

Implementation Of Supervision Management Transformation Based On The Ruangguru Application To Strengthen The Professionality Of Islamic Religious Education Teachers

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ARTICLE INFO

Article history

Received:

xx-xx-xxxx

Revised:

xx-xx-xxxx

Accepted:

xx-xx-xxxx

Keywords

Digital Supervision,
Ruangguru Application,
Teacher Professionalism,
Islamic Religious Education,
Supervision Management.

ABSTRACT

This study aims to analyze the implementation of the Ruangguru application-based supervision management transformation in strengthening the professionalism of Islamic Religious Education teachers at SMAN 1 Ciomas, Bogor Regency. The study used a qualitative approach with in depth interviews, observation, and document analysis techniques. The results show that the Ruangguru application helps transform conventional supervision into digital supervision that is more efficient, transparent, collaborative, and documented. This transformation strengthens supervision planning, accelerates reporting, facilitates evaluation, and encourages teachers to use supervision data for learning reflection. The main impact is seen in improving discipline, digital competence, accountability, and collaboration between teachers. Obstacles found include limited digital literacy, internet access, device readiness, and adaptation to the new system. This study concludes that Ruangguru-based supervision can be a model for professional development of Islamic Religious Education teachers that is adaptive, data-driven, and relevant to the needs of Islamic education in the digital era, especially in improving the quality of learning, reflective culture, and sustainable school supervision governance at the public secondary education level.

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Introduction

Digital transformation has changed the way schools manage academic supervision and teachers' professional development (Oktaviani et al. 2023). Supervision, which previously relied heavily on manual observations, written reports, and face-to-face meetings, is now shifting toward application based systems that are faster, better documented, and easier to track. This change is important for Islamic Religious Education (PAI) teachers because they are not only responsible for delivering subject matter, but also for fostering students' values, morals, and character. In the context of SMAN 1 Ciomas, Bogor Regency, conventional supervision still faces obstacles such as delayed feedback, poorly organized documentation, and limited access to continuous professional training for teachers.

The urgency of this issue is not only technical, but also social and institutional. PAI teachers need a supervision system that can continuously help them improve their pedagogical, professional, social, and digital competencies. Studies on digital supervision show that technology platforms can accelerate feedback, strengthen collaboration, and support teachers' professional development, although their success still depends on digital literacy, infrastructure, and school policy support.(Nurtamami 2024) Therefore, application-based supervision management should be understood not merely as a replacement for manual methods, but as a transformation in the governance of teacher development.

International studies over the past five years have shown that educational technology can support improvements in learning when implemented according to local needs. Rodriguez Segura emphasized that access to technology alone is not sufficient to improve educational outcomes, because EdTech interventions must be adapted to policy barriers and user contexts.(Rodriguez-Segura 2022) A systematic review by Amemasor et al. also found that effective teacher professional development programs require practical training, continuous mentoring, collaboration, and institutional support. (Amemasor et al. 2025) These findings indicate that effective digital supervision should not rely solely on applications, but must be integrated with teacher development strategies.

Previous studies have proposed several relevant methods, such as instructional supervision, principal-led e-supervision, professional learning networks, and TPACK-based digital training. Wiyono et al. showed that group and individual supervision techniques influence teachers' work motivation and performance.(Wiyono et al. 2022) Rasdiana et al. found that instructional e-supervision, principals' technological leadership, and a school's digital culture play important roles in improving teachers' professional digital competence.(Rasdiana et al. 2024) Nisa et al. also showed that digital academic supervision has a direct impact on teacher professionalism and strengthens professional learning networks.(Nisa et al. 2024) From these various findings, the best approach identified in previous studies is digital supervision that integrates applications, principal leadership, a collaborative culture, and teacher mentoring.

However, previous studies still have several limitations. Most studies discuss digital supervision in general, while only a limited number examine specific EdTech applications as instruments for supervision management in public secondary schools.(Sihombing et al. 2021) Existing studies also tend to emphasize teachers' digital competence in a broad sense, rather than the professionalism of Islamic Religious Education (PAI) teachers within the context of local schools.(Habibah 2022) In addition, there are still few studies that position the Ruangguru application as a means of transforming supervision management that includes vision, planning, implementation, impact evaluation, challenges, solutions, and institutional recommendations.(Maisyaroh et al. 2021) These limitations represent an important gap, because digital applications will only be effective if their implementation is examined within the context of users, school culture, and subject-specific needs.

