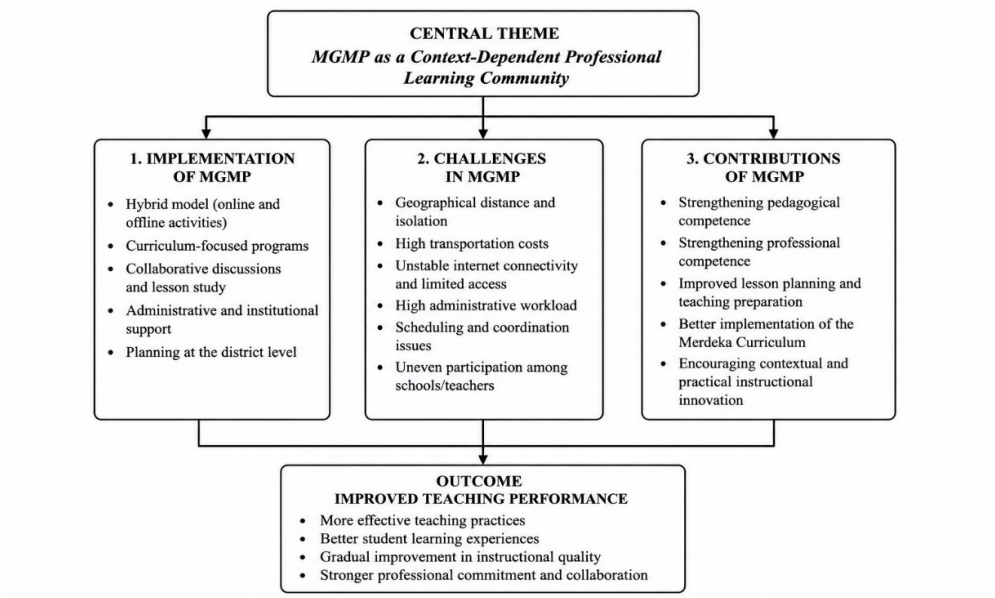


Figure 1. Thematic Map of MGMP Effectiveness in Geographically Constrained Educational Contexts

Teachers demonstrated improvements in lesson planning through the development of more structured teaching modules aligned with the Merdeka Curriculum. Classroom observations also revealed greater use of discussion-based learning, project-oriented activities, contextual examples drawn from local environments, and more systematic assessment practices. In several schools, supervisory records documented improvements in instructional preparation and classroom management, suggesting that the influence of MGMP extends beyond professional perceptions and can be observed in everyday teaching practices. Unlike previous studies that predominantly portray MGMP as a uniformly beneficial professional development mechanism, this study demonstrates that MGMP effectiveness is highly dependent on contextual conditions. The findings suggest that professional learning outcomes emerge not simply from participation itself, but from teachers' adaptive responses to geographical, infrastructural, and organizational constraints. This highlights the importance of viewing MGMP as a context-sensitive professional learning community rather than a universally transferable model.

4. Conclusion

This study concludes that MGMP IPA plays an important role in improving science teachers' instructional performance by strengthening pedagogical and professional

competencies, supporting the implementation of the Merdeka Curriculum, and encouraging contextual instructional innovation. However, the effectiveness of MGMP is not experienced uniformly across schools. Geographical distance, transportation constraints, limited internet access, administrative workload, and scheduling challenges continue to influence teachers' participation and the extent to which MGMP outcomes can be translated into classroom practice. Despite these constraints, teachers demonstrate strong professional commitment and continue to view MGMP as a valuable forum for collaborative learning and professional growth.

Theoretically, this study contributes to the literature on teacher professional development by demonstrating that MGMP effectiveness should not be understood as a linear consequence of participation. Instead, the findings suggest that MGMP operates as a context-dependent professional learning mechanism whose outcomes are shaped by the interaction between institutional support, contextual challenges, and teachers' adaptive capacities. This perspective extends existing discussions on professional learning communities by highlighting the importance of geographical and organizational contexts in influencing professional development outcomes. Practically, the findings imply that strengthening MGMP in geographically dispersed regions requires more than simply increasing program availability. Efforts should focus on improving digital infrastructure, providing transportation and logistical support, implementing more flexible scheduling, and promoting participatory planning that accommodates local conditions. Such measures are essential for ensuring equitable access to professional learning opportunities and maximizing the contribution of MGMP to sustainable improvements in teaching quality. This study has several limitations. The research was conducted in a limited number of schools within one regency, which may restrict the transferability of the findings to other contexts. In addition, the study relied primarily on participants' experiences and perceptions, although supported by observations and document analysis. Future research may involve broader geographical settings, comparative analyses across regions, or mixed-methods approaches to further examine the relationship between MGMP participation and measurable improvements in teaching performance.

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