Development of Peer-Based Academic Supervision Model in Increase Skills Teaching The 21st Century in Elementary Schools

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Abstract: This study aims to develop a peer-based academic supervision model to enhance 21st-century teaching skills in elementary schools. The research employs a Research and Development (R&D) approach based on the Borg & Gall model, utilizing a mixed-method design with a Sequential Exploratory Design. The research subjects consist of teachers from SD Negeri Banyubiru 01, Semarang Regency, Central Java Province. Data were collected through observations, interviews, questionnaires, and documentation, which were subsequently analyzed using both qualitative and quantitative approaches. Product validation involved two experts (content and language). Qualitative data validation applied source triangulation and technique triangulation, while quantitative data validation employed expert judgment. Qualitative data were analyzed using the Miles and Huberman model, while quantitative data were processed using the Mann-Whitney statistical test. Expert validation resulted in an average score of 90% (categorized as highly feasible) for content and 93% (highly feasible) for language. The findings indicate that the peer-based academic supervision model positively impacts teachers' teaching skills, as evidenced by the Mann-Whitney test results, which reveal a significant difference in teachers' pedagogical competence before and after the implementation of academic supervision. Through this approach, teachers can exchange experiences, provide constructive feedback, and enhance their professional teaching practices. Moreover, the model fosters a collaborative school culture and encourages innovation in teaching methods. The peer-based academic supervision model has proven effective in improving teachers' teaching skills in the context of 21st-century education. Therefore, this model is recommended for broader implementation with policy support from schools and educational authorities to sustainably enhance the quality of teaching and learning.

Introduction

21st-century education requires teachers to possess adaptive skills in response to technological advancements and competency-based learning demands. Manik et al., (2024) highlighted in their study that, "However, many teachers are still not fully prepared to adopt innovative teaching methods." Educational supervision serves as a process aimed at creating effective learning environments, where teachers and students engage through a series of coaching, mentoring, and guidance activities (Mahlopi, 2022). The primary goal of educational supervision is to enhance teachers' pedagogical competencies, ultimately expected to improve students' learning outcomes (Marzano & Frontier, 2011). In practice, academic supervision is typically tailored to the school's needs and goals, encompassing three

main stages: planning, implementation, and follow-up (Irayati et al., 2022). However, its implementation in schools still faces several challenges, including the ineffectiveness of top-down approaches and the limited capacity of school principals in fulfilling their supervisory roles. The inadequate execution of academic supervision duties by school principals may lead to suboptimal performance and functioning of the principals themselves (Yunus & Radjab, 2022). This issue cannot be overlooked, considering the significant positive impact of academic supervision on teachers' performance and pedagogical competence.

The implementation of supervision in Indonesia has yet to contribute optimally due to various challenges faced by teachers, including diverse educational backgrounds, limited professional adjustment, variations in achievement levels and creativity, and differing leadership capabilities (Rahman & Rizal, 2021). In several schools, principals still employ traditional approaches where academic supervision tends to be authoritarian and hierarchical, failing to align with the spirit of collaborative learning essential for future education. Many principals are not yet fully optimal in performing their supervisory roles, which often overlap with other administrative duties, resulting in poorly organized supervision. This issue is further corroborated by Handayani, (2021) who found that supervision failed to function effectively due to the overwhelming administrative workload of principals, leading to role conflicts between their supervisory and managerial responsibilities.

Successful academic supervision conducted by school principals can foster a more dynamic and high-quality learning environment, positively impacting school educational outcomes. Therefore, principals must provide effective guidance, coaching, and direction to teachers and staff (Prasetia, 2021). Ma'ayis & Syahidul Haq, (2024) explain that educational supervision within school environments functions to improve learning quality, especially in response to ongoing technological developments. Furthermore, supervision contributes to enhancing teachers' skills through adaptation to scientific and technological advancements and the application of various supervision techniques. Effective educational supervision is expected to ensure that learning processes run efficiently, ultimately achieving the established educational goals (Gotwalt, 2023). According to Glickman Carl et al., (2017) one positive aspect of supervision is the training process, where teachers can exchange knowledge about lesson planning and instructional media development. Additionally, principals can facilitate learning enhancement by inviting resource persons who are competent in addressing teachers' questions related to teaching processes.

