Al-Ishlah: Jurnal Pendidikan
Vol.16, 2 (June, 2024), pp. 1383-1398
ISSN: 2087-9490 EISSN: 2597-940X, DOI: 10.35445/alishlah.v16i2.4626

The Development of a Scientific-based Academic Supervision Management Model

Rokhman[1], Nirva Diana[2], Yurnalis Etek[3], Koderi[4], Muhammad Sufian[5]

[1] Universitas Islam Negeri Raden Intan Lampung; Lampung; Indonesia; rokhman.uinradenintan@gmail.com
[2] Universitas Islam Negeri Raden Intan Lampung; Lampung; Indonesia; nirvadiana@radenintan.ac.id
[3] Universitas Islam Negeri Raden Intan Lampung; Lampung; Indonesia; yurnalisetek@radenintan.ac.id
[4] Universitas Islam Negeri Raden Intan Lampung; Lampung; Indonesia; koderi@radenintan.ac.id
[5] Universitas Islam Negeri Raden Intan Lampung; Lampung; Indonesia; iyansufian1998@gmail.com

ARTICLE INFO

Keywords:

Development of academic supervision;
ADDIE model;
OQEAC approach

Article history:

Received 2023-09-04
Revised 2023-12-05
Accepted 2024-03-29

ABSTRACT

The role of supervision in education is crucial for fostering teacher professionalism, necessitating a supervision model tailored to teachers' needs. The current supervision models often fall short of meeting these needs and lack efficacy and efficiency. This study aimed to devise a scientific-based academic supervision management model, evaluate its viability, and determine its impact on supervisor competency in terms of effectiveness and efficiency. Using the ADDIE model, a scientific-based academic supervision management model was crafted. Data were gathered through observation, questionnaires, and documentation, involving principals and supervisors in Tulang Bawang Regency. A mixed-methods approach was applied for data analysis. The developed model, encapsulating the principles of Observing, Questioning, Experimenting, Associating, and Communicating (OQEAC), underwent evaluation by experts in content, language, and media, and was found suitable for field testing. Subsequent trials with principals and supervisors in both small and large groups affirmed the model's high effectiveness and its capability to enhance supervisor competence. This research corroborates that the OQEAC model, grounded in scientific principles, significantly improves education supervisors' skills, thereby elevating teaching and learning quality. The OQEAC-based academic supervision represents a potent strategy for augmenting educational quality and empowering teachers to lead learning outcome improvements.

Corresponding Author:
Koderi
Universitas Islam Negeri Raden Intan Lampung, Indonesia; koderi@radenintan.ac.id

1. INTRODUCTION

Ensuring quality education is fundamental for achieving national education development goals, with effective teaching as a pivotal factor in educational quality (Utami & Vioreza, 2020). In this context, academic supervision emerges as a critical mechanism to improve teaching and learning within educational settings (Setyaningsih & Suchyadi, 2021). Through academic supervision, supervisors and principals provide essential guidance, feedback, and support to teachers, thereby fostering an enhanced

teaching and learning atmosphere (Djuhartono, Ulfiah, Hanafiah, & Rostini, 2021; Guntoro, 2020). This process enables teachers to gain insightful feedback on their pedagogical practices, pinpoint areas needing improvement, and bolster their strengths, ultimately cultivating an effective learning environment.

Academic supervision is a process carried out by educational supervisors to assess, guide, and support teachers in enhancing the quality of education and their performance within schools (Aljassar & Altammar, 2020; Marmin, Koderi, Muin, Fahri, & Imam, 2020). Academic supervision is a process that facilitates ongoing professional development for teachers (Mu'alimin, Rusdiana, & Sulhan., 2021). In order for formal education to successfully accomplish its objectives, it is crucial for key individuals such as supervisors, principals, and teachers to effectively fulfill their roles and responsibilities.

Supervisors are individuals who have the responsibility of overseeing and coordinating the activities of company employees in carrying out assigned tasks (Cichocka, 2016; Darvishmotevali, 2019; Villarreal-Davis, Sartor, & McLean, 2021). Supervisors play a crucial role in the learning process of teachers. They oversee, monitor, and guide teachers to ensure that their actions align with educational objectives (Darvishmotevali, 2019). The supervision conducted by school supervisors or principals contributes to the enhancement of learning by assigning teachers the duty of continuously improving the learning process. Supervisors have the responsibility of ensuring that teachers adhere to the curriculum, deliver instruction effectively, and attain the educational objectives established by the institution (Agung Pambudi & Gunawan, 2019; Amelia, Aprilianto, Supriatna, Rusydi, & Zahari, 2022; Komalasari, Arafat, & Mulyadi, 2020). Supervisors play an essential part in the field of education. They offer valuable feedback and support to teachers, helping them identify areas where they can improve and enhance their teaching skills (Sitepu, Simarmata, Nasution, & Wau, 2023). Supervisors play an essential role in upholding educational quality and facilitating the attainment of an institution's educational objectives.

Supervisors play a vital role in enhancing the quality of education by managing and overseeing teaching and learning in schools. The principal's responsibility as a supervisor involves regularly observing teachers' teaching and learning activities (Saleh & Mutiani, 2021). Principals play a role in the planning and organization of professional development programs for teachers and academic staff (Pont, 2020). Teachers can enhance their skills and introduce new teaching approaches by participating in training sessions, workshops, or similar activities (Robiyah, Koderi, Muin, & Hijriyah, 2021). Regularly monitoring the performance of teachers and academic staff is a crucial task (Shernoff, Sinha, Bressler, & Ginsburg, 2017). The evaluation serves as the foundation for recognizing or assisting in efforts to improve quality (Pont, 2020; Zanza et al., 2021). Principals play a crucial role in enhancing the quality of education by serving as dedicated supervisors. They have a positive influence on promoting teacher professionalism and fostering an inspiring learning environment for all members of the school community.

Teachers are one of the keys to the success of educational institutions that must be properly supervised (Ampofo, Onyango, & Ogola, 2019). It is important to focus on implementing academic supervision to allow teachers to enhance their professional development (Lorensius, Hanim, & Warman, 2022). Teachers have a crucial and unique role in shaping and nurturing students' growth and progress. Educators impart knowledge and serve as facilitators, motivators, and sources of inspiration in the learning process. Teachers are responsible for guiding students in developing skills, expanding their knowledge, and preparing them for future endeavors. Furthermore, educators establish a secure and encouraging educational setting where students can experiment, seek clarification, and explore novel concepts. Teachers offer valuable feedback and positive reinforcement to motivate students to achieve their maximum capabilities.

The implementation of academic supervision encounters several challenges. These challenges include inadequate supervision quality, absence of standardized supervision practices, and limited utilization of data in academic supervision (Azainil, Komariyah, & Yan, 2021; Setyaningsih & Suchyadi, 2021; Villarreal-Davis et al., 2021). Managing the academic supervision of teachers presents numerous intricate challenges. Hence, it is necessary to enhance supervision quality by fostering collaboration, implementing standardization, and developing academic supervision management models.

