



Digital Peer Supervision: Building a Professional Learning Community (PLC) among Madrasah Ibtidaiyah Teachers

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ABSTRACT

Peer supervision offers Indonesian madrasah teachers an alternative to top down classroom monitoring, yet how it works once it moves onto digital platforms is still poorly documented. This article examines a digital peer supervision model built and used for one semester at Madrasah Ibtidaiyah Al-Istiqlal Cibalongsari, Karawang, West Java. The design is a qualitative single site case study with eight participants, namely the principal, the vice principal for curriculum, and six classroom teachers. Interviews, participatory observation of the supervision cycles, and analysis of supervision documents were combined and read through thematic analysis. The model settled into a three phase cycle of joint planning, peer observation based on evidence, and a guided reflective conversation, and this cycle moved supervisory authority from the principal to the teaching pair. Professional learning community attributes strengthened across collegial interaction, shared resources, reflective practice, collective responsibility, and peer trust, with trust behaving as a condition for the others rather than as one more parallel dimension. Uneven digital skill, unstable connectivity, and reluctance to critique senior colleagues were reworked into adaptive routines rather than removed. The study contributes an account of peer supervision as a culturally situated practice in Islamic primary schooling.

Supervisi sejawat menawarkan alternatif bagi guru madrasah terhadap pemantauan kelas yang bersifat atas bawah, tetapi cara kerjanya ketika dipindahkan ke platform digital belum banyak terdokumentasi. Artikel ini mengkaji model supervisi sejawat digital yang dibangun dan dijalankan selama satu semester di Madrasah Ibtidaiyah Al-Istiqlal Cibalongsari, Karawang, Jawa Barat. Penelitian menggunakan desain kualitatif studi kasus satu lokasi dengan delapan partisipan, yaitu kepala madrasah, wakil kepala bidang kurikulum, dan enam guru kelas. Data dikumpulkan melalui wawancara, observasi partisipatif pada siklus supervisi, serta telaah dokumen supervisi, lalu dianalisis secara tematik. Model mengendap menjadi siklus tiga fase berupa perencanaan bersama, observasi sejawat berbasis bukti, dan percakapan reflektif terpandu, dan siklus tersebut memindahkan otoritas supervisi dari kepala madrasah kepada pasangan guru. Atribut komunitas pembelajaran profesional menguat pada interaksi kolektif, berbagi sumber daya, praktik reflektif, tanggung jawab kolektif, dan kepercayaan antarsejawat, dengan kepercayaan berperan sebagai syarat bagi dimensi lain, bukan sebagai dimensi yang sejajar. Kesenjangan keterampilan digital, koneksi yang tidak stabil, serta keengganan mengritik guru senior tidak hilang, melainkan diolah menjadi rutinitas adaptif. Kontribusi studi ini adalah penjelasan supervisi sejawat sebagai praktik yang terikat konteks kultural pendidikan dasar Islam.



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INTRODUCTION

Digital technology has changed what school systems expect of teachers and how they organise support for teacher learning. In many countries the teacher is no longer treated only as a deliverer of content but as a practitioner who examines their own work and keeps learning inside an institutional community (Darling-Hammond et al., 2017; Fullan, 2007). Indonesia has made that expectation explicit. The Merdeka Belajar curriculum policy places teacher agency, reflective practice, and professional development organised by the school itself at the centre of improvement efforts (Hairon & Tan, 2017; Kemendikbudristek, 2022).

Improvement efforts in Madrasah Ibtidaiyah run into structural obstacles. Supervision in MI has long followed a top down pattern in which the principal or an appointed supervisor conducts a formal classroom visit and issues prescriptive feedback, which leaves little room for collegial dialogue (Dwi et al., 2014; Singerin, 2021). Teachers describe few opportunities for horizontal professional exchange. Informal knowledge sharing happens during short breaks or at annual teacher working group meetings that tend to be occupied by administrative matters rather than pedagogy. Without a structured channel for peer engagement, teachers resolve classroom problems on their own, and shared professional norms take longer to form (Blase & Blase, 2004; Glickman et al., 2014).

Peer supervision offers a different arrangement. Building on Goldhammer (1969) and Cogan (1973), it redefines the supervisory relationship as mutual inquiry rather than evaluation. Teachers of equal standing observe one another, hold structured reflective conversations, and build professional knowledge from their own classrooms. Studies report more frequent and more analytic pedagogical reflection, stronger trust within teaching teams, and gains in instructional practice (Amini & Gholami, 2018; McGrane & Hopfenbeck, 2020; Nakibaala et al., 2022).

