EDUKASIA: Jurnal Pendidikan dan Pembelajaran
Vol. 5, 2 (December, 2024), pp. 523-536
ISSN: 2721-1150; EISSN: 2721-1169; DOI: 10.62775/edukasia.v5i2.1639

Development of an Internet of Things (IoT)-Based Teacher Performance Evaluation System to Improve the Quality of Basic Education

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ARTICLE INFO

Keywords:

Teacher Performance Evaluation;
Internet of Things (IoT);
Basic education

Article History:

Received 2024-09-20
Revised 2024-11-23
Accepted 2024-12-31

ABSTRACT

This research aims to integrate the Internet of Things (IoT) in teacher performance evaluation in elementary schools to improve efficiency, accuracy, and transparency in assessment. The method used in this study is a mixed approach, which involves collecting data through questionnaires, interviews, and observations. The results of the study show that YIMI Gresik Elementary School is ready to adopt IoT with various devices that support real-time data collection. IoT-based evaluation systems are able to increase objectivity and transparency in teacher performance assessments, as well as accelerate feedback provided to teachers. The study also found that the application of IoT can reduce the subjectivity that often arises in manual evaluations and improve the quality of teaching through more efficient systems. The implications of this study show that the integration of IoT in the evaluation system can optimize education management, especially in improving the quality of teacher performance evaluation. However, the challenges faced, such as inadequate infrastructure and the need for more intensive training, must be addressed immediately in order for the implementation of IoT to run effectively across primary schools. Follow-up research is expected to examine the long-term impact of the use of IoT-based evaluation systems on teaching quality and student learning outcomes.

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1. INTRODUCTION

Basic education plays an important role in building basic knowledge and developing children's character. Basic education not only provides academic knowledge but also aims to develop essential skills that students need to face future challenges. This stage of education serves as a solid foundation

to prepare a competent and adaptive generation in various aspects of life (Pushplata, Sable., Kavita, 2024). In an era marked by globalization and rapid change, the quality of basic education is an important determinant of the success of individuals and nations. Therefore, improving the quality of basic education has become an important priority in the framework of national development (Ramdanil, Mubarok., Fadillah, Ramadhan., Sulistiani, 2024).

The role of teachers in basic education is very important. Teachers are not only the deliverers of academic content, but also act as role models and mentors in developing students' personal potential. The quality of teachers directly affects the experience and educational outcomes of their students (Christina, Turner., Ian, Harum, Prasasti., Yasmika, Baihaqi., Widi, 2024). Teachers bear the substantial responsibility of not only transferring knowledge, but also forming attitudes, character, and life skills that are essential for students to become productive and contributing members of society. Thus, teachers are a fundamental pillar in the education process, and their quality must be continuously monitored and improved through effective performance evaluation (Laros, Tuhuteru., Emy, Yunita, Rahma, Pratiwi., Devin, Mahendika., Dahlan, 2023) .

However, many educational institutions still conduct manual teacher performance evaluations. This traditional approach faces a variety of challenges, including subjective judgment, personal bias, and limitations in data collection and analysis. Subjective evaluation can produce unfair outcomes, as judgment is influenced more by personal perceptions or relationships than objective criteria (Sanchit, Kripalani, Tejas, Lipare, Dipali, 2024). Further, the slow and non-real-time nature of data collection may result in delayed responses to improvements or improvements in the quality of required teaching. The time-consuming evaluation process often results in delays in the identification of problems and the implementation of solutions, which ultimately impacts the quality of education students receive (Aaron, M., Pallas, Cami, 2024).

To overcome these challenges, innovations in teacher performance evaluation systems are needed that improve efficiency, accuracy, and objectivity. One promising solution is the application of the concept of the Internet of Things (IoT), which emerged from advances in information and communication technology. IoT, which involves a network of interconnected devices that can communicate and share data, has brought significant changes in various sectors, including education (Shafi, Shereef, Nisha, 2023). (Attra, 2023). In the context of education, IoT can offer profound benefits, especially in real-time data collection, faster and more accurate analysis, and more effective implementation of solutions (Shafi, Shereef, and Nisha, 2023).

IoT is a technological framework that allows physical devices to connect over the internet and share data without human intervention. In the world of education, IoT can be used to monitor and measure various aspects of teacher performance, such as attendance, interaction with students, and the use of technology in teaching. By using sensors and connected devices, this data can be collected and analyzed automatically, resulting in a more accurate and comprehensive evaluation (Gilang, Kartika, Hanum., Andi, Irwin., Ruly, Nadian, Sari., Abdullah, Ardi., Lismaryanti, 2024b) .