This study seeks to address these limitations by examining the implementation of supervision management transformation based on the Ruangguru application to strengthen the professionalism of PAI teachers at SMAN 1 Ciomas. The focus of the study is directed toward four main issues: the vision, planning, and policies of supervision transformation; the implementation and strategies of digital supervision; the evaluation of its impact on teacher professionalism; and the challenges, solutions, and recommendations for strengthening digital supervision. This focus is aligned with the need for empirical research that not only describes the use of technology, but also assesses how technology shapes school management practices.

Theoretically, this study is grounded in the concept of academic supervision as a reflective, collaborative, and improvement oriented process of professional development. The TPACK framework is also relevant because strengthening teacher professionalism in the digital era requires the integration of technological, pedagogical, and content knowledge. Shi et al. showed that professional development based on digital pedagogy can improve teachers' competence, digital self efficacy, and work well being. (Shi, Sin, and Wang 2025) From the perspective of Islamic education, supervision can also be understood as an effort of tarbiyah that guides teachers to continuously improve their knowledge, ethics, responsibility, and teaching quality.

The scientific novelty of this study lies in the integration of the Ruangguru application into the supervision management of PAI teachers within the context of a public secondary school. This study does not merely view technology as a reporting tool, but also as a professional development system that connects planning, monitoring, feedback, evaluation, and teacher competency development. Therefore, this study is expected to contribute to the development of an adaptive, data-driven, and contextually relevant digital supervision model for Islamic education.

Based on the background, brief literature review, research gap, and identified novelty, this study aims to analyze the vision, planning, and policies of supervision management transformation based on the Ruangguru application; to analyze the implementation and strategies of digital supervision in strengthening the professionalism of Islamic Religious Education teachers; to evaluate the impact of using the Ruangguru application on changes in teacher professionalism; and to formulate the challenges, solutions, and recommendations for strengthening digital supervision at SMAN 1 Ciomas, Bogor Regency.

Method

This study employs a qualitative approach using a phenomenological case study design to understand the implementation of supervision management transformation based on the Ruangguru application in strengthening the professionalism of Islamic Religious Education (PAI) teachers at SMAN 1 Ciomas, Bogor Regency. (Sugiyono 2022) A qualitative approach was chosen because this study focuses on the experiences, perceptions, practices, and meanings constructed by the principal, PAI teachers, and performance managers in the digital supervision process. The phenomenological approach is relevant for exploring participants' subjective experiences regarding the transformation of the supervision system from conventional patterns to an application based system. Qualitative phenomenological studies have also been used in recent research to understand participants' experiences in depth through semi structured interviews and thematic analysis. (Nasir et al. 2023)

A single case study design was used because this research positions SMAN 1 Ciomas as a specific site with empirical experience in using the Ruangguru application to support supervision, reporting, evaluation, and the strengthening of PAI teachers' competencies. The case study design is appropriate for examining educational practices that occur in real contexts, especially when researchers seek to understand in depth the processes, actors, strategies, challenges, and impacts of a policy or innovation (Nurhayati and Rosadi 2022) Case studies in educational contexts have also been used by Sakti et al. to investigate context based educational practices through interviews, document analysis, and data triangulation. (Sakti, Endraswara, and Rohman 2024)

The unit of analysis was the experience of teachers at SMAN 1 Ciomas regarding Ruangguru-based supervision, with a population of 45 teachers from Mathematics and

Natural Sciences (MIPA) and Social Sciences (IPS) subjects. The unit was focused on 12 purposively selected teachers (with at least five years of experience and involvement in supervision activities) as key informants to achieve data saturation. "The individual teacher as the unit of analysis in a supervision case study ensures depth of the phenomenon." This selection is relevant because teachers are the main actors in professional transformation. The initial research manuscript also stated that data were obtained from the principal, Islamic Religious Education (PAI) teachers, and performance managers through in-depth interviews and document analysis related to the use of the Ruangguru application. Informants were selected purposively based on the following criteria: involvement in digital supervision, understanding of the use of the Ruangguru application, experience in the supervision process, and willingness to provide information openly. Purposive sampling is appropriate in qualitative research because researchers require informants who have direct experience with the phenomenon being studied.(Nurhaeni et al. 2024)

The research data sources consisted of primary and secondary data.(Nurhayati 2024) Primary data were obtained through in depth interviews with the principal, PAI teachers, and performance managers, as well as through observations of the process of using the Ruangguru application in supervision activities. Secondary data were obtained from school documents, supervision schedules, supervision reports, teacher evaluation records, training documentation, and digital archives related to the use of the Ruangguru application. The use of interviews and documents helped the researcher obtain rich, contextual data that could be compared across sources. Research by Sianturi et al. also showed that interviews and a phenomenological case study approach can be used to understand the relationship between technology, educational practices, and the users' social context. (Sianturi, Lee, and Cumming 2025)

