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Assessing digital leadership of junior high school principals

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ABSTRACT

Digital leaders are not necessarily experts in computer programming; rather, they are individuals capable of leveraging information technology to achieve organizational goals in the current era of digitalization. This research analyzes the digital leadership aspects or dimensions of junior high school principals in Sukabumi City, West Java, Indonesia. Specifically, it examines whether the digital leadership of these principals has met the target, is on target, or still falls short in enhancing the digital competence of 21st-century teachers. The study employs a qualitative descriptive design, utilizing interviews and observations as instruments. Data were collected from three junior high schools, involving three principals and nine teachers in Sukabumi City. The qualitative analysis was conducted using Atlas.Ti version 8. The research findings reveal several obstacles in the implementation of digital initiatives, including budget constraints, insufficient digital competence among teachers, and uneven infrastructure, all of which have hindered effectiveness in meeting the targets. Consequently, the study suggests that principal support, increased teacher literacy, and the formation of innovation teams are crucial for effective digital leadership and the successful achievement of school program targets.

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Introduction

Human life is now in the 21st century, often referred to as the century of openness or globalization. This era signifies fundamental changes in human life, distinct from previous centuries (Wijaya et al., 2016). In the realm of education, digitalization has brought rapid progress, marked by the emergence of various learning resources and the proliferation of mass media, especially electronic media, as sources of knowledge and educational centers (Afif, 2019). The changes in 21st-century life have given rise to the concept of digital leadership, which thrives in a digital environment and focuses on technological capabilities (Abbu & Gopalakrishna, 2021). The impact of digital transformation became particularly evident during the Covid-19 pandemic in 2020. This pandemic necessitated various changes in the education system, including teaching and learning processes, professional development, communication, and management (Tanucan et al., 2022). According to Babacan et al. (2022), digitalization has been crucial

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in overcoming the challenges of face-to-face activities, making teaching, administrative processes, and supervision more effective and efficient during the pandemic.

Digital leadership has emerged as a new management strategy that supports the digital revolution of organizations, enhancing flexibility, efficiency, and effectiveness (Abdul Musid et al., 2023). It is vital in education as it integrates effective communication, improves teaching processes, and facilitates problem-solving, ensuring the successful implementation of digital initiatives in educational institutions. This approach is particularly relevant for educating the Alpha generation, who benefit from digital technology education combined with engaging and fun physical activities (Sitompul et al., 2023; Ruslan et al., 2023). Digital leadership involves the strategic use of information technology to achieve organizational goals, fostering an environment where digital tools enhance efficiency, communication, and innovation (Anita & Astuti, 2022).

In the educational sector, particularly among junior high schools in Indonesia, digital leadership is crucial due to the rapid technological advancements and the increasing integration of digital tools in teaching and learning processes. The COVID-19 pandemic has underscored the necessity for educational institutions to adapt quickly to digital methods, highlighting the gaps in digital competencies among educators (Sitompul et al., 2023). Principals, as digital leaders, play a pivotal role in this transformation by guiding and supporting teachers in adopting digital tools, ensuring infrastructure readiness, and fostering a culture of continuous improvement and innovation (Winda & Dafit, 2021). Conducting research on the implementation of digital leadership among junior high school principals in Indonesia is urgent to identify the current state, challenges, and opportunities within this context. Such research can inform policies and practices that enhance digital literacy and competence, ultimately leading to improved educational outcomes and preparing students for the demands of the 21st century. This focus is especially critical in Indonesia, where educational disparities and varying levels of digital infrastructure can impact the effectiveness of digital transformation efforts.

Principals, as digital leaders, provide essential skills and knowledge necessary for 21st-century digital transformation in schools. Teachers also play a crucial role in utilizing technology for teaching, creating engaging media or teaching materials, and using social media effectively (Suganda, 2022). Teachers must be proficient in operating digital learning resources and applications, guiding students in digital communication, including the use of email and messaging apps (Winda & Dafit, 2021).

