

Information Technology Management in Improving Teacher Performance Productivity in the Digital Era of IT Middle Schools in the Riau Islands Province

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ABSTRACT

This study aims to analyze information technology management in improving teacher performance productivity in the digital era at Integrated Islamic Junior High Schools in Riau Islands Province, focusing on planning, infrastructure, implementation, security, information technology evaluation, and teacher performance productivity including teaching quality, time efficiency, learning innovation, commitment, and collaboration. The research employed a qualitative approach with a case study method conducted at SMP IT Ulil Albab Batam, SMP IT As Sakinah Tanjungpinang, and SMP IT Bahtera Insani Bintan. Research subjects included teachers, principals, vice principals, IT coordinators, students, and parents selected through purposive sampling until data saturation was achieved. Data were collected through participant observation, semi-structured interviews, documentation studies, and focus group discussions, then analyzed using an interactive analysis model with two-stage coding. Data validity was ensured through triangulation, member checking, and thick description. Results show that 70% of schools have strategic IT plans, although implementation varies with significant infrastructure gaps between schools. Teacher performance productivity increased with 80-85% of students finding materials easier to understand, 78% of teachers more efficient in time management, and 90% of teachers committed to improving teaching quality through technology. Supporting factors include management support, continuous training, and adequate infrastructure, while inhibiting factors include budget constraints, lack of digital competence, and low cybersecurity awareness. This study proves that effective information technology management is key to improving teacher performance productivity, requiring a holistic approach including strategic planning, competency development, and continuous evaluation to create a sustainable digital learning ecosystem.

Keywords: information technology management, teacher performance productivity, digital era, Integrated Islamic Junior High School Riau Islands

INTRODUCTION

The digital era has brought about a transformation in the world of education, not only in learning systems but also in expectations for teacher performance. Amidst the rapid development of information technology, teachers are required to adapt to digital transformation in various aspects of their work, including the learning process, assessment, student data management, and continuous professional development



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(UNESCO, 2023). Integrating digital technology into teaching practice goes beyond the use of tools or devices, but also encompasses a deep understanding of how technology can enhance students' learning experiences and teacher productivity.

Teacher performance productivity in the digital era must be measured comprehensively, not only by attendance and teaching hours, but also by their ability to integrate digital technology into teaching practices (Bates, 2019). Teachers who are able to create innovative learning, utilize digital tools effectively, and produce optimal student learning outcomes can act as agents of change in education (Fullan, 2020). However, the reality on the ground shows that not all teachers are able to meet these demands, primarily due to difficulties in operating digital tools, lack of participation in educational technology training, limited infrastructure, and minimal managerial support.

In the context of educational organizations, management information systems play a crucial role in supporting various management functions, such as planning, organizing, implementing, and controlling (Robbins & Coulter, 2021). Implementing an integrated educational management information system enables every element within the educational organization to collaborate more effectively, thereby increasing efficiency and effectiveness in achieving educational goals. This system serves not only as a tool but also as a strong foundation for achieving established operational goals.

Excellent service in the school context is a necessity that cannot be ignored. According to Sutrisno (2019), achieving user satisfaction in educational information services can be achieved by meeting user needs and desires, which encompass not only the technical aspects of information services but also emotional and psychological aspects. Schools, as educational institutions, must prioritize quality through information technology services, specifically the Education Management Information System. As cited by Sallis (2021), customers always desire quality service that can provide satisfaction, so a management system is needed to empower institutions to improve quality.

Conditions at Integrated Islamic Junior High Schools (SMP Islam Terpadu/IT) in the Riau Islands Province exhibit interesting dynamics. These schools embrace the vision of integrating religious knowledge and technology, which should be a strength in facing the challenges of education in the digital age. However, the challenge of teacher productivity in the digital age remains a strategic issue that needs to be addressed. Some schools have shown good progress in digital adaptation by conducting regular teacher training and providing the necessary tools for learning. On the other hand, some schools still face challenges in terms of human resource (HR) readiness, digital literacy, and policy support, creating inequities in the quality of education received by students (Trust et al., 2020).