Data collection techniques were conducted through semi structured interviews, non participant observation, and documentation study.(Widodo, Gustari, and Chandrawaty 2022) Semi structured interviews were used to explore informants' experiences regarding the vision of supervision transformation, strategies for using the application, changes in teacher professionalism, technical challenges, and solutions developed by the school. Non participant observation was carried out to examine the digital supervision process, communication patterns between the principal and teachers, and the ways teachers uploaded or reported supervision data through the application. Documentation study was conducted by reviewing supporting documents so that the interview data would not stand alone. Semi structured interviews have proven effective for exploring professional experiences in depth and flexibly, as used in the study by Yosep et al.(Yosep et al. 2025)

The main instrument of this study was the researcher, supported by interview guidelines, observation sheets, and a document review checklist.(Sanoto and Paseleng 2024) The interview guidelines were developed based on four research focuses: the vision, planning, and policies of digital supervision; the implementation and strategies of supervision; the evaluation of its impact on teacher professionalism; and the challenges, solutions, and recommendations for strengthening supervision. Observation sheets were used to record the process of application use, interactions among actors, reporting regularity, and forms of supervisory feedback. The document review checklist was used to assess the consistency between interview findings, supervision documents, and actual practices occurring at the school. The use of these multiple instruments strengthened data traceability and helped the researcher maintain the consistency of the findings.

Data were analyzed using a thematic analysis model that included data transcription, data reduction, coding, theme categorization, interpretation, and conclusion

drawing.(Wiyono et al. 2022) Interview data were transcribed verbatim, then read repeatedly to identify patterns of meaning relevant to the research focus. Initial codes were grouped into major themes, such as digital supervision planning, administrative efficiency, transparency of evaluation, teacher collaboration, digital literacy, and infrastructure barriers. Thematic analysis was used because it can systematically organize qualitative data and help researchers identify patterns in participants' experiences. This approach has also been used in recent qualitative studies examining intervention strategies based on participants' experiences.

Data validity was maintained through source triangulation, technique triangulation, member checking, and an audit trail.(Solehati et al. 2025) Source triangulation was conducted by comparing information from the principal, PAI teachers, and performance managers. Technique triangulation was conducted by comparing interview, observation, and document data. Member checking was carried out by asking informants to review the summaries of interview results to avoid misinterpretation. An audit trail was maintained by preserving records of the research process, interview guidelines, observation findings, documents, and coding procedures. Triangulation strategies have also been used in educational case studies to ensure that research findings are grounded in strong and accountable data. (Sakti, Endraswara, and Rohman 2024)

This study observed research ethics principles by obtaining informants' consent, explaining the purpose of the study, maintaining confidentiality of identities, and using the data solely for academic purposes.(Sianturi, Lee, and Cumming 2025) Informants' names may be anonymized using codes, such as KS for principal, GPAI for Islamic Religious Education teacher, and PK for performance manager. These ethical measures are important because the research concerns professional experiences, performance evaluation, and internal school processes. Through these procedures, this study is expected to produce an empirical, systematic, and relevant description of how the Ruangguru application plays a role in transforming supervision management and strengthening the professionalism of Islamic Religious Education teachers at SMAN 1 Ciomas.

Results and Discussion

1. Vision, Planning, and Policy of Supervision Transformation Based on the Ruangguru Application

The findings of the study show that the supervision transformation at SMAN 1 Ciomas began with the school's need to change the manual supervision system into one that is faster, more transparent, and better documented. The principal viewed the Ruangguru application as a digital tool to strengthen supervision management, particularly in the aspects of reporting, performance monitoring, feedback provision, and the professional development of Islamic Religious Education (PAI) teachers. These findings indicate that supervision transformation is not only related to the use of an application, but also to changes in the school's work culture.

Planning for application based supervision was carried out through the determination of supervision schedules, the division of roles among the principal, PAI teachers, and performance managers, as well as the preparation of digital reporting mechanisms. Teachers no longer merely received supervision as an administrative activity, but began to understand supervision as a data-based professional development process. This pattern is in line with the findings of Wiyono et al., who showed that educational supervision influences teachers' work motivation and performance when

conducted systematically through both group and individual approaches.(Wiyono et al. 2022)

School policy was also reflected in the socialization of application use, initial assistance, and periodic evaluation of teachers' difficulties. This policy is important because the success of digital supervision cannot depend on the application alone. Schools need to ensure user readiness, infrastructure support, and a collaborative culture. Rasdiana et al. emphasized that principal-led e-supervision, technological leadership, and a school's digital culture play important roles in improving teachers' professional digital competence.(Rasdiana et al. 2024)