Interviews conducted at Madrasah Tsanawiyah in Tulang Bawang Regency reveal that supervision activities primarily centered on issuing directives and guidance to teachers, often in a manner not aligned with their actual academic needs. This approach resulted in insufficient support for teachers, particularly in the areas of planning, executing, and evaluating educational activities, leading to superficial and inadequate guidance. Key issues identified include: 1) Low scores in the 2019 Teacher Competency Test (UKG) in Tulang Bawang, particularly in pedagogical and professional areas; 2) A generic approach in supervision, indicating the absence of tailored academic supervision methods; 3) A mismatch between the supervision provided and the actual requirements of teachers, with a focus on developing models, methods, and techniques that may not be pertinent to teaching practices; 4) A lack of a scientific methodology in addressing problems within previous academic supervisions; 5) Supervision that predominantly emphasized procedural guidance, overlooking the core educational issues and failing to offer strategies to enhance teacher competency; 6) The absence of a proven effective and innovative academic supervision model to foster improvement in teacher competence.

Considering the issues identified at Madrasah Tsanawiyah in Tulang Bawang Regency, it becomes imperative to focus on developing an academic supervision management model that enhances the effectiveness and efficiency of academic supervision processes. While there have been developments in academic supervision models, a gap exists in integrating a scientific methodology into teacher supervision. Effective supervision ought to be grounded in a scientific, systematic, and evidence-based framework (Igumbor et al., 2022; Rahabav, 2016; Zhongxin Dai, 2015), in contrast to the often subjective, unstructured, and empirically unsupported methods currently prevalent (Nordentoft, Thomsen, & Wichmann-Hansen, 2013). Without a solid scientific basis, academic supervision risks failing to foster professional growth in educators and may not achieve its full potential in positively impacting educational quality.

Developing a scientific-based model for academic supervision management can help address this issue. The academic supervision management model was developed based on scientific principles and incorporates the characteristics of observing, questioning, experimenting, associating, and communicating (Zaim, 2017). This model incorporates scientific principles, systematic methodology, and empirical evidence to effectively manage the academic supervision of teachers. This model aims to enhance supervision, professional development of teachers, and the overall quality of teaching and learning in schools (Purwaningsih, Najwa, Nahidah, Hariyadi, & Su'ad, 2023; Sampirni, 2020).

Supervision based on scientific principles offers advantages to both supervisors and teachers. Firstly, supervisors or school leaders often have established guidelines for managing academic supervision. These guidelines help ensure that the quality of supervision teachers provide is consistent and reliable (Astarini, 2016; Wodahl, Mowen, & Garland, 2021). This approach does not rely on requests from teachers or other education personnel, such as laboratory assistants or librarians (Jahshan, Vinogradov, Wynn, Hellemann, & Green, 2019). In its implementation, monitoring, evaluation, and guidance for improvement are required. Supervision activities carried out following scientific steps are carried out by supervisors so that in supervision, there are steps to determine the right steps to solve learning problems in the classroom carried out by teachers.

The issues highlighted have necessitated the development of an academic supervision management model, centered on the meticulous collection of accurate and reliable data, and employing a methodical approach to enhance its efficiency and effectiveness. This research is dedicated to establishing a scientifically based model for managing academic supervision in Madrasah Tsanawiyah, with a targeted application in this context. The study's significant contribution lies in the formation of a scientific-based academic supervision management model within Tulang Bawang Regency, Lampung Province, Indonesia. Its primary goal is to support supervisors and educational supervisors in improving the standard of academic supervision and teaching performance in Madrasah Tsanawiyah.

2. METHODS

This research belonged to the category of research and development (R&D). The development model utilized was the ADDIE model, which comprises five stages: analysis, design, development, implementation, and evaluation.

2.1 Analysis

At this phase, scholars assessed the needs of school principals and supervisors in their supervisory roles through a two-stage analysis: performance and needs. The performance analysis aimed to pinpoint issues in materials, methods, and media used for teaching Arabic, with the goal of enhancing or developing a scientifically grounded academic supervision module. The qualitative needs analysis identified crucial materials, methods, and academic supervision modules to meet teachers' requirements (Lacerda, Petrillo, Pimenta, & Guéhéneuc, 2020). Data collection involved methods such as observation, interviews, and documentation. Initial research data was gathered through systematic observations and interviews with school leaders and teachers, enhancing the validity of the data (Dodds & Hess, 2021). The overarching objective was to design a scientifically-based academic supervision module aligning with teacher professionalism requirements.

2. 2 Module Design

The researcher presents the module framework. Within the module framework, the researcher established the general theory as the foundation for development, including the theory of the academic supervision model and the theories related to the development of scientific-based academic supervision. All theories involved the application of model development research concepts. Moreover, the model design aligned with the identification and needs analysis findings.

2.3 Development

The next step was creating a scientific-based academic supervision management model, presented as a module. Once the module had been developed, it underwent validation by subject matter experts and media experts. Before conducting validation, it was necessary to first create an instrument. The instrument used in this study was a questionnaire sheet with a value scale format of 4, 3, 2, and 1 (Campos, Pitombo, Delhomme, & Quintanilha, 2020). A score of 4 is considered excellent, 3 is considered high, 2 is moderate, and 1 is considered low.

2.4 Implementation

The validated modules were implemented at Madrasah Tsanawiyah Tulang Bawang, involving distribution, structured tasks, and a usability questionnaire. Implementation had two stages: observing user responses and testing academic supervision module effectiveness based on scientific principles. Teachers used a questionnaire with a 4-point value scale (4 for strong agreement, 3 for agreement, 2 for disagreement, and 1 for strong disagreement). The average score calculation used the percentage formula by dividing the answering teachers' number by the total and multiplying by 100 (Campos et al., 2020).

2.5 Evaluation

The academic supervision module evaluation process involves two stages. independent evaluation of the prototype and evaluation from experts in related fields reviewing the prototype. Data analysis assesses validity and feasibility, considering feedback from material and media experts as well as questionnaire responses from supervisors. A module is considered valid if it reaches a score of 61% or falls into the moderate or high valid category, in line with the standards of Indonesian language learning experts. The table below displays the product validity categories as defined by Akbar Sa'dun (Akbar Sa'dun, 2013).

Table 1. Criteria of Validity

Score	Category
0%-20%	Highly invalid, ineffective, incomplete, and unusable
21%-40%	Invalid, ineffective, incomplete, and unusable
41%-60%	Less valid, less effective, less complete, and cannot be used
61%-80%	Fairly valid, effective, and usable with minor improvements
81%-100%	Highly valid, complete, and can be used

The module is categorized as practical if it gets an assessment score of 50.01% from the teachers as users or is in the practical and very practical category. The following is a table of product validity categories according to Akbar Sa'dun (Akbar Sa'dun, 2013).

