IRJE |Indonesian Research Journal in Education|Vol. 10| No. 1|March|Year 2026|

Development of *SUKA MAJU* application using Google Workspace for academic supervision effectiveness

HURRIYATI[1*], SYAHRIL[2], NURHIZRAH GISTITUATI[3], AND IRSYAD[4]

Abstract

This study addresses the continued reliance on manual academic supervision, with paper-based instruments still widely used despite rapid educational digitalisation and the integration of teacher performance assessment through the Merdeka Mengajar Platform (PMM). This condition creates challenges for school principals in understanding the supervision priorities and indicators aligned with PMM-based education report cards, leading to inconsistencies in academic oversight and hindering the effective implementation of educational strategies. This research aims to develop the SUKA MAJU application using Google Workspace for Education to support more effective and integrated academic supervision. The study employs a research-and-development approach based on the ADDIE model, comprising analysis, design, development, implementation, and evaluation stages. Data were collected through expert validation, practicality testing, and effectiveness evaluation involving school principals. The results indicate high validity (90%), strong practicality (82%), and high effectiveness (84%). These findings demonstrate that the SUKA MAJU application effectively enhances the implementation of academic supervision in schools, leading to improved educational outcomes and better support for teachers' professional development.

Keywords

Academic supervision, ADDIE model, educational technology, Google Workspace for education, teacher performance assessment

Article History

Received 11 September 2025
Accepted 11 February 2026

How to Cite

Hurriyati, Syahril, Gistituati, N., & Irsyad, I. (2026). Development of *SUKA MAJU* application using Google Workspace for academic supervision effectiveness. *Indonesian Research Journal in Education |IRJE|*, *10*(1), 655-668. https://doi.org/10.22437/irje.v10i1.48295

[1]Universitas Negeri Padang, Padang, Indonesia, Corresponding author: ridhamnur16@gmail.com
[2,3,4]Universitas Negeri Padang, Padang, Indonesia

Introduction

Since 2020, the Ministry of Education, Culture, Research, and Technology (Kemendikbudristek, 2021) has carried out various transformations in the world of education through the Merdeka Belajar program at all levels, from primary and secondary education to higher education, to create superior human resources (HR) who behave appropriately according to Pancasila values. This program aims to foster critical thinking, creativity, and a sense of responsibility among students, enabling them to contribute positively to society. Pancasila values. Freedom to learn is an effort to have freedom of thought and expression. This independent learning program aims to liberate teachers and students by providing them with the tools and resources needed to explore their interests and develop critical thinking skills. This aligns with the spirit of Ki Hajar Dewantara, namely to liberate people, especially through education (Wijayanti et al., 2025).

The Ministry of Education, Culture, Research, and Technology has launched several packages of Merdeka Belajar episodes. To date, 26 episodes have been released, covering all aspects needed to support the realisation of quality learning in Indonesia. In the 19th episode of Independent Learning, the Education Report Card was launched. Education Report Card is a platform that provides data on the results of education system evaluations, an improvement over previous quality report cards. The new education system evaluation policy places greater emphasis on orientation towards educational quality and an integrated system.

This education report card contains 6 priority indicators: literacy skills, numeracy skills, character index, school safety climate, global diversity climate, and learning quality (Sanmarwi, 2022). These six priority indicators are interconnected and closely related to classroom learning implementation and the quality of learning delivered by the teacher. The quality of learning is assessed based on learning methods, psychological support, and classroom management, which are essential components that influence student engagement and academic success.

The Ministry of Education, Culture, Research, and Technology has launched several packages of Merdeka Belajar episodes. To date, 26 episodes have been released, covering all aspects needed to support the realisation of quality learning in Indonesia. On December 19, 2023, the Ministry of Education, Culture, Research, and Technology, together with the State Civil Service Agency (BKN), released a performance management feature for teachers and school principals by integrating the Merdeka Mengajar Platform (PMM) and BKN e-Kinerja.