Sukabumi, a city in West Java Province, is actively conducting training to improve digital literacy. According to an article on the jabarprov.go.id page in 2022, the Digital Leadership Academy (DLA) program aims to create leaders from the public sector capable of driving Indonesia's digital transformation. This program aligns with the efforts of the Sukabumi Regional Government to enhance governance and public services. Yuliawati et al. (2021) provided digital literacy counseling for junior high school teachers in Sukabumi, emphasizing the importance of teachers' digital literacy before they can effectively teach it to students. Preliminary observations of several school websites in Sukabumi indicate that science and technology are integral to their vision and mission, closely related to digital leadership.

Research by Khoeroni et al. (2023) indicates that digital leadership improves the development of digital competencies in public services. Sulastri et al. (2024) suggest that principals' leadership styles and work motivation significantly affect the digitalization of learning in schools. The leadership model suitable for 21st-century education is the digital leadership model, also known as technological leadership (Aryawan, 2019). Sunu (2022) found that digital leadership significantly influences teachers' acceptance and use of digital technology, contributing 79.8% to the adoption and utilization of digital tools like Google Classroom during the Covid-19 pandemic.

Despite these insights, previous studies have limitations. Sunu (2022) focused solely on the impact of digital leadership on teacher acceptance without considering the effectiveness of principal leadership and its impact on teacher digital competence.

Similarly, Sulastri et al. (2024) concentrated on elementary school teachers, leaving a gap in understanding the digital leadership dynamics at the junior high school level. This research fills these gaps by examining the digital leadership of junior high school principals in Sukabumi City and its effectiveness in enhancing teacher digital competence, using the advanced qualitative analysis tool Atlas.ti version 8.

In general, this study aims to provide an overview of the aspects or dimensions of digital leadership among junior high school principals in Sukabumi City. The results of this research can provide valuable insights into the effectiveness of digital leadership in enhancing teacher digital competence, particularly in the context of junior high schools. These findings can guide policymakers and educational leaders in developing targeted strategies and interventions to overcome existing challenges, ultimately improving the digital literacy and teaching quality in schools. Specifically, it seeks to answer the following research questions:

1) How is digital leadership implemented by the principals?
2) How does the digital competence of teachers relate to the principals' digital leadership?

Method

Research design and context

This research employs qualitative methods with a descriptive approach, aiming to describe current events or phenomena as they naturally occur (Abdussamad, 2021). This method was chosen to capture natural conditions in the field within contemporary limited systems over an extended period, producing descriptions and themes of a case resulting from in-depth data collection (Creswell, 2013). The research was conducted in three junior high schools in Sukabumi City, West Java, Indonesia: SMPN 1 Sukabumi City, SMP ITech Passim Ar Rayan, and SMPN 15 Sukabumi City. According to Yuliawati et al. (2021), these schools have participated in digital literacy counseling. Additionally, searches on their web pages and social media indicate active usage, which impacts school branding. Hia et al. (2020) emphasized that schools should utilize technology, especially the internet and websites, for marketing and branding, which also indicates digital leadership implementation (Prayuda, 2022).

Participants

This research involves several individuals selected using purposive sampling. According to Sugiyono (2023), purposive sampling is based on specific considerations, such as the characteristics or properties of a population. The selected individuals are those most knowledgeable about the research topic. Key informants in this study include three principals (coded as K), with additional support from three vice principals for curriculum (coded as R) and six teachers (coded as R).

Data collection

Data was collected through interviews and direct observations at the schools. The instruments used included an interview sheet with a list of questions and a voice recorder to capture responses not written down. The questions were developed based on aspects and indicators of digital leadership and 21st-century teacher digital competence, summarized from Van Wart et al. (2019) and Brunner et al. (2023). These aspects include leadership capabilities in digital technology, digital-era learning culture, professional development, personal characteristics, actions/behavior, and team-building skills. Teacher digital competence aspects were summarized from Sopianingsih and Lukman (2022) and Rubach and Lazarides (2021), covering information and literacy, communication and collaboration, digital content creation, safety and security, and

problem-solving. Observations focused on the use of technology by principals and teachers, the digital platforms used, and the digital infrastructure in the schools.

Data analysis

Data analysis was conducted using Atlas.ti, which aids in organizing, coding, and analyzing research data efficiently and systematically (Mahmudah, 2021). First, the interview transcripts were imported into Atlas.ti. Then, relevant responses were marked as quotations and assigned codes. Next, the aspects of principals' digital leadership and teachers' digital competence were categorized and grouped into codes. The relevant codes were color-coded and connected to their respective categories, while irrelevant codes indicated new findings. The categories were organized into three main headings: principals' digital leadership, teachers' digital competencies, and additional findings. These were then mapped into a concept chart illustrating the relationships between the categories and findings.