Data-driven decision-making and valid information are highly relevant in educational management information systems. In the world of education, decisions made by stakeholders, such as teachers, principals, and foundation administrators, must be based on accurate and reliable information (Mandinach & Schildkamp, 2021). As Allah SWT says in Surah Al-Isra, verse 36: "Do not follow that of which you have no knowledge. Indeed, your hearing, your sight, and your conscience—all of these—will be questioned about their responsibility." This verse emphasizes the importance of knowledge and responsibility in decision-making, particularly in the context of education, which will impact future generations.

Based on these conditions, this study aims to examine in depth the productivity of teacher performance in the digital era, especially in IT junior high schools spread across the Riau Islands Province, such as Batam, Tanjungpinang, and Bintan. This study is not only useful for identifying problems, but also for formulating strategies to strengthen teacher competencies and their supporting systems. This study will analyze: (1)

information technology management in Integrated Islamic Junior High Schools in the Riau Islands Province; (2) teacher performance productivity in the digital era; (3) the role of information technology management in improving teacher performance productivity; and (4) supporting and inhibiting factors of information technology management in improving teacher performance productivity in the digital era. The results of this study are expected to contribute to the development of effective information technology management to improve teacher performance productivity in the digital era.

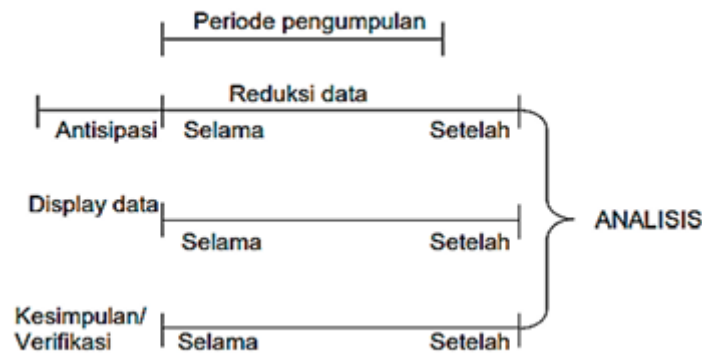
METHOD

This research uses a qualitative approach with a case study method to in-depth explore information technology management in improving teacher performance productivity in the digital era at an Integrated Islamic Junior High School in the Riau Islands Province. A qualitative approach was chosen because it allows researchers to understand phenomena holistically and describe the meanings attached by participants to the issues studied (Creswell & Creswell, 2023). The case study method provides an opportunity to investigate contemporary phenomena in depth within a real-life context, especially when the boundaries between phenomenon and context are unclear (Yin, 2023).

The research was conducted at Integrated Islamic Junior High Schools (SMP) across the Riau Islands Province, specifically in Batam City, Tanjungpinang City, and Bintan Regency. Locations were selected purposively, with the following criteria: schools that have implemented an educational management information system, have adequate information technology infrastructure, and teachers who actively utilize information technology in learning. The research subjects included teachers, principals, vice principals, information technology coordinators, students, and parents, selected through a purposive sampling technique, taking into account various characteristics such as subject matter, teaching experience, and digital literacy levels until data saturation was reached (Patton, 2023).

The research data consisted of primary and secondary data. Primary data were obtained through direct observation, in-depth interviews, and focus group discussions, while secondary data consisted of school policy documents, information system development plans, evaluation reports, and relevant scientific literature (Sugiyono, 2022). Data collection techniques included moderate participant observation to observe the implementation of information technology in learning, semi-structured interviews lasting 45–90 minutes per informant to explore participants' experiences and perceptions, documentation studies to analyze school policies and programs, and focus group discussions with groups of teachers to gain a collective perspective (Flick, 2022; Krueger & Casey, 2023).