The technical regulations for assessing the performance of teachers and school principals, integrated with PMM, are based on the Director General Regulation Number 7607 of 2023 concerning the management of the performance of teachers and school principals. School principals are responsible for academic supervision, which aims to improve the quality of teachers' learning practices by managing performance on the Merdeka Mengajar Platform. Through PMM, the assessment of teacher performance is more focused, as teachers are required to concentrate solely on improving their performance in one of the recommended indicators, which is based on the achievements reflected in the education report card integrated into PMM. In general, the indicators that need to improve the results of school education reports include the quality of learning, which comprises three sub-indicators: learning methods, psychological support, and class management, each accompanied by specific activities. The next problem in implementing learning and observing teachers is the form of

behavioural or learning observations. The PMM directly provides the indicators for inclusion in the instrument. The teacher enters these indicators himself in the instrument file, in accordance with the instructions in the Director General's Regulation No. 7607 of 2023. Of course, these indicators must also be reflected in the planned and implemented classroom learning activities, making it easier for the school principal to conduct behavioural or learning observations. Under these conditions, schools cannot provide observation forms that apply equally to all teachers, whether within a single school or across schools.

Another problem found was that when observations were made of whatever target teacher behaviour, the assessment rating only consisted of 3 types, namely 1) Not Yet Done: Not yet shown during the observation. The cause needs to be explored by discussing it with the teacher. 2) Done but not yet effective: Done but not yet impacting learning/achieving goals. 3) Done and Effective: Done and has improved learning/achieved goals. Only these 3 assessment ratings are considered; of course, they will not represent the teacher's performance over 6 months. The problems described have resulted in assessment results not aligning with expectations and in learning management not being monitored effectively.

For this reason, an application was developed to describe the integration of academic supervision with learning observations as a stage in the assessment of teacher performance. This application includes a template for entering teaching modules, which will automatically be linked to teacher behaviour observation instruments or learning observations, as well as for follow-up on academic supervision results, making it easier for teachers to prepare to manage quality classroom learning guided by the head. It is also hoped that the implementation of teacher performance assessments will be more accurate, as they are comprehensively evaluated by the school principal through the coaching process and supported by digital academic supervision via the SUKA MAJU application, which uses Google Workspace for Education.

Literature Review

Academic supervision

The learning process is an important element in quality education. Teachers must strive to ensure that students receive the same services without distinction based on ethnicity, religion, race, class, gender, socioeconomic status, or special needs throughout the learning process (Michelle, 2016). To ensure a quality learning process in schools, academic supervision is crucial (Arifin, 2022). In relation to school supervision, Zepeda (2003) describes it as a social process that stimulates, nurtures, and appraises teachers' professional growth, with the supervisor as the prime mover in creating optimal conditions for learning. Based on the definition, supervision is a planned coaching activity designed to help teachers and other personnel carry out their work.

Academic supervision is professional assistance and guidance for teachers in carrying out instructional tasks to improve the teaching and learning process by providing stimulation, coordination, and overall guidance, both individually and in groups, to create changes in certain conditions, which is even better (Rusdiana et al., 2020). According to Rahabav (2016), academic supervision is a series of activities that help teachers develop their ability to manage the learning process and achieve learning goals.

Based on the opinions above, it can be emphasised that academic supervision is a series of professional assistance activities that provide encouragement, guidance, and direction from the school principal to teachers to improve their ability to carry out the learning process and achieve learning goals. With academic supervision, teachers will feel better supported in overcoming problems encountered in the learning process, enabling them to improve learning quality, as reflected in the education report card, which may include metrics such as student performance, engagement levels, and feedback from parents and students.

Overview of Google Workspace for education

According to Yasyakur (2023), Google Workspace for Education is a collection of applications developed by Google that integrates various Google features, including Google Mail, Google Drive, Google Classroom, Google Meet, Google Calendar, Google Docs, Google Sheets, Google Slides, Google Forms, and Google Sites, among others (Ekayogi, 2022). Google Workspace is a suite of Google tools and services tailored for schools and homeschools to collaborate, simplify instruction, and keep learning safe. In the current digital era, various digital platforms are very useful for supporting learning, making teacher administration easier and more efficient. The Ministry of Education has provided facilities for all educational practitioners, including teachers, school principals, and students, to make the most of various Google features by offering a learning account that offers advantages over other accounts.