The principal played an important role in monitoring the implementation of supervision and ensuring that all teachers followed the agreed procedures. This is consistent with studies showing that policies supporting digitalization, such as structured task distribution and clear scheduling, can facilitate the implementation of supervision and improve the quality of decision-making in education.(Sermal 2025)



Figure 1. Supervisor Development and Strategic Planning Framework

Figure 1 above shows a black-and-white infographic illustrating the framework of "Vision, Planning, & Policy of Supervision Transformation" in education, with a concept that connects four main interrelated components in a circular diagram. (Zonneveld, Conroy, and Lines 2025) Each component contains explanations focusing on how these elements work together to support a more efficient and technology-based supervision transformation.

In line with this policy, the Ruang GTK application has become a solution for facilitating communication between teachers and the principal. Previously, communication was conducted face to face, which required more time, but with the application, the process can now be carried out online and more efficiently. Ageng Harang, a teacher at SMAN 1 Ciomas, stated that the use of this application is very helpful in preparing reports and communicating with the principal. This has accelerated administrative processes and reduced teachers' workload, as previously all tasks had to be completed manually.(Tamsah, Ilyas, and Yusriadi 2021)

However, the implementation of this application is not free from challenges, especially for teachers who have limitations in digital literacy. Senior teachers, in particular, experienced difficulties in operating the Ruang GTK application. Therefore, the school provided training and guidance to help them understand how this digital system works. Research also shows that training and mentoring are key factors in overcoming the barriers of digitalization in education. This demonstrates the importance of an inclusive approach to ensure that all teachers, without exception, can adapt to this new

technology.(Yuan, Liu, and Kuang 2021)

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These findings indicate that the vision of supervision transformation at SMAN 1 Ciomas is directed toward three main goals. First, the school aims to improve the efficiency of supervision. Second, the school seeks to build transparency in teacher evaluation. Third, the school intends to strengthen the professionalism of PAI teachers through more measurable professional development. In the context of Islamic education, this policy holds important value because PAI teachers are not only responsible for teaching religious knowledge, but also for fostering students' morals, character, and exemplary behavior.

2. Implementation and Strategies of Digital Supervision

The implementation of the Ruangguru application was carried out through a gradual process. The first stage was the introduction of the application's features to teachers. The second stage involved training teachers to use the application for reporting purposes, document uploads, and access to teaching materials. The third stage was the utilization of the application in the supervision process and performance evaluation. The fourth stage was the reflection on supervision results through discussions among teachers, the principal, and performance managers.

After the initial socialization was conducted, every teacher was required to complete supervision reports through the application, participate in training related to its features, and make use of various facilities within the platform, such as searching for teaching materials and engaging in independent training. This step not only simplified the reporting process but also made supervision more structured and digitally documented. Studies on the use of digital platforms for academic supervision indicate that the implementation of such systems can make planning, observation, evaluation, and feedback processes more systematic and data-driven.

The strategy for implementing digital supervision in the school also involves regular monitoring and evaluation. The principal can monitor teachers' performance reports in real time, making the assessment process more transparent and accountable. Findings from academic studies support that integrated digital supervision enables educational supervisors to identify strengths and weaknesses in performance more quickly, while also providing more targeted feedback to teachers.(Kurniadi, Dwi, and Ismanto 2025)

In addition, the use of technology in supervision creates opportunities for collaborative strategies between teachers and supervisors. With application based digital features, communication between teachers and the principal can be conducted in a more flexible and efficient manner. This strategy is similar to research findings showing that digital-based supervision can expand professional learning networks and strengthen working relationships through rapid and collaborative feedback.

However, significant challenges arise from teachers' readiness to use digital technology optimally. Some teachers, particularly senior teachers, experience difficulties in using applications and digital features due to limited technological literacy. Other

studies reveal that the lack of technological skills among teachers is a major challenge in the implementation of digital supervision and requires continuous training so that they are able to adapt to the demands of technology-based supervision.

Therefore, the school's long-term strategy includes continuous mentoring and guidance, both through formal training and support from colleagues who are more technologically proficient. This approach is relevant to the literature, which explains that professional training and ongoing support are essential for improving teachers' capacity to adopt digital technology in supervision and learning. (Karmina et al. 2021)

Furthermore, the integration of digital supervision strategies with broader performance management goals is designed so that supervision activities contribute to the continuous improvement of teacher professionalism. With performance data automatically available, decision-making can be more evidence-based, and competency development planning can be arranged more strategically. This is consistent with the literature stating that digital supervision management can improve the quality of learning through monitoring that is oriented toward the development of teachers' competencies.