SDN Banyubiru 01, located in Banyubiru District, Semarang Regency, Central Java Province, is one of the elementary schools that has implemented academic supervision. However, its implementation is still limited to supervision carried out by the principal and school supervisors. There has been no initiative to develop a peer-based academic supervision model that allows teachers to learn from and share experiences with each other in improving students' 21st-century learning skills. To date, the development of 21st-century skills has received limited attention from teachers. When preparing teaching modules, some teachers at SDN Banyubiru 01 have not explicitly formulated success indicators for the four core skills students should develop through learning. This leads to students experiencing difficulties when transitioning to higher grades, as the necessary foundational skills were not adequately developed in previous classes. Teachers tend to focus more on the teaching process and evaluation, without placing enough emphasis on these critical skills.

Regarding the academic supervision at SDN Banyubiru 01, it has not been conducted regularly and sustainably as expected, contributing to doubts about the quality of learning at the school. Current academic supervision appears forced, with principals, regardless of their academic background, expected to understand and oversee all subject areas taught by

teachers. This creates another issue—when teachers discuss subject-specific content, the principal, who may lack expertise in that area, struggles to provide meaningful feedback. Another challenge arises when supervision is entirely dependent on the principal, leading to reluctance among teachers and a lack of naturally occurring academic supervision during actual teaching processes. Based on interviews with teachers at SDN Banyubiru 01, it was revealed that teachers tend to over-prepare for formal supervision sessions, which results in teaching practices that do not reflect their usual classroom practices. Teachers feel pressured to demonstrate their best performance due to the principal's presence, contradicting the fundamental principles of academic supervision. Some teachers also suggested that the principal should develop a simpler, more practical, and efficient supervision model to enhance both principals' and teachers' performance in academic supervision.

It is important to note that academic supervision by the principal is a key effort to enhance teachers' competence in managing learning processes at school (Mansyur, 2021). Despite the challenges, academic supervision must still be carried out. However, the principal must also effectively perform other managerial duties, as they serve both as leaders and managers within their schools. "Supervision implementation is the responsibility of the principal, to be conducted meticulously and in accordance with a predetermined schedule" (Astuti, 2022). According to Ministerial Regulation (Permendikbud) No. 15 of 2018, one of the principal's main duties is to provide academic mentoring through academic supervision. This supervision aims to support teachers in developing their competencies in managing learning while simultaneously encouraging improved teacher performance within the school environment. Based on these considerations, updating the academic supervision system currently in place is necessary.

Therefore, innovative approaches are needed to bridge the gap between the demands for 21st-century learning skills and effective supervision methods. Peer-to-peer academic supervision can serve as an alternative solution to address these challenges. In this model, teachers provide mutual feedback, suggestions, and guidance related to their classroom teaching practices. Through teacher collaboration, this approach is expected to enhance students' 21st-century learning skills.

Peer-based academic supervision serves as a responsive solution to the demands of 21st-century education. This era requires mastery of various skills, competencies, and educational system adjustments to meet global challenges that continuously evolve in the digital and information age. In this context, education systems must not only focus on knowledge transfer but also on developing critical thinking, creativity, communication, and collaboration skills (4C) as core foundations for students. Furthermore, the integration of technology into learning processes becomes crucial to ensure students acquire adequate digital literacy, enabling them to adapt to scientific advancements and the dynamics of future work environments (OECD, 2012)

The development of this peer-based supervision model is expected to trigger a paradigm shift in supervision processes and teacher professional development. Collaboration enabled by the peer-based approach is anticipated to make academic supervision more dynamic and supportive, providing space for exchanging ideas and best practices while stimulating the development of 21st-century learning skills more effectively. The objective of this study is to develop a peer-based academic supervision model at SDN Banyubiru 01, Banyubiru District, Semarang Regency, Central Java Province.