Results

Principal's digital leadership

Based on the results of the interviews, the informants' answers are illustrated in accordance with the existing aspects of digital leadership, and visualized in Figure 1.

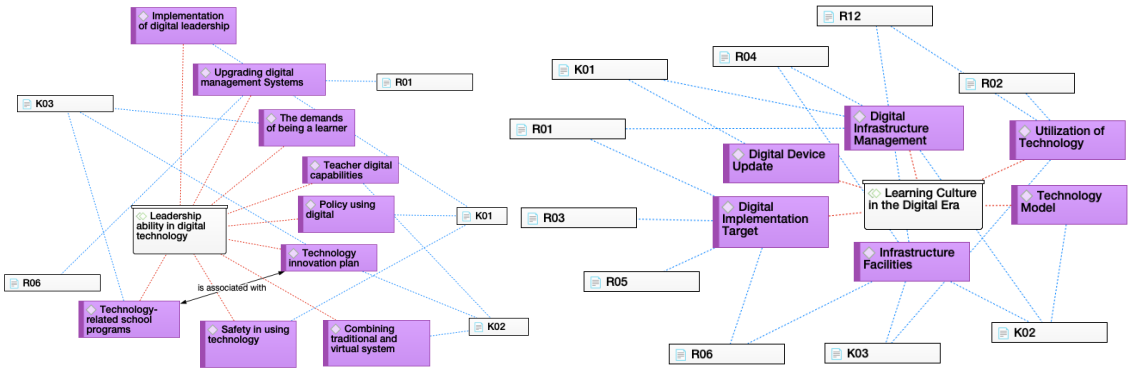

Figure 1. Aspects of school principals' digital leadership abilities and digital era learning culture (Source: atlas.ti)

According to Figure 1, one of the digital leadership abilities of the school principal was visible during the interview, this was said by one of the informants who had experience as a school principal in several junior high schools in the city of Sukabumi.

> *"Now here we are starting to implement online learning, also known as the Mid-Semester Exam. Before I was here, not only when there was Covid-19, even before I had implemented it, I had introduced how to learn to use Google Meet and so on. Then for communication we also have YouTube and Instagram media. I really encourage teachers in the field of public relations to also focus on that." (K01)*

Regarding the Technological Innovation Plan indicators, one of the technology-based schools in the city of Sukabumi has plans to create a greenhouse as expressed by one of the following informants.

> *"We want to make a greenhouse, a technology greenhouse, we will call it PATUT (Passim Unit for Applying Technology) where there will be an exhibition of robot products, animation*

including agriculture, if we farm there will also be hydroponics and healthy plants and we will link it with digital technology." (K02)

Moreover, this is also supported by the statements of two other informants regarding the Technology-Related School Program indicators.

"Well, for science and technology, we happen to have PATUT here, specifically for technology we have the Pasim Apply Technology Unit, so there is space for agriculture, for robotics, and animation for children to explore all activities related to science and technology, even lastly we held one IT-based, our children make graphic designs, so the children are extraordinary." (R06, K03)

Based on aspect Digital Era Learning Culture, there are several indicators, one of the indicators that are in the spotlight is digital management related to facilities, informant with code K01 gave a statement.

"I made a concept at least in the next one year the library will become a digital library, SMP 1 has collaborated with SMA 4, SMA 4 is also pioneering so that the cost is not too heavy". Then fingerprints for attendance and now maybe we try with other things that cannot be deceived, then absences that cannot be deceived, maybe with technology, I can also gather some friends who can do this, whether with barcodes and so on." (K01)

The next aspect is team building skills and personal characteristic that the result of data analysis is shown in Figure 2.