Finally, this digital supervision strategy is directed toward building a culture of continuous evaluation within the school. With a transparent system and data that can be accessed in real time, supervision evaluation becomes part of teachers' ongoing professional learning. Similar studies conclude that a digital supervision approach encourages teachers' active participation in professional reflection and strengthens their involvement in overall efforts to improve the quality of education.

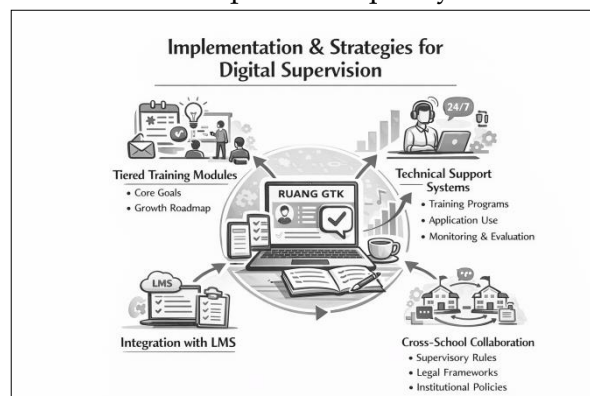


Figure 2. Digital Educational Supervision Framework.

Figure 2 above is a black-and-white infographic illustrating "Implementation & Strategies for Digital Supervision." The diagram presents an interconnected structure with five main components that support digital supervision strategies: Tiered Training Modules. This section highlights the importance of structured training at several levels, starting from core goals to a growth roadmap. The training is intended to improve teachers' digital skills in using digital supervision applications such as Ruang GTK.

This strategy shows that the Rungguru application functions not only as an administrative tool, but also as a medium for professional development. PAI teachers can prepare reports, access materials, receive feedback, and document learning progress in a more organized manner. Nurtamami found that digital platforms can improve supervision efficiency through real-time feedback, collaboration, and the acceleration of teachers' professional development. (Nurtamami 2024)

The research findings also show that the implementation of digital supervision has accelerated communication between the principal and teachers. Previously, the supervision process required face-to-face meetings and physical documents. After the

application was introduced, reporting could be carried out online, allowing the principal to more easily monitor administrative completeness and the progress of teacher performance. This is consistent with the study by Nisa et al., which found that digital academic supervision has a direct effect on teacher professionalism and strengthens personal learning networks. (Nisa et al. 2024)

A collaborative strategy also emerged in the form of peer mentoring among teachers. Teachers who were more familiar with technology helped colleagues who experienced difficulties. This practice built an internal learning community within the school. Zamiri and Esmaeili explain that technology can strengthen knowledge sharing within learning communities because it encourages the exchange of experiences, collaboration, and active participation. (Zamiri and Esmaeili 2024)

Thus, the implementation of Ruangguru based supervision at SMAN 1 Ciomas operates through both technical and social strategies. The technical strategy is reflected in the use of the application for reporting and documentation. The social strategy is reflected in training, mentoring, discussions, and cooperation among teachers. Both complement each other, because digital transformation will not succeed without changes in user behavior.

3. The Impact of Supervision Transformation on the Professionalism of PAI Teachers

The digital transformation of supervision at SMAN 1 Ciomas has had a tangible impact on teacher professionalism, particularly in the area of work discipline. The digital system automatically records delays or inaccuracies in reporting through the application, encouraging teachers to be more careful and orderly in carrying out their duties. Dadang Sutisna stated that this mechanism makes teachers aware that every action is monitored transparently and directly by the system, which significantly promotes greater discipline in their daily routines. Other studies also show that digital supervision can improve administrative consistency and punctuality in academic tasks due to real time reporting that is well documented.

In addition to its effect on discipline, the digital transformation of supervision has also encouraged collaboration among teachers. The use of digital platforms facilitates cross disciplinary communication through discussion features, the sharing of teaching materials, and mutual feedback, which were previously difficult to maintain consistently in manual supervision. This is consistent with findings that digital supervision expands opportunities for teachers to engage in their professional networks and enriches learning experiences through digital interaction. (Irawan et al. 2025) With online learning groups and discussion forums, teachers can support one another in solving both technical and pedagogical problems that arise in the implementation of digital supervision.

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The teaching profession has also experienced changes in terms of transparency in performance evaluation. In a digital system, supervision results can be accessed quickly and systematically by relevant stakeholders, thereby reducing subjectivity and

dependence on individual judgment. Easy access to data also helps make the evaluation process more objective and accurate, allowing teachers to receive clear feedback regarding their strengths and areas for improvement. International literature shows that data-based evaluation through digital platforms can strengthen professional reflection because teachers receive more concrete evidence to support the feedback they receive.