The integration of IoT into the teacher performance evaluation system allows for automatic and real-time collection of performance data. For example, teacher attendance, student interaction, use of teaching technology, and other aspects of the learning process can be monitored directly through sensors and connected devices. This data can then be analyzed to provide a more accurate picture of teacher performance, reduce bias, and provide timely feedback, thus facilitating a more efficient, objective, and transparent evaluation process (Gina, Martinez, Jason, Perry, Vadim, 2024) .

In education management theory, teacher performance evaluation aims to assess the effectiveness of teaching and its impact on student learning outcomes. Effective evaluation should cover various aspects, such as pedagogical competence, teaching methods, classroom management, and interpersonal relationships with students. Evaluations should be designed to provide constructive feedback to teachers, support their professional development, and ensure that their teaching practices are up to expected standards (Putri, Suci, Ramadhan., Desi, Fitri, Yani, Sembiring., Ella, Nurmaini., Dessy, Masliani, Lubis., Muhammad, 2024) .

The implementation of IoT-based systems allows for a more systematic and structured approach to performance evaluation, thereby minimizing potential bias or subjectivity. For example, data about the time teachers spend in the classroom, their interactions with students, and the use of educational technology can be objectively measured through IoT devices. This data can then be analyzed to identify areas where teachers may need additional support or training, as well as to recognize and provide an appreciation of best practices that can be adopted by other educators (Putri, Suci, Ramadhan., Desi, Fitri, Yani, Sembiring., Ella, Nurmaini., Dessy, Masliani, Lubis., Muhammad, 2024) .

The various challenges faced in the process of evaluating teacher performance in primary education encourage this research to develop innovative solutions through the application of Internet of Things (IoT) technology. Key issues identified include subjective evaluation, personal bias, and slow data collection and analysis if done manually. These conditions inhibit the rapid response needed to improve and improve the quality of teaching (Georgios, 2024) .

This research focuses on the development of an IoT-based teacher performance evaluation system as a solution to overcome these challenges in primary education. The initial steps of this research include identifying user needs, analyzing current conditions, and designing systems that are aligned with existing needs and conditions. The system will be designed to ensure that the data collected is relevant, accurate, and actionable for decision-making aimed at improving the quality of education (Shafi, Shereef, Nisha, 2023) .

The development process will also involve collaboration with a variety of stakeholders, including teachers, principals, and education managers, to ensure that the developed system effectively addresses their needs and challenges. Development will be iterative, involving continuous testing and validation to ensure the system functions properly in a real-world context (Nurul, Hidayah, Agus, Pahrudin, Tri, 2024) .

Developing an IoT-based teacher performance evaluation system is a strategic step in overcoming performance evaluation challenges in the primary education environment. By utilizing the potential of this technology, it is hoped that the teacher evaluation process can become more objective, transparent, and results-oriented, so as to make a real contribution to improving the quality of basic education. This research focuses not only on the development of technology but also on how this technology can be used effectively to support the professional development of teachers and improve student learning outcomes (Ridhwan, Amrullah., Ahmad, 2024). As part of efforts to improve the quality of basic education, the development of this system will also involve various stakeholders to ensure that the developed system is relevant and can be used practically in the context of education (Aneesh, 2024). Thus, it is hoped that the findings of this research will make a significant contribution to supporting the goal of national education, which is to create a competent and adaptive generation that is ready to face future challenges (Nurul, Hidayah., Agus, Pahrudin., Tri, 2024) .

The purpose of this study is to develop an IoT-based teacher performance evaluation system that can improve efficiency, accuracy, and transparency in the evaluation process. This research aims to identify the current state of teacher performance evaluation in elementary schools as well as the challenges faced in manual evaluation systems, develop IoT-based models that suit the needs and conditions of basic education, and test and evaluate the effectiveness of the developed system in improving the quality of overall teacher performance evaluation.

2. METHOD

It is an exploratory research with a mixed approach, which combines qualitative and quantitative methods to provide a more comprehensive understanding of the application of IoT-based teacher performance evaluation systems. This research will be carried out at the YIMI Education Foundation Elementary School in Gresik Regency, which was chosen because it has a diversity of classes and representative teaching staff, thus providing a broader perspective on the implementation of IoT technology in the context of basic education. The school is also considered to have a readiness to adopt technology-based systems, which is the main focus of this research.

The research subjects consisted of three main groups, namely teachers, administrators, and students. Teachers are selected based on the criteria of teaching experience, educational background, and willingness to participate in research. A total of 25 teachers from various grade levels, including the early and upper grades, will be involved in this study. Administrators and educational staff involved in teacher performance evaluations are selected based on their roles and responsibilities in the evaluation system at the school. Meanwhile, students will be randomly selected from a variety of classes, with a sample of around 50 students representing different elementary grade levels. Data Collection Techniques with Questionnaires include aspects of satisfaction with existing systems, perceptions of the use of technology in evaluation, and expectations of new systems. Data Analysis Techniques from the questionnaire were analyzed using descriptive statistical techniques to identify patterns and trends in stakeholder perceptions and needs. Qualitative Analysis: Data from interviews and observations will be analyzed using a thematic analysis approach to identify key themes that emerge from the data.

3. FINDINGS AND DISCUSSION

Findings

The results of this analysis showed that the questionnaire met the criteria of validity and reliability, ensuring that the data obtained were reliable for further analysis in the study.

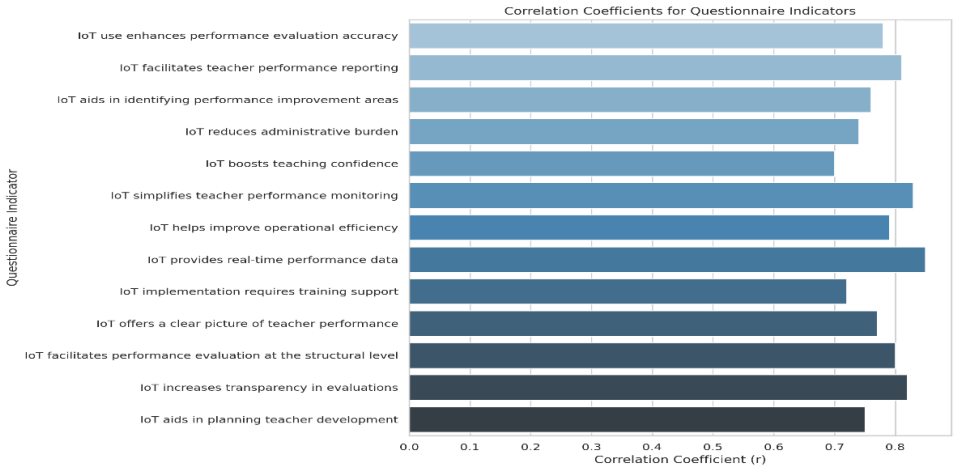

Figure 1Analysis of the Validity of Questionnaire Items

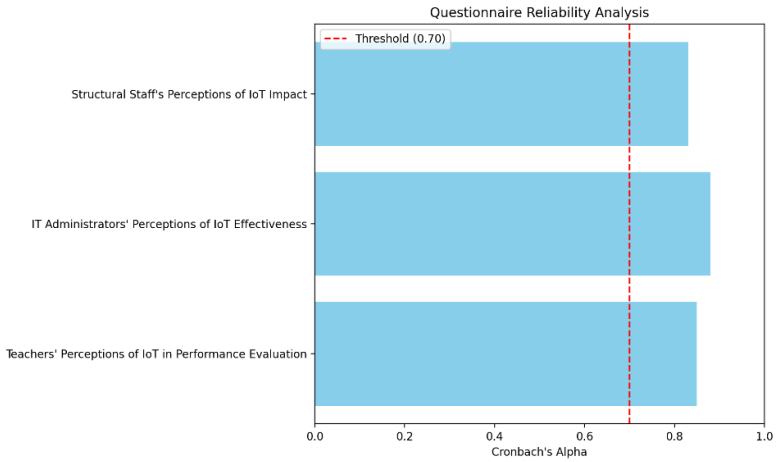

Figure 2Questionnaire Reliability Analysis

Figure 1 shows that all questionnaire indicators have a correlation coefficient exceeding 0.70, which indicates that each item is valid for use in this study. Figure 2 shows that all aspects measured on the questionnaire had a Cronbach's Alpha value above 0.80, indicating that the questionnaire showed excellent reliability and high internal consistency in assessing teachers, IT administrators, and structural staff perceptions of IoT in performance evaluations at YIMI Elementary School.