Academic supervision supported by Google Workspace for Education can enhance teachers' competence in implementing differentiated learning, thereby improving student services by aligning them with students' readiness, interests, and learning profiles. In this case, the Google features used are Google Docs and Google Classroom (Subekti, 2023). According to Yasyakur (2023), Google Workspace has both advantages and disadvantages. Another advantage of Google Workspace is its sophisticated tools and widespread use for workplace productivity. The advantages are as follows: easy to use; high mobility and easy access; increases collaboration within teams; accessible regardless of time and distance; compatible with all devices; high uptime; system safe; and low cost. Meanwhile, the disadvantage of Google Workspace is that you must have an internet connection to access it. This limitation creates barriers to the use of cloud-based technology, as it cannot be accessed by residents in areas where the internet has not yet reached.

Overview of the SUKA MAJU application

The SUKA MAJU application (an acronym for *Supervisi Akademik Mudah dan Jitu*) is a digital tool designed to facilitate the implementation of academic supervision by school principals. The name "SUKA MAJU" was intentionally chosen to create a distinctive identity and increase user appeal, reflecting a strategic approach to adoption and usability within educational environments. This application aims to simplify supervision processes while promoting more efficient and systematic practices.

In its initial stage, the application is developed to support digital-based supervision, enabling easier data input, management, and processing. In subsequent stages, the system is planned to be further enhanced to enable synchronization with other platforms used for

teacher performance assessment, particularly those related to the Merdeka Mengajar Platform (PMM), thereby facilitating a more comprehensive evaluation of teaching effectiveness and streamlining the feedback process. The SUKA MAJU application is designed for school principals and supervisors across various educational levels, including elementary, junior high, and senior high schools. The research product is a digitally integrated supervision instrument developed using Google Workspace for Education. The system connects multiple supervision components—such as lesson planning, observation instruments, data processing, and follow-up actions—into a unified platform. This integration enables users to efficiently manage, analyze, and leverage supervision data to support decision-making and continuous improvement. This application represents the author's original work, developed based on practical experience as a school principal in a pilot digitalization project in Solok City. It is inspired by existing report card systems and performance assessment applications but offers a more integrated, flexible, and cloud-based solution.

Research Methodology

Research design

This study employed a Research and Development (R&D) approach to develop and evaluate the SUKA MAJU application's effectiveness in academic supervision. The development process followed the ADDIE model, which consists of five systematic stages: analysis, design, development, implementation, and evaluation. This model was selected because it provides a structured framework for producing valid, practical, and effective educational products.

Research site and participants

The research was conducted in junior high schools in Solok City, Indonesia. The participants were selected using purposive sampling, focusing on individuals directly involved in academic supervision.

Table 1. *Research participants*

No	Participant Types	Number	Description
1	School Principals (Public Schools)	6	Responsible for academic supervision implementation
2	School Principals (Private Schools)	2	Support supervision and evaluation processes
3	Expert Validators	3–5	Lecturers/experts in education, media, and language
Total		8 + experts	

These participants were involved in evaluating the validity, practicality, and effectiveness of the developed application.

Data collection techniques

Multiple data collection techniques were employed to ensure comprehensive and triangulated data.

Table 2. *Data collection methods*

No	Method	Purpose	Instrument
1	Observation	To examine the implementation of Google Workspace in supervision	Observation sheet
2	Interview	To identify problems in academic supervision practices	Interview guide
3	Questionnaire	To assess validity, practicality, and user responses	Validation & practicality sheets
4	Written Test	To measure training effectiveness	Test instrument

- Observations were conducted to analyze existing supervision practices and digital tool usage.
- Interviews were carried out with school principals to explore challenges in supervision and performance assessment.
- Questionnaires were used to evaluate product quality (validity and practicality).
- Written tests measured the effectiveness of training related to the application.

Data analysis techniques

1. Validity analysis

The validity of the SUKA MAJU application was assessed by expert validators (material, media, and language experts). The validity score was calculated using:

$$P = \frac{F}{N} \times 100\%$$

Where:

- P = validity percentage
- F = total score obtained
- N = maximum score

Table 3. *Validity criteria*

Percentage	Category
81% – 100%	Very Valid
61% – 80%	Valid
41% – 60%	Less Valid

Source: Mohamad et al. (2018)

2. Practicality analysis

Practicality data were obtained from user questionnaires and analyzed using percentage-based scoring.

Table 4. *Practicality criteria*

Scores	Category	Percentage Range
1	Not Very Strong	0–20%
2	Weak	21–40%
3	Moderate	41–60%
4	Strong	61–80%
5	Very Strong	81–100%

The product is considered practical if it achieves at least the "strong" category.

3. Effectiveness analysis and research procedure

The effectiveness of the application was evaluated through questionnaires completed by five school principals after implementation.

Table 5. *Effectiveness criteria*

Scores	Category	Percentage Range
1	Not Very Strong	0–20%
2	Weak	21–40%
3	Moderate	41–60%
4	Strong	61–80%
5	Very Strong	81–100%

Source: Akdon and Ridwan (2013)

The product is considered effective if it achieves a minimum score in the "strong" category (≥61%).

The research followed the ADDIE stages as outlined below:

Table 6. *ADDIE development stages*

Stages	Description
Analysis	Identifying problems in academic supervision and user needs
Design	Designing system structure, instruments, and application features
Development	Developing the SUKA MAJU application using Google Workspace
Implementation	Testing the application in selected schools
Evaluation	Assessing validity, practicality, and effectiveness

Validity test

The validity of the SUKA MAJU application was evaluated through expert judgment, involving material experts and language experts. The results of the validation process are presented as follows.

1. Validity by material experts

The validation conducted by material experts assessed two main aspects: clarity and content quality, consisting of 10 indicators. The results are presented in Table 7.

Table 7. *Results of material expert validation*

No	Aspects	Average Score	Criteria
1	Clarity	5.0	Very Valid
2	Content Quality	4.0	Valid
Total		9.0	

The overall validity score was calculated using the formula:

$$P = \frac{9}{10} \times 100\% = 90\%$$

Based on the established validity criteria, a score of 90% indicates that the SUKA MAJU application falls into the "very valid" category. This result demonstrates that the application's content is accurate, relevant, and aligned with the principles of academic supervision. Furthermore, the high clarity score indicates that the application's features and instructions are easy to understand and suitable for practical use by school principals.

2. Validity by language experts

The language validation assessed two aspects: clarity and guidebook quality, covering 9 indicators. The results are shown in Table 8.

Table 8. *Results of language expert validation*

No	Aspects	Average Scores	Criteria
1	Clarity	4.0	Valid
2	Guidebook Quality	4.4	Valid
Total		8.4	

The percentage score was calculated as follows:

$$P = \frac{8.4}{10} \times 100\% = 84\%$$

A score of 84% places the application in the "very valid" category, indicating that the language used in both the application and its guidebook is clear, communicative, and appropriate for users. This ensures that users can easily interpret instructions and utilize the system effectively without ambiguity.

Practicality test

The practicality of the SUKA MAJU application was evaluated by media experts from Google Partners, who are certified Google Coaches. The assessment included three aspects: application cover design, application design, and software engineering, consisting of 15 indicators.

Table 9. *Results of the practicality test by media experts*

No	Aspects	Average Scores
1	Application Cover Design	3.3
2	Application Design	4.3
3	Software Engineering	4.7
Total		12.3

The practicality score was calculated as follows:

$$P = \frac{12.3}{15} \times 100\% = 82\%$$

Based on the practicality criteria, a score of 82% falls into the "very strong" category. This indicates that the application is easy to use, well-structured, and technically reliable. In particular, the high score in software engineering suggests that the system operates smoothly and supports efficient data processing. These findings confirm that the SUKA MAJU application is practical for real-world implementation in academic supervision activities.

Effectiveness test

The effectiveness of the application was assessed by five school principals from state junior high schools in Solok City. The evaluation included two aspects: clarity and content quality, with a total of 10 indicators.

Table 10. *Results of effectiveness test*

No	Aspect	Average Score
1	Clarity	4.4
2	Content Quality	4.4
Total		8.8

The effectiveness score was calculated as follows:

$$P = \frac{8.8}{10} \times 100\% = 88\%$$

The 88% result indicates that the application is in the "very strong" category, demonstrating its effectiveness in supporting academic supervision. The findings suggest that the application not only facilitates supervision processes but also enhances the quality of monitoring and evaluation of teaching practices, leading to improved educational outcomes for both students and educators.

Overall, the results of the validity, practicality, and effectiveness tests indicate that the SUKA MAJU application meets the criteria of a high-quality educational product. The high validity scores confirm that the application is conceptually sound and appropriate for academic supervision. Meanwhile, the practicality results demonstrate that the system is user-friendly and feasible for implementation in schools. Most importantly, the effectiveness findings show that the application significantly improves the implementation of academic supervision. By integrating supervision instruments, data processing, and follow-up actions into a single digital platform, the SUKA MAJU application enables more systematic, efficient, and data-driven supervision practices. These findings highlight the potential of digital solutions, particularly those based on Google Workspace for Education, in addressing challenges related to manual supervision and fragmented evaluation systems. Therefore, the SUKA MAJU application can serve as an innovative tool to support school principals in enhancing the quality of teaching and learning processes.

Discussion

Validity, practicality, and usability of the SUKA MAJU application

The findings of this study demonstrate that the SUKA MAJU application has high validity and practicality, indicating that it is conceptually appropriate and feasible for implementation in academic supervision. The strong validity results confirm that the application aligns with supervision principles, particularly in clarity and content relevance, supporting previous studies that emphasise the importance of structured supervision systems for improving instructional quality (Sugiar et al., 2024). The involvement of expert validators further ensures that the application meets both theoretical and practical standards.

In addition, the high practicality score shows that the application is user-friendly and efficient. By integrating supervision instruments, data processing, and follow-up actions into a single platform, the system reduces administrative complexity and supports more systematic supervision practices. The use of Google Workspace for Education enhances usability through its collaborative and cloud-based features, enabling flexible access and real-time data management (Ayanwale et al., 2024; Budiartha et al., 2024). As a result, school principals can focus more on improving teaching quality rather than managing administrative tasks.

Moreover, the usability of the SUKA MAJU application reflects the importance of designing educational technology that aligns with users' actual needs. Often, digital tools fail

due to complexity or irrelevance; however, this application demonstrates that simplicity and functionality can significantly influence adoption. The clear interface and structured workflow enable users to quickly adapt to the system without requiring extensive technical training. This is especially important in schools, where students have different levels of digital literacy.

Additionally, integrating multiple supervision components into a single system enhances consistency and standardisation in supervision practices. Unlike manual systems that often vary across schools and individuals, the SUKA MAJU application ensures that supervision procedures follow a unified structure. This consistency contributes to more reliable evaluation results and supports better decision-making in improving teaching practices.

Effectiveness of digital-based academic supervision

The effectiveness results indicate that the SUKA MAJU application significantly improves the implementation of academic supervision. Digital-based supervision enables structured data collection, continuous monitoring, and timely feedback, which are essential for enhancing teaching quality. These findings are consistent with research showing that e-supervision supports teachers' professional competence and promotes data-driven decision-making in schools (Liu et al., 2025).

By transforming manual supervision into a digital system, the application addresses key challenges, including inconsistent instruments, limited documentation, and inefficient evaluation processes, ultimately improving teaching practices and student outcomes. The integration of Google Workspace tools facilitates better communication between school principals and teachers, enabling faster feedback and more collaborative problem-solving. Furthermore, digital supervision promotes transparency and accountability, as data can be systematically recorded and analyzed. In the long term, this approach contributes to the development of a reflective teaching culture, where teachers continuously improve their instructional practices based on evidence and feedback.

Another important aspect of effectiveness is the application's ability to support continuous improvement. Digital systems allow supervision data to be stored and revisited over time, enabling longitudinal analysis of teacher performance. This helps school principals identify patterns, monitor progress, and design targeted interventions. Such data-driven approaches are increasingly important in modern education systems that emphasize measurable outcomes and accountability. Furthermore, the effectiveness of the SUKA MAJU application also lies in its ability to foster collaboration between supervisors and teachers. Through digital tools, feedback becomes more immediate and interactive, encouraging dialogue rather than one-way evaluation. This collaborative approach aligns with contemporary supervision models that emphasize professional growth and mutual learning rather than control and inspection.

Implications, challenges, and contribution to educational innovation

The implementation of the SUKA MAJU application highlights the importance of aligning academic supervision with broader educational digitalization policies, particularly the Merdeka Mengajar Platform (PMM). This alignment ensures that supervision practices are consistent with national standards and focused on improving learning quality. The role of

school principals as instructional leaders is also crucial, as their digital competence and leadership significantly influence the success of technology-based supervision (Rasdiana et al., 2024).

However, several challenges may arise, including limited technological skills, infrastructure constraints, and resistance to change among educators (Singun, 2025), which can hinder the effective implementation of technology-based supervision and ultimately affect the quality of education. Therefore, continuous training and institutional support are essential to ensure effective implementation. Without adequate preparation, even well-designed digital systems may not achieve their intended impact, as they may fail to be utilized effectively by educators who lack the necessary skills or support.

In addition, the successful implementation of digital supervision requires a supportive organizational culture. Schools need to foster openness to innovation and encourage teachers to adopt new technologies as part of their professional development. Leadership plays a key role in creating this culture by providing motivation, guidance, and recognition for teachers who actively engage in digital transformation.

This study also contributes to educational innovation by introducing a digital-based supervision model that is integrated, practical, and scalable, , which aims to enhance teacher engagement and improve student outcomes through the effective use of technology in the classroom. The SUKA MAJU application represents a shift from conventional supervision practices toward a more adaptive and technology-driven approach. Its use of Google Workspace for Education ensures accessibility and flexibility, making it applicable across various educational contexts, including remote learning environments, blended classrooms, and collaborative projects among students and teachers. Future research is recommended to explore its long-term impact on teacher performance and student learning outcomes, as well as its potential integration with broader educational systems.

Conclusion and Recommendations

This study aimed to develop and evaluate the SUKA MAJU application using Google Workspace for Education to support the implementation of academic supervision aligned with the Merdeka Mengajar Platform (PMM). The findings demonstrate that the application meets the criteria of a high-quality educational product in terms of validity, practicality, and effectiveness.

The validity results indicate that the application is conceptually appropriate and well-designed, as reflected in the high scores from material experts (90%) and language experts (84%), both of which are categorised as very valid. These findings confirm that the application's content, structure, and language are suitable for academic supervision.

In terms of practicality, the application achieved an 82% score, indicating a very strong level of usability. This suggests that the system is user-friendly, efficient, and feasible for implementation in real school contexts. The integration of supervision components into a single digital platform simplifies administrative processes and supports more systematic supervision practices, which ultimately enhances the overall effectiveness of academic supervision in schools. Furthermore, the effectiveness test results (84%) indicate that the application is highly effective in improving the implementation of academic supervision. The use of digital tools enables more structured data collection, continuous monitoring, and timely

feedback, thereby improving teaching practices. Overall, the SUKA MAJU application provides an innovative and practical solution for enhancing academic supervision, particularly by integrating digital technology with PMM-based performance assessment.

Disclosure Statement

No potential conflict of interest was reported by the authors.

References

Akdon, A., & Ridwan, R. (2013). *Formulas and data in statistical analysis*. Bandung: Alfabeta.

Arifin, J. (2022). Implementasi manajemen supervisi akademik kepala sekolah dalam meningkatkan mutu kompetensi profesional guru *(Implementation of principal academic supervision management in improving teachers' professional competence quality)*. *Jurnal Ilmiah Ilmu Pendidikan, 5*(9), 3850–3857.

Ayanwale, M. A., Molefi, R. R., & Liapeng, S. (2024). Unlocking educational frontiers: Exploring higher educators' adoption of google workspace technology tools for teaching and assessment in Lesotho dynamic landscape. *Heliyon*, *10*(9), 1-11. https://doi.org/10.1016/j.heliyon.2024.e06080

Budiartha, C., Redi, A. A., & Halim, G. R. (2024). *Task-technology fit analysis in the adoption of Google Workspace for educatio*n. ACEID.

Ekayogi, I. W. (2022). Model pembelajaran inkuiri terbimbing berbantuan Google Workspace for Education *(Guided inquiry learning model assisted by Google Workspace for Education)*. *Jurnal Didaktika Pendidikan Dasar, 6*(2), 433–452.

Kemendikbudristek. (2021). *Buku saku rapor pendidikan Indonesia (Indonesian education report card handbook)*. Jakarta: Kemendikbudristek.

Liu, T., Luo, Y. T., Pang, P. C. I., & Kan, H. Y. (2025). The impact of ICT on educational administration and supervision. *Education Sciences, 15*(2), 112–125.

Mitchell, D. (2016). *Diversities in education: Effective ways to reach all learners*. Routledge.

Mohamad, M. M., Sulaiman, N. L., Sern, L. C., & Salleh, K. M. (2015). Measuring the validity and reliability of research instruments. *Procedia-Social and Behavioral Sciences*, *204*, 164-171.

Rahabav, P. (2016). The effectiveness of academic supervision for teachers. *Journal of Education and Practice*, *7*(9), 47-55.

Rasdiana, Wiyono, B. B., Imron, A., Rahma, L., Arifah, N., Azhari, R., ... & Maharmawan, M. A. (2024). Elevating teachers' professional digital competence: synergies of principals' instructional e-supervision, technology leadership and digital culture for educational excellence in digital-savvy era. *Education Sciences*, *14*(3), 266-285.

Rusdiana, A., Huda, N., Mu'in, A., & Kodir, A. (2020). The effectiveness of educational supervision in increasing the teacher's professional competence in the COVID-19 pandemic period. *International Journal of Innovation, Creativity and Change*, *14*(5), 918-942.

Sanmarwi, S. (2022). Pemanfaatan hasil asesmen nasional dalam program peningkatan mutu pendidikan dasar *(Utilization of national assessment results in improving the quality of basic education)*. *Jurnal Lingkar Mutu Pendidikan, 19*(2), 97–110.

Singun, A. J. (2025). Unveiling the barriers to digital transformation in higher education institutions: a systematic literature review. *Discover Education*, *4*(1), 37.

Sugiar, L., Sukirman, S., & Sanusi, S. (2024). Academic supervision as a strategy for improving teaching and learning quality. *International Journal of Educational Administration, Management, and Leadership*, 3(2), 31-48.

Subekti, A. (2023). Supervisi akademik berbantuan Google Workspace untuk meningkatkan kompetensi guru *(Academic supervision assisted by Google Workspace to improve teacher competence)*. *Jurnal Didaktika Pendidikan Dasar, 7*(1), 57–70.

Wijayanti, T., Irawan, H., Nugroho, D. A., & Utama, N. J. (2025). Addressing the challenges of the times through the concept of character education by Ki Hajar Dewantara. *IJORER: International Journal of Recent Educational Research*, *6*(6), 1911-1924.

Yasyakur, M. (2023). Implementasi pembelajaran pendidikan agama Islam melalui Google Workspace *(Implementation of Islamic education learning through Google Workspace)*. *Jurnal Pendidikan Bina Manfaat Ilmu, 6*, 68–78.

Zepeda, S. J. (2003). *Instructional supervision: Applying tools and concepts*. Eye on Education.