



Empowering Cross-Subject Professional Learning Communities as a Solution for Equitable Teaching Quality Improvement

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Abstract:

This community engagement study aimed to empower a Cross-Subject Professional Learning Community (PLC) as a sustainable strategy for improving equitable teaching quality through collaborative professional development. The program employed a Participatory Action Research (PAR) design integrated with the Participatory Learning and Action (PLA) approach. The intervention was implemented through four iterative stages: planning, action, observation, and reflection. Data were collected using participatory observation, focus group discussions, document analysis, and reflective documentation, and were analyzed using an interactive qualitative approach involving data reduction, data display, and conclusion drawing. The findings indicate that the program successfully strengthened interdisciplinary teacher collaboration, facilitated the collaborative development of integrated teaching modules, enhanced teachers' social-emotional competence through reflective practice, and fostered a sustainable culture of collegial learning. The integration of PAR and PLA encouraged teachers to become active participants in identifying instructional challenges and generating collaborative solutions, thereby supporting more equitable teaching quality across subject areas. This study implies that community-based professional learning provides an effective and sustainable model for teacher empowerment and may serve as a practical reference for schools seeking to strengthen collaborative instructional improvement.

INTRODUCTION

Teacher quality is a key determinant of educational effectiveness and equitable learning opportunities. Nevertheless, disparities in teaching quality remain a persistent challenge because teachers often work within isolated subject departments, limiting opportunities for collaboration and professional learning. As education increasingly emphasizes interdisciplinary learning, student-centered instruction, and competency-based curricula, collaborative professional development has become essential. Professional Learning Communities (PLCs) have been recognized as an effective strategy for fostering continuous teacher learning, collective efficacy, and sustainable instructional improvement through shared professional responsibility (Christensen & Jerrim, 2025; Wang & Fan, 2025).

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Likewise, interdisciplinary collaboration enables teachers to integrate diverse pedagogical perspectives, resulting in more coherent learning experiences and improved instructional practices (Butler & Burgin, 2024; Lin et al., 2025). Therefore, empowering collaborative teacher communities is crucial for promoting equitable teaching quality and strengthening educational outcomes.

Despite these benefits, many schools continue to experience uneven teaching quality because professional development remains fragmented and largely confined to subject-based groups. Teachers often participate in individual training without sustained collaboration, reducing opportunities to exchange innovative teaching strategies or solve instructional problems collectively. Such conditions limit curriculum integration and continuous professional growth. Previous studies have shown that Professional Learning Communities improve teacher competence, instructional innovation, and organizational learning, although their sustainability depends on institutional support and collaborative leadership (Geletu & Mihiretie, 2023; Khasawneh et al., 2023). Furthermore, integrating social-emotional competence into professional development enhances classroom management, teacher well-being, and student engagement, making it an essential component of effective teacher empowerment (Gimbert et al., 2023; Pozo-Rico et al., 2023). These findings indicate the need for collaborative and sustainable professional learning models.

This challenge was also identified among teachers participating in a Cross-Subject Professional Learning Community. Initial observations revealed limited interdisciplinary collaboration, inconsistent instructional practices, and difficulties in developing integrated learning activities. Teachers also reported limited opportunities to reflect collectively on classroom experiences and share effective pedagogical strategies. To address these issues, this community engagement program implemented Participatory Action Research (PAR) integrated with the Participatory Learning and Action (PLA) approach. The program positioned teachers as active participants in identifying instructional challenges, designing collaborative solutions, implementing integrated teaching modules, and reflecting on their professional practices. By strengthening interdisciplinary collaboration and continuous collegial learning, the program sought to establish a sustainable Professional Learning Community capable of promoting more equitable teaching quality across different subject areas.