The reduction of administrative burden has also become one of the most significant professional changes. Teachers can now spend less time preparing manual reports and shift their focus to teaching and professional development. This efficiency occurs because the automation of supervision and reporting processes reduces duplication of administrative tasks and accelerates internal workflows. Research findings show that digital platforms enable teachers to allocate more time to professional activities directly related to improving the quality of learning, rather than spending time on repetitive administrative tasks.

Another positive impact of digital supervision is the improvement of teachers' professional competence in integrating technology into their teaching practices. By becoming accustomed to using digital applications for supervision, teachers also develop technological skills that are relevant to the demands of 21st-century learning. Empirical studies note that digital supervision practices contribute to the development of teachers' digital competence, which is an integral part of professionalism in the era of educational digitalization. This competence includes the ability to access, evaluate, and effectively utilize digital resources in the teaching and learning process as well as in professional collaboration. (Danial, Mumu, and Nurjamil 2022)

However, changes in professionalism are not always positive without challenges. Some teachers feel pressure because they are required to master new digital skills in order to meet supervision demands. This creates a need for further training and continuous learning support so that teachers can adapt without excessive pressure. Research also emphasizes that the improvement of professionalism through digital supervision largely depends on teachers' readiness to learn technology and the support provided by educational institutions.



Figure 3. Teacher Professional Growth & Impact Framework.

Figure 3 above is a black-and-white infographic illustrating Impact Evaluation & Changes in Professionalism in the context of digital supervision. The infographic consists of three main interconnected parts arranged in a cycle, showing how digital transformation in educational supervision influences teachers' professional development. The following is an explanation of each part: Improved Digital Skills. This section describes the direct impact of digital supervision on teachers' technological skills, with a focus on support for senior teachers and increased confidence in using technology. (Fuadiy et al. 2025) The laptop and mentor icons represent efforts to empower senior

teachers who may have difficulty adapting to new technology. Through training and mentoring, teachers can improve their digital skills in order to use supervision applications effectively.

The research findings show that the Ruangguru application has a positive impact on the professionalism of PAI teachers. The first impact can be seen in improved discipline. The digital system encourages teachers to be more orderly in preparing reports, uploading documents, and meeting supervision schedules. Data stored in the application makes work processes easier to monitor and evaluate.

The second impact can be seen in increased transparency. Teachers are able to understand the aspects being assessed, the evaluation results, and the areas that need improvement. This transparency reduces subjectivity because the supervision process no longer depends solely on manual records. Nisa et al. showed that digital academic supervision influences teacher professionalism because digital supervision strengthens data access, learning networks, and teachers' self-development processes. (Nisa et al. 2024)

The third impact can be seen in the improvement of teachers' digital competence. PAI teachers who were previously less familiar with applications began learning how to manage digital documents, search for learning resources, and use learning platforms to support the teaching process. Hidayat et al. showed that the ability to use digital devices and the perceived benefits of technology are correlated with more positive online learning experiences in Indonesia. (Hidayat et al. 2022)

The fourth impact is reflected in changes in the way teachers reflect on learning. Teachers began using supervision data to identify the strengths and weaknesses of their teaching practices. This process is important because teacher professionalism is not only assessed through administrative completeness, but also through the ability to improve teaching practices. Shi et al. showed that TPACK based professional development can improve digital pedagogical competence, digital self efficacy, work engagement, and teacher well being. (Shi, Sin, and Wang 2025)

In the context of PAI teachers, this improvement in professionalism has a broader meaning. PAI teachers must be able to integrate Islamic content, pedagogical strategies, and digital technology in a balanced manner. The Ruangguru application can serve as a tool to strengthen learning management, but the substance of Islamic education must remain at the center of teaching practices. Therefore, digital supervision needs to assess administrative aspects, pedagogy, role modeling, and the quality of internalizing religious values.