Table 2. Criteria of Validity

Score	Category	Description
75,01% - 100%	Very practical	Can be used without revision
50,01% - 75,00%	Practical	Can be used with minor revisions
25,01% - 50,00%	Less practical	Recommended to use
00,00% - 25,00%	Impractical	Can not be used

3. FINDINGS AND DISCUSSION

The results obtained from the research have to be supported by sufficient data. The research results and the discovery must be the answers, or the research hypothesis stated previously in the introduction.

3.1. Finding

3.1.1. Analysis

The initial research survey, based on interviews with two madrasah principals, uncovered shortcomings in teacher planning, administration, and regulatory compliance. The learning process faced suboptimal conditions, with minimal student engagement and a lack of authentic assessment in evaluations. Interviews with two school supervisors emphasized inadequate supervision, education, and training. Effective planning was notably absent, and monitoring failed to address instructors' learning needs. The findings underscored poor administration of teacher planning, non-compliance with regulations, and subpar learning experiences due to inadequate student engagement. The assessment process lacked authenticity, potentially distorting the measurement of student progress. Insights from school supervisors' interviews highlighted administrators' inadequate planning, overlooking teachers' demands during the learning process, and insufficient investment in their growth despite education and training. The accompanying table details the needs analysis findings.

Table 3. The Findings of the Need Analysis

No	Indicator	Previous Condition	Expected Condition
1	Planning administration	Unregulated teacher planning administration.	Administration that is following the regulative curriculum.
2	Process	Implementing academic supervision is still not optimal where teachers have not carried out the process under the applied curriculum.	The academic supervision module will obtain learning outcomes following the process standards per the applied curriculum.

3	Assessment result	Learning outcomes assessment, learning strategy design, and learning materials are still not as expected.	The scientific-based academic supervision module is expected to use authentic assessment.
4	Planning in supervision	Supervisors have not planned supervision appropriately.	Through the scientific-based academic supervision module, supervisors can organize the right plan.
5.	Supervision	Supervision is not yet based on the needs of teachers in learning.	By using the scientific-based academic supervision module, supervision will be carried out according to the teacher's needs.
6.	Supervisors have not been optimally trained.	There are a few forms of self-development, such as supervision, education, and training.	Through the scientific-based academic supervision module, supervisors can train themselves based on the module.

To overcome the issues with academic supervision, a review and analysis of literature studies based on developing scientifically based academic supervision models is conducted. This analysis includes reviewing and determining general theories that serve as the foundation for developing scientifically based academic supervision models, theories of developing scientifically based academic supervision, and more. These theories are all used as the foundation for the model development study.

3.1.2. Design

After the analysis, the design step focused on determining the goals and outcomes of the scientific-based academic supervision model by clearly defining the characteristics and components. This step developed a framework or draft supervision model with detailed supervision steps, procedures, and strategies.

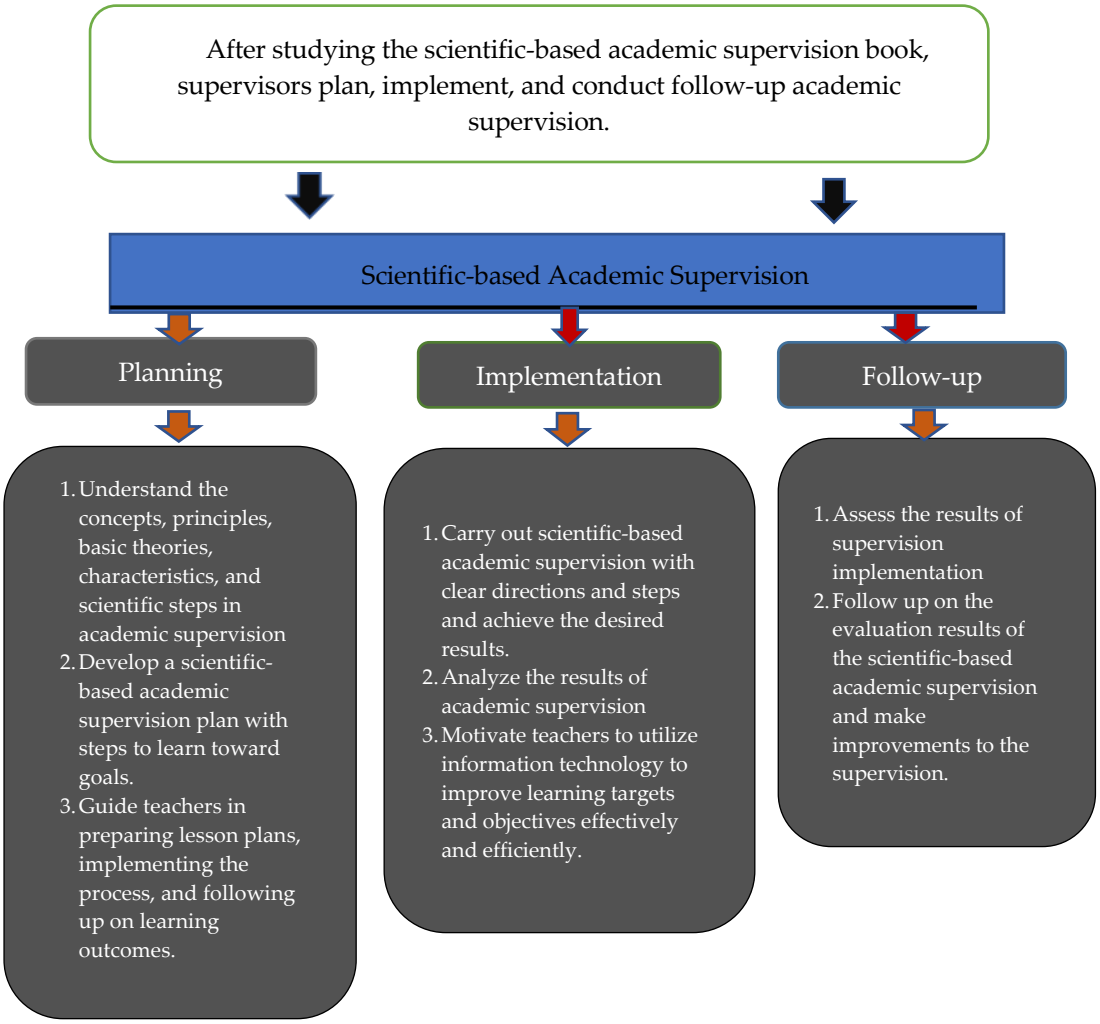

Figure 1. The Supervision Model

Development involves creating supporting materials and resources, such as guidelines, instruments, and evaluation tools, and adapting data collection methods. The steps in this overall design were intended to ensure that an academic supervision management model was created that is structured, relevant, and leads to an expected rise in the standard of academic supervision.