Previous studies on academic supervision primarily emphasized the role of school principals or supervisors in guiding teachers, as highlighted in the study by (Sunaryo, 2020). The supervision approaches applied were still traditional, focusing on basic administrative

and pedagogical aspects, with previous academic supervision models tending to follow a top-down approach, in which the principal or supervisor provided feedback to teachers (Wiyono et al., 2021). In contrast, this study develops a peer-based academic supervision model, offering a more collaborative and democratic approach (Tamrin, 2021). This research also introduces a peer-based approach that allows teachers to learn from and evaluate each other in a more open and supportive environment (Nurjanah, 2021). Furthermore, this study integrates 21st-century teaching skills, such as technology integration, project-based learning, and collaborative approaches into the supervision process (Cabahug et al., 2024). The developed model not only assesses conventional teaching aspects but also evaluates how teachers apply critical thinking, communication, collaboration, and creativity skills in their teaching practices. Digital platforms are also utilized to facilitate observation, feedback, and collaborative reflection among teachers, thereby enhancing the effectiveness of academic supervision. The findings of this study can serve as a foundation for other elementary schools to adopt peer-based academic supervision to improve teaching quality in the digital era. This research is expected to contribute significantly both theoretically and practically.

From a practical perspective, this study enhances teaching quality by strengthening teacher competencies, building a constructive feedback system, and encouraging innovation in teaching practices aligned with 21st-century demands. Additionally, the findings are beneficial for school principals in improving the effectiveness of management and academic supervision, while also fostering a collaborative culture within the school environment. For supervisors, this study supports the optimization of teacher performance monitoring and evaluation processes, improves the effectiveness of academic supervision, and assists in the systematic implementation of educational policies. Theoretically, this research contributes to the development of academic supervision concepts, enriches the theory of teacher professionalism, and deepens the study of 21st-century learning skills and collaboration in education. The results of this study also have implications for the advancement of educational management science, serving as a reference for designing more effective learning policies and strategies in the future.

Research Method

The study adopts the Research & Development (R&D) model, referring to the definition provided by Borg & Gall. The selection of the R&D approach aims to produce a tangible product (Febrianti et al., 2024). This product is expected not only to be acceptable to its users but also to meet criteria related to sustainability and practical applicability. The final output of this research is the design of a peer-based academic supervision model, which is then materialized into an implementation guidebook specifically developed for elementary school teachers. The research employs a mixed-method approach, utilizing the Sequential Explanatory Design. The researcher first collects and analyzes quantitative data to gain an initial overview of the research phenomenon. Data collection techniques applied in this study include observation, interviews, and documentation. Meanwhile, the quantitative research process is intended to obtain more in-depth knowledge (Bahrum, 2021)

The model proposed by Gall (2023) in this study was implemented gradually, with limitations up to the fifth stage, namely the revision stage following the initial trial. Nevertheless, despite these procedural limitations applied in this research, they did not significantly affect the final outcomes, as also asserted by (Mulyatiningsih, 2023). The revisions resulting from the initial trial were still able to provide an accurate and relevant depiction in line with the research objectives, even though not all stages of the model were fully implemented.

The product validation technique employed in this research utilized Expert Judgment. This validation process involved assessments by experts with relevant competencies in the corresponding field. These experts thoroughly examined and reviewed the product, provided constructive feedback, and suggested improvements to enhance the product's quality. Regarding the feasibility assessment of the developed model, the validation process involved subject matter experts who focused on the content aspects of the model, as well as language experts who assessed the linguistic aspects, including grammar, diction, and adherence to standardized language conventions.

The product trial was conducted only once, in the form of a limited field trial, consisting of: (a) expert judgment, to refine and review the initial product while gathering feedback for improvements from expert validators, and (b) a field trial, to empirically test and validate the product's quality through its actual implementation in schools. The researcher conducted this initial limited trial in a selected school, involving 10 participants. During the field trial, the researcher actively observed how the participants interacted with and applied the product in real teaching and learning situations.

In this study, data collection was carried out using multiple methods, including interviews, document analysis, observations, and questionnaires. Interviews were used to gather in-depth understanding of teachers' and school principals' experiences, needs, and perspectives regarding the implementation of peer-based academic supervision. Document analysis was conducted to collect and analyze relevant secondary data to support this study. The analyzed data consisted of official documents, such as academic supervision policies applied in schools, teacher professional development programs, and guidelines or standards for 21st-century teaching skills.

Through observations, the researcher assessed how the supervision process took place, including teacher interactions with peers, the provision of constructive feedback, and the reflective strategies employed. In addition, the observations focused on how teachers applied 21st-century teaching skills in the classroom, such as technology integration in learning, the development of students' critical thinking skills, and the use of collaborative and communicative teaching methods.

The questionnaire enabled the researcher to assess the extent to which teachers found peer-based supervision helpful in developing innovative teaching methods, enhancing professional collaboration, and adopting 21st-century skills such as critical thinking, effective communication, creativity, and the use of technology in teaching. Furthermore, the questionnaire was also designed to explore teachers' satisfaction levels, challenges encountered during the supervision process, and suggestions for improving the model to make it more effective and better suited to the instructional needs of elementary schools.

Qualitative data validation was conducted using methodological triangulation and source triangulation. Methodological triangulation refers to the process of verifying data by comparing results obtained from different data collection methods, such as interviews, observations, and document analysis (Ule et al., 2023). Meanwhile, quantitative data validation was carried out through expert judgment to ensure the validity of the collected data. The validity and reliability of the questionnaire instruments were tested, along with descriptive and inferential statistical analysis, to ensure the accuracy of the research findings.

The analytical techniques employed in this study refer to the Miles & Huberman (1994) model, which consists of three main stages in qualitative data processing: data reduction, data display, and conclusion drawing with verification. According to Sugiyono, (2021) data reduction involves summarizing, selecting key points, and focusing on essential aspects relevant to the research objectives. Furthermore, a study by Komor & Grzyb (2023)

emphasized that data reduction assists researchers in managing complex data, enabling the identification of patterns, themes, and significant relationships, thereby facilitating accurate conclusion drawing.

For quantitative data analysis, validity testing was conducted using product-moment correlation analysis or expert judgment validation, along with descriptive statistical analysis. The questionnaire data were analyzed using descriptive statistics to examine frequency distribution, mean, standard deviation, and the percentage of respondents' perceptions regarding the peer-based academic supervision model. The effectiveness test of the model was conducted by comparing the results before and after the implementation of peer-based academic supervision. To measure the significant differences in teaching skills before and after the model's application, the Mann-Whitney test was employed, as this is a non-parametric test suitable for small sample sizes (fewer than 30 participants, with only 10 teachers involved). Data analysis was supported by SPSS version 25.

Results and Discussion

This study focuses on the development of a Peer-Based Academic Supervision Model at SDN Banyubiru 01, Banyubiru District. Based on data collected through interviews, observations, document analysis, and needs assessment questionnaires, several key findings emerged: Academic supervision at the school has so far been carried out periodically by the principal through classroom observations, individual discussions, and feedback provision. However, several challenges were identified, including limited time allocated for supervision, ineffective supervision methods, and a tendency for supervision to be more evaluative rather than developmental. Moreover, existing supervision documentation has not been optimized to provide specific and actionable improvement recommendations.

The challenges in implementing supervision include: Limited supervision time: Principals have extensive administrative responsibilities, which often reduces the time available for comprehensive supervision. Ineffective supervision methods: The supervision process tends to be one-way, lacking reflective dialogue or constructive mentoring. Teacher resistance: Some teachers perceive supervision as a rigid assessment rather than a supportive professional development process. Communication barriers: The absence of open dialogue between the supervisor and teachers contributes to the overall ineffectiveness of the supervision process.

The development procedure refers to a series of steps that must be followed before producing a finalized product. In the context of developing this peer-based academic supervision model, the first step is conducting a needs analysis. At this stage, it is crucial to thoroughly understand who the primary users of the model are, what their specific needs entail, and how the model can provide effective solutions to address those needs.

The next stage is model design, in which various elements such as the cover, introduction, content, and guidelines for use/implementation are carefully structured to ensure ease of use and clarity. Once the design is completed, the third stage involves model development, which includes implementing the content based on the established design. The fourth stage is product testing, where the model is tested with a group of respondents to gather constructive feedback and suggestions for improvement to enhance the model's quality. The final stage is model evaluation, where the effectiveness of the model is assessed based on how well it meets its intended objectives and delivers positive impacts for its users. By systematically and thoroughly applying these stages in the development of the peer-based academic supervision model, the final product is expected to fully address the users' needs and optimally support the achievement of the intended educational goals.

The development of the Peer-Based Academic Supervision Model was designed to enhance the effectiveness of academic supervision through a collaborative approach. This peer-based academic supervision model was structured into five key components, each of which was carefully designed to ensure the supervision process is conducted in a systematic and effective manner. These components include: Planning Conference, Peer-Based Academic Supervision Planning, Observation Implementation, Analysis, and Supervision Reporting.

During the Planning Conference stage, various preparations are carried out to ensure that the supervision process can run effectively and provide positive impacts on teaching quality. Activities at this stage include: forming a peer supervision team, socializing the concept and benefits of supervision, and preparing supervision instruments. The activities conducted during the Peer-Based Academic Supervision Planning stage include: identifying the 21st-century teaching skills to be assessed, determining supervision pairs (peer pairing), setting the supervision schedule, and developing observation and reflection strategies.

The core stage of the supervision process involves teachers collaborating by observing each other's teaching practices during ongoing classroom activities, while simultaneously documenting their observations using the previously prepared supervision instruments. This process aims to enhance teaching quality through constructive peer feedback. During this process, supervision assessments consider several key aspects that reflect overall teaching quality. These aspects include: (1) Lesson Planning, (2) Teaching Implementation, and (3) Evaluation of Student Learning Outcomes.

In the analysis stage, two primary activities are carried out: analyzing the supervision results and conducting follow-up actions to address areas for improvement.
The Peer-Based Academic Supervision Handbook was developed as a reference for implementing the supervision process. This Peer-Based Academic Supervision Model Handbook consists of: Title Page, Preface, Table of Contents, List of Figures, Introduction, Theoretical Review, Model Development, Conclusion, and References.

In the Introduction section, the handbook elaborates on the background, objectives, target users, and legal foundations of the model. The Theoretical Review section presents a comprehensive review of theories related to Academic Supervision, Peer Supervision, Peer-Based Academic Supervision, and 21st-Century Teaching Skills. Meanwhile, the Model Development section presents the supervision model framework, along with guidelines for its implementation and the expected outcomes from using this handbook. The final section, Conclusion, summarizes the key points and provides practical recommendations for effective implementation.

As a primary reference, this handbook is designed to support school principals and teachers in establishing a more collaborative, reflective, and technology-integrated supervision system to enhance teaching quality. With the availability of this handbook, academic supervision is expected to evolve from merely an evaluation tool into a sustainable professional development platform.

Table 1. Material Validation Test Assessment Results Table

No	Assessment Components	Percentage	Criteria
1	Content validation (Suitability of the model to the concept of Academic Supervision)	88%	Legitimate
2	Construct Validation (Clarity and Usability)	91%	Legitimate
3	Product Usability (Practicality and Benefits)	91%	Legitimate
	Means	90%	Legitimate

Based on the assessment results presented in the table on Material Validation Testing for the Peer-Based Academic Supervision Model, the expert panel assigned a score of 90%. Referring to the category interval table, this score falls into the "Highly Feasible" category, indicating that the product is ready for field testing without requiring major revisions. However, the experts provided feedback recommending the inclusion of relevant theories from Glickman and Marzano, as well as the incorporation of these theories into the supervision steps to enhance user understanding.

Table 2. Language Validation Test Assessment Results Table

No	Assessment Components	Percentage	Criteria
1	Conformity with Indonesian Language Rules	92%	Legitimate
2	Clarity of Language	88%	Legitimate
3	Accuracy of Design and Content	100%	Legitimate
4	Integration	92%	Legitimate
	Means	93%	Legitimate

Meanwhile, the results of the Language Validation Test presented in the table show that the model obtained a score of 93% from the expert. Based on the categorical interval table, this score falls into the "highly feasible" category, indicating that the product can proceed to the trial phase without requiring major revisions. However, the expert recommends reviewing the use of letters, syllables, and sentence structure to ensure alignment with the Enhanced Indonesian Spelling System (EYD), particularly in relation to the title. The results presented in the table above are grouped and categorized according to the criteria outlined in the following table:

Table 3. Category Interval Table

No	Interval	Category
1	81-100%	Very worthy
2	61-80%	Worthy
3	41-60%	Quite decent
4	21-40%	Not feasible
5	0-20%	Totally unworthy

To examine the effectiveness of this supervisory model, the researcher conducted a series of product trials. The trial process began with the submission of the product to the school principal, followed by the implementation of peer-based academic supervision, and concluded with teachers completing an assumption questionnaire as part of the evaluation process. The product trial aimed to measure the effectiveness of the peer-based academic supervision model in enhancing 21st-century teaching skills competencies. The assessment results, both before and after the supervision, indicated a significant improvement in teachers' pedagogical competency scores, as measured by the predetermined rubric.

Table 4. of Average Analysis of Trial Results Before and After Peer-Based Supervision

No	Teacher Name	Research site	Before supervision	After supervision
1	Respondent 1	SDN Banyubiru 01	73%	96%
2	Respondent 2	SDN Banyubiru 01	74%	98%
3	Respondent 3	SDN Banyubiru 01	73%	95%
4	Respondent 4	SDN Banyubiru 01	76%	98%
5	Respondent 5	SDN Banyubiru 01	74%	96%
6	Respondent 6	SDN Banyubiru 01	71%	95%
7	Respondent 7	SDN Banyubiru 01	72%	98%
8	Respondent 8	SDN Banyubiru 01	74%	96%

9	Respondent 9	SDN Banyubiru 01	76%	96%
10	Respondent 10	SDN Banyubiru 01	75%	95%
11	Respondent 11	SDN Banyubiru 01	76%	95%
12	Respondent 12	SDN Banyubiru 01	73%	95%
Mean			73.3%	96.3%

Results of the Supervisory Model Trial, Before the implementation of peer-based academic supervision, the average teacher competency was only 73.3%. However, after the supervision was conducted, the competency increased to 96.3%. The results of the Mann-Whitney test on the data related to teachers' teaching skills before and after the implementation of peer-based academic supervision are presented in the following figure:

→ **NPar Tests**

Mann-Whitney Test

Ranks

	Waktu_Penilaian	N	Mean Rank	Sum of Ranks
Hasil_Penilaian	Sebelum	12	6.50	78.00
	Sesudah	12	18.50	222.00
	Total	24		

Test Statistics[a]

	Hasil_Penilaian
Mann-Whitney U	.000
Wilcoxon W	78.000
Z	-4.228
Asymp. Sig. (2-tailed)	.000
Exact Sig. [2*(1-tailed Sig.)]	.000[b]

a. Grouping Variable: Waktu_Penilaian
b. Not corrected for ties.

Based on the table above, it is clearly evident that the average teaching skill ranking of teachers before the implementation of peer-based academic supervision was 6.50. However, after the supervision was conducted, the average ranking increased to 18.50. This indicates an improvement in the average ranking of teachers' teaching skills following the implementation of peer-based academic supervision. Furthermore, the analysis results show that the Asymp. Sig value is 0.000, meaning Asymp. Sig < 0.005. Consequently, the null hypothesis (Ho) is rejected, and the alternative hypothesis (Ha) is accepted. These findings indicate a significant difference in teachers' teaching skills before and after the implementation of peer-based academic supervision.

The final conclusion from the Mann-Whitney test confirms that the implementation of peer-based academic supervision has a significant impact on improving teachers' teaching skills. The substantial difference in average ranking (6.50 before versus 18.50 after) further reinforces the finding that teachers' teaching skills improved after the supervision was conducted. Overall, based on the statistical analysis of the Mann-Whitney test, peer-based academic supervision has been proven effective in enhancing teachers' teaching skills.

Discussion

The research findings indicate that Peer-Based Academic Supervision is an effective solution for addressing the challenges of academic supervision at SD Negeri Banyubiru 01. The significant improvement in teaching skills following the implementation of this model proves that a collaborative approach is more effective than conventional supervision, which tends to focus solely on administrative evaluation. This aligns with previous research showing that collaborative instructional supervision effectively enhances teacher performance

and learning quality, as evidenced by improvements in teacher performance scores and student learning outcomes after the implementation of this method (Nurinsani et al., 2024).

The success of this model is supported by several key factors: Active teacher involvement in the supervision process, which enhances a sense of ownership and motivation for professional growth, in line with Razak et al., (2022) in Teacher Quality Improvement Strategies through Academic Supervision. Flexibility in the supervision process, allowing teachers to receive more relevant and applicable feedback, as highlighted by Adam et al., (2024), which facilitates more efficient observation and evaluation of the teaching process, consistent with findings from Asmarani et al., (2021), where e-supervision was shown to streamline observation and evaluation. The establishment of professional learning communities, enabling teachers to share experiences and collectively develop their skills, as explained by Razak et al., (2022).

Therefore, the Peer-Based Academic Supervision model not only enhances teachers' teaching skills but also fosters a stronger culture of professionalism within the school environment. For broader implementation, this model can be adopted by other schools, with necessary adjustments to fit the specific needs and characteristics of each educational institution.

Conclusion

Based on the findings of this study, it can be concluded that the peer-based academic supervision model has a positive impact on teachers' teaching skills. Through this approach, teachers can share experiences, provide constructive feedback, and enhance their professionalism in teaching. In addition, this model also fosters a collaborative culture within schools and encourages innovation in teaching methods. The peer-based academic supervision model has proven to be effective in improving teachers' teaching skills in the context of 21st-century education. Therefore, this model is recommended for wider implementation, supported by policies from schools and educational authorities, to continuously enhance the quality of learning.

Recommendation

Based on the conclusions of this study, the following recommendations are proposed: (1) Policy Support from Schools and Educational Authorities, to ensure the sustainability of peer-based academic supervision, stronger policy support from both schools and educational authorities is required. Clear regulations will enhance appreciation for this model and ensure its implementation as part of the educational quality assurance system. (2) Provision of Training and Facilities, Schools should provide specialized training for teachers regarding peer-based academic supervision. In addition, adequate time and facilities must be allocated to enable teachers to carry out supervision effectively, without being burdened by excessive administrative tasks. (3) Flexible Time Management, Peer-based academic supervision requires more flexible time planning to ensure its effective implementation without disrupting teachers' instructional hours. By establishing a more systematic supervision schedule, teachers will be able to better balance their teaching duties and supervision responsibilities. (4) Development of Objective Evaluation Instruments, to enhance objectivity in evaluations, it is necessary to develop systematic guidelines and supervision instruments, such as clear observation rubrics, reflection forms, and structured feedback mechanisms. This will help prevent biases that may arise from personal relationships among teachers. (5) Strengthening Collaborative Culture, Schools should foster a collaborative culture among teachers by providing dedicated spaces for discussions and joint reflections. With open and structured

communication, peer supervision can become an effective instrument for improving teaching quality. The conclusions and recommendations provided in this study are expected to contribute to the development of peer-based academic supervision as an innovative solution to enhance teachers' professionalism and improve learning quality in elementary schools.

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