Although numerous studies have highlighted the benefits of Professional Learning Communities and interdisciplinary teacher collaboration, most have focused on formal teacher education, institutional policy, or school-based professional development without integrating participatory community empowerment into the improvement process. Existing research has demonstrated that collaborative curriculum design, co-teaching, and interdisciplinary learning promote instructional innovation and strengthen teachers' professional competence (Butler & Burgin, 2024; Wang, 2024). Likewise, studies on collaborative curriculum development emphasize that sustained interaction among teachers improves curriculum coherence and pedagogical quality (Lin et al., 2025; Zeivots et al., 2024). However, these studies primarily examine collaborative practices as educational strategies rather than as community empowerment initiatives. Consequently, limited attention has been given to how

teachers can collectively identify instructional challenges, implement collaborative actions, and sustain professional learning through participatory approaches that position educators as active agents of educational change.

Another important research gap concerns the limited integration of Professional Learning Communities, interdisciplinary collaboration, and teachers' social-emotional competence within a single participatory framework. Previous studies have independently reported the positive effects of collaborative professional learning on teacher performance (Dumandan & Paglinawan, 2025) and the importance of social-emotional competence in supporting effective teaching and classroom well-being (Gimbert et al., 2023). Nevertheless, few community engagement programs have combined these components using the Participatory Action Research approach to address disparities in teaching quality across different subject areas. This study addresses that gap by integrating collaborative lesson design, peer learning, reflective practice, and social-emotional development into a sustainable Cross-Subject Professional Learning Community. The integration provides a practical model that simultaneously strengthens teacher collaboration, professional competence, and equitable instructional quality within schools.

Based on these considerations, this community engagement program aims to empower a Cross-Subject Professional Learning Community as a sustainable strategy for improving equitable teaching quality among teachers. Specifically, the program seeks to strengthen interdisciplinary collaboration, facilitate the collaborative development of integrated teaching modules, enhance teachers' professional and social-emotional competencies through reflective practice, and establish a sustainable culture of collegial learning using the Participatory Action Research framework. The scope of the program is limited to teachers participating in the Cross-Subject Professional Learning Community in Malang, Indonesia, while its broader contribution lies in offering a replicable community-based professional development model for schools facing similar instructional disparities. By integrating Participatory Action Research (PAR), Participatory Learning and Action (PLA), and interdisciplinary Professional Learning Communities, this study contributes both theoretically and practically to the development of collaborative teacher empowerment models that support sustainable educational improvement.

RESEARCH METHODS

This community engagement study employed a qualitative Participatory Action Research (PAR) design integrated with the Participatory Learning and Action (PLA) approach. PAR was selected because it positions participants as active co-researchers in identifying educational challenges, planning interventions, implementing actions, and reflecting on outcomes, supporting professional learning and collective problem-solving (Kulaibi & Alamodi, 2025; Mardi et al., 2026). PLA strengthened participation through collaborative learning, dialogue, and shared decision-making throughout the program. The implementation followed four iterative PAR stages: planning, action, observation, and reflection, enabling continuous improvement during the intervention. This iterative process is also consistent with action research within Professional

Learning Communities (PLCs), which emphasizes identifying problems, implementing actions, and evaluating practices collectively (Bondurant, 2024; Nehez, 2023). The design was appropriate because the program aimed not only to transfer knowledge but also to facilitate interdisciplinary professional development through collaborative learning and collegial engagement.

The program was conducted in Malang, East Java, Indonesia, involving teachers from various schools participating in a Cross-Subject Professional Learning Community. Participants were selected using purposive sampling to ensure representation from Mathematics, Natural Sciences, Social Sciences, Languages, and other subject areas. This heterogeneous composition was intentionally established to facilitate interdisciplinary knowledge exchange, collaborative curriculum development, and peer learning. Such collaboration is relevant to Haukås (2025), who examined teacher collaboration across language subjects, and De Souza et al. (2025), who demonstrated how communities of practice can support integrated educational practices. Throughout the intervention, participants engaged in collaborative workshops, focus group discussions, curriculum mapping, collaborative lesson design, microteaching, peer feedback, and reflective discussions. Microteaching and peer feedback were incorporated because previous studies have demonstrated their relevance to pedagogical development and teacher learning (Amrullah et al., 2025; Jacobsen et al., 2025). Reflective activities also addressed teachers' social-emotional competence.

Data were collected through participatory observations, focus group discussions, document analysis, and visual documentation generated throughout the PAR stages. Observation sheets recorded participant engagement and collaborative interactions, while teaching modules, lesson plans, curriculum maps, and reflective notes provided documentary evidence of professional learning outcomes. Multiple data sources were used to capture changes in teacher collaboration and interdisciplinary instructional development. The collected qualitative data were analyzed using an interactive analysis process comprising data reduction, data display, and conclusion drawing, with continuous verification throughout the analysis. Data triangulation across observations, documents, and participant reflections was applied to strengthen the credibility and trustworthiness of the findings. The analysis of collaborative instructional products was particularly useful for identifying changes in interdisciplinary curriculum development, consistent with research on integrated lesson planning and cross-curricular curriculum design (Nipyrakis et al., 2024; Park et al., 2024). This procedure enabled comprehensive examination of teacher collaboration, instructional development, and professional learning outcomes generated through the Cross-Subject PLC.

RESULTS AND DISCUSSION

Results

Cross-Subject PLC Formation

The planning stage of the Participatory Action Research (PAR) cycle resulted in the formation of a Cross-Subject Professional Learning Community (PLC). The process began with a needs assessment involving participating teachers

and the research team. The assessment identified challenges related to instructional practices, professional collaboration, and curriculum implementation.

The initial assessment showed that teacher collaboration had primarily occurred within subject-based departments. Opportunities for interaction and knowledge exchange across different subject areas were limited. Based on these findings, the participants agreed to establish a cross-subject collaborative platform involving teachers from Mathematics, Natural Sciences, Social Sciences, Languages, and other subject areas.

The formation process was conducted through a Focus Group Discussion (FGD) and orientation session. Teachers shared their classroom experiences, instructional challenges, professional development needs, and expectations for cross-subject collaboration. The participants jointly identified priority issues and agreed on mechanisms for collaborative activities, including joint curriculum planning, teaching-module development, peer feedback, and regular professional meetings.



Figure 1. Focus Group Discussion (FGD) and Orientation Session on Cross-Subject Teacher Collaboration

The planning activities and their initial outcomes are summarized in Table 1.

Table 1. Summary of Participatory Planning Activities and Initial Outcomes

PAR Stage	Main Activities	Expected Collaborative Outcomes
Planning	Needs assessment and identification of instructional challenges	Shared understanding of teaching quality disparities
Planning	Focus Group Discussion (FGD)	Collective identification of professional learning needs
Planning	Formation of the Cross-Subject PLC	Establishment of collaborative professional networks
Planning	Agreement on collaborative work mechanisms	Increased commitment toward sustainable teacher collaboration

The planning stage resulted in an established Cross-Subject PLC, agreement on collaborative mechanisms, and identification of priority areas for subsequent activities. The participating teachers were subsequently organized into cross-subject groups for collaborative module development.

Integrated Teaching Module Development

The action stage focused on the collaborative development of integrated teaching modules using the Participatory Learning and Action (PLA) approach. Teachers were organized into groups consisting of participants from different subject areas. Each group conducted curriculum mapping to identify related learning objectives, learning outcomes, instructional activities, and assessment components.

During the collaborative process, teachers discussed the connections between subject content and selected common learning objectives. The groups developed integrated lesson plans by combining relevant concepts, learning activities, instructional strategies, and assessment methods from different disciplines.

Teachers also exchanged examples of teaching practices and instructional materials during the module development process. Participants contributed according to their respective subject expertise, while other members provided suggestions and revisions. The process produced collaborative teaching modules that incorporated content and learning activities from multiple subject areas.

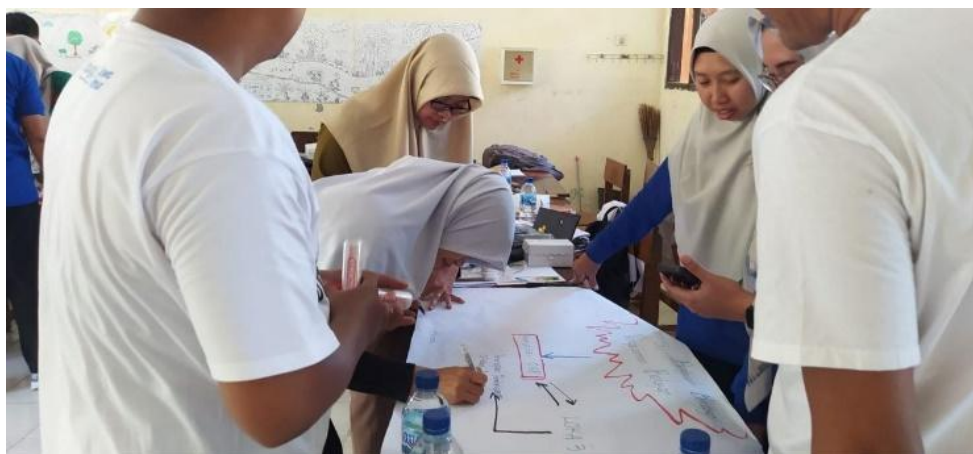


Figure 2. Collaborative Curriculum Mapping and Development of Cross-Subject Teaching Modules Using Visual Learning Sheets

Visual learning sheets were used during the curriculum mapping and module development activities. Teachers recorded learning objectives, subject connections, instructional activities, and assessment ideas on the sheets. The completed sheets were then discussed within each group and revised based on participants' input.

The module development stage resulted in a set of integrated instructional materials developed collectively by cross-subject teacher groups. The materials were prepared for subsequent microteaching and peer validation.

Microteaching and Peer Feedback

The observation stage focused on testing the collaboratively developed teaching modules through microteaching. Teachers implemented selected learning scenarios in front of their peers. Each participant demonstrated instructional activities based on the integrated modules developed during the previous stage.

During the microteaching sessions, participating teachers observed instructional delivery, classroom interaction, learning activities, use of teaching materials, and assessment procedures. After each presentation, peers provided feedback regarding the strengths and aspects requiring revision.



Figure 3. Peer Review and Validation of Cross-Subject Teaching Modules during the Microteaching Session

The peer-review process generated revisions to several components of the teaching modules. Teachers adjusted learning activities, instructional strategies, classroom interaction procedures, and assessment components based on the feedback received. The revised modules were prepared for potential classroom implementation.

Social-Emotional Reflection

The reflection stage included activities focusing on teachers' Social-Emotional Competence (SEC). Teachers reflected on their classroom experiences, communication with students, emotional responses, and strategies for creating supportive learning environments.

The reflection activity was conducted individually and collectively using interactive sticky notes. Teachers recorded experiences and responses related to self-awareness, emotional management, empathy, communication, and problem-solving during teaching. The notes were subsequently discussed as part of the collective reflection session.



Figure 4. Reflection on Teachers' Social-Emotional Competence (SEC) Using Interactive Sticky Notes

The observation and reflection stages produced several outcomes, as presented in Table 2.

Table 2. Main Outcomes of the Observation and Reflection Stages		
PAR Stage	Main Activity	Key Outcomes
Observation	Microteaching and peer feedback	Improved teaching strategies and collaborative evaluation
Observation	Teaching module validation	Revision of instructional materials before classroom implementation
Reflection	Social-emotional competence reflection	Increased teacher awareness of emotional management and student-centered instruction

The activities resulted in validated teaching modules and documented reflections concerning instructional practices and teachers' social-emotional experiences.

Dissemination and Sustainability

The final stage focused on disseminating the teaching modules and sharing the results of the collaborative activities. Each cross-subject group presented its integrated teaching module, described the development process, and shared experiences from the microteaching and reflection activities.

During the presentation session, teachers compared the instructional approaches developed by different groups and provided feedback on the materials and implementation strategies. Participants also discussed challenges encountered during collaborative planning, module development, and microteaching.



Figure 5. Dissemination of Collaborative Teaching Modules and Sharing of Best Practices among Teachers

The dissemination activity resulted in the documentation and presentation of integrated teaching modules developed by the participating groups. Teachers also identified follow-up activities for maintaining cross-subject collaboration, including regular collaborative meetings, continued sharing of instructional practices, and joint development of teaching materials.

Overall PAR Outcomes

The implementation of the PAR cycle produced outcomes across four interconnected stages: planning, action, observation, and reflection. The planning stage resulted in the establishment of the Cross-Subject PLC and the identification

of collaborative learning needs. The action stage produced integrated teaching modules through cross-subject curriculum mapping and collaborative development.

The observation stage involved microteaching, peer feedback, and module validation, resulting in revisions to instructional materials and teaching strategies. The reflection stage documented teachers' experiences related to classroom interaction, emotional management, communication, and student-centered instruction.

The final dissemination stage enabled participants to present the developed modules, exchange instructional practices, and establish follow-up mechanisms for continued collaboration. Overall, the PAR activities generated a structured sequence of collaborative teacher development activities involving needs assessment, PLC formation, integrated module development, microteaching, reflection, peer feedback, dissemination, and follow-up planning.

Discussion

The establishment of the Cross-Subject Professional Learning Community (PLC) indicates that participatory planning can effectively shift teacher collaboration from isolated subject-based interaction toward interdisciplinary professional learning. The finding is consistent with Pilotti et al. (2023), who demonstrated that interdepartmental PLCs can strengthen collaboration across professional boundaries. It also aligns with Bondurant (2024), who found that PLCs engaged in action research support incremental professional growth. However, the present study differs in that the PLC was established across multiple subject areas from the initial planning stage, rather than being developed within a single disciplinary context. This finding suggests that participatory needs assessment can serve as an entry point for constructing interdisciplinary professional networks. The contribution lies in demonstrating how teachers can collectively identify instructional disparities and determine collaborative mechanisms before intervention activities begin.

The participatory planning process also confirms the importance of positioning teachers as active participants in professional development. Through needs assessment, FGD, and collective decision-making, teachers identified their own instructional and professional learning priorities. This finding corresponds with Kulaibi and Alamodi (2025), who reported that participatory action research can support the professional practice development of teachers, and with Mardi et al. (2026), who emphasized PAR as a basis for active, reflective, and collaborative teacher development. Similarly, Lapidot-Lefler (2025) highlights the empowering potential of participatory approaches in teacher education. Nevertheless, the present study extends these findings by combining PAR with a cross-subject PLC rather than focusing primarily on teacher practice within a particular professional or contextual group. Its contribution is therefore the integration of participatory problem identification with the institutional formation of an interdisciplinary collaborative structure.

The development of integrated teaching modules demonstrates that cross-subject collaboration can move beyond professional dialogue toward concrete curriculum products. Teachers jointly mapped learning objectives, connected

disciplinary content, and developed integrated instructional activities. This result is consistent with De Souza et al. (2025), who found that communities of practice can support teachers in progressing from collaboration toward integrated STEAM understanding. It also corresponds with Haukås (2025), who identified the importance of teachers recognizing connections across language subjects, and with Park et al. (2024), who demonstrated the potential of cross-curricular teacher collaboration for developing curriculum units. However, unlike these studies, the present program involved teachers from broader disciplinary categories and used PLA as a participatory mechanism for module construction. The contribution is the demonstration of a practical process through which interdisciplinary dialogue is transformed into shared instructional resources.

The findings from microteaching and peer feedback further demonstrate that collaborative professional learning became connected to actual instructional practice. Teachers tested the integrated modules, observed peer teaching, exchanged feedback, and revised instructional components. This result is consistent with Amrullah et al. (2025), who found that peer assessment and constructive feedback can enhance pedagogical competence, and with Odo (2023), who reported positive perceptions of peer video feedback in microteaching. It also corresponds with Jacobsen et al. (2025), who demonstrated the potential of microteaching to facilitate peer feedback. However, the present study differs because peer feedback was applied to collaboratively developed cross-subject modules rather than primarily to individual teaching performances. The contribution lies in connecting peer assessment with interdisciplinary curriculum co-design, making feedback part of a collective rather than individual improvement process.

The integration of Social-Emotional Competence (SEC) reflection represents another significant finding. Teachers reflected on emotional management, communication, empathy, classroom experiences, and student-centered responses after completing the instructional activities. This finding is consistent with Masry-Herzallah (2024), who examined the development of social-emotional competence through teacher professional development, and with Correa and Martínez (2025), whose systematic review identified the importance of structured interventions for developing socio-emotional competencies. Gebre et al. (2025) further established an association between teacher socio-emotional competence and student engagement. However, the present study differs by embedding SEC reflection within a PAR-based interdisciplinary PLC rather than treating it as a standalone professional development intervention. Its contribution is therefore the integration of pedagogical, collaborative, and socio-emotional reflection within one professional learning cycle.

The dissemination and follow-up activities indicate an emerging mechanism for sustaining interdisciplinary professional learning beyond the intervention. Teachers presented integrated modules, exchanged experiences, discussed challenges, and agreed to continue collaborative meetings and joint instructional-material development. This finding supports Liu et al. (2024), who demonstrated the role of PLCs in connecting professional development with instructional integration, and Nehez (2023), who showed how action research can help PLCs identify actions for improving practice. It also aligns with Ved and

Kareem (2026), who emphasized implementation and retention strategies for sustaining teacher socio-emotional competence. Nevertheless, the present study provides an important distinction by linking sustainability directly to a cross-subject PLC formed through participatory planning. The contribution is the establishment of continuation mechanisms based on teacher ownership rather than reliance solely on externally provided professional development.

Overall, the findings contribute a more integrated model of teacher professional development by connecting PAR, PLA, cross-subject PLC formation, integrated curriculum design, microteaching, peer feedback, and SEC reflection within a single cycle. Existing studies have generally examined these elements separately or within narrower disciplinary contexts, such as mathematics PLCs (Bondurant, 2024), integrated STEM collaboration (De Souza et al., 2025; Nipyrakis et al., 2024), or socio-emotional professional development (Masry-Herzallah, 2024). The novelty of the present study lies in combining these components into a participatory interdisciplinary framework designed to reduce disparities in instructional quality across subject areas. Rather than positioning professional development as a sequence of isolated training activities, the model establishes teachers as co-designers, peer reviewers, reflective practitioners, and knowledge-sharing partners. Thus, the study offers a transferable framework for developing sustainable and equitable teacher professional learning through collaborative school-based action.

CONCLUSION

The most important finding of this community engagement program is that empowering a Cross-Subject Professional Learning Community (PLC) through Participatory Action Research (PAR) and Participatory Learning and Action (PLA) can strengthen teaching quality by fostering interdisciplinary collaboration, collaborative lesson design, reflective practice, and teachers' social-emotional competence. The main lesson learned is that sustainable improvement in teaching quality depends on continuous collegial learning and active teacher participation, rather than relying solely on individual professional development. The implication of these findings is that schools should strengthen collaborative professional learning structures that enable teachers from different subject areas to share practices, reflect collectively, and develop contextually relevant instructional strategies. The contribution of this study lies in providing an integrated community-based teacher empowerment model that connects PLCs, cross-subject collaboration, and participatory professional development within a sustainable framework, thereby extending practical and conceptual understanding of collaborative teacher development. Nevertheless, the study was limited to a single teacher community, involved a relatively short implementation period, and employed a qualitative approach, which limits the transferability of the findings to other educational contexts. Future research should involve more diverse schools and educational settings and employ mixed-method or longitudinal designs to examine the sustained effects of Cross-Subject PLCs on teacher professionalism, instructional quality, and student learning outcomes.

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CONFLICTS OF INTEREST

The author confirms that no conflict of interest exists in relation to the conduct or reporting of this study.

USE OF ARTIFICIAL INTELLIGENCE (AI)-ASSISTED TECHNOLOGY

In preparing this manuscript, the author used AI-assisted technology to facilitate language editing, manuscript organization, and academic writing enhancement. All outputs generated with AI assistance were carefully examined, modified where necessary, and validated by the author. Responsibility for the scientific accuracy, originality, and integrity of the final manuscript remains entirely with the author.

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