4. Challenges in the Implementation of Digital Supervision

The digital supervision transformation implemented at SMAN 1 Ciomas faces a number of technical obstacles, particularly related to limited internet access and disruptions in the digital application. These limitations often hinder the process of completing reports, monitoring performance, and maintaining real-time communication between teachers and the principal. Research shows that unequal infrastructure, including unstable internet access in some educational settings, is one of the main factors that hampers the effectiveness of digital supervision in education. (Lastini et al. 2025)

In addition, low levels of digital literacy among teachers, especially senior teachers, have also slowed the process of adopting supervision technology. Teachers who are less familiar with the features of digital applications tend to experience difficulties during adaptation, which affects reporting timeliness and the effective use of the digital system. Other studies have also identified that a lack of technological skills is a significant challenge in the implementation of digital supervision, requiring specialized training support to improve teachers' competence in educational technology. (Rugaiyah et al. 2022)

The research findings identified several major challenges in the implementation of supervision based on the Ruangguru application. The first challenge is limited digital literacy, especially among some teachers who are not yet accustomed to using applications regularly. Teachers need time to understand the features, reporting procedures, and ways to utilize the application in supervision.

The second challenge is technical problems, such as internet connectivity, devices, and the stability of application access. These issues can hinder timely reporting and reduce teachers' comfort in using the digital system. Rodriguez-Segura emphasized that the success of EdTech in developing countries is determined not only by access to technology, but also by implementation design, user readiness, and the context of educational policy. (Rodriguez-Segura 2022)

The third challenge is the change in work habits. Some teachers are still accustomed to manual supervision and require adaptation to the digital system. This change requires schools not only to provide instructions, but also to offer consistent mentoring. Amemasor et al. emphasized that effective teacher professional development programs must include practical training, continuous mentoring, collaboration, and institutional support. (Amemasor et al. 2025)

The fourth challenge is the risk that digital supervision may become overly administrative. If the application is used only for uploading reports, the substance of teacher development may weaken. Therefore, the principal needs to ensure that digital data are used for reflective discussion, not merely for administrative control. Wiyono et al. emphasized that effective supervision needs to combine group and individual techniques in order to improve teacher performance and motivation. (Wiyono et al. 2022)

To address these obstacles, SMAN 1 Ciomas has implemented a continuous training strategy involving teachers who are more technologically proficient to guide their colleagues. This approach represents a collaborative solution that ensures senior teachers receive direct support from their peers, allowing the adaptation process to proceed more quickly and without excessive pressure. This type of training model is supported by research stating that collaborative approaches and mentoring can accelerate technology adoption in educational environments.

In addition to internal training, the establishment of teacher learning communities has also become an effective solution strategy. These communities function as forums for sharing experiences and strategies for using supervision technology, while also strengthening mutual support among educators. Research on digital supervision emphasizes that collaborative learning among teachers can stimulate innovation and collectively strengthen their digital skills.

Another technical solution is adjusting the application architecture to make it more user friendly, especially for users with less experience. Requests for the Ruang GTK application to be simpler and easier to understand reflect the real needs of users with varying levels of technological skills. Academic studies show that intuitive and simple interface design is an important factor in increasing technology adoption among educators.

The next recommendation is the periodic improvement of the school's technological infrastructure, for example through upgrading internet networks, providing additional devices, and establishing technical support facilities. Research suggests that investment in digital infrastructure in schools can reduce gaps in technology access and improve the overall effectiveness of digital supervision.

Finally, further integration between digital supervision applications and other educational systems (for example, learning management systems and teacher performance evaluation systems) can provide greater benefits in terms of coordination and data

utilization. This is consistent with findings stating that the integration of digital systems can strengthen data analytics, provide more comprehensive feedback, and create a holistic digital learning ecosystem.



Figure 4. Sustainable Educational Digital Supervision Framework.

Figure 4 above is a black and white infographic illustrating “Challenges, Solutions, and Recommendations” in the implementation of digital supervision in education. The diagram is divided into three interconnected main sections, describing the challenges faced, the solutions implemented, and the recommendations to ensure the sustainability of digital supervision. The following is an explanation of each section: 1. Challenges Limited Infrastructure: Limited infrastructure, such as restricted Wi Fi access and insufficient digital devices, is one of the main obstacles in the implementation of digital supervision.

5. Solutions and Recommendations for Strengthening Digital

The first solution is to design phased training for all PAI teachers. Initial-stage training can focus on the use of the basic features of the application. Advanced-stage training can be directed toward the use of supervision data for improving learning. This pattern is important because one-time training is not sufficient to build stable digital competence. Amemasor et al. emphasized that digital professional development needs to be continuous, contextual, and supported by mentoring. (Firmansyah et al. 2021)

The second solution is to build a PAI teacher learning community based on digital supervision. This community can serve as a space for sharing best practices, discussing technical challenges, reviewing teaching materials, and reflecting on supervision results. Zamiri and Esmaeili showed that technology-supported learning communities can strengthen collaboration, communication, and knowledge exchange. (Zamiri and Esmaeili 2024)

The third solution is to strengthen the role of the principal as a technology leader. The principal needs to ensure that digital supervision operates according to the principles of professional development, not merely monitoring. The principal also needs to promote a digital culture that is safe, open, and supportive of teachers’ professional growth. Rasdiana et al. showed that principals’ technological leadership and a school’s digital culture contribute to improving teachers’ professional digital competence. (Rasdiana et al. 2024)

The fourth solution is to improve infrastructure and technical support. Schools need to ensure the availability of internet access, devices, and technical assistance when teachers encounter problems. Without this support, the application can become an additional burden for teachers. Nurtamami showed that digital supervision faces challenges such as limited infrastructure, low digital literacy, and inadequate policy

support. (Nurtamami 2024)

Based on these findings, this study recommends a digital supervision model based on four components. The first component is clear school policy. The second component is teacher training and mentoring. The third component is the use of applications for documentation, feedback, and reflection. The fourth component is continuous evaluation of the impact of supervision on the professionalism of PAI teachers. This model positions the Ruangguru application as part of a professional development ecosystem, rather than as an end goal.

Overall, these findings and discussions show that the implementation of supervision management transformation based on the Ruangguru application at SMAN 1 Ciomas is able to strengthen efficiency, transparency, collaboration, and the digital competence of PAI teachers. However, the success of this transformation depends greatly on teachers' readiness, the leadership of the principal, infrastructure support, and the continuity of training. With proper management, digital supervision can become a relevant instrument for professional development in Islamic education in the digital era.

Conclusion

This study demonstrates that the early generations of Qur'anic exegetes in Indonesia developed through a gradual historical process beginning with the pioneering

This study shows that the transformation of supervision management based on the Ruangguru application at SMAN 1 Ciomas has been able to meet the school's need for a supervision system that is more efficient, transparent, collaborative, and well documented. The first objective was achieved through findings showing that the vision, planning, and policies of digital supervision were directed toward changing supervision from a manual administrative activity into a data-based professional development process. The principal, PAI teachers, and performance managers played important roles in ensuring that the application was used not only as a reporting tool, but also as a means of strengthening learning quality and teacher professionalism.

The second objective was achieved through the gradual implementation of digital supervision, starting from socialization, training in application use, digital reporting, performance monitoring, and reflection on supervision results. This strategy demonstrates that the success of Ruangguru-based supervision depends not only on technology, but also on user readiness, mentoring, communication, and a collaborative work culture. The Ruangguru application helps accelerate supervision workflows, facilitates documentation, and strengthens teachers' access to digital learning resources.

The third objective was achieved through changes in the professionalism of PAI teachers. The use of the Ruangguru application encouraged improvements in discipline, transparency of evaluation, digital skills, and teachers' reflective abilities. Teachers became more accustomed to preparing learning documents digitally, receiving feedback, and using supervision results as a basis for improving learning. In the context of Islamic Religious Education, this change is important because teacher professionalism is related not only to teaching administration, but also to the ability to foster students' values, morals, and character in a more purposeful manner.

The fourth objective was achieved through the identification of challenges and solutions. The main challenges included limited digital literacy, technical problems, internet access, and teachers' adaptation to the new system. The required solutions include phased training, peer mentoring among teachers, strengthening the role of the principal as a technology leader, improving infrastructure, and conducting continuous evaluation. In this way, digital supervision does not stop as a technical innovation, but

develops into a more mature and sustainable teacher development system.

Scientifically, this study advances the field of Islamic educational supervision by showing that digital applications can be contextually integrated into the supervision management of PAI teachers. Previous studies have discussed digital supervision in general, whereas this study positions Ruangguru as a supervision instrument within the context of a public senior high school and Islamic Religious Education learning. The main contribution of this study lies in strengthening a digital supervision model that combines school management, digital pedagogy, professional reflection, and Islamic educational values.

The findings of this study can be applied to other schools that wish to build application-based supervision systems. The resulting model can be expanded through the development of digital supervision guidelines, needs-based teacher training, learning communities for PAI teachers, and the integration of supervision data with school performance evaluation systems. The Ruangguru application can also be further developed as a professional development space containing supervision records, feedback, follow-up plans, and teacher development portfolios.

Further research needs to be conducted on a broader scale. Future studies may compare several schools with different levels of digital readiness. Quantitative research may also measure the effect of using the Ruangguru application on pedagogical competence, teaching performance, and student learning outcomes. In addition, school action research can be conducted to test the effectiveness of phased training, digital mentoring, and PAI teacher learning communities as follow-up to application-based supervision. With such developments, digital supervision can become a strategic instrument for strengthening the professionalism of PAI teachers and improving the quality of Islamic education in the digital era.

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