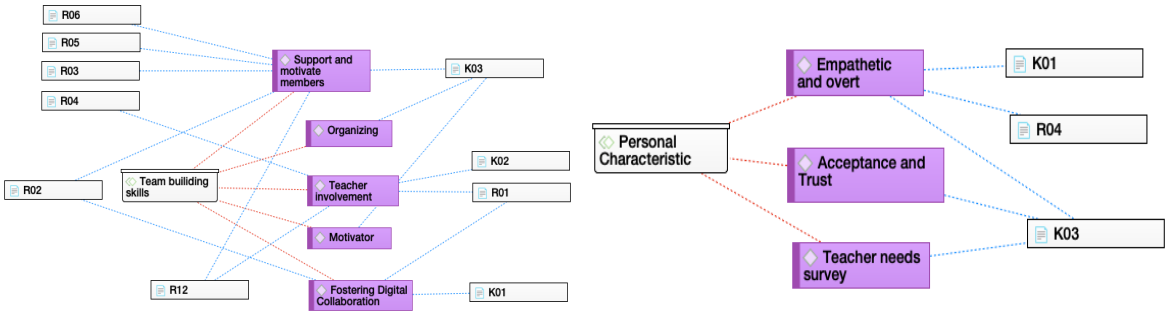

Figure 2. Team building skill and personal character aspects (Source: atlas.ti)

One way for principals to build team skills is by providing support and motivation to teachers. In accordance with the statements of several teachers who explained that their principals motivate by providing support or support to their members.

"Alhamdulillah, we have a principal who supports learning development, so his support is from providing facilities and infrastructure, he is very supportive." (R03)

The principal also involves teachers and fosters digital collaboration, when the interview took place, students in Sukabumi City Junior High School were carrying out STS (Mid-Semester Summative), so the principal gave teachers the opportunity to develop applications in the implementation of online exams.

"STS uses the application, so the policy starts from the curriculum and then is accredited by the principal and later coordinated with the head of facilities and infrastructure and also specifically the STS committee, so for STS, it really has its own team from teachers too." (R01).

Furthermore, aspects of personal characteristics are often associated with the personality of the school principal. One of the personal characteristics possessed by the

principal is the empathetic and open nature of the principal providing opportunities for qualified teachers to become resource persons, In accordance with the following informant's statement.

> *"We give full trust and have the prerogative of teaching in the classroom, although I give opportunities if there are problems in the field, then we also give opportunities to teachers who are already qualified to be resource persons to share with their friends." (K03)*

In the professional development and behavioral aspects, the principal provides opportunities for teachers to take part in training and think about long-term plans for their school to become an international school.

> *"We provide freedom in determining learning models, provide freedom in wanting to utilize facilities and infrastructure, please. So, we give you freedom in determining learning media, as long as it is for the good of supporting the learning process, why not." (K03)*

Digital competence of 21st century teachers

There are several aspects of 21st century teacher digital competence, including Analyzing and Reflecting, Digital Skills, Information, Literacy and Critical Thinking, Communication and Collaboration, Problem Solving, based on the results of interviews with informants and are illustrated in Figure 3.

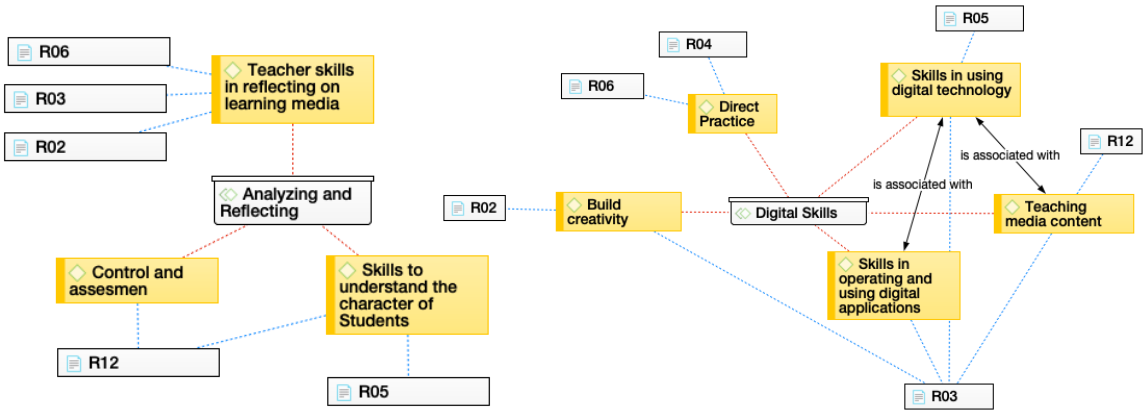

Figure 3. Analyzing and reflecting and digital skills (Source: atlas.ti)

One way of analyzing and reflecting carried out by teachers is assessing students' honesty during exams and including sources when the teacher gives assignments in the form of papers.