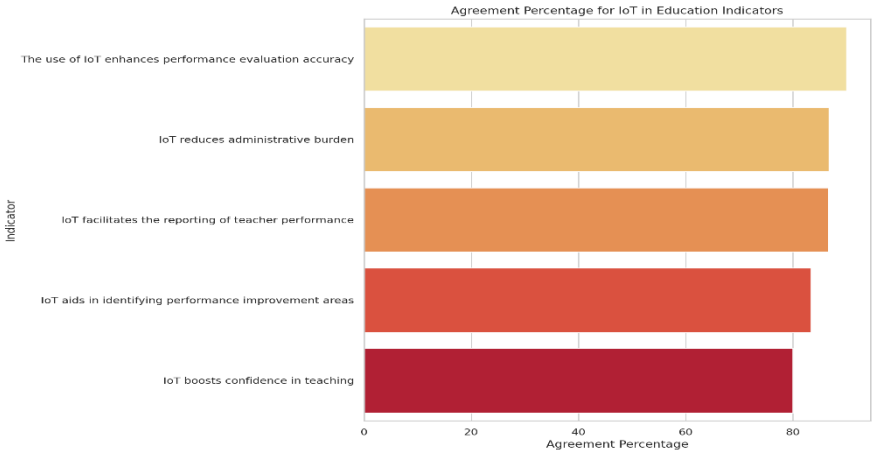

Figure 3. Analysis of YIMI Elementary School Teachers' Perception of the Utilization of IoT in Performance Evaluation

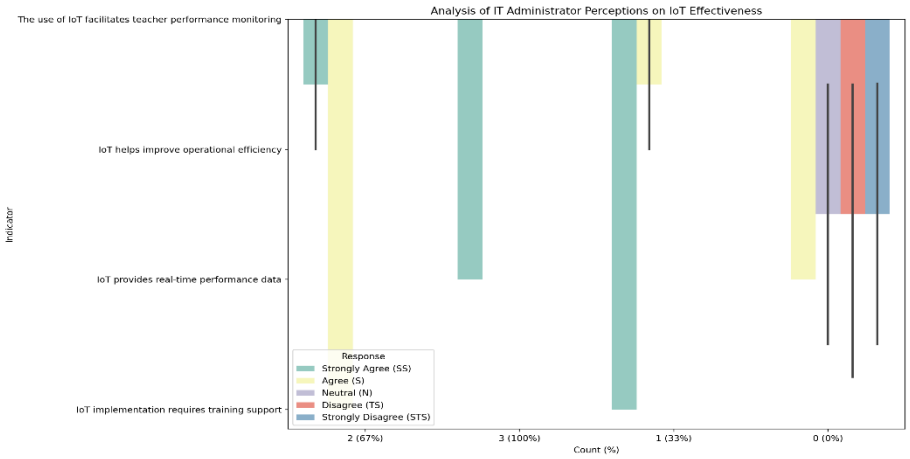

Figure 4. Analysis of IT Administrators' Perceptions of IoT Effectiveness in Performance Evaluation

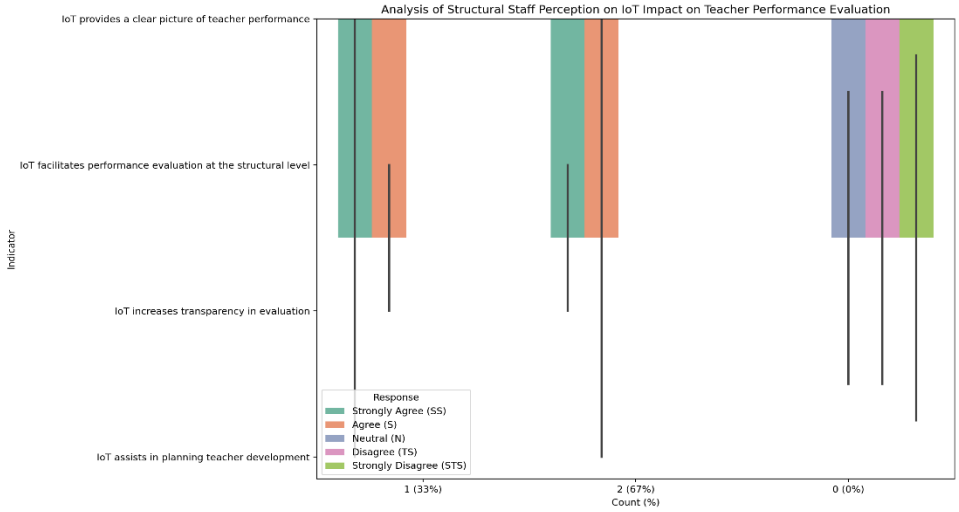

Figure 5. Analysis of IoT Tool Utilization at SD YIMI

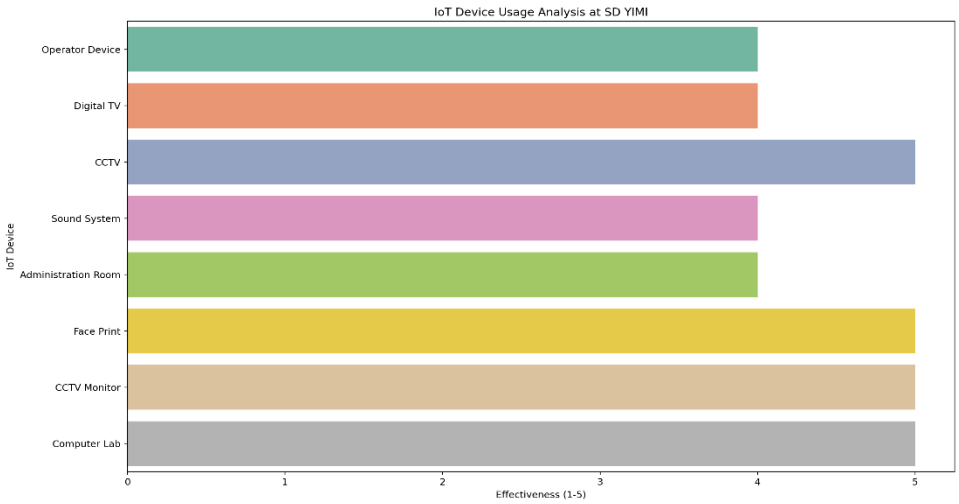

Figure 6. *Analysis* of IoT Tool Utilization in SD YIMI *Figure 4.* Analysis of IoT Tool Utilization by IT Administrators Perception of IoT Effectiveness in Performance Evaluation

Table 1. Analysis of IoT Tool Utilization at SD YIMI Thematic Analysis

Theme	Information	Subtheme
IoT Integration in Education	The use of IoT technology in teacher performance evaluation	Real-time monitoring, Data collection, Analytics
Stakeholder Perceptions	The views of teachers, IT administrators, and structural staff	Acceptance, Rejection, Perceived Usefulness
System Effectiveness	Impact on improving teaching quality and student learning outcomes	Accuracy, Fairness, Quality of Feedback

Data Privacy and Security	Concerns about data protection and confidentiality	Data encryption, Access control, Ethical considerations
Implementation Challenges	Technical and organizational constraints in system adoption	Infrastructure, Cost, Technical Support
Professional Development	Training needs for effective IoT-based evaluation	Digital literacy, Continuous learning, Adaptation to new technologies

Research on the integration of the Internet of Things (IoT) in teacher performance evaluation shows great potential in improving the efficiency, accuracy, and transparency of evaluation systems. The use of IoT enables real-time monitoring, automated data collection, and faster, objective analysis of teacher performance. This can reduce subjectivity in traditional evaluations, speed up feedback to teachers, and ultimately improve the quality of teaching. In addition, acceptance of this technology is quite positive among teachers, administrators, and educational staff, despite the infrastructure and cost challenges that need to be addressed to ensure effective implementation across schools.

However, significant challenges arise related to data privacy and security, where the protection of personal information is a very important issue. The use of data encryption, strict access controls, and ethical considerations in data management are aspects that must be considered so that this technology does not cause concern among stakeholders. In addition, to ensure the effectiveness of the use of IoT in performance evaluation, professional development is needed through digital literacy training and continuous learning for teachers and education staff. Thus, the adoption of IoT can make a significant contribution to improving the quality of basic education, provided that these challenges can be addressed properly.

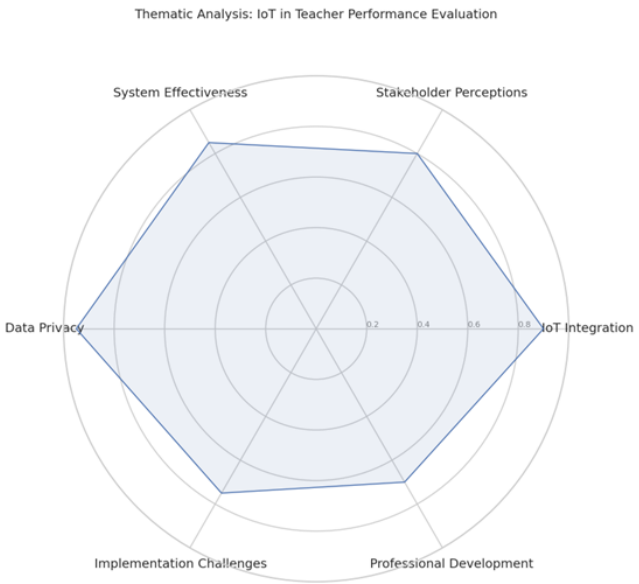

Figure 7. Radar graph visualizing IoT-based teacher thematic analysis Performance Evaluation

Table Interpretation

- Figure 3 shows that the majority of YIMI elementary school teachers have a positive view of the use of IoT in performance evaluation. Most teachers agree that IoT improves accuracy and facilitates performance reporting.
- Figures 4 and 5 show that IT administrators and structural staff support the application of IoT in teacher performance evaluations, believing it improves efficiency and transparency in the evaluation process.
- Figure 6 provides insight into the effectiveness and challenges associated with the use of various IoT devices in YIMI Primary School. Although CCTV and Face Print technology are considered very effective, there are some important technical issues that affect their use.

