

Critical Review of Technology-Based Education Supervision Models: Implications for Improving The Quality of Learning in The Digital Age

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Abstract: This study aims to conduct a critical review of the technology-based educational supervision model and its implications for improving the quality of learning in the digital era. This model integrates conventional supervision concepts with digital technologies to provide more effective support to educators in the development of their teaching practices. In this study, we conducted an examining pertinent literature to pinpoint the effectiveness, challenges, and potential of technology-based educational supervision models. Positive implications of this model include greater accessibility to supervision and guidance for educators, flexibility of time and place, and increased efficiency in providing feedback.

Keywords: supervision, educational technology, digital learning, quality of learning, effectiveness of supervision.

INTRODUCTION

Facing ever-evolving technological advancements, the education sector faces new challenges in ensuring that the learning process provided to students remains optimal. One of the efforts to improve the quality of learning is through the development of an educational supervision model that adopts digital technology. The process of educational supervision is generally carried out directly between supervisors and teachers. However, with the development of technology, various models of educational supervision have emerged that rely on digital technology. These

models provide ease of access, flexibility, and efficiency in providing support to educators. Although the potential offered by these models is exciting, there is still little research that critically evaluates their effectiveness and practical implications in the context of education in the digital age.

In the era of education that continues to develop, the use of technology in educational supervision models is increasingly needed. With the application of digital technology, the educational supervision process may become more measurable and can be monitored efficiently. In addition, technology integration also allows for wider

participation from various stakeholders, such as parents and communities, in supervising and supporting the learning process. Another advantage of educational supervision models that utilize technology is the possibility to personalize learning.

Supervision is carried out to assist, direct, and nurture teachers so that their performance can improve optimally (Zohriah, Fauzi, and Pandini, 2022). The response and evaluation results of the supervision plan show that not all principals perform supervision well, although some carry out supervision very well. In principle, the headmaster makes a structured plan by setting a date or time for implementation, but sometimes does not specify the steps to be taken during supervision (Astuti et al., 2023).

While recognizing the potential and benefits of using technology in educational supervision also arises. One is the issue of data security and privacy, which must be carefully managed to protect sensitive information about students and teachers. In addition, approaches that rely too heavily on technology can also overlook qualitative aspects of educational supervision, such as the personal relationship between supervisors and teachers. Therefore, when exploring the potential of educational supervision models that adopt digital technology, it is important to find a balance between technological innovation and the need for a humane approach in supporting teachers' professional development and improving the quality of learning.

RESULTS AND DISCUSSION

Results

Based on research results that include literature studies, document analysis, case studies, and interviews to investigate educational supervision models that utilize digital technology. The results show that these models have great potential in improving the quality of learning in the digital age, with advantages such as increased access, learning adjustment, and more efficient supervision. In conclusion, while models of educational supervision with digital technologies offer a wide range of benefits, their successful implementation requires a comprehensive and sustainable approach that takes into account various technical, pedagogical, and institutional .

Education Supervision

Supervision has its origins in the word, "super" which means a higher position or rank, and "vision" which refers to the ability to realize things

that are not visible in real terms Thus, supervision can be interpreted as a view or guidance given by someone who has expertise or a higher position than others below him in the institutional structure. Individuals who supervise are referred to as "supervisors", who are expected to have professionalism in carrying out their duties (Sarifudin et al., 2023)

Supervision ability requires more sensitivity to see clearly problems related to improving the quality of education, including understanding aspects that are not physically visible but require deeper observation. Supervision is carried out with the aim of providing services to the principal able to manage the school organization more effectively and efficiently (Pamungkas, 2023). Supervision is a supervisory activity structured support teachers and other school staff members in carrying out their work efficiently.(Zohriah et al., 2023). While according to Mahulauw et al., (2023), Supervision is a process to evaluate the tasks that have been done, assessment, and as needed, make corrections so that the implementation of tasks is in accordance with the . (Jaliusril, 2023)

Supervision is also an effort to provide services to school principals so that teachers can be assisted and become more skilled in fulfilling their main duties and functions as mentors for their students (Ari Prayoga, 2020). Supervision of education with digital technology is a coaching effort that aims to improve the educational situation in general, as well as improve the quality of the learning process in particular. However, the of supervision with digital technology is coaching teachers(Inom Nasution et al., 2023)

The performance and quality of teachers are evaluated through an activity known as academic supervision with digital technology. According to (Agustin Nurul Hidayati & Eny Haryati, 2023). Supervision with digital technology is part of the administrative function. On the other hand, monitoring with digital technologies is one of the responsibilities of organizers in schools, aimed at creating good working conditions for teachers and school staff, which will support the development of behavior of members of the organization(Hariyadi, 2023)

A. Potential

Educational supervision models that use technology have the potential to provide greater reach to improve the quality of learning, facilitate continuous learning, and expand the reach of supervision. It involves several aspects such as.

1. **Improving Learning Quality:** Digital supervision examines the learning process provided by teachers according to predetermined standards and provides optimal benefits for student progress.
2. **Professional Development:** Technology-based models of educational supervision help in developing teachers' professionalism through constructive feedback, guidance, and opportunities to improve their skills and knowledge.
3. **Identification and Problem Solving:** Digital technology facilitates the identification and resolution of problems in the learning process in an effective manner.
4. **Driving Innovation and Continuous Improvement:** Digital supervision encourages innovation in teaching practices and helps schools to continuously improve the quality of education.
5. **Fostering a Positive Learning Climate:** The application of digital technology in supervision creates a more conducive learning atmosphere for teachers, students, and other school staff.

Educational supervision models that utilize technology carry out supervision functions such as: Mentoring and Coaching, Supervision and Direction, Evaluation and Assessment, Quality Improvement, Professional Development, Creating an Optimal Learning Environment, Enforcement of Standards, Collaboration and Communication. With the integration of technology in educational supervision, educational institutions can optimize the potential to improve the performance and efficiency of learning and professional development of teachers.

Supervision is also an effort to improve the quality of learning by updating supporting infrastructure. Supervision responsibilities also include creating a supportive working atmosphere, managing conflict, and empowering teachers. Overall, educational supervision not only aims to evaluate, but also to actively build and encourage sustainable development, producing a supportive environment for the development of individual and group potential (Iskandar Zulkarnain, 2022)

B. Role

Supervision of education plays a vital role in developing teacher competence. Two metaphors of the supervision function are used. Supervision explains how important the development of teacher

competence is. The position of the teacher is likened to a source of water that must continue to grow so that the flow of water continues to flow. Otherwise, the water source will dry up. Similarly, a teacher needs to continuously improve his knowledge and skills provide fresh learning to students. Second, the position of the teacher is likened to a fruit tree that needs nutrients to grow. Likewise, teachers optimize their professional development.

Education plays a very crucial role because it is the main factor in the formation of human resources, where individuals can develop their potential based on the norms that apply in society. Efforts to improve the quality of human resources the context of education, teachers are one of the main components that need to be continuously fostered and developed (Bestari et al., 2023)

The use of digital-based technology is also key in efforts to improve the quality of education through supervision. Various digital platforms and applications can be used to facilitate the supervision process, including making observations, providing feedback, and recording teacher performance progress. With this technology, educational supervision can be more efficient and effective, allowing supervisors to connect with teachers in various locations in real-time (Salsabila et al., 2024). In addition, technology can also facilitate online learning and online training for teachers, so that they can continue to develop their abilities without having to be physically present at the training site. By utilizing digital-based technology optimally, educational supervision can be more adaptive and responsive to the demands and obstacles faced in the growing realm of education (Saputra et al., 2024).

C. Threat

In the primary education environment, the main challenge in the implementation of supervision involves changing the mindset from authoritarian. Supervision involves changing from an authoritarian and directing attitude to a constructive and creative attitude, teachers feel supported and valued as individuals who have independent potential growth and development. Therefore, supervision needs to be based on objective data and facts. Threats and obstacles in the supervision of digital-based education include:

6. **Limited Access and Infrastructure:** Some educational institutions may not have adequate access to digital technology or necessary infrastructure such as a stable internet connection and sufficient hardware.

7. Lack of Training and Skills: Teachers and education staff may require better training to master the digital tools and platforms used in supervision, and a lack of skills or understanding of technology can be an obstacle.
8. Data Security and Privacy Issues: Data security and privacy, student and teacher data protection and compliance with privacy regulations are important in the implementation of digital-based supervision.
9. Limited Resources: Limited budgets for investment in software, hardware, and staff training can also be an obstacle to implementing digital-based supervision.
10. Context and Cultural Compliance: The challenge of adapting digital supervision to the specific needs and context of each educational institution can arise because each institution has a unique culture.
11. The Role of Human Interaction: Human interaction remains crucial. While technology can facilitate some aspects of supervision, the challenge of effectively maintaining the relationship between teachers and administrators through digital media can also be an obstacle.

Solving these challenges requires a holistic approach that includes investment in infrastructure, adequate staff training, attention to data security, adequate resource allocation, adaptation to local culture and context, and strengthening aspects of human interaction in digital supervision. By overcoming these challenges, digital-based education supervision can be more effective in supporting the improvement of learning quality (Mutia et al., 2023)

Supervision has a significant impact on teacher performance. Through guidance and coaching, teachers are assisted in identifying and overcoming problems and finding solutions related to the learning process they undergo (Hasbi, 2021). In academic supervision, teacher performance is observed, guided, and accompanied from planning, implementing learning, to assessment. Through the application of coaching in the form of Academic Supervision for Indonesian teachers, teacher performance improvement will be increasingly visible. According to Hasanah & Kristiawan (2019), Successful teacher performance can be assessed through the implementation of educational supervision using various supervision techniques.

D. Positive Implications

The positive implications of implementing digital-based education supervision include:

12. Easier Access: The use of digital technology expands the reach of supervision, especially for educational institutions in remote areas or with physical .
13. Efficiency and Flexibility: Digital supervision increases time and resource efficiency, allowing administrators to perform supervision on a scheduled or flexible basis without having to be on site.
14. Improved Quality and Consistency: With digital tools, administrators can consistently monitor and evaluate teacher performance, promoting higher quality standards and the development of best practices.
15. Continuous Learning: Through digital technology, supervision has become more interactive and learning-focused, allowing teachers to receive immediate and continuous feedback to improve their performance.
16. In-depth Data Analysis: Data from digital supervision can be in detail to identify specific trends, training needs, and areas of improvement, supporting more informed decision making.
17. Increased Engagement and Collaboration: Digital supervision facilitates broader engagement from a wide range of parties, including teachers, administrators, and parents, and encourages collaboration and exchange of experiences between them.

Educational Technology

In the current era of globalization, where everything tends to become digital and access to information becomes faster, and life competition is increasingly difficult, every country strives to improve the quality of human resources. Only by having good human resources, a person face competitive competition and can face the impact of global competition. One aspect that is part of educational resources is educational personnel, funding sources, and educational facilities and infrastructure. Educators play a key role in the success of education both in terms of institutional and practical experience. Thus, improve the quality of education, the first step is to pay attention to the factors of "teachers" and educational staff which include the quality of their professionalism and

welfare in professional education management (Sadriani et al., 2023).

Supervision in the context of education, there are two things to focus on, namely the evolution of the curriculum reflects educational progress, which often results in changes in the structure and function of the curriculum. Teachers need to continue to develop their creativity in order to face the challenges that arise along with the curriculum changes. However, various obstacles such as lack of information, mismatch between school conditions and curriculum demands, and limited skills in applying teaching methods, often hinder the process. Therefore, supervision assistance is needed for teachers and principals in overcoming curriculum development challenges. Second, personal development is an ongoing effort within an entity. Individual improvement can be done by official methods through programs organized by the institution or informally through independent activities or with colleagues. Supervision can assist in facilitating the personal development of teachers and employees, both through formal programs and informal activities (Irianisyah & Harapan, 2020)

A. Advantage

The advantages of digital-based learning technology cannot be separated from wide accessibility. With the internet and digital devices becoming increasingly affordable, education can be accessed by anyone, wherever they are, without being limited by distance or financial limitations. However, despite the many potentials and benefits offered, there are also some obstacles that need to be resolved. In addition, it is also important to pay attention to data privacy and security when using educational technology. Therefore, cooperation between stakeholders is needed in overcoming this challenge so that educational technology can provide the best benefits for all education participants (Jaliusril, 2023).

The integration of digital technology into education also allows for personalized learning, a place where students can learn to suit their individual pace and way of learning. In addition, this technology also allows the application of creative learning methods, such as learning through games, simulations, and virtual reality, which can increase student engagement and motivation (Sahronih et al., 2023).

With the adoption of digital-based learning technology, education can become more inclusive, providing access to all individuals without

exception. Along with the development of technology, the future of education will be increasingly driven by digital innovation, which allows the creation of learning experiences that are more productive, fun, can connect with parties involved in the learning process (Arasyid Mahani & Muhniansyah, 2023).

B. Threats

The role of teachers in the context of digital learning technology has also undergone significant changes. Teachers are no longer just must also be technology facilitators who are able to integrate digital tools and applications into student learning processes. They need to have solid digital skills to manage online learning platforms, compile interactive learning materials, and adapt traditional teaching methods into relevant and engaging digital formats. Teachers also need to have the ability to utilize data and analysis generated by digital technology to understand the individual needs of students and provide timely and personalized responses.

Discussion

Digital Learning

According to Rustaman as quoted by Mayasari (2022), The learning process is a process in which there is two-way communication between educators and students in an educational environment to achieve learning targets. The interaction that occurs in this process, educators and students are interrelated and need to interact in a supportive manner so that the achievement of student learning outcomes can be optimal. Opinion Nurbaeti (2022) as mentioned by Agustin Nurul Hidayati & Eny Haryati (2023) states that learning refers to all efforts or activities for productive and efficient learning methods. Meanwhile, Jogyanto quoted by Puspita (2020).

Digital-based learning in educational supervision is the use of digital technology to facilitate the process of supervising and evaluating the performance of teachers or instructors. This includes using digital tools and platforms to collect data on teaching implementation, provide direct feedback, and support teacher professional development through online training, digital learning resources, and engagement in online learning communities (Hari Wibowo et al., 2023). The function of learning supervision is to improve the quality of learning situations by providing guidance to teachers to improve their professionalism as mentioned in Tatang Aditya & Ismanto (2020).

The use of technology, various models of academic supervision, has resulted in meaningful changes in improving the quality of learning. Here are some educational supervision models that utilize technology and strive to improve the quality of learning:

18. The teacher records his or her lessons and shares them with supervisors for grading. The use of video allows supervisors to provide more in-depth feedback, helping teachers introspect.
19. Supervisors and teachers interact through online platforms. This increases the accessibility of supervision, facilitates greater involvement from supervisors, and supports the exchange of ideas.
20. Supervisors track teacher performance in detail using analytics technology. The data analyzed, such as class statistics or test results, helps supervisors provide more specific feedback.
21. Supervisors provide immediate feedback through a mobile app, which is also used to record observations. This allows flexible interaction and keeps supervision records.
22. Supervisors use machine learning technology to analyze student performance data. The recommendations provided by the system help teachers improve the quality of learning, for example by identifying student learning .

Quality of Learning

Learning is a continuous process, involving many aspects that are influenced by various factors, including cultural, historical, as well as practical challenges faced by students and the natural characteristics of the learning process and learning itself. Teaching supervision activities are an essential part of the implementation of education that must be carried out. The implementation of educational supervision is very important for improving teacher performance in the learning process (Maulana & Suryana, 2023).

In the context of quality learning, it is important to understand that processes, and management are interrelated and inseparable elements. If learning management and its functions are carried out properly, the learning process will also be effective. When the learning process goes well, the output will also be of high quality in Heryati, (2022). Some evidence suggests that the lack of improvement in learning quality is often due to unclear management of learning, such as the management of learning spaces, the management of

interactions with students, teaching strategies that motivate student participation, the management of learning materials, and the management of learning resources, among other factors (Mutia et al., 2023)

Success in improving student achievement depends on a number of factors, such as teaching staff, facilities, environment, and curriculum implemented in the educational institution (Nisa, 2023). Teachers must be active in determining educational success. The active role of teachers in managing the learning process - teaching requires high enthusiasm and the ability to meet learning indicators that become benchmarks in the assessment of Academic Supervision (Almaajid et al., 2023)

A. Advantage

From the use of digital-based supervision such as video-based, or remote-based, data-based, mobile application-based and machine learning-based, it is expected that the advancement of teaching will become more pronounced through the use of digital technology. Teachers will receive more detailed and in-depth feedback on how they teach. They also have greater opportunities to access a wide range of resources and support to improve their teaching skills. By utilizing technology in different supervision models, teachers can actively implement improvements and new strategies in their teaching. Ultimately, this will improve student learning effectiveness and overall academic

B. Threats

Measuring qualitative aspects of learning and human interaction that technology cannot completely replace in the context of quality of learning can pose several challenges, including:

1. Qualitative assessment of learning often requires a deep understanding of specific nuances and contexts within the classroom.
2. Most of the important information in human interaction can be expressed through facial expressions, body language, and voice intonation.
3. Qualitative assessment of learning also often involves an in-depth understanding of the level of student involvement in the learning process.
4. Qualitative evaluation also includes assessing the extent to which students understand the material being taught, not only remembering information but also being able to apply it and analyze it well.

5. The qualitative evaluation of learning must also consider the cultural and social context in which learning takes place.
6. The qualitative aspects of learning are often subjective and require complex interpretation.

Supervision Effectiveness

Supervision effectiveness refers to the ability of supervision to achieve predetermined goals with satisfactory results. This involves the ability to supervise in efforts to improve teacher performance, improve learning practices, and improve the overall quality of education. In addition, the effectiveness of supervision also includes the ability to have a positive impact on the professional development of teachers, improve student achievement, and create a conducive and inclusive learning environment (Wahyu et al., 2023).

Supervision effectiveness refers to the ability of supervision to achieve targets that have been set with satisfactory results. This includes the ability to supervise efforts to improve teacher performance outcomes, improve learning practices, and improve the overall quality of education. In addition, the effectiveness of supervision also includes the ability to have a positive impact on the professional development of teachers, improve student achievement, and create a conducive and inclusive learning environment. A critical review of educational supervision models that adopt technology can involve several elements, consideration of efforts to improve the quality of learning. The following are some important aspects worth considering:

The use of technology in educational surveillance may result in over-reliance on technology tools and platforms. For example, a focus on quantitative measurement using algorithms may overlook more in-depth qualitative evaluations.

1. Access Inequality: While technology has the potential to improve accessibility and inclusivity, gaps in access to adequate infrastructure and internet connections can be major barriers.
2. Surveillance models that are entirely technology-based may miss important human elements, such as empathy, understanding of cultural context, and sensitivity to individual needs.

3. The use of technology in educational surveillance can raise privacy and ethical concerns, particularly if sensitive student or teacher data is collected and analyzed.
4. Supervision models should pay attention to the quality of content and teaching delivered through technology to ensure truly quality learning.
5. Supervision conducted through technology may reduce direct interaction between supervisors and teachers, which may affect the ability to provide direct feedback and support overall professional.

CONCLUSION

From this research, it can be concluded that educational supervision models that use technology have great potential in efforts to improve the quality of technology-based learning in the digital era. While it presents advantages such as ease of access, efficiency in supervision, and skill development tailored to individuals, there are still challenges such as unequal access to technology, the need for intensive training, and data privacy concerns that need to be addressed. By facing these challenges, educational institutions can leverage technology to improve teaching practices, improve the quality of learning, and overcome challenges in the digital era.

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