> "*When making a report we are obliged to include the source, that is one of our ways of teaching children how to look for additional information and then the source must be clear, that is it." (R12)*

Teachers are greatly helped by the presence of social media such as YouTube, Instagram and TikTok to support innovation and abilities in utilizing digital, as said by the following informant.

> *"I'm one of those who likes to watch TikTok, Instagram and I follow educational accounts. I learn a lot from TikTok and Instagram." (R03)*

Teacher digital competence, especially in the 21st century, cannot be separated from literacy, collaboration and communication as well as teacher skills in solving problems and visualized based on the Figure 4 below.

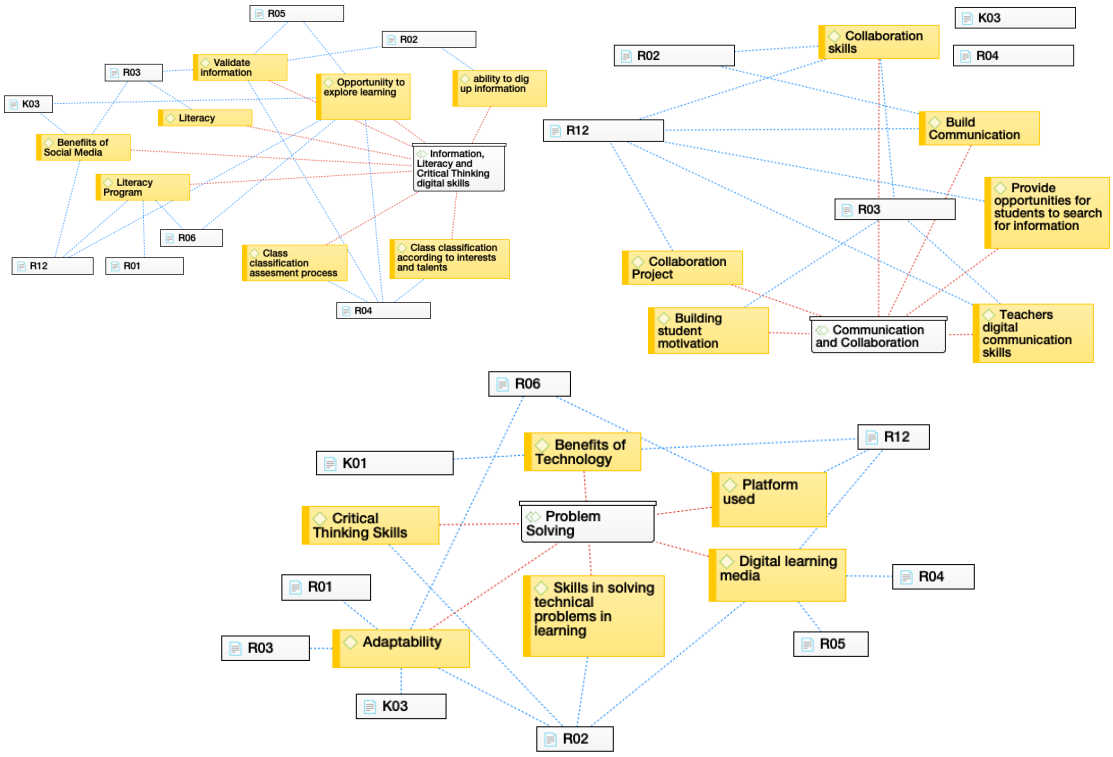

Figure 4. Information, literacy and critical thinking, communication and collaboration, problem solving (Source: atlas.ti)

Teachers' digital information literacy skills are seen when validating information on learning materials obtained through the internet, besides that the principal's support in improving digital literacy is also needed here. This is confirmed by the following informants.