3.1.3. Development

The developed product of this research is an academic supervision management model based on scientific principles, integrating aspects from the ADDIE model (Analysis, Design, Development, Implementation, Evaluation) and utilizing the Observing, Questioning, Experimenting, Associating, and Communicating (OQEAC) supervision characteristics. This concept aims to enhance the efficiency and effectiveness of academic supervision in an educational context. The Observing phase involves supervisors observing teachers in various learning activities to grasp teaching methods thoroughly. Questioning encourages instructors to delve into course topics, teaching methods, and student understanding, promoting ongoing learning. Experimenting encourages teachers to try innovative learning strategies, collaborating with supervisors to assess their impact on student outcomes. Associating involves connecting theory and practice, expanding knowledge through reading, attending conferences, and communication. The academic supervision model incorporates analysis, planning,

development, implementation, and evaluation, aligning with the ADDIE model for comprehensive improvement in teaching and student outcomes.

3.1.4. Implementation

The field trial results revealed a high level of acceptance, applicability, and efficacy of the academic supervision model among one-to-one learners. Continuous feedback from participants further improved the model. Large-scale trials indicated widespread positive feedback, affirming the product's acceptance and utility. Participants suggested enhancements: 1) more engaging content, 2) clearer supervision procedures, 3) aligning module cover with content, and 4) changing paper size to A4. Developers responded by incorporating these recommendations, refining the module based on feedback from field trial participants to enhance overall quality.

3.1.5. Evaluation

The evaluation aims to determine the model's effectiveness, pinpoint its advantages and disadvantages, and lay the groundwork for future development and improvement. The feasibility test results by the material expert Dr. SW were 60. The results of the material expert assessment amounted to 52, then 52 divided by 60 and multiplied by 100, which is 86.6% in the good category. The material expert suggested paying attention to the sentence structure and links between sentences to match the applicable Indonesian language rules and continuing to make works in the form of books. The results of the expert assessment are displayed in Figure 2.

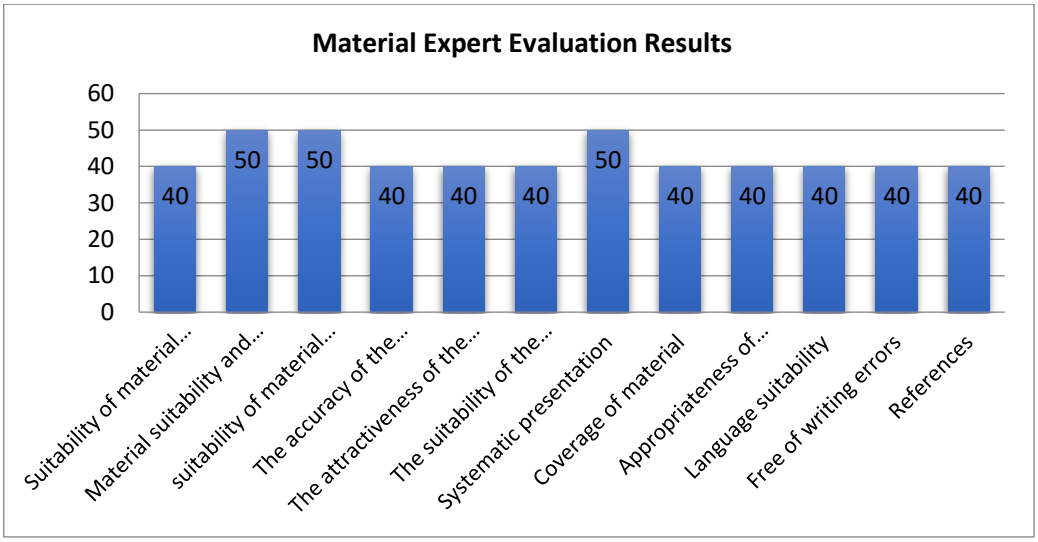

Figure 2. Material Expert Evaluation Results

The next evaluation is by academic supervision experts to obtain product feasibility on scientific-based academic supervision. The maximum number of scores is 55. The results of the material expert assessment amounted to 51, then 51 divided by 55 multiplied by 100%, resulting in 92.7% with an excellent category.

The product of developing this academic supervision model is very good in terms of alignment between PK, material in objectives, accuracy of examples, material coverage, suitability of evaluation, suitability of material with supervision practices and fields of work based on the assessment of Dr. D, The results of the material expert assessment are illustrated in Figure 3.

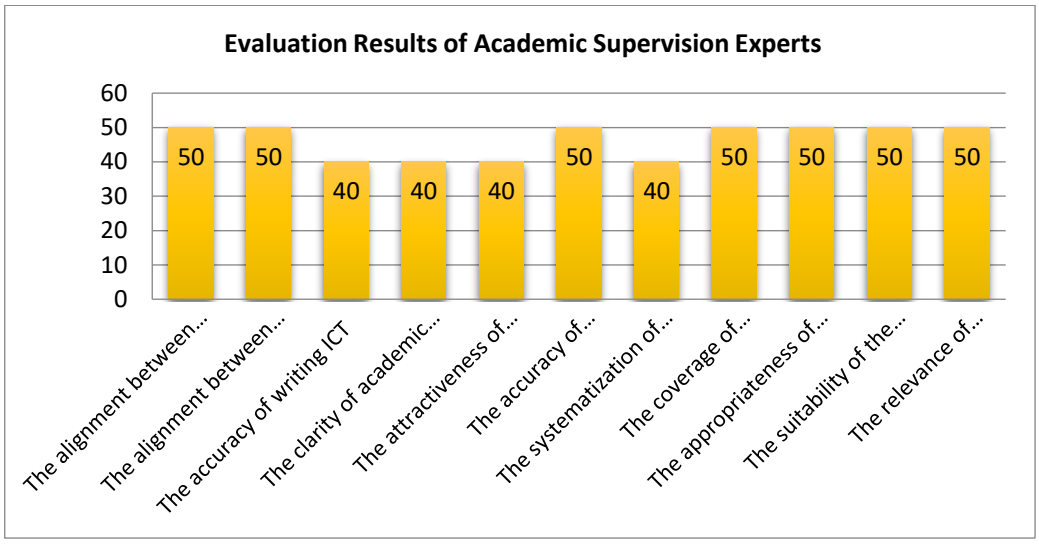

Figure 3. Evaluation Results of Academic Supervision Experts

The evaluation by media experts was conducted to assess the feasibility of the scientific-based academic supervision module, with the highest possible score being 50. The module received a score of 45 from the media experts, which translates to 90% when calculated as \(\frac{45}{50} \times 100 \), thereby falling into the 'excellent' category. The experts recommended enhancements such as incorporating more representative and creative imagery, ensuring color compatibility with the paper, and including more detailed examples. Details of the media expert's evaluation can be found in Figure 4.

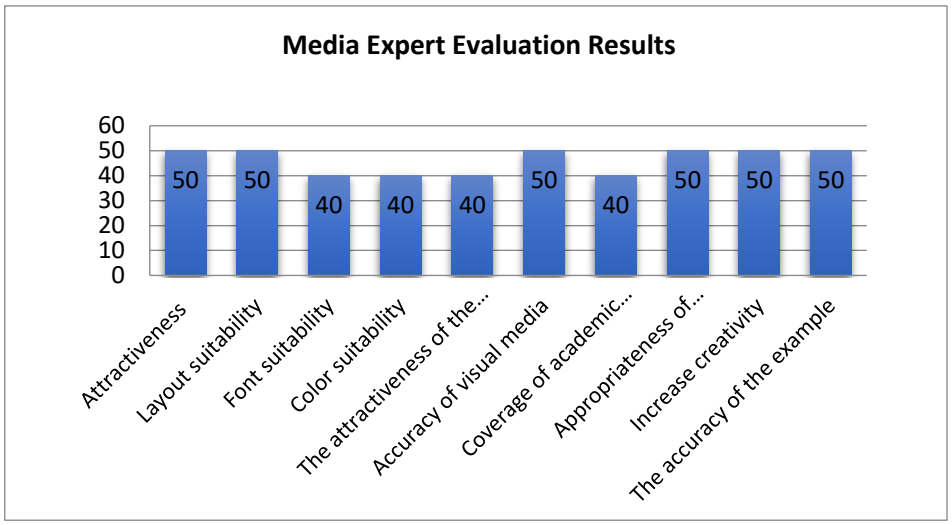

Figure 4. Media Expert Evaluation Results

The material expert suggested 1) paying attention to the sentence structure because some paragraphs need improvement, 2) reviewing the links between sentences, and 3) improving following applicable Indonesian language rules. Improvements have been made based on suggestions from the Media Expert and have been approved.

The supervision expert recommended enhancing the appeal of the supervision material and refining its systematic presentation, leading to subsequent improvements based on this feedback. Similarly, media experts proposed enhancements to the cover design to boost its attractiveness and motivational impact, and facilitate early content comprehension for users. They also advised on optimizing the paper size and font in the printed module to enhance its appeal and readability. These suggestions were implemented to improve the media aspects of the supervision module.

The development of the scientific-based academic supervision model aims to advance the current supervision approach to a more effective and refined version. This model encapsulates a product, process, and system that delineates a comprehensive and integrated set of procedures employed by educational supervisors, such as principals or supervisors, to enhance the educational process undertaken by teachers.

3.2 Discussion

Developing an academic supervision model is a systematic process to enhance the quality of supervision objectives. The goal is to create a scientific-based model that improves existing ones. This development is grounded in identifying problems through interviews, questionnaires, observations, and research needs analysis. It addresses program implementation experiences, teacher needs, and adapts to global educational progress. The model aims to enhance, maintain, and enrich academic supervision, aligning with expected goals. The research process yielded three main outcomes: planning, implementation, and follow-up of academic supervision. The impact of product development is evident in enhanced proficiency for education supervisors, utilizing scientific methods and trial results to improve competence.

The scientific approach used in scientific-based academic supervision in education offers notable benefits for the professional development of teachers and the enhancement of learning quality. This approach allows teachers to cultivate analytical and reflective thinking regarding their teaching methods (Ghanizadeh, 2016; Zahid, 2019). Teachers are encouraged to engage in observations, analyze data, and reflect deeply to identify the strengths and weaknesses in their teaching methods. Teachers can enhance the effectiveness of their instruction by implementing targeted and research-supported interventions (Yu, 2021).

Furthermore, this approach promotes collaboration and mutual learning between supervisors and teachers. Supervisors play a role in assisting teachers with data analysis, developing strategies for improvement, and exchanging effective teaching methods (Boso, van der Merwe, & Gross, 2021). supervisors and teachers support each other, enhance the exchange of knowledge and skills, and encourage professional development. The scientific approach is an effective framework for enhancing teacher professional development and improving the quality of learning in academic supervision (Gore et al., 2020). Teachers play a crucial role in enhancing learning outcomes by becoming education leaders. By employing effective teaching methods supported by research and evidence, teachers can significantly influence students' learning experiences.

The OQEAC approach is a scientific-based academic supervision model that offers several benefits for teacher professional development and enhancing learning quality. The Observing step allows supervisors to methodically observe teachers' teaching practices and assess their strengths and weaknesses (Pratiwi & Suratman, 2023). This is a solid foundation for offering helpful and precise feedback to teachers, allowing them to enhance specific aspects of their instruction. Supervisors will personally witness the interaction between teachers and students while they are learning (Nurlaili, Warman, & Raolah, 2021). Teachers will focus on their delivery of the subject matter, engage students through questioning, and offer feedback and support to address any difficulties in understanding. Supervisors will monitor both teacher-student interactions and the utilization of learning materials in the classroom. The materials used will be assessed to ensure they align with the curriculum and are effectively utilized by teachers to support learning.

Observing is the basis for supervisors to provide constructive feedback to teachers (Buchanan, 2020). Supervisors can effectively identify the strengths and weaknesses in teachers' teaching practices through careful observation. This enables them to offer appropriate support and guidance to enhance the quality of teaching and learning in the classroom. Observation allows for a firsthand understanding of the teaching methods employed by educators and their interactions with students within the classroom setting. Supervisors can comprehensively understand teachers' teaching strategies, approaches, and styles through this method (Mamo, Bekele, & Daksa, 2019; O'Hara, Bookmyer,

Pritchard, & Martin, 2020). Teachers can make quick and effective improvements by receiving immediate and specific feedback through observations (Watts & Lawson, 2009). This facilitates accelerated professional growth. Observations offer valuable feedback that supports the professional growth of teachers and enhances the overall standard of teaching.

The Questioning step prompts teachers to self-reflect and explore alternative teaching methods. In-depth questions serve several purposes for teachers. Firstly, they assist teachers in explaining their selection of teaching methods. Secondly, they contribute to a deeper comprehension of the learning process. Lastly, they promote analytical thinking among students (Nurlaili et al., 2021; Reed, Klutts, & Mattingly, 2019). During this stage, supervisors ask questions to encourage teachers to engage in critical thinking and analyze the effects of their decisions in the teaching process. Supervisors assist teachers in engaging in structured and comprehensive self-reflection by posing detailed and pertinent questions (Haatainen & Aksela, 2021; Thessin, 2019). The process of reflection assists teachers in gaining a deeper understanding of the strengths and weaknesses in their teaching methods. This, in turn, creates opportunities for them to make improvements and enhancements.

During the Experimenting phase, educators are motivated to explore novel methodologies and diverse instructional techniques. This study allows teachers to discover more efficient and creative teaching methods (Santenna, Kumar, Balakrishnan, Jhaj, & Ahmed, 2019). The Experimenting step in the OQEAC approach to academic supervision allows teachers to explore new approaches and innovative learning strategies, leading to advancements in classroom teaching practices. By conducting experiments, educators can assess and compare the efficacy of various instructional approaches, thereby enhancing the overall efficiency and effectiveness of teaching. Experimentation promotes evidence-based decision-making in teaching practices by utilizing data and concrete evidence (Bolinger, Josefy, Stevenson, & Hitt, 2022). Teachers can enhance their teaching skills and knowledge by engaging in experimentation, which ultimately improves their proficiency in delivering subject matter (Rusdiman AB, Paningkat Siburian, Saut Purba, & Osberth Sinaga, 2022). Teachers' active involvement in the experimentation process fosters a sense of ownership and motivation to consistently enhance the quality of teaching. Experimentation in schools fosters an innovative learning environment by encouraging the collaborative exploration and implementation of new teaching methods. This approach cultivates a creative atmosphere focused on enhancing the quality of teaching and learning (Stoddard, Gillis, & Cohn, 2019).

Collaboration is an essential component of the Associating step in this model. It enables teachers to exchange experiences, learn from their colleagues' effective strategies, and receive support and guidance from supervisors (Indra et al., 2020; Sholeh, 2017). This collaboration fosters a work culture that encourages collaboration and enables teachers to actively drive change in the field of education. This collaboration fosters an environment of inclusivity and support for both parties involved. Teachers can openly discuss the difficulties encountered in the learning process and exchange their experiences and effective solutions (Indra et al., 2020). Supervisors and teachers engage in a collaborative learning process to enhance their understanding of effective teaching practices supported by evidence. This continuous improvement aims to enhance the quality of learning (Fitriani, 2019; Sholeh, 2017).

Lastly, the communicating step underscores the significance of efficient communication between supervisors and teachers. Effective communication fosters a positive reception of teacher feedback, promoting ongoing teaching enhancement (Rahayu, 2023; Zhang & Bray, 2020). Effective communication allows teachers to gain a clear understanding of the expectations and objectives of the supervision process. This understanding enables them to make ongoing improvements in their teaching practices. Open communication allows teachers to express their goals, difficulties, and learning requirements (Herlina, 2023). Supervisors can offer suitable guidance and support based on the specific needs of teachers.

The OQEAC model fosters a supportive environment that enables teachers to enhance their expertise in delivering effective teaching by developing new skills and knowledge. Using the OQEAC approach in academic supervision fosters collaboration, empowers teachers as leaders in enhancing

learning, and enhances the quality of teaching for students. The OQEAC model emphasizes the importance of effective communication in academic supervision. This model suggests that effective communication is the connecting element among all steps in academic supervision (Jill Channing, 2020). Effective communication that is open, honest, and based on evidence helps teachers to receive feedback positively (Herlina, 2023; Rahayu, 2023; Zhang & Bray, 2020). This enables teachers to experience significant professional development, enhancing their skills and knowledge to enhance the quality of education. In general, the scientific-based academic supervision model, which incorporates the OQEAC approach, offers significant advantages in enhancing the quality of learning and promoting the professional growth of teachers. This model fosters continuous improvement in education by integrating observation, thorough questioning, experimentation, collaboration, and effective communication.

Developing a scientific-based academic supervision model with the Observing, Questioning, Experimenting, Associating, and Communicating (OQEAC) approach provides a holistic and targeted approach that encourages teachers' professional development and improves the quality of learning. With interrelated steps like observation, questioning, experimentation, collaboration, and effective communication, this model provides advantages such as identifying teachers' strengths and weaknesses, stimulating analytical thinking, innovation in teaching practices, and collaboration that enriches knowledge. In addition, this model has positive impacts through continuous professional development, improved learning quality, teacher motivation and ownership, and the creating of a collaborative culture. Thus, the scientific-based OQEAC model provides an effective framework for improving the quality of education.

4. CONCLUSION

The development of a scientific-based academic supervision model using the Observing, Questioning, Experimenting, Associating, and Communicating (OQEAC) approach has been found to have notable benefits in enhancing the achievement of supervision goals. The model includes observation, questioning, experimentation, collaboration, and communication steps designed to identify teachers' development needs and enhance their learning. The model also encourages teachers to engage in ongoing professional development, enables them to make evidence-based decisions, and fosters a collaborative working environment that enhances knowledge. The findings of this research indicate that the OQEAC model, which is based on scientific principles, can be suggested for enhancing the skills of education supervisors. It can improve the quality of teaching and learning within schools. Using the scientific approach in OQEAC-based academic supervision is an effective method for enhancing the quality of education and empowering teachers as leaders in educational improvement. Despite the OQEAC scientific-based supervision model proving advantages in enhancing the quality of achieving supervision goals, this research is confined to a specific educational context, cautioning against generalizing the results. Implementation challenges may arise concerning the understanding and skills of supervisors in applying the scientific approach, necessitating further research to explore factors influencing implementation effectiveness. Recommendations for future research involve exploring model adaptation for diverse contexts and testing its effectiveness in varied environments, as well as investigating strategies to overcome implementation barriers.

Acknowledgments: In this section, you can acknowledge any support not covered by the author's contribution or funding sections. This may include administrative and technical support or donations in kind (e.g., materials used for experiments).

Conflicts of Interest: Declare conflicts of interest or state, "The authors declare no conflict of interest." Authors must identify and declare any personal circumstances or interests perceived as inappropriately influencing the representation or interpretation of reported research results.

REFERENCES

Agung Pambudi, B., & Gunawan, I. (2019). Instructional Leadership as an Effort to Increase Teacher Professionalism in the Industrial Revolution Era 4.0. *Proceedings of the 4th International Conference on Education and Management (COEMA 2019)*. Paris, France: Atlantis Press. https://doi.org/10.2991/coema-19.2019.43

Akbar Sa'dun. (2013). *Instrumen bahan ajar*. Bandung: Remaja Rosdakarya.

Aljassar, S., & Altammar, J. (2020). A framework for the professional development of in-service teachers in Kuwait. *Journal of Turkish Science Education*, *17*(3), 364–386. https://doi.org/10.36681/tused.2020.33

Amelia, C., Aprilianto, A., Supriatna, D., Rusydi, I., & Zahari, N. E. (2022). The Principal's Role as Education Supervisor in Improving Teacher Professionalism. *Nidhomul Haq : Jurnal Manajemen Pendidikan Islam*, *7*(1), 144–155. https://doi.org/10.31538/ndh.v7i1.2075

Ampofo, S. Y., Onyango, G. A., & Ogola, M. (2019). Influence of school heads' direct supervision on teacher role performance in public senior high schools, Central Region, Ghana. *IAFOR Journal of Education*, *7*(2), 9–26. https://doi.org/10.22492/ije.7.2.01

Astarini, D. (2016). Meningkatkan Kemampuan Kepala Sekolah dalam Menyusun Program Supervisi Akademik melalui Pendampingan dan Supervisi Manajerial. *Jurnal Manajemen Dan Supervisi Pendidikan*, *1*(1), 36–41. https://doi.org/10.17977/um025v1i12016p036

Azainil, A., Komariyah, L., & Yan, Y. (2021). The effect of principal's managerial competence and teacher discipline on teacher productivity. *Cypriot Journal of Educational Sciences*, *16*(2), 563–579. https://doi.org/10.18844/CJES.V16I2.5634

Bolinger, M. T., Josefy, M. A., Stevenson, R., & Hitt, M. A. (2022). Experiments in Strategy Research: A Critical Review and Future Research Opportunities. *Journal of Management*, *48*(1), 77–113. https://doi.org/10.1177/01492063211044416

Buchanan, R. (2020). An Ecological Framework for Supervision in Teacher Education. *Journal of Educational Supervision*, *3*(1), 76–94. https://doi.org/10.31045/jes.3.1.6

Campos, C. I. de, Pitombo, C. S., Delhomme, P., & Quintanilha, J. A. (2020). Comparative analysis of data reduction techniques for questionnaire validation using self-reported driver behaviors. *Journal of Safety Research*, *73*, 133–142. https://doi.org/10.1016/j.jsr.2020.02.004

Cichocka, A. (2016). Understanding defensive and secure in-group positivity: The role of collective narcissism. *European Review of Social Psychology*, *27*(1), 283–317.

Darvishmotevali, M. (2019). Decentralization and Innovative Behavior: The Moderating Role of Supervisor Support. *International Journal of Organizational Leadership*, *8*(1), 31–45. https://doi.org/10.33844/ijol.2019.60204

Djuhartono, T., Ulfiah, U., Hanafiah, H., & Rostini, D. (2021). Supervisi Akademik Kepala Sekolah Dalam Meningkatkan Kinerja Guru Kejuruan. *Research and Development Journal of Education*, *7*(1), 101. https://doi.org/10.30998/rdje.v7i1.9147

Dodds, S., & Hess, A. C. (2021). Adapting research methodology during COVID-19: lessons for transformative service research. *Journal of Service Management*, *32*(2), 203–217. https://doi.org/10.1108/JOSM-05-2020-0153

Fitriani. (2019). Peran Kepala Sekolah Sebagai Supervisor Dalam Membina Profesionalisme Guru. *Adaara: Jurnal Manajemen Pendidikan Islam*, *8*(1), 730–744.

Ghanizadeh, A. (2016). The interplay between reflective thinking, critical thinking, self-monitoring, and academic achievement in higher education. *Higher Education*. https://doi.org/10.1007/s10734-016-0031-y

Guntoro, G. (2020). Supervisi Pengawas dan Kepemimpinan Kepala Sekolah sebagai Stimulus dalam Meningkatkan Kinerja Guru. *Jurnal Ilmiah Iqra'*, *14*(1), 64. https://doi.org/10.30984/jii.v14i1.1100

Haatainen, O., & Aksela, M. (2021). Project-based learning in integrated science education: Active teachers' perceptions and practices. *Lumat*, *9*(1), 149–173. https://doi.org/10.31129/LUMAT.9.1.1392

Herlina, H. (2023). The Literature Review of Principal's Supervision in Increasing Teacher's Competence and Performance. *PPSDP International Journal of Education*, *2*(2), 224–233. https://doi.org/10.59175/pijed.v2i2.88

Igumbor, J. O., Bosire, E. N., Karimi, F., Katahoire, A., Allison, J., Muula, A. S., … Ajuwon, A. (2022). Effective supervision of doctoral students in public and population health in Africa: CARTA supervisors' experiences, challenges and perceived opportunities. *Global Public Health*, *17*(4), 496–511. https://doi.org/10.1080/17441692.2020.1864752

Indra, R., Kustati, M., Saregar, A., Warnis, Nelmawarni, & Yusuf, Y. Q. (2020). The effect of principals' leadership towards effective learning at an indonesian secondary school. *European Journal of Educational Research*, *9*(3), 1063–1074. https://doi.org/10.12973/eu-jer.9.3.1063

Jahshan, C., Vinogradov, S., Wynn, J. K., Hellemann, G., & Green, M. F. (2019). A randomized controlled trial comparing a "bottom-up" and "top-down" approach to cognitive training in schizophrenia. *Journal of Psychiatric Research*, *109*, 118–125. https://doi.org/10.1016/j.jpsychires.2018.11.027

Jill Channing. (2020). How Can Leadership Be Taught? Implications for Leadership Educators. *International Journal of Educational Leadership Preparation*, *15*(1), 134–148. Retrieved from https://eric.ed.gov/?id=EJ1254573

Komalasari, K., Arafat, Y., & Mulyadi, M. (2020). Principal's Management Competencies in Improving the Quality of Education. *Journal of Social Work and Science Education*, *1*(2), 181–193. https://doi.org/10.52690/jswse.v1i2.47

Lacerda, G., Petrillo, F., Pimenta, M., & Guéhéneuc, Y. G. (2020). Code smells and refactoring: A tertiary systematic review of challenges and observations. *Journal of Systems and Software*, *167*. https://doi.org/10.1016/j.jss.2020.110610

Lorensius, Hanim, Z., & Warman. (2022). Implementasi Supervisi Akademik Kepala Sekolah dalam Peningkatan Profesionalisme Guru di SMK Katolik Kota Samarinda. *Attractive: Innovative Education Journal*, *4*(2), 2685–6085. Retrieved from https://www.attractivejournal.com/index.php/aj/

Mamo, T. R., Bekele, A., & Daksa, D. (2019). An Exploration of the Effectiveness of School Leadership Training in Ethiopian Public Universities: Intentions, Practices and Challenges. *International Journal of Social Sciences & Educational Studies*, *6*(1), 96–110. https://doi.org/10.23918/ijsses.v6i1p96

Marmin, M., Koderi, K., Muin, J. A., Fahri, J., & Imam, S. (2020). The Effectiveness of Supervision Program At Madrasah Aliyah in Pesawaran Regency. *Educational Management*, *9*(2), 248–257.

Mu'alimin, M., Rusdiana, A., & Sulhan., M. (2021). *Manajemen Supervisi Akademik Pengawas Madrasah Tsanawiyah Di Kota Cimahi Jawa Barat*. Pascasarjana UIN Sunan Gunung Djati Bandung.

Nordentoft, H. M., Thomsen, R., & Wichmann-Hansen, G. (2013). Collective academic supervision: a model for participation and learning in higher education. *Higher Education*, *65*(5), 581–593. https://doi.org/10.1007/s10734-012-9564-x

Nurlaili, N., Warman, W., & Raolah, R. (2021). Improvement of principals' supervision competence through accompaniment in principal working groups. *Cypriot Journal of Educational Sciences*, *16*(4), 1704–1720. https://doi.org/10.18844/cjes.v16i4.6033

O'Hara, S., Bookmyer, J., Pritchard, R., & Martin, R. (2020). Mentoring Secondary Novice Teachers to Develop Academic Language of English Language Learners. *Journal of Educational Research and Practice*, *10*(1). https://doi.org/10.5590/JERAP.2020.10.1.02

Pont, B. (2020). A literature review of school leadership policy reforms. *European Journal of Education*, *55*(2), 154–168. https://doi.org/10.1111/ejed.12398

Pratiwi, T. I., & Suratman, B. (2023). A Effort Of An Academic Supervision On Guidance And Counselling Teachers To The Success Of Students Achievements At The Junior High School Students In Jombang Regency Of East Java Indonesia. *Journal of Namibian Studies*, *34*, 5695–5713.

Purwaningsih, E., Najwa, K., Nahidah, N., Hariyadi, A., & Su'ad. (2023). SUPERVISI AKADEMIK DENGAN PENDEKATAN KOLABORATIF DALAM MENINGKATKAN KINERJA GURU. *Equity In Education Journal*, *5*(1), 30–36. https://doi.org/10.37304/eej.v5i1.8257

Rahabav, P. (2016). The Effectiveness of Academic Supervision for Teachers. *Journal of Education and Practice* , *7*(9), 47–55. Retrieved from https://www.iiste.org/Journals/index.php/JEP/article/view/29620/30413

Rahayu, F. R. (2023). Strategi Komunikasi Efektif Guru dalam Membentuk Kepercayaan Diri Siswa di MTs YPK Cijulang. *Jurnal Pelita Nusantara*, *1*(1), 116–123. https://doi.org/10.59996/jurnalpelitanusantara.v1i1.128

Reed, B. N., Klutts, A. M., & Mattingly, T. J. (2019). A Systematic Review of Leadership Definitions, Competencies, and Assessment Methods in Pharmacy Education. *American Journal of Pharmaceutical Education*, *83*(9), 7520. https://doi.org/10.5688/ajpe7520

Robiyah, S., Koderi, K., Muin, J. A., & Hijriyah, U. (2021). CONTINUOUS PROFESSIONAL DEVELOPMENT OF JUNIOR HIGH SCHOOLS' ISLAMIC RELIGIOUS EDUCATION TEACHERS AT BANDAR LAMPUNG CITY, INDONESIA. *International Journal of Educational Management and Innovation*, *2*(1), 44. https://doi.org/10.12928/ijemi.v2i1.2218

Rusdiman AB, Paningkat Siburian, Saut Purba, & Osberth Sinaga. (2022). Academic Supervision Model In Improving Teacher Performance. *International Journal Of Humanities Education and Social Sciences (IJHESS)*, *1*(6). https://doi.org/10.55227/ijhess.v1i6.171

Saleh, M., & Mutiani, M. (2021). The Role of the Principal in Increasing Teacher Performance Through Periodic Academic Supervision. *AL-ISHLAH: Jurnal Pendidikan*, *13*(2), 1135–1141. https://doi.org/10.35445/alishlah.v13i2.889

Sampirni, S. (2020). Penerapan Pendekatan Supervisi Kolaboratif Untuk Meningkatkan Kompetensi Profesional Guru Di SD Negeri 9 Namang Kabupaten Bangka Tengah. *SOCIAL PEDAGOGY: Journal of Social Science Education*, *1*(2), 162. https://doi.org/10.32332/social-pedagogy.v1i2.2689

Santenna, C., Kumar, S., Balakrishnan, S., Jhaj, R., & Ahmed, S. N. (2019). A comparative experimental study of analgesic activity of a novel non-steroidal anti-inflammatory molecule – zaltoprofen, and a standard drug – piroxicam, using murine models. *Journal of Experimental Pharmacology*, *11*, 85–91. https://doi.org/10.2147/JEP.S212988

Setyaningsih, S., & Suchyadi, Y. (2021). Implementation of Principal Academic Supervision To Improve. *JHSS (Journal of Humanities and Social Studies)*, *05*(02), 179–183.

Shernoff, D. J., Sinha, S., Bressler, D. M., & Ginsburg, L. (2017). Assessing teacher education and professional development needs for the implementation of integrated approaches to STEM education. *International Journal of STEM Education*, *4*(1), 13. https://doi.org/10.1186/s40594-017-0068-1

Sholeh, M. (2017). Keefektifan Peran Kepala Sekolah dalam Meningkatkan Kinerja Guru. *Jurnal Dinamika Manajemen Pendidikan*, *1*(1), 41. https://doi.org/10.26740/jdmp.v1n1.p41-54

Sitepu, R. H., Simarmata, P. S., Nasution, H. S., & Wau, Y. (2023). Supervisi Klinis dalam Keterampilan Mengajar Guru Sejarah Berdasarkan Kurikulum Merdeka. *Yupa: Historical Studies Journal*, *7*(1), 46–60. https://doi.org/10.30872/yupa.v7i1.1777

Stoddard, M. M., Gillis, B., & Cohn, P. (2019). Agile Project Management in Libraries: Creating Collaborative, Resilient, Responsive Organizations. *Journal of Library Administration*, *59*(5), 492–511. https://doi.org/10.1080/01930826.2019.1616971

Thessin, R. A. (2019). Establishing productive principal/principal supervisor partnerships for instructional leadership. *Journal of Educational Administration*, *57*(5), 463–483. https://doi.org/10.1108/JEA-09-2018-0184

Utami, P. P., & Vioreza, N. (2020). Teacher Work Productivity in Senior High School. *International Journal of Instruction*, *14*(1), 599–614. https://doi.org/10.29333/IJI.2021.14136A

Villarreal-Davis, C., Sartor, T. A., & McLean, L. (2021). Utilizing Creativity to Foster Connection in Online Counseling Supervision. *Journal of Creativity in Mental Health*, *16*(2), 244–257. https://doi.org/10.1080/15401383.2020.1754989

Watts, M., & Lawson, M. (2009). Using a meta-analysis activity to make critical reflection explicit in teacher education. *Teaching and Teacher Education*, *25*(5), 609–616.

https://doi.org/10.1016/j.tate.2008.11.019

Wodahl, E. J., Mowen, T. J., & Garland, B. E. (2021). The Effect of Individual Characteristics and Supervision Experiences on the Perceived Quality of the Supervision Relationship. *Criminal Justice Policy Review*, *32*(5), 523–545. https://doi.org/10.1177/0887403420967070

Yu, Z. (2021). The effects of gender, educational level, and personality on online learning outcomes during the COVID-19 pandemic. *International Journal of Educational Technology in Higher Education*, *18*(1). https://doi.org/10.1186/s41239-021-00252-3

Zahid, M. (2019). *Effect of Reflective Teaching Practices on the Performance of Prospective Teachers*. *18*(1), 32–43.

Zaim, M. (2017). Implementing Scientific Approach to Teach English at Senior High School in Indonesia. *Asian Social Science*, *13*(2), 33. https://doi.org/10.5539/ass.v13n2p33

Zanza, A., Seracchiani, M., Di Nardo, D., Reda, R., Gambarini, G., & Testarelli, L. (2021). A Paradigm Shift for Torsional Stiffness of Nickel-Titanium Rotary Instruments: A Finite Element Analysis. *Journal of Endodontics*, *47*(7), 1149–1156. https://doi.org/10.1016/j.joen.2021.04.017

Zhang, W., & Bray, M. (2020). Comparative research on shadow education: Achievements, challenges, and the agenda ahead. *European Journal of Education*, *55*(3), 322–341. https://doi.org/10.1111/ejed.12413

Zhongxin Dai, Y. Z. (2015). J ournal of A rts & H umanities Toward an Analytical and Methodological Understanding. *Journal of Arts and Humanities*, *4*(2), 29–44.