Data analysis used an interactive analysis model consisting of data collection, data condensation, data presentation, and conclusion drawing (Miles et al., 2020). Data condensation was carried out through two stages of coding: first cycle coding, which included descriptive coding, in vivo coding, and process coding; and second cycle coding, which included pattern coding, focused coding, and axial coding to identify emerging themes and patterns (Saldaña, 2021). The condensed data were presented in the form of matrices, flowcharts, and descriptive narratives to facilitate understanding and further analysis.



Data validity was ensured through four criteria: credibility using triangulation of sources, methods, and time, member checking, prolonged engagement, and peer debriefing; transferability through a thick description of the research context; dependability through an audit trail and documentation of the research process; and confirmability through researcher reflexivity and the use of direct participant quotations (Lincoln & Guba, 2022; Creswell & Poth, 2024).

RESULTS AND DISCUSSION

The research results show that information technology management at Integrated Islamic Junior High Schools in the Riau Islands Province involves various interrelated aspects, including planning, infrastructure, implementation, security, evaluation, and human resource competency. According to data from the Riau Islands Provincial Education Office, more than 70% of schools in the region have a clear and measurable information technology strategic plan. However, the implementation and quality of information technology management still show significant variation across schools.

Information Technology Planning

Information technology planning is a crucial first step in IT management. Data shows that only 60% of schools have a clear strategic plan for IT use, indicating room for improvement. SMP IT Ulil Albab Batam has developed a systematic long-term plan that includes hardware and software procurement and teacher training. This thorough planning encompasses not only equipment purchases but also the active participation of all stakeholders, including teachers, students, and parents.

These findings align with strategic management principles that emphasize the importance of participatory planning in educational technology implementation (Robbins & Coulter, 2021). Regular evaluation and revision of established plans is also a key practice implemented by SMP IT Ulil Albab Batam through annual evaluations. This approach ensures that plans remain relevant and effective, keeping pace with technological developments and educational needs.

Information Technology Infrastructure and Resources

Research reveals significant gaps in information technology infrastructure across schools. SMP IT As Sakinah Tanjungpinang has made substantial investments in providing an accessible Wi-Fi network throughout the school. Surveys show that approximately 75% of students report easy access to online learning materials thanks to adequate infrastructure. According to a report by the Ministry of Education and Culture, 85% of teachers in the Riau Islands Province feel that the existing information technology infrastructure is sufficient to support learning activities.

In contrast, SMP IT Bahtera Insani Bintan faces serious challenges, with only 40% of students having direct access to computers at school. This limitation creates inequities in learning opportunities and potentially leads to gaps in academic achievement among students. This finding confirms the research of Trust et al. (2020), which emphasizes the importance of equitable access to technology to support effective learning. This infrastructure gap highlights the need for intervention from various stakeholders, including school management, the government, and the community, to improve technology accessibility.

Implementation and Utilization of Information Technology

The implementation of information technology has shown varying results. At SMP IT Ulil Albab Batam, the implementation of Google Classroom significantly increased student participation, with 85% of students actively using the platform to access materials and assignments. Data shows that 90% of teachers use technology in daily learning activities, positively impacting student engagement. The digital platform facilitates independent, flexible learning, and encourages interaction and collaboration among students and between students and teachers.

In contrast, at SMP IT As Sakinah Tanjungpinang, despite adequate infrastructure, technology utilization remains relatively low, with only around 50% of teachers actively using technology in their teaching. This gap between facility availability and user proficiency indicates a lack of training and professional development for teachers. This finding underscores the importance of not only providing technology infrastructure but also ensuring user competency through ongoing training (Bates, 2019).

System Security and Reliability

Data security is a critical concern in the digital age. Bahtera Insani Bintan Junior High School has implemented a security system using advanced antivirus and firewall software. According to a Cybersecurity Indonesia survey, 75% of schools in the Riau Islands experienced improved data security after implementing enhanced IT security measures.