> *"Validating the information is when students after the presentation, I equalize the perception between what students convey and what I read, adjusting the material that students get from the internet. If it is not appropriate, I will ask students to repeat the presentation." (R05)*

Similar perspective was also supported by the other informant who said,

> *"For material sources, you cannot use Wikipedia sources, for example, for images you must include the creator. I'd rather look at the source." (R04)*

Teachers also realize that collaboration, communication and problem solving are very important in 21st century learning, at the time of the interview the teacher applied this method by forming project groups in the learning process, as the informant said,

> *"In terms of communication and collaboration, I do it by equalizing apperception first, I form a group to make a tangram project to build a flat shape as a group." (R02)*

Collaboration does not only occur in the classroom, but collaboration also occurs between teachers and parents, as said by the following informant,

> *"We always collaborate with parents to communicate with parents to be able to control their sons and daughters, especially in using this technology, because sorting out this technology is difficult to trace." (R12)*

The digitalization process currently occurring in schools is the result of problem solving that has occurred since Covid 19 which has made school principals and teachers adapt to distance learning which is ultimately needed by all school members, the following informants stated,

> *"As a teacher, it is actually very important for us to be assisted in the learning process with several communication tools that can help the learning process, such as laptops, then infocus, etc., well, but it was really felt during the Covid 19 pandemic, so that's where we really felt it. need it and teachers who, for example, are still not aware or don't feel that they really need it at that time, inevitably they end up having to use this digitalized learning process." (R01)*

> *"One of the solutions to solving problems in this technological era is implementing TPACK (Technological Pedagogical and Content Knowledge) so that in the learning process we introduce technology to make learning more effective." (R12)*

Effectiveness of implementing digital leadership

Overall, aspects of digital leadership and digital competence of 21st century teachers have been implemented by principals and teachers in the research schools, but there are still obstacle and challenges in its implementation so that, its effectiveness has not been maximized. one of the causes is related to teacher competence, one of the informants gave his opinion on this matter

> *"I can't close my eyes that 100% of the teachers here have used digitalized media or learning processes, there are some senior teachers who don't want to, because they think that it is complicated, difficult and troublesome." (R01)*

Other informants stated different things regarding infrastructure, one of which was the desire to upgrade the exam application but was constrained due to budget limitations.

> *"Infrastructure is in accordance with the budget, if we propose that there is a budget, it can be facilitated, even if not, it means that it will go to the next program, because for public schools, the budget depends on the government, so it is only limited to the BOS budget." (R12).*

> *We are trying to design it, but the problem is that it is impossible for teachers to make it, because to make this kind of application, you have to learn to be a programmer first, while the BOS funds themselves cannot buy application, So, it means that we can only utilize what is available here." (R10)*

Some informants said that their targets were related to the implementation of digital leadership in schools,

> *"On Process, it is still gradual, of course this school continues to improve for digitalization. There are still teachers who are not proficient and familiar with digital." (R03).*

> *"For teachers who are not yet proficient in digital, we will support, for digital-related facilities about 80% of 100 percent." (R12, K03).*

Discussion

This research highlights the digital leadership aspects of school principals in enhancing teachers' digital competence in the 21st century. Digital leadership is seen as a potential driver for increasing school effectiveness (Timan et al., 2022). According to Shepherd and Taylor (2019), digital leadership practices enable school principals to pioneer and encourage teachers to utilize information technology in implementing learning for students, thereby impacting the learning process positively. Wahyuni (2019) emphasized that mastering technology is crucial for teachers, including mastering material and learning methods that align with the depth of the material being taught. This involves mastering communication and information technology devices such as laptops, projectors, the internet, and other learning support tools.

Based on the research findings, school principals are committed to continuously developing digital-related innovations and program plans. Brett (2019) and Muslim (2021) stated that one of the components of digital leadership is digital organizing skills. Digital organization includes human and non-human resources, and principals in Sukabumi City have developed these resources based on digital technology. In this study, principals actively encouraged teachers to participate in seminars and digital webinars and gave them the freedom to innovate in learning. Nurrochman et al. (2023) indicated that principals can enhance teachers' digital competence by facilitating their participation in regular education and training. This can be achieved through initiatives such as revitalizing subject teachers' meetings, mentor teachers' meetings (MGP), and working groups (KKG), which include activities like discussions, seminars, workshops, and the provision of relevant human resources. Beