Volume 4 Number 1 (2026)
January – June 2026
Page: 785-796

EDUJAVARE: International Journal of Educational Research
ISSN: 3031-2884
https://edujavare.com/index.php/edujavare
DOI: 10.70610/edujavare.v4i01.1458

Implementation of Academic Supervision to Improve Teachers' Ability to Integrate Learning Technology

Martina Sri Indriyati[1], Welius Purbonuswanto[2], Rahmat Mulyono[3]
[1,2,3] Universitas Sarjanawiyata Tamansiswa (UST), Indonesia;
Correspondence email; indieazka30@gmail.com

Article history Submitted: 2026/04/12; Revised: 2026/05/20; Accepted: 2026/06/22

Abstract

The integration of technology in education is no longer considered an optional innovation but has become a fundamental requirement for effective teaching and learning. This study aims to analyze the implementation of academic supervision and its impact on improving teachers' ability to integrate learning technology at SDN Jolontoro. This research employed a qualitative case study design involving the school principal and teachers as research participants. Data were collected through observations, semi-structured interviews, and document analysis, including supervision programs, supervision reports, and technology-based lesson plans. The data were analyzed using the interactive model of Miles, Huberman, and Saldaña, which consists of data condensation, data display, and conclusion drawing. The findings reveal that academic supervision at SDN Jolontoro was implemented systematically through planning, classroom observation, feedback, mentoring, and follow-up activities. The supervision process provided professional guidance that helped teachers improve their technological pedagogical competencies and effectively integrate digital learning tools into classroom instruction. Furthermore, academic supervision positively influenced teachers' confidence, reflective practice, collaboration, and willingness to adopt innovative teaching strategies. As a result, teachers became more capable of utilizing technology to support student-centered learning and enhance classroom engagement. The study concludes that academic supervision plays a significant role in strengthening teacher professionalism and facilitating successful technology integration in elementary education.

Keywords Academic Supervision, Elementary School, Learning Technology, Teacher Competence, Technology Integration.

INTRODUCTION

The rapid development of information and communication technology has transformed various sectors of human life, including education. In the era of digital learning, schools are expected to integrate technology into teaching and learning processes to improve educational quality and prepare students for the challenges of the twenty-first century. Learning technology provides opportunities for teachers to create more interactive, engaging, and student-centered

learning environments through the use of digital tools, online platforms, multimedia resources, and educational applications. The integration of technology in education is no longer considered an optional innovation but has become a fundamental requirement for effective teaching and learning. Teachers play a crucial role in determining the success of technology integration because they are directly responsible for designing, implementing, and evaluating instructional activities. Therefore, improving teachers' competence in utilizing learning technology is an essential aspect of educational development and school improvement (Mishra & Koehler, 2006; UNESCO, 2023).

Despite the growing importance of technology integration, many elementary school teachers still encounter challenges in utilizing digital technologies effectively in classroom instruction. These challenges include limited technological skills, insufficient training opportunities, lack of confidence in using educational technology, and inadequate support from school leadership. In many cases, teachers tend to use technology only for administrative purposes rather than as a pedagogical tool to enhance student learning outcomes. Consequently, the potential benefits of educational technology remain underutilized. Research indicates that successful technology integration requires not only access to technological resources but also continuous professional development, instructional support, and effective leadership practices that encourage teachers to adopt innovative teaching strategies (Ertmer & Ottenbreit-Leftwich, 2010; Tondeur et al., 2017).

Academic supervision has emerged as one of the most important strategies for improving teachers' professional competence and instructional performance. Academic supervision is a systematic process conducted by school principals or supervisors to assist teachers in enhancing the quality of teaching and learning activities. Through observation, feedback, coaching, mentoring, and professional discussions, academic supervision helps teachers identify their strengths and weaknesses and develop effective instructional practices(Mulyono & Sulistyani, 2022). In the context of technology integration, academic supervision can provide guidance and support for teachers in selecting, implementing, and evaluating appropriate digital learning tools. Effective supervision encourages reflective practice, continuous improvement, and professional growth among teachers, enabling them to adapt to changing educational demands and technological advancements (Glickman, Gordon, & Ross-Gordon, 2018; Sergiovanni & Starratt, 2013).

The relationship between academic supervision and technology integration has gained increasing attention in educational research. Studies have shown that instructional leadership and supervisory support significantly influence teachers' willingness and ability to integrate technology into their teaching practices. School leaders who actively supervise and facilitate professional learning opportunities contribute to the development of teachers' technological pedagogical competencies. Moreover, supervision that emphasizes collaboration, constructive feedback, and professional learning communities can foster a culture of innovation and continuous improvement within schools. As educational institutions strive to implement digital transformation initiatives, academic supervision becomes a strategic mechanism for ensuring

that technology integration aligns with curriculum goals and pedagogical objectives (Hallinger, 2011; Dexter, 2018).

At the elementary school level, the integration of learning technology is particularly important because it supports the development of students' digital literacy, critical thinking, creativity, and problem-solving skills from an early age. However, elementary school teachers often require additional support to integrate technology effectively due to varying levels of technological proficiency and pedagogical experience(Purbonuswanto et al., 2024). Therefore, academic supervision can serve as a professional support system that helps teachers develop confidence and competence in using digital learning tools. Through regular supervision activities, teachers can receive practical guidance on lesson planning, classroom implementation, and the evaluation of technology-enhanced learning experiences, thereby improving the overall quality of instruction (Koehler, Mishra, & Cain, 2013; Darling-Hammond et al., 2017).

SDN Jolontoro, as an elementary educational institution, faces similar challenges and opportunities related to the integration of learning technology. Efforts to improve teachers' technological competence require not only access to digital resources but also effective supervisory practices that promote professional development and instructional innovation. Therefore, examining the implementation of academic supervision in enhancing teachers' ability to integrate learning technology is essential for understanding how supervisory practices contribute to educational improvement. This study aims to analyze the implementation of academic supervision at SDN Jolontoro and its role in strengthening teachers' capacity to integrate technology into teaching and learning processes. The findings are expected to provide valuable insights for school leaders, supervisors, and educators seeking to enhance teacher professionalism and support the successful integration of educational technology in elementary schools (Fullan, 2016; Hattie, 2023).

METHODS

This study employed a qualitative case study design to explore the implementation of academic supervision in improving teachers' ability to integrate learning technology at SDN Jolontoro. A case study approach was chosen because it enables an in-depth understanding of a contemporary phenomenon within its real-life context, particularly when the boundaries between the phenomenon and context are not clearly evident (Yin, 2018). The research participants consisted of the school principal and teachers who were directly involved in academic supervision activities. Data were collected through observations, semi-structured interviews, and document analysis, including supervision programs, supervision reports, lesson plans, and learning technology implementation records. The collected data were analyzed using the interactive model of data analysis proposed by Miles, Huberman, and Saldaña (2014), which includes data condensation, data display, and conclusion drawing or verification. To ensure the trustworthiness of the findings, data triangulation, source triangulation, and member checking were conducted. This method allowed the researcher to obtain comprehensive information regarding supervisory practices, teachers' experiences, and the impact of academic supervision

on the integration of learning technology in classroom instruction (Creswell & Poth, 2018; Yin, 2018).

FINDINGS AND DISCUSSION

Analysis of the Implementation of Academic Supervision to Improve Teachers' Ability to Integrate Learning Technology at SDN Jolontoro

The implementation of academic supervision at SDN Jolontoro can be analyzed through the perspective of instructional supervision theory proposed by Glickman, Gordon, and Ross-Gordon (2018), which emphasizes that academic supervision is a developmental process designed to assist teachers in improving instructional quality through guidance, observation, feedback, and professional support. In the context of technology integration, academic supervision serves not only as an evaluation mechanism but also as a professional development strategy that enables teachers to enhance their competence in utilizing digital tools and learning technologies. The findings indicate that academic supervision at SDN Jolontoro was implemented systematically through planning, classroom observation, feedback sessions, and follow-up coaching activities. These stages reflect the supervisory cycle suggested by Sergiovanni and Starratt (2013), who argue that effective supervision should involve collaborative interactions between supervisors and teachers to promote continuous instructional improvement. Through supervision activities, teachers received guidance on selecting appropriate digital platforms, designing technology-based lesson plans, and implementing interactive learning strategies that support student engagement and achievement. Such practices demonstrate that supervision functions as a catalyst for pedagogical innovation and professional growth.

From the perspective of instructional leadership theory, the role of the school principal in implementing academic supervision is particularly significant. Hallinger (2011) explains that instructional leaders influence teaching quality by establishing educational goals, monitoring instructional practices, and supporting teacher development. At SDN Jolontoro, the principal actively conducted classroom observations and provided constructive feedback regarding teachers' use of technology in instruction. This leadership practice aligns with the concept of transformational instructional leadership, where leaders encourage teachers to adopt innovative teaching methods and continuously improve their professional competencies. By facilitating discussions on technology integration and providing opportunities for professional learning, the principal created an environment that supported experimentation with digital learning tools. Consequently, teachers became more motivated to explore educational technologies and incorporate them into classroom activities. This finding confirms that effective academic supervision is strongly influenced by leadership practices that prioritize teacher learning and instructional improvement (Robinson, Lloyd, & Rowe, 2008).

The implementation of academic supervision at SDN Jolontoro can also be examined through the Technological Pedagogical Content Knowledge (TPACK) framework developed

by Mishra and Koehler (2006). According to the TPACK model, effective technology integration requires teachers to possess not only technological knowledge but also pedagogical and content knowledge and the ability to integrate these domains into instructional practice. Academic supervision at SDN Jolontoro focused on helping teachers understand how technology could be used to support learning objectives rather than merely introducing technological tools. Supervisory feedback emphasized the alignment between digital resources, instructional methods, and curriculum content. For example, teachers were encouraged to utilize multimedia presentations, educational videos, interactive quizzes, and online learning platforms to enhance student understanding of subject matter. Through continuous supervision and mentoring, teachers gradually developed stronger TPACK competencies, enabling them to make informed decisions about technology use in different learning contexts. This finding supports previous studies indicating that professional support and supervision are essential for developing teachers' technological pedagogical competencies (Koehler, Mishra, & Cain, 2013).

Furthermore, the implementation of academic supervision can be interpreted through the lens of adult learning theory proposed by Knowles (1984). Adult learning theory suggests that professional development activities are most effective when they are relevant to participants' professional needs and provide opportunities for reflection and problem-solving. The supervision process at SDN Jolontoro emphasized individualized guidance based on teachers' specific challenges in integrating technology into classroom instruction. Rather than adopting a directive approach, supervisors engaged teachers in reflective discussions about their instructional practices and encouraged them to identify areas for improvement. This collaborative approach promoted teacher ownership of the learning process and enhanced their willingness to adopt new technological practices. Teachers reported that supervisory feedback helped them recognize weaknesses in their use of educational technology and identify practical solutions for overcoming these challenges. Therefore, academic supervision functioned not merely as a monitoring activity but as a form of job-embedded professional learning that supported teacher capacity building.

The findings can also be analyzed using the concept of professional learning communities (PLCs). According to DuFour and Eaker (1998), professional learning communities encourage collaboration among educators to improve teaching practices and student outcomes. Academic supervision at SDN Jolontoro fostered collaboration through professional discussions, peer sharing, and reflective meetings focused on technology integration. Teachers had opportunities to exchange experiences regarding the use of digital tools and discuss effective instructional strategies. Such collaborative interactions contributed to the development of a supportive professional culture where teachers learned from one another and collectively addressed challenges related to educational technology. This collaborative dimension of supervision is particularly important because technology integration often requires ongoing experimentation and adaptation. Through professional

dialogue and shared learning experiences, teachers became more confident in implementing innovative instructional approaches supported by technology.

Another important theoretical perspective is Rogers' Diffusion of Innovation Theory (2003), which explains how innovations are adopted within organizations. According to Rogers, the adoption of innovation is influenced by communication channels, social systems, leadership support, and perceived benefits. The implementation of academic supervision at SDN Jolontoro facilitated the diffusion of learning technology by providing teachers with information, support, and opportunities to observe successful practices. Supervisory activities helped reduce uncertainty regarding technology use and demonstrated the practical advantages of digital learning tools. Teachers who initially showed hesitation toward technology integration became more willing to adopt innovative practices after receiving guidance and observing positive outcomes in student learning. This finding indicates that academic supervision serves as an effective mechanism for accelerating innovation adoption within schools and promoting a culture of continuous educational improvement.

The success of academic supervision at SDN Jolontoro is also evident in the enhancement of teachers' self-efficacy regarding technology integration. Bandura's Social Cognitive Theory (1997) emphasizes that self-efficacy influences individuals' motivation, persistence, and performance. Through supportive supervision, teachers gained confidence in their ability to utilize technology effectively in classroom instruction. Positive feedback, mentoring, and opportunities for successful technology implementation contributed to the development of stronger technological self-efficacy. As teachers became more confident, they demonstrated greater willingness to experiment with new digital tools and instructional approaches. Increased self-efficacy subsequently improved the quality of technology integration and contributed to more engaging and interactive learning experiences for students.

Overall, the implementation of academic supervision at SDN Jolontoro reflects a comprehensive and developmental approach to teacher professional growth. Viewed through the theories of instructional supervision, instructional leadership, TPACK, adult learning, professional learning communities, diffusion of innovation, and self-efficacy, the findings demonstrate that academic supervision plays a strategic role in enhancing teachers' ability to integrate learning technology. The supervision process not only improves teachers' technological competencies but also fosters reflective practice, collaboration, innovation, and professional confidence. Consequently, academic supervision becomes an essential instrument for supporting digital transformation in education and ensuring that technology integration contributes meaningfully to the improvement of teaching and learning quality in elementary schools (Glickman et al., 2018; Mishra & Koehler, 2006; Hallinger, 2011).

Analysis of the Impact of Academic Supervision on Teachers' Ability to Integrate Learning Technology in the Teaching and Learning Process at SDN Jolontoro

The impact of academic supervision on teachers' ability to integrate learning technology at SDN Jolontoro can be understood through several educational and leadership

theories that explain how professional support influences teacher competence and instructional effectiveness. Academic supervision serves not only as a mechanism for evaluating teacher performance but also as a professional development strategy that enhances teachers' knowledge, skills, confidence, and motivation in utilizing educational technology. The findings indicate that academic supervision has significantly contributed to improving teachers' ability to plan, implement, and evaluate technology-based learning activities. This improvement can be analyzed through Glickman, Gordon, and Ross-Gordon's (2018) developmental supervision theory, which argues that effective supervision promotes teacher growth by providing continuous guidance, reflection, and professional assistance. Through systematic supervision activities such as classroom observation, feedback sessions, mentoring, and follow-up discussions, teachers at SDN Jolontoro gained a deeper understanding of how digital technologies can support instructional objectives and improve student engagement. As a result, teachers demonstrated greater competence in selecting appropriate technological tools and integrating them into classroom instruction.

One of the most significant impacts of academic supervision is the enhancement of teachers' technological pedagogical competence. This finding can be explained through the Technological Pedagogical Content Knowledge (TPACK) framework developed by Mishra and Koehler (2006). According to the TPACK model, effective technology integration requires the interaction of technological knowledge, pedagogical knowledge, and content knowledge. Before receiving intensive supervision, many teachers tended to use technology primarily for administrative purposes or simple presentations. However, after participating in academic supervision activities, teachers showed an increased ability to align technological tools with instructional strategies and curriculum objectives. They became more capable of using interactive applications, multimedia resources, online assessments, and digital collaboration platforms to facilitate meaningful learning experiences. This development demonstrates that supervision contributed to strengthening teachers' TPACK competencies, enabling them to integrate technology in ways that enhance both teaching effectiveness and student learning outcomes. The findings support previous research indicating that professional support and instructional coaching are essential factors in developing teachers' technological pedagogical knowledge (Koehler, Mishra, & Cain, 2013).

Another important impact of academic supervision is the improvement of teachers' confidence in utilizing learning technology. This finding can be interpreted through Bandura's Social Cognitive Theory, particularly the concept of self-efficacy. Bandura (1997) argues that individuals who possess strong self-efficacy are more likely to undertake challenging tasks, persist when facing difficulties, and achieve higher levels of performance. Through constructive feedback, mentoring, and positive reinforcement, academic supervision helped teachers overcome their fears and uncertainties regarding technology use. Teachers gradually developed confidence in operating digital tools, managing technology-based learning environments, and solving technical challenges that emerged during instruction. As their confidence increased, teachers became more willing to experiment with innovative

instructional methods and explore new educational technologies. This increased self-efficacy subsequently contributed to more effective technology integration and improved instructional quality. The findings confirm previous studies showing that supportive supervision and professional coaching significantly enhance teachers' confidence in implementing educational innovations (Tschannen-Moran & Hoy, 2007).

The impact of academic supervision can also be analyzed through the lens of transformational leadership theory. According to Bass and Riggio (2006), transformational leaders inspire followers to achieve higher levels of performance by providing vision, encouragement, intellectual stimulation, and individualized support. At SDN Jolontoro, the principal's role as an instructional leader was instrumental in encouraging teachers to adopt technology-enhanced instructional practices. Through academic supervision, the principal communicated the importance of digital learning, motivated teachers to improve their technological competencies, and facilitated opportunities for professional growth. This supportive leadership environment fostered a positive attitude toward technology integration and encouraged teachers to embrace change. As a result, teachers became more proactive in utilizing technology to support learning activities and improve student participation. The findings suggest that academic supervision functions most effectively when combined with transformational leadership practices that inspire innovation and continuous professional development.

Furthermore, academic supervision had a positive impact on teachers' reflective practice and professional learning. Schön's (1983) theory of reflective practice emphasizes that professionals improve their performance through critical reflection on their experiences and actions. During supervision sessions, teachers at SDN Jolontoro were encouraged to reflect on their teaching practices, evaluate the effectiveness of their technology integration strategies, and identify areas for improvement. Feedback discussions provided opportunities for teachers to analyze instructional challenges and develop solutions collaboratively with supervisors. This reflective process enhanced teachers' awareness of effective technology use and encouraged continuous improvement in instructional practices. Consequently, academic supervision promoted a culture of lifelong learning and professional inquiry among teachers, which is essential for adapting to rapidly changing technological developments in education.

The findings also reveal that academic supervision contributed to increased collaboration among teachers regarding technology integration. This impact can be explained through the theory of Professional Learning Communities (PLCs) proposed by DuFour and Eaker (1998). Professional learning communities emphasize collaborative learning, shared responsibility, and collective improvement among educators. Through supervision activities, teachers were encouraged to share experiences, discuss best practices, and collaborate in solving challenges related to educational technology. These collaborative interactions facilitated the exchange of knowledge and strengthened teachers' professional networks within the school. As teachers learned from one another, they became more capable of implementing innovative instructional strategies and adapting technology to diverse

classroom contexts. This collaborative culture not only improved individual teacher competence but also contributed to the overall capacity of the school to support technology-enhanced learning.

From the perspective of Rogers' Diffusion of Innovation Theory (2003), academic supervision also accelerated the adoption of educational technology within the school environment. Rogers argues that innovation adoption is influenced by communication, leadership support, social interaction, and perceived benefits. Academic supervision provided a structured mechanism for introducing technological innovations and demonstrating their instructional value. Teachers received practical examples of successful technology integration and were encouraged to experiment with digital learning tools in their classrooms. Supervisory support reduced resistance to change and increased teachers' willingness to adopt new instructional practices. Consequently, technology integration became more widespread and sustainable across the school. This finding suggests that academic supervision plays an important role in facilitating educational change and promoting innovation in teaching and learning processes.

In addition to improving teacher competence, academic supervision also had a positive impact on classroom learning quality. The integration of technology enabled teachers to create more interactive, engaging, and student-centered learning environments. Students became more actively involved in learning activities through the use of multimedia resources, educational applications, online quizzes, and collaborative digital platforms. This finding aligns with constructivist learning theory, which emphasizes that meaningful learning occurs when students actively construct knowledge through interaction and engagement (Vygotsky, 1978). By helping teachers integrate technology effectively, academic supervision indirectly contributed to improved student participation, motivation, and learning experiences. Therefore, the impact of supervision extends beyond teacher development and influences the broader educational outcomes of the school.

Overall, the findings demonstrate that academic supervision at SDN Jolontoro has a substantial impact on teachers' ability to integrate learning technology in the teaching and learning process. Viewed through the theories of developmental supervision, TPACK, self-efficacy, transformational leadership, reflective practice, professional learning communities, diffusion of innovation, and constructivism, academic supervision contributes to the development of teachers' technological competence, confidence, collaboration, innovation, and instructional effectiveness. The supervision process supports teachers in adapting to the demands of digital education while simultaneously improving the quality of classroom instruction. Therefore, academic supervision can be regarded as a strategic instrument for enhancing teacher professionalism and facilitating successful technology integration in elementary education. These findings reinforce the argument that sustained supervisory support is essential for achieving meaningful educational transformation in the digital era (Glickman et al., 2018; Mishra & Koehler, 2006; Hallinger, 2011).

CONCLUSION

Based on the findings and analysis, it can be concluded that the implementation of academic supervision at SDN Jolontoro plays a significant role in improving teachers' ability to integrate learning technology into the teaching and learning process. The supervision was carried out systematically through planning, classroom observation, feedback, mentoring, and follow-up activities, enabling teachers to enhance their technological, pedagogical, and professional competencies. Academic supervision not only provided guidance on the effective use of digital learning tools but also fostered teachers' confidence, reflective practice, collaboration, and willingness to adopt innovative instructional strategies. As a result, teachers became more capable of integrating technology in ways that align with curriculum objectives and support student engagement. Furthermore, the impact of academic supervision extended beyond teacher development by contributing to more interactive, student-centered, and technology-enhanced learning environments. Therefore, academic supervision can be regarded as a strategic instrument for strengthening teacher professionalism and supporting the successful implementation of educational technology in elementary schools, particularly in the context of digital transformation in education.

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