This data offers a comprehensive overview of stakeholders' perceptions and experiences with IoT in YIMI Elementary School, providing the basis for the further development of an IoT-based performance evaluation system.

Discussion

Based on the results of the questionnaire, most teachers at SD YIMI have a positive perception of the use of IoT for their performance evaluation. In general, teachers feel that IoT improves accuracy and objectivity in performance assessments. This perspective is in line with performance measurement theory, which emphasizes the importance of accuracy in evaluating individual performance. Christian et al. (2019) argue that accuracy in performance evaluation is essential to assess individuals fairly and effectively, which ultimately supports the development of those being evaluated (Christian, Rosales, Sánchez., Dolores, Díaz-Cabrera., Estefanía, 2019). As shown in Table 3, IoT technology, with its ability to collect data in real-time and automatically, facilitates more precise performance assessments compared to traditional methods that tend to be subjective. For example, the use of IoT devices such as CCTV and face print technology to measure teacher attendance and classroom activities has been shown to reduce bias in evaluations. Dessler (2017) supports this, noting that accurate performance evaluation requires objective and measurable data, and technology plays an important role in providing such data (Song-Hwa, Chae., Lauren, M., Eagle., Douglas, A., Johnson., Kwang, Su, Moon., Eunju, Choi., Shezeen, 2020) .

Additionally, teachers found that IoT simplifies performance reporting and helps identify areas that need improvement more efficiently. In performance management theory, an effective evaluation system must provide constructive and timely feedback to the individuals being evaluated. IoT technology allows teachers to receive information about their performance quickly and accurately, which can drive improved quality of their teaching. Rosemary (2024) emphasizes that timely and relevant feedback is essential for improving performance, and technology can facilitate this process by automating data collection and delivery (Rosemary, 2024) .

Based on the perspective of IT administrators and structural staff, the application of IoT in teacher performance evaluation at SD YIMI is also considered effective in improving administrative efficiency. Most respondents in this category stated that IoT facilitates the collection and analysis of teacher performance data, thereby reducing the administrative burden typically associated with manual evaluations. In the theory of educational administration, operational efficiency is a crucial element to ensure optimal resource utilization.

Previous research by Brown and Duguid (2000) showed that technology can automate time-consuming routine tasks, thus allowing the workforce to focus on more strategic and value-added activities. The implementation of IoT in YIMI Elementary School, for example, involves the use of devices such as digital TVs, CCTV monitors, and computer labs that are systematically connected to monitor and record teachers' activities. With data automatically stored in the system, IT administrators and structural staff can concentrate more on data analysis and decision-making, instead of spending time on manual data collection (Gilang, Kartika, Hanum., Andi, Irwin., Ruly, Nadian, Sari., Abdullah, Ardi., Lismaryanti, 2024b) (V., Arunkumar., Prof., S., Thiyagarajan, Dr., K., A., 2024) .

According to the theory of innovation adoption, the application of new technologies in an organization requires careful planning and strong management support to ensure widespread acceptance and effective use. Rogers (2003) explains that a key factor in the success of technology adoption is the perception of relative advantage perceived by users (Firat, Bestepe., Dr., Sevgi, Özkan, 2022). At SD YIMI, benefits such as increased operational efficiency and reduced administrative burden are key drivers for IT administrators and structural staff to embrace and adopt an IoT-based evaluation system (Preetinder, Singh, Brar., Babar, Shah., Jaiteg, Singh., Farman, Ali., Daehan, 2022) .

An important aspect of this study is to examine how IoT-based evaluation systems affect the quality of learning at YIMI Elementary School. The results of the questionnaire show that teachers, administrators, and structural staff believe that IoT can improve the quality of learning in various ways. Technology-based learning theory suggests that integrating technology into the educational process can increase student engagement and facilitate more effective learning (Sri, Maryati, Muhammad, Ichsan, 2022) .

At YIMI Elementary School, the use of technology such as computer labs and CCTV monitors in the classroom allows teachers to monitor student interactions and adjust their teaching methods based on the data generated by the IoT system. Mayer (2003) stated that multimedia learning supported by technology can improve students' understanding and retention, as information is presented through various sensory channels. By leveraging data from IoT devices, teachers can gain deeper insights into how students learn and interact, ultimately resulting in more effective and personalized teaching strategies (Jingbin, 2022) .

Furthermore, IoT helps monitor the use of technology by teachers during learning, for example by using a sound system to clarify communication or multimedia devices to support teaching materials. The theory of social constructivism, popularized by Vygotsky (1978), emphasizes the importance of social interaction and the use of aids in the learning process. In this context, IoT technology can be seen as an aid that enriches the learning environment, allowing teachers to create a more interactive and immersive learning experience for students (Jan, Francisti., Zoltán, Balogh., Milan, 2023) .

Teachers' Trust in IoT-Based Evaluation

The integration of Internet of Things (IoT) technology in education can improve the quality of learning by providing more objective and accurate data on the interaction between teachers and students. In a study conducted by Jan et al. (2023), it was found that IoT technology can assist teachers in monitoring learning activities in real-time, thus allowing them to adjust teaching methods based on the data obtained, which ultimately increases student engagement. The use of devices such as CCTV cameras and other monitoring systems provides a clearer picture of classroom dynamics (Shafi et al., 2023).

IoT also allows teachers to utilize multimedia devices in the learning process, which can significantly improve students' understanding. As explained by Mayer (2003), Multimedia technology can improve information retention through teaching that involves a variety of sensory channels, such as images, sound, and text. Therefore, the application of IoT in classroom management can enrich students' learning experiences, which in turn has an impact on improving their learning outcomes. Teachers who feel evaluated fairly and transparently tend to be more motivated to improve their performance. This is supported by Locke and Latham's goal-setting theory (2002), which states that clear goals and objective feedback can drive individual performance. With the IoT system, teachers at YIMI Elementary School can receive real-time performance reports, which can increase their confidence in the system and motivate them to perform better (Ramdanil, Mubarok., Fadillah, Ramadhan., Sulistiani, 2024) .

In addition, the theory of organizational fairness by Greenberg (1987) suggests that employees' perceptions of fairness in performance evaluations can affect job satisfaction and commitment to the organization. In the context of YIMI Elementary School, teachers' trust in the fairness and transparency of the IoT-based evaluation system plays an important role in creating a positive work environment

and supporting optimal performance. This shows that IoT technology, in addition to serving as an evaluation tool, can also contribute to building a healthier and more productive organizational culture (Maud, Adjeley, Ashong, Elliot, Reginald, 2020) .

While IoT has been felt for its benefits in teacher performance evaluations, the study also identifies challenges that must be addressed to ensure successful implementation. Some teachers and structural staff noted the need for further training to make optimal use of this technology. According to Davis' (1989) technology acceptance model, the acceptance rate and the use of IoT has been felt for its benefits in teacher performance evaluations, the study also identifies challenges that must be addressed to ensure successful implementation. Some teachers and structural staff noted the need for further training to make optimal use of this technology. According to the Davis (1989) technology acceptance model, the rate of acceptance and use of new technologies is significantly influenced by the perception of ease of use and usability. (Mesiono, Mesiono, Hotni, Sari, 2024) (José, María, Fernández, Batanero, Marta, Montenegro-Rueda, José, Fernández-Cerero, Eloy, López, 2023) .

Murtala (2019) stating that adequate training and technical support are key factors that can improve users' perception of new technologies. At YIMI Elementary School, intensive training efforts are required to ensure that all teachers and structural staff have the competencies needed to use IoT systems effectively. This includes training on the use of IoT devices such as fingerprints, CCTV, and other operator tools, as well as an understanding of how to analyze the data generated (Murtala, Aminu., Norazrena, Abu, 2019) .

In addition to training, management support is essential to ensure successful implementation. Lewin's (1947) theory of change management states that organizational change requires a systematic process, which includes stages of thawing, change, and refreezing. At YIMI Elementary School, the disbursement stage involves increasing awareness of the importance of IoT adoption in teacher performance evaluation, while the change stage includes training and system implementation. Finally, the refreezing stage ensures that the use of IoT becomes an integral part of the performance evaluation process in schools (Dr.C., 2021) .

This study shows that the implementation of an IoT-based teacher performance evaluation system at SD YIMI Gresik is well received by teachers, IT administrators, and structural staff. This system is considered effective in improving the accuracy and objectivity of performance evaluation and administrative efficiency. In addition, the use of IoT has a positive impact on learning quality by providing more in-depth data to improve teaching methods (Yang, Sun., Donna, Marie, A., 2023) .

However, the study also identified challenges in implementation, especially regarding the need for training and technical support for users. Therefore, to ensure the sustainability and success of IoT implementation, investment in adequate training and support is required, along with a commitment from management to support this change.

Overall, the findings of this study show that an IoT-based evaluation system has significant potential to improve the quality of education at SD YIMI Gresik, provided that the existing challenges are overcome with the right strategy. A successful implementation of IoT will not only improve teacher performance but also have a positive impact on student learning outcomes, creating a more innovative and efficient educational environment (Rosenda, ALICWAS, 2024) (Shafi, Shereef., Nisha, 2023) .

The integration of Internet of Things (IoT) technology into teacher performance evaluations has brought significant changes in the assessment system in educational institutions. The use of IoT allows for real-time monitoring of teacher performance, more efficient data collection, and more in-depth analysis. This results in a more accurate and comprehensive depiction of teaching activities, which can be used to improve the overall quality of learning. Subthemes that emerged from this analysis included real-time monitoring, systematic data collection, and advanced analytical capabilities (Jan, Francisti., Zoltán, Balogh., Milan, 2023) .

Stakeholders such as teachers, IT administrators, and structural staff have diverse views on the implementation of IoT in performance evaluation. Several stakeholders expressed positive acceptance of this technology, mainly because of its potential to increase transparency and objectivity in

assessments. However, there is also resistance from those who are worried about the reliance on technology and its potential disruptions. Subthemes in stakeholder perception include acceptance, rejection, and perception of system benefits (Shafi, Shereef, Nisha, 2023) .

IoT-based evaluation systems play a crucial role in improving the quality of teaching and student learning outcomes. This technology is considered to be able to provide more accurate and fair assessments, with high-quality feedback for educators. This system not only helps identify strengths and weaknesses in teaching, but also provides data that can be used for professional development. Subthemes related to system effectiveness include assessment accuracy, fairness in evaluation, and quality of feedback provided (José, María, Fernández, Batanero., Marta, Montenegro-Rueda., José, Fernández-Cerero., Eloy, López, 2023) .

Despite its many benefits, the implementation of IoT in education raises concerns regarding data privacy and security. The protection of personal data and confidentiality is a major concern, especially given the sensitivity of the information collected. Addressing these concerns requires strong data encryption, strict access controls, and ethical considerations in data management. Subthemes that emerged include data encryption, access control, and ethical considerations in data use (Gilang, Kartika, Hanum., Andi, Irwin., Ruly, Nadian, Sari., Abdullah, Ardi., Lismaryanti, 2024a) .

The implementation of an IoT-based evaluation system in educational institutions faces several technical and organizational challenges. Adequate infrastructure, associated costs, and ongoing technical support are significant obstacles that need to be addressed. Inadequate infrastructure can hinder implementation, while high costs can burden educational institutions. Subthemes related to implementation challenges include infrastructure, costs, and technical support (Gilang, Kartika, Hanum., Andi, Irwin., Ruly, Nadian, Sari., Abdullah, Ardi., Lismaryanti, 2024a) .

For the effective implementation of IoT in teacher performance evaluation, professional development is essential. Digital literacy, continuous learning, and adaptation to new technologies training should be provided to teachers and related staff. Without adequate training, the effectiveness of technology use will be reduced. Subthemes in professional development include digital literacy, continuous learning, and adaptation to new technologies (Gina, Martinez, Jason, Perry, Vadim, 2024) .

4. CONCLUSION

This study shows that the application of IoT in teacher performance evaluation can increase efficiency, accuracy, and transparency in the evaluation process. IoT-based systems enable real-time data collection, reduce subjectivity in assessment, and speed up feedback to teachers. In addition, the results of the study also show that the acceptance of this technology is relatively positive from teachers, administrators, and educational staff, despite the technical challenges and the need for more intensive training for users. The theoretical contribution of this research lies in the development of an IoT-based teacher performance evaluation system model that can be used to improve the quality of basic education. In practical terms, this study provides insights for schools and other educational institutions on how IoT technology can be implemented to increase the effectiveness of teacher performance evaluations and support their professional development. The implementation of this system also provides the potential to accelerate the improvement of teaching quality and student learning outcomes through more objective and accurate evaluation. However, this study has several limitations, including being limited to the location of the research that was only conducted in one elementary school, as well as a relatively small sample size. In addition, the implementation of IoT in teacher performance evaluations also faces technical challenges that require adequate infrastructure and training, which may not be available in all schools. Recommendations for further research include expanding the scope of research to different schools with different infrastructures, to evaluate the success of IoT systems in a broader context. Further research is also expected to examine the long-term impact of the use of IoT-based evaluation systems on teaching quality and student learning outcomes. Additionally, it is important to explore more deeply the challenges faced in IoT implementation in various school settings, as well as how more effective technical and training solutions can address these constraints.

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