These outcomes are usually read through the theory of Professional Learning Communities, and the three accounts most often invoked are not interchangeable. DuFour et al. (2016) treat such a community as a working structure defined by shared mission and vision, collaborative teams, collective inquiry into practice, an orientation to action, and attention to results, with the last of these as the test of whether the other elements amount to more than procedure. Hord (1997) approaches the same object through five supportive conditions, namely supportive and shared leadership, shared values, collective learning and its application, shared personal practice, and supportive structural and relational arrangements. She treats shared personal practice, which means teachers observing and commenting on each other's teaching, as the condition schools most often fail to establish. Wenger (1998) frames the community differently again, as a community of practice held together by mutual engagement, a joint enterprise, and a shared repertoire that members build over time. Read together, these accounts locate the community in what teachers do with one another rather than in the scheduling of meetings. Peer supervision acts on the element Hord identifies as the weakest link, which makes it a useful site for examining how such a community actually forms.

Bringing digital tools into that work changes its reach. Video conferencing, shared document environments, and messaging applications extend peer supervision beyond the timetable and the school building, so teachers can hold reflective exchanges asynchronously, circulate recordings of

their own lessons, and build teaching materials together outside formal meetings (Boud et al., 2013; Trust et al., 2018). The conditions for this are not evenly distributed. Adoption depends on a working level of digital skill, on connectivity that holds up, and on a professional culture willing to make practice visible and open to comment (Ertmer & Ottenbreit-Leftwich, 2010; Macià & García, 2016).

Reading these two bodies of work against each other exposes where the evidence stops. Peer supervision has been examined in general school settings and in community service contexts (Amini & Gholami, 2018; Pallikkuth et al., 2023). Online teacher communities have been reviewed at scale, most systematically by Lantz-Andersson et al. (2018), who examined fifty two empirical studies and concluded that participation in such communities frequently remains at the level of resource exchange without moving into critical discussion of teaching. Vangrieken et al. (2017) reached a comparable verdict about teacher communities in general and argued that they work best when teachers themselves initiate them. What neither literature covers is the point where the two meet inside an Indonesian madrasah, where supervision carries an evaluative history, seniority governs who may comment on whose teaching, and infrastructure is uncertain. The Indonesian studies closest to this question (Dwi et al., 2014; Singerin, 2021) use survey designs, which record whether collegial supervision occurred but not how teachers negotiated it. Table 1 sets out this comparison and the gap that follows from it.

Table 1. Prior Studies on Peer Supervision and Technology Mediated Teacher Collaboration

Author(s)	Research context	Key findings	Research gap
Amini & Gholami (2018)	EFL teachers, rotatory peer supervision	Rotating peer supervision raised the quality of teaching and of professional exchange	Secondary language teaching only, no digital mediation, no religious school setting
Pallikkuth et al. (2023)	Community mental health workers, low resource settings	Structured peer supervision was feasible and acceptable for non specialist practitioners	Outside schooling, does not address classroom pedagogy or platform use
Ketonen et al. (2020)	Secondary students, peer assessment intervention	Repeated structured peer exchange developed feedback literacy	Concerns student learning rather than teacher professional learning
Trust et al. (2018)	Teachers in professional learning networks	Networked participation widened teachers' professional resources and support	Voluntary informal networks, not supervision inside a single school
Lantz-Andersson et al. (2018)	Systematic review of fifty two studies of online teacher communities	Online participation often remains at resource sharing and seldom reaches critique of practice	Western and East Asian settings, no Indonesian Islamic schools
Vangrieken et al. (2017)	Systematic review of forty studies of teacher communities	Leadership, trust, and group dynamics condition success, and teacher initiated formation works best	Says little about digitally mediated observation of teaching
Dwi et al. (2014); Singerin (2021)	Academic supervision with peer evaluation, Indonesia	Peer based supervision models improved measured pedagogical	Survey designs, no account of how teachers negotiate

Author(s)	Research context	Key findings	Research gap
		competence	hierarchy or adopt digital tools

The claim that platform mediated supervision speeds up the formation of a Professional Learning Community rests on three mechanisms, namely continuous documentation of professional exchange, peer review that can be scaled, and an institutional memory that survives staff turnover (Hargreaves & Fullan, 2012; Ketonen et al., 2020; Trust et al., 2018). That evidence comes from Europe, North America, and East Asia. It does not transfer to a madrasah without examination, because hierarchy, the way trust is extended within a religious community, and unequal access to devices and bandwidth all shape what teachers are willing to put on a shared platform. Indonesian policy meanwhile continues to treat teacher professional development as a lever for system quality (OECD, 2019), which makes the question practical as well as scholarly.

This study addresses three questions. How does a digital peer supervision model take shape within the organisational and cultural conditions of Madrasah Ibtidaiyah Al-Istiqal Cibalongsari? What happens to the professional learning community among participating teachers once the model runs? Which obstacles appear during implementation, and what do participants do about them? The qualitative case study design produces an empirical account of peer supervision as an institutional practice and a basis for designing professional development suited to Indonesian Islamic primary schools.

METHOD

The study uses an interpretive qualitative paradigm and the single site embedded case study design described by Yin (2018). The phenomenon of interest, a digital peer supervision model working inside one madrasah community, cannot be separated from its social and institutional setting, and the research questions concern processes and meanings as participants describe them rather than outcomes measured across a sample (Creswell & Poth, 2018; Miles et al., 2020).

Fieldwork took place at Madrasah Ibtidaiyah Al-Istiqal Cibalongsari in Karawang Regency, West Java. The site was chosen on criterion based purposive grounds. The school had already begun a voluntary peer supervision programme with a university improvement project, and it had a documented record of technology use, including a regional digital literacy programme that left partial infrastructure in place. The school serves a mainly working class community in peri urban Karawang and carries the constraints familiar to many Indonesian MI, namely limited resources, unstable connectivity, and thin professional support, while still being held to national quality standards. Those conditions make it a case of digital peer supervision under ordinary rather than favourable circumstances.

Participants were the principal, the vice principal for curriculum, and six classroom teachers. This is the whole staff group involved in the supervision programme rather than a sample drawn from a larger population, so the question is not whether eight is representative but whether eight carries enough information for the analysis. The justification rests on information power as Malterud et al. (2016) set it out. The aim of the study is narrow, the participants are highly specific to the phenomenon, established theory guides the analysis, the dialogue was extended over three interviews with each participant, and the analysis is a case analysis rather than a cross case comparison. Each of these lowers the number of participants required. The twenty four interviews also sit within the range at which saturation is normally reported for homogeneous samples, which Guest et al. (2006) place at around twelve interviews and Hennink et al. (2017) at nine to seventeen for code saturation and sixteen to twenty four for meaning saturation. Saturation was monitored during fieldwork by comparing the codes generated in each round of interviews against those already established. Interview accounts were further set against observation of twelve supervision cycles and against supervision documents, so no claim in the analysis rests on interview data alone.

Three methods were combined. Semi structured interviews were held with all eight participants at the start, midpoint, and end of the semester, giving twenty four sessions of forty to

seventy minutes. The interview guide, reproduced in Appendix A, moved through four areas, namely prior experience of supervision, understanding of peer supervision as a principle, use of and attitude towards digital tools in professional work, and perceived change in collegial relationships and teaching practice, with probes attached to each area. Participatory observation covered twelve supervision cycles, with the researcher present as a non evaluative observer in planning meetings, peer observations, and reflective conversations. Field notes were written during and immediately after each session against an observation guide covering who participated, the content of the professional talk, how the platform was used, and what each session produced. Document analysis drew on draft and final lesson plans, completed digital observation forms, WhatsApp transcripts from the supervision group, recordings of Zoom sessions used with consent, and school records of professional development activity. The digital peer observation form and the reflective dialogue protocol, both developed with participants, are reproduced in Appendix B and Appendix C. Anonymised examples of completed forms and platform exchanges are held by the corresponding author and available on request.

Analysis followed the six phase thematic procedure of Braun and Clarke (2006), adapted to hold three data sources together. Familiarisation involved repeated reading and listening across the corpus with initial notes. Open coding was then applied to interview transcripts, field notes, and document extracts using NVivo 12, which produced [n] initial codes. Codes were clustered into eleven categories on the basis of shared reference rather than shared wording, and the categories were collapsed into three themes, which were checked against the coded extracts for internal coherence and for separation from one another. Themes were then defined and named in relation to peer supervision theory, Professional Learning Community theory, and work on digital adoption. Figure 1 sets out the resulting structure from codes through categories to themes. Trustworthiness was addressed by triangulating participant accounts against field notes and documents, and by member checking with five of the eight participants, who read summaries of the emerging themes and returned confirmations and corrections that were carried into the final analysis. The account of the setting is detailed enough for readers to judge transferability to comparable schools.

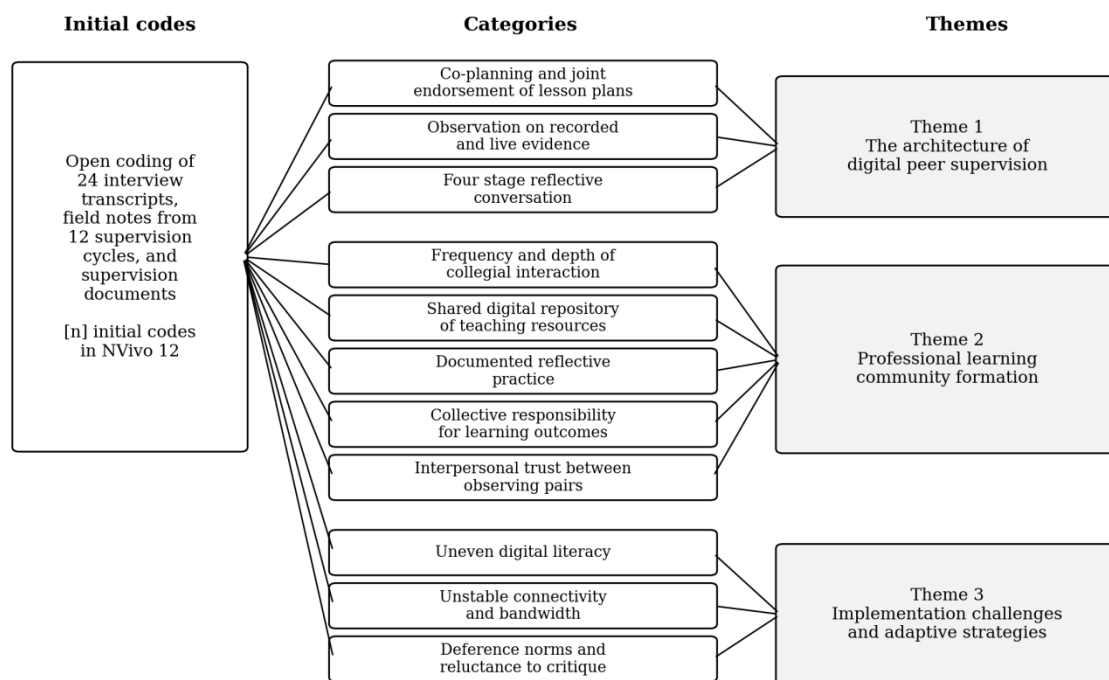


Figure 1. Coding Structure from Initial Codes to Themes

RESULT AND DISCUSSION

Result

1. The Architecture of Digital Peer Supervision at Madrasah Ibtidaiyah

The model at MI Al-Istiqlal took its final form through negotiation among the teachers, the principal, and the university project team. By the third cycle it had settled into three phases that teachers themselves distinguished from earlier supervisory practice, namely collaborative planning, peer observation based on recorded evidence, and a structured reflective conversation. Each phase runs on a specific digital tool and on the assumption that authority in the process belongs to the pair rather than to the principal.

In the planning phase, pairs or small groups co planned lesson units in a WhatsApp group set up for supervision, where draft plans were posted for peer comment. Working asynchronously mattered. Participants could read a colleague's plan and compose a considered reply outside teaching hours. A teacher with fourteen years in the classroom said the written comments she received from a colleague teaching the same grade made her rework her scaffolding sequence, and that those comments were more detailed than anything she had received through formal supervision. The phase closes with a lesson plan endorsed by both teachers, which places responsibility for the design with the pair before the observation begins.

Observation was hybrid. Teachers whose timetables allowed it observed each other live, while the rest recorded lesson segments of fifteen to twenty minutes and uploaded them to a private Google Drive folder shared only with their partner. Observers completed a digital form that teachers had designed together in an initial professional development session, covering four domains: the clarity of the opening and of stated objectives, student engagement and questioning, formative assessment, and lesson closure. Forms were completed live or within two hours of viewing a recording. Several participants described the recording route as uncomfortable at first and then preferable, because it removed the presence of an observer and let them choose the segment they wanted read.

The reflective conversation combined synchronous and asynchronous exchange. Pairs opened with a voice or video call on WhatsApp or Zoom within forty eight hours of the observation, following a protocol the research team wrote with participants. The observed teacher first assessed the lesson, the observer then presented what the form had recorded, both identified patterns and questions in that evidence, and the pair closed by agreeing one or two instructional commitments for the next lesson. Between cycles the exchange continued in the WhatsApp group, where teachers posted articles, short clips, and samples of student work. Participants contrasted this with earlier arrangements by calling it a conversation that continued rather than one that occurred.

Table 2. Components of the Digital Peer Supervision Model at MI Al-Istiqlal

Phase	Collaborative Planning	Evidence-based Peer-Observation	Structured Reflective Dialogue
Key Activities	Co-planning of lesson units, written peer commentary on draft plans, joint finalization, and co-endorsement of lesson design	Live classroom observation or video recording review, completion of a structured four-domain digital observation form within two hours	Structured four-stage conversation via voice or video call, asynchronous continued exchange, formulation of explicit instructional commitments
Digital Platform	Whatsapp Group	Google Drive, Zoom Meeting, Video	Whatsapp Groups, Zoom Meeting

Phase	Collaborative Planning	Evidence-based Peer- Observation Recording	Structured Reflective Dialogue
Primary Output	Mutually endorsed lesson plan with documented revisions	Completed digital observation form with specific timestamped evidence notes	Documented instructional commitments and co-authored reflective summary notes

The three phases did not arrive complete, and the twelve cycles divide into three stretches with a different character. In the first two cycles the pairs worked mechanically. Teachers followed the form, wrote short and largely affirmative comments, and treated the reflective call as a report on what had gone well. Three teachers still needed help to open the shared folder, so contribution was uneven and the observed teacher did most of the talking. From the third cycle to the eighth the pattern changed. The phase sequence had stabilised, and the comments on lesson plans began to carry disagreement, with observers naming specific segments instead of offering general encouragement. This is also the point at which teachers began approaching colleagues from other grade levels without being paired with them. In the final four cycles the pairs arrived at the reflective call having already reviewed the commitment made in the previous cycle, they consulted the accumulated observation records when preparing, and Zoom entered the routine for pairs that had until then used voice calls. What developed across the semester was less the structure, which was fixed by the third cycle, than what teachers were willing to say inside it.

2. Impact on Professional Learning Community Formation

Implementation changed the professional relationships and the working habits of the teacher group at MI Al-Istiqlal. The changes map onto the attributes DuFour et al. (2016) associate with a Professional Learning Community, namely shared values and vision, collective responsibility for student learning, collaborative inquiry into practice, and attention to results. Participants described the change as one of professional culture rather than of timetable.

The clearest change was in how often teachers talked to each other about teaching and how far those conversations went. Before the programme, instructional talk was confined to short exchanges during breaks, and teachers from different grade levels had little contact. After the third cycle all six classroom teachers were seeking colleagues' views on teaching problems, circulating resources without being asked, and continuing conversations on WhatsApp outside working hours. The principal described the staffroom as busier and its talk as more pedagogical. Teachers who had previously worked alone began consulting peers from other grades about learning difficulties. Peer supervision research in other cultural settings reports the same direction of change (Amini & Gholami, 2018; McGrane & Hopfenbeck, 2020), and this case extends it to an Indonesian Islamic primary school.

A second change was what participants called a culture of sharing, which took material form as a shared repository of teaching resources, observation records, and reflective notes held on WhatsApp and Google Drive. By the end of the semester the repository contained forty seven lesson plans, twelve annotated video clips, and thirty one completed observation forms, an archive of practical knowledge the school had not previously held. Teachers reported drawing on it when planning, and three described adapting a colleague's lesson framework for a different grade level. Hargreaves and Fullan (2012) describe this kind of accumulation as collective intellectual capital, although it has rarely been documented in Islamic primary schools.

Participants also described a change in how they thought about their own teaching. Teachers who had done little formal reflection before the programme began locating specific features of a lesson design as the thing to work on, in place of general statements about difficult classes. Ketonen et al. (2020) report a comparable development of feedback literacy among students, and

the same movement appears here among teachers. Written comments on shared documents and asynchronous observation notes contributed to this, because they leave a record that can be returned to after the exchange itself has ended.

Table 3. Impact of Digital Peer Supervision on PLC Formation Dimensions

PLC Dimension	Pre-implementation condition	Post-implementation condition	Direction of change
Collegial Interaction	Rare, informal, and largely administrative in content	Regular, substantive, and pedagogically focused across grade levels	Significant increase in frequency and depth
Collaborative Resource Development	Absent, each teacher maintained individual and separate resource files	Active, shared digital repository with 47 lesson plans and 12 annotated video clips by semester end	Substantial and lasting structural change
Reflective Practice	Minimal, limited to informal post-lesson personal review when conducted at all	Structured and documented, integrated into each supervision cycle through guided four-stage protocols	Qualitative transformation in approach
Collective Responsibility	Individual teachers perceived instructional quality as an exclusively personal professional matter	Developing an emerging sense of shared accountability for grade-level and whole-school learning outcomes	Gradual but meaningful normative shift
Interpersonal Trust	Moderate; formal hierarchical norms created caution about peer-to-peer critical commentary	Strengthened and structured protocols successfully normalized constructive evidence-based peer-feedback	Measurable improvement across all dyads

3. Implementation Challenges and Adaptive Strategies

Implementation was not smooth. Three categories of difficulty recurred across the semester and required responses from teachers and from the school leadership. They describe the conditions under which a digitally mediated collegial innovation has to work in a school with limited resources, established seniority norms, and uneven individual competence.

The first difficulty was an uneven level of digital skill. Of the six classroom teachers, three had little experience of using digital tools for professional purposes beyond WhatsApp and basic file storage. Two needed individual orientation sessions before they could open shared documents or comment on a colleague's lesson plan without help. The consequence was not only technical. Teachers who were already comfortable with the platform contributed more in the early cycles, while the others contributed less, which put at risk the reciprocity that peer supervision depends on. Ertmer and Ottenbreit-Leftwich (2010) separate first order barriers of access from second order barriers of belief and professional identity, and both were visible here. Three responses followed: a

digitally fluent teacher was attached to each supervision pair as a technology mentor, fifteen minute familiarisation sessions were added to existing staff meetings, and the observation form was simplified to reduce what it demanded of the user.

The second difficulty was infrastructure. Connectivity was unreliable at the school and at the homes of several teachers during the asynchronous phases. The school ran on a single shared router that could not carry simultaneous video streaming, which affected live observation and the reflective calls. Three teachers reported that connection failures had interrupted scheduled supervision conversations, forcing them to reschedule and compressing the time available for reflection before the next cycle. The school responded by making asynchronous review the default, with recordings downloaded overnight to avoid buffering, and by accepting audio only reflective calls on WhatsApp as equivalent to video meetings. The principal also began reallocating part of the school operational budget towards router capacity, a process still under way in the final month of the study.

The third difficulty was the most deeply held. Several participants were uneasy about observing a colleague and commenting critically on the teaching of someone senior to them. This was less personal hesitation than a question of propriety, grounded in norms of respect towards greater experience and formal authority. Two senior teachers said in interviews that they had initially read peer observation as a threat to their professional standing, which matches reports from peer supervision research in comparable socio cultural settings (Pallikkuth et al., 2023). Participants identified the structured conversation protocol as what eased the tension, because it framed observation notes as evidence rather than judgement and placed both teachers as inquirers rather than as evaluator and evaluated. They also credited the principal's written statement, distributed to all staff at the start, which defined the programme as professional rather than evaluative and so supplied institutional permission for collegial critique.

Table 4. Implementation Challenges, Manifestations, and Adaptive Strategies

Challenge Category	Concrete Manifestation	Impact on Supervision Process	Adaptive Strategy Employed
Digital Literacy Limitations	Three of six teachers required individual onboarding; initial participation asymmetry in shared document contributions during cycles 1 and 2	Temporary inequality in peer contribution; risk of non-reciprocal supervision dynamic in early implementation	Peer technology mentoring within pairs; embedded weekly digital familiarization sessions; simplified observation form design reducing platform navigation demands
Infrastructure Inconsistency	Insufficient school router bandwidth; home connectivity disruptions for three teachers during asynchronous phases across the semester	Rescheduled or abbreviated reflective dialogues in two cycles; reduced video quality affecting remote observation review	Asynchronous-primary observation protocol with overnight downloads; audio-only dialogue formally recognized; budget reallocation initiated for router infrastructure upgrade
Cultural	Initial discomfort	Reduced candor in early	Structured

Challenge Category	Concrete Manifestation	Impact on Supervision Process	Adaptive Strategy Employed
Resistance to Collegial Critique	among two senior teachers about receiving peer feedback; perceived conflict with institutional hierarchical deference norms	observation feedback; risk of superficial rather than substantive peer commentary that would undermine model goals	conversation protocol framing notes as evidence not judgment; principal's formal written endorsement establishing institutional permission; trust built progressively over successive cycles

Discussion

1. Digital Peer Supervision as Pedagogical Innovation in Madrasah Ibtidaiyah Context

The three phase model at MI Al-Istiqlal is a departure from how supervision has been practised in Indonesian Islamic primary schools, and the departure is not mainly technological. What changed is who holds supervisory authority. The evaluative position of an authorised observer gives way to inquiry between equals, and prescriptive advice gives way to a conversation anchored in recorded evidence. This follows the trajectory supervision scholarship has traced from the clinical models of Cogan (1973) and Goldhammer (1969) to the developmental and collegial orientation of Glickman et al. (2014), and it locates that trajectory in an institutional setting the literature has not examined.

That collegial reorientation occurred inside a strongly hierarchical culture is the finding with the widest reach, because it indicates that collegial supervision theory holds in settings where it has rarely been tested, provided the structural conditions and the institutional permission are put in place first. Digital mediation contributed more than convenience. Asynchronous planning and observation review gave teachers time to compose an analytic response, which the pace of a face to face supervisory meeting does not allow. The record left on the platform turned passing exchanges into material the school retains, so teachers could follow the development of their own instructional reasoning across cycles (Boud et al., 2013; Ketonen et al., 2020).

Three contributions can be stated precisely. The study documents a working peer supervision cycle inside a madrasah, a setting absent from both the peer supervision literature and the online teacher community literature, and it identifies the device through which the cycle displaced hierarchical supervision, namely the lesson plan endorsed by both teachers before any observation takes place, which assigns responsibility for the design to the pair. It also identifies trust as a sequential condition for the other community dimensions rather than as one dimension among several, which qualifies the additive treatment common in measurement instruments for Professional Learning Communities. Finally it shows that the order in which platforms are introduced is itself a design variable, with a familiar social application carrying the early exchanges and a dedicated conferencing tool entering only after collegial relationships had formed.

Two results run against what the comparative literature would predict, and both are worth stating plainly. Lantz-Andersson et al. (2018) found across fifty two studies that online teacher communities tend to stall at resource exchange and seldom reach critical discussion of teaching. The exchanges at MI Al-Istiqlal did reach it. The reason appears to lie in the structure imposed on them, since the observation form and the four stage conversation protocol gave teachers a script for critique and removed the need to invent a way of criticising a colleague. Where the form of participation is left open, participation drifts towards the safest option. Vangrieken et al. (2017)

concluded that teacher communities work best when teachers initiate them, whereas the programme here was initiated by the principal together with an external project, and participants named the principal's written statement more often than any other factor as what made peer critique possible. In a hierarchical setting the preference for teacher initiated formation reported from Western schools may therefore not hold, because permission to comment on the teaching of a senior colleague has to come from someone with the standing to grant it. That peer supervision worked despite deference norms is not evidence that those norms were weak. It is evidence that they were addressed directly, by an authority figure who removed the risk and by a protocol that presented observation notes as evidence rather than judgement.

2. Professional Learning Communities Formation as a Socially Emergent Process

The Professional Learning Community formed sequentially rather than additively, which is a problem for accounts that treat its dimensions as separate components to be summed. Trust came first and conditioned the rest. In the early cycles teachers approached the shared platform and the feedback form carefully, and the professional exchange stayed shallow while that caution lasted. By the midpoint a shared vocabulary had developed, teachers knew more about each other's working conditions, and feedback had been received without defensiveness often enough for participants to speak more openly. DuFour et al. (2016) describe a Professional Learning Community as a collaborative culture rather than an assembly of structures, and the sequence observed here gives that description an empirical shape.

Digital platforms did not simply host this process. WhatsApp worked as the entry point because teachers already used it socially, which lowered the threshold for a new kind of professional exchange. Trust et al. (2018) report that teacher networks on social platforms often begin socially and move towards pedagogy, and the same movement occurred here. The practical implication is that platform sequencing is a design decision. Starting with a familiar application and introducing a dedicated tool later, as happened with Zoom in this case, is likely to work better than opening with an unfamiliar professional development environment (Wenger, 1998; Yuan & Lee, 2014).

Four mechanisms account for why this arrangement produced a professional community rather than a series of documented visits. Trust accumulated because the risk was kept small and repeated. Each cycle required a limited disclosure, first a lesson plan, then a recorded segment, then a self-assessment, and each disclosure came back with evidence rather than judgement, so teachers learned across cycles that exposure carried no cost. Social learning operated through the pairing itself, since a teacher watched a colleague handle a problem recognisable from their own classroom, which is a closer model than external training provides. Collaborative reflection was produced by the protocol rather than by disposition, because the four stage sequence obliged the observed teacher to interpret the lesson before the observer spoke, and that ordering kept the conversation from settling into advice giving. Knowledge sharing became cumulative because the platform kept a record, so a lesson plan revised in the second cycle remained available to a teacher planning in the ninth. Trust and the protocol carry the other two, and neither is a property of the technology.

3. Navigating Structural Constraints: Leadership, Literacy, and Institutional Agency

The difficulties encountered point to the conditions that decide whether digital peer supervision can work in schools with constrained resources. Uneven digital skill, unreliable connectivity, and reluctance to critique senior colleagues are not particular to MI Al-Istiqal, and they describe the situation of a large part of Indonesian Islamic primary schooling, which is why they bear on policy rather than only on this school. The difficulties were worked around rather than solved, and the working around produced some of the learning the programme was meant to generate. Teachers who took on the technology mentor role improved their own technical fluency and their ability to explain pedagogical decisions, so addressing a structural constraint also advanced the aim of the innovation (Macià & García, 2016; Vangrieken et al., 2017).

The principal's role deserves specific attention. Framing peer supervision as professional development rather than assessment, stating it in writing, and repeating it in staff meetings was named by participants more often than any other factor as what made the programme possible. Leadership research associates this kind of framing with teachers' willingness to take professional risks (Singerin, 2021), and the present case extends that association to the adoption of digital supervision. Principals in MI work under reporting requirements from the Ministry of Religious Affairs and under expectations from local Islamic educational foundations. That a principal was able to create institutional permission for collegial critique within those constraints indicates that leadership agency matters more than the constraints themselves, which is directly relevant to anyone designing professional development for schools with similar governance (Hargreaves & Fullan, 2012; Hord, 1997).

4. Practical Implications

For madrasah principals, the sequence that worked here is specific and repeatable. Issue a written statement separating peer supervision from teacher assessment before the first cycle, pair teachers across grade levels rather than within them, and protect the reflective conversation by holding it within forty eight hours of the observation. Begin with the messaging application teachers already use and introduce a conferencing tool only once the pairs are working comfortably.

For school supervisors attached to the district office of the Ministry of Religious Affairs, the implication is a change of role rather than a reduction of it. The supervisory visit need not be replaced, but the evidence teacher pairs generate, in the form of completed observation records and documented commitments, gives a fuller picture of instructional development than an annual visit produces. Supervisors would add most value by checking that the cycle is running and by supporting the pairs, not by grading the documents the cycle produces.

For policy makers, the binding constraint at this school was bandwidth rather than willingness. A modest allocation for connectivity within the school operational budget, together with recognition of completed peer supervision cycles as professional development hours for certification purposes, would remove the two obstacles participants raised most often. Reporting formats that record only formal supervisory visits should be extended to record documented peer supervision cycles.

For providers of teacher professional development, the design lesson is that the protocol carries the intervention. Training that supplies a structured observation form and a staged conversation script, and then withdraws, is more likely to produce durable collegial practice than training delivered as a series of workshops. Programmes should also budget for individual technical onboarding for the two or three teachers in any school who will need it, because unequal participation in the early cycles is the point at which reciprocity is most likely to break.

CONCLUSION

Digital peer supervision is workable in Indonesian Islamic primary education when its structure is designed deliberately, its cultural conditions are addressed before implementation, and its tools are introduced in an order that matches what teachers already use. The three phase cycle developed at MI Al-Istiqlal, combining collaborative planning, peer observation based on evidence, and a structured reflective conversation, is transferable as a design to schools with comparable conditions.

The model changed the Professional Learning Community across collegial interaction, shared resources, reflective practice, collective responsibility, and peer trust, and it did so in a sequence in which trust conditioned the other dimensions rather than developing alongside them. Understanding how such a community forms therefore requires attention to the order in which its elements appear. The digital environment contributed by keeping a record of professional exchange, by allowing asynchronous participation, and by using tools teachers already trusted.

The obstacles encountered were real but tractable, and the responses to them generated professional learning in their own right, which suggests that in resource constrained schools implementation problems are worth treating as material for building institutional problem solving capacity. The study is limited by its single site design, which supports interpretive depth but not generalisation. Multi-site comparison across madrasah with different resource levels and leadership orientations, and longitudinal work testing whether these community formations persist after external support ends, are the obvious next steps.

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