However, the audit revealed that approximately 30% of teachers still use weak passwords, a major data security risk. This finding highlights the need to increase cybersecurity awareness through comprehensive training covering strong password creation, recognizing phishing emails, and the importance of regular software updates. In addition to training, policies for safe and responsible technology use need to be strengthened, including guidelines for personal device use, student data management, and procedures for reporting security incidents.

System Evaluation and Maintenance

System evaluation and maintenance are conducted periodically to ensure the effectiveness of technology use. SMP IT Ulil Albab Batam conducts routine evaluations every semester, involving surveys of students and teachers. The evaluation results indicate that 85% of students reported ease of understanding the material using technology, and 90% of teachers felt it helped them deliver material effectively. Meanwhile, SMP IT As Sakinah Tanjungpinang reported 80% satisfaction with the information technology support they receive.

However, at SMP IT As Sakinah Tanjungpinang, system evaluations have not been conducted regularly, resulting in some devices being poorly maintained and frequently experiencing technical problems. This disrupts the learning process and reduces teacher and student motivation to use technology. Proper system maintenance not only ensures

optimal device function but also increases user confidence in the technology (Miles et al., 2020). Therefore, it is crucial for school management to develop a regular maintenance and evaluation plan involving all staff.

Teacher Performance Productivity in the Digital Era at Integrated Islamic Junior High Schools in the Riau Islands Province

Teacher productivity in the digital age has shown significant improvements thanks to the implementation of information technology. This improvement is reflected in various indicators, including teaching quality, time and task efficiency, learning innovation and creativity, commitment and responsibility, and cooperation and work discipline.

Teaching Quality

The quality of teaching has improved through the use of information technology. At SMP IT Ulil Albab Batam, teachers utilize multimedia and digital resources to enrich teaching materials. Surveys show that approximately 80% of students feel the use of multimedia makes the material easier to understand. The use of web-based applications for mathematics learning allows students to solve interactive problems with instant feedback, creating more active and participatory learning.

These findings support Fullan's (2020) research, which states that technology integration in learning can improve student engagement and understanding. At SMP IT Bahtera Insani Bintan, data shows that 85% of students feel more engaged with technology-based learning. However, at SMP IT Bahtera Insani Bintan, it was also found that some teachers still use traditional teaching methods despite adequate technology access. This gap indicates that the success of technology implementation depends heavily on teacher readiness and skills, not just the availability of infrastructure.

Time and Task Efficiency

The use of classroom management applications significantly improves teachers' time and task efficiency. At SMP IT As Sakinah Tanjungpinang, teachers can save up to 30% of their time managing administrative tasks. Automatic reminders for assignments and exams reduce manual workload, allowing teachers to focus on developing teaching materials. According to a survey by the Riau Islands Province Teachers Association, 78% of teachers feel that technology helps them manage their time better.

However, at SMP IT Bahtera Insani Bintan, some teachers still experience difficulties using the management application, resulting in wasted time on administrative tasks. Teachers who struggle to input digital grade data are forced to use manual recording, which is not only time-consuming but also high-risk for errors. This situation underscores the importance of ongoing training and mentoring in technology use to ensure all teachers can utilize the application to its full potential (Bates, 2019).

Innovation and Creativity in Learning

Innovation and creativity in learning are enhanced through the use of digital technology. At SMP IT Ulil Albab Batam, teachers conduct collaborative projects using digital platforms that positively impact student creativity. These projects teach collaboration, communication, and leadership skills. Research shows that students involved in creative projects have higher learning motivation, as evidenced by increased active participation in class. At SMP IT As Sakinah Tanjungpinang, 70% of students are more actively engaged in innovative project-based learning.

Conversely, at SMP IT As Sakinah Tanjungpinang, a lack of technology training for teachers was also found to be hampering innovation. Most teachers still use traditional teaching methods, such as lectures, which tend to be monotonous and unengaging. This situation suggests that learning innovation is heavily influenced by teachers' readiness and ability to adapt to technology. Schools need to invest in training programs that focus not only on technical aspects but also on curriculum development that effectively integrates technology (Fullan, 2020).

Commitment and Responsibility

Teacher commitment and responsibility in implementing information technology vary across schools. At SMP IT Ulil Albab Batam, 90% of teachers feel responsible for improving the quality of teaching through technology. Teachers actively participate in ongoing training and incorporate technology into daily learning, using interactive applications like Kahoot! and Quizizz, which make learning more engaging and competitive.

Data shows that 90% of teachers at SMP IT Bahtera Insani Bintan attend information technology training at least once a year. This training improves technical competency and builds teachers' confidence in using technology. However, in some schools, such as SMP IT Bahtera Insani Bintan, some teachers demonstrate a lack of commitment to using technology, due to a lack of adequate training, a fear of change, or a lack of understanding of its benefits. These findings emphasize the importance of raising awareness through seminars, workshops, and incentive systems for teachers who actively innovate (Trust et al., 2020).

Cooperation and Work Discipline

Teacher cooperation and discipline have improved through the use of online collaboration platforms. At SMP IT Ulil Albab Batam, approximately 80% of teachers feel that collaboration among colleagues has improved thanks to technology. Collaboration platforms allow teachers to share teaching materials, experiences, and strategies, creating a more collaborative and productive work environment. Teachers can discuss challenges in online forums and find solutions together, strengthening professional relationships and building a strong team.

At SMP IT As Sakinah Tanjungpinang, collaboration in designing a technology-based curriculum increased work motivation, with 75% of teachers feeling more motivated to work together on learning projects. Collaboration leveraged teachers' diverse expertise, such as information technology teachers working with other subject matter teachers to integrate digital tools into teaching. In contrast, at SMP IT Bahtera Insani Bintan, a lack of communication and cooperation among teachers was a serious obstacle. Without effective collaboration, teachers tended to work separately, resulting in duplication of effort and confusion among students. These findings underscore the importance of building a culture of collaboration through regular meetings, group discussions, and the use of platforms that support collaboration (Mandinach & Schildkamp, 2021).

Discussion

The results of this study indicate that information technology management plays a crucial role in improving teacher productivity in the digital age. Key findings reveal that successful information technology implementation depends not only on infrastructure

availability but also on thorough planning, human resource competency, system security, and ongoing evaluation and maintenance.

The gaps found between schools in terms of infrastructure, technology utilization, and teacher competency demonstrate the need for a holistic approach to information technology management. Successful schools like SMP IT Ulil Albab Batam demonstrate that strategic planning involving all stakeholders, ongoing teacher training, and regular evaluation are key factors for success. Conversely, schools facing challenges like SMP IT Bahtera Insani Bintan and SMP IT As Sakinah Tanjungpinang require interventions in the form of infrastructure improvements, more intensive teacher training, and strengthening a culture of collaboration.

The improvement in teacher performance productivity through information technology is reflected in various indicators: more interactive teaching quality, time efficiency in administrative tasks, innovation and creativity in learning, higher commitment and responsibility, and better collaboration and work discipline. However, the main challenges faced are the digital competency gap for teachers and the lack of adequate training. This aligns with UNESCO research (2023), which emphasizes that teacher professional development in digital technology is key to the success of educational transformation in the digital era.

The findings of this study also confirm the importance of information system security and reliability in supporting teacher productivity. Although most schools have implemented basic security measures, gaps remain, particularly regarding user awareness of cybersecurity. Cybersecurity training and the implementation of safe technology policies are priorities.

Overall, this study provides a comprehensive overview of information technology management in improving teacher productivity at an integrated Islamic junior high school in the Riau Islands Province. The results indicate that with proper management, information technology can be a catalyst for improving educational quality. However, successful implementation requires commitment from all stakeholders, including school management, the government, teachers, and the community, to collaboratively create a sustainable and inclusive digital education ecosystem.

CONCLUSION

Based on the results of research on information technology management in improving teacher performance productivity in the digital era at Integrated Islamic Middle Schools in the Riau Islands Province, the following conclusions can be drawn:

First, information technology management at Integrated Islamic Junior High Schools in the Riau Islands Province has been running quite well, indicated by information technology planning, infrastructure development, implementation of digital learning systems, data security implementation, and regular evaluations. Data shows that more than 70% of schools have a clear and measurable strategic information technology plan. However, the level of implementation varies between schools, with 60% having a systematic plan. Information technology planning has been carried out adequately at Ulil Albab Islamic Junior High School in Batam and Bahtera Insani Islamic Junior High School in Bintan, involving active stakeholder participation and regular evaluations. While As Sakinah Islamic Junior High School in Tanjungpinang is still in the stage of strengthening its strategic documents and planning management.

Second, information technology infrastructure is a key differentiating factor in successful implementation. SMP IT Ulil Albab Batam and SMP IT As Sakinah Tanjungpinang have relatively adequate infrastructure, with accessible Wi-Fi throughout the school, where 75% of students reported easy access to online learning materials.

Meanwhile, SMP IT Bahtera Insani Bintan still faces device limitations, with only 40% of students having direct access to computers, creating a gap in learning opportunities. According to a report by the Ministry of Education and Culture, 85% of teachers in the Riau Islands Province feel that the existing information technology infrastructure is sufficient to support learning activities, but equitable access remains a challenge.

Third, the implementation and utilization of information technology have shown significant progress, particularly at SMP IT Ulil Albab Batam and SMP IT Bahtera Insani Bintan, where 85% to 90% of teachers have utilized digital learning applications such as Google Classroom and Zoom in their daily learning activities. These digital platforms increase student participation and engagement in the learning process. In contrast, at SMP IT As Sakinah Tanjungpinang, the utilization of information technology remains low, with only around 50% of teachers actively using technology in their teaching, due to a lack of adequate training and professional development.

Fourth, the security and reliability of information technology systems are beginning to become a concern, with 75% of schools in the Riau Islands experiencing improved data security after implementing antivirus and firewall software. However, significant weaknesses remain, such as the use of weak passwords by approximately 30% of teachers in some schools. This indicates the need to strengthen cybersecurity literacy through comprehensive training and the implementation of policies for safe and responsible technology use.

Fifth, teacher performance productivity in the digital era has increased significantly, as reflected in the improvement in teaching quality with 80-85% of students feeling the material is easier to understand through the use of multimedia, time efficiency with savings of up to 30% of time on administrative tasks, learning creativity with 70% of students being more actively involved in innovative learning, commitment with 90% of teachers feeling responsible for improving the quality of teaching through technology, and collaboration with 75-80% of teachers feeling collaboration has increased thanks to online platforms. Schools with good information technology management such as SMP IT Ulil Albab Batam show a greater increase in productivity compared to schools with less than optimal management.

Sixth, information technology management directly impacts teacher productivity. Schools with sound information technology planning, adequate infrastructure, and regular training are able to produce teachers who are more productive and innovative in their teaching. Surveys show that 78% of teachers feel technology helps them manage their time better, and 90% of teachers in schools with good information technology management participate in information technology training at least once a year. Technology integration not only improves administrative efficiency but also transforms teaching methods and the way students learn.

Seventh, supporting factors for successful information technology management include strong school management support, ongoing teacher training, adequate infrastructure, and pro-technology school policies. Meanwhile, identified inhibiting factors include limited budgets for equipment procurement and system maintenance, a lack of teacher digital competency requiring intensive training, low awareness of data security, with many teachers still using weak passwords, and infrastructure gaps between schools that create inequities in education quality.

Overall, this study demonstrates that effective information technology management is a key factor in improving teacher productivity in the digital era. Successful implementation of information technology requires a holistic approach that encompasses strategic planning, adequate infrastructure, human resource competency development through ongoing training, the implementation of robust security systems, and regular

system evaluation and maintenance. With proper information technology management, schools can create a digital learning ecosystem that supports improved educational quality and prepares students for the challenges of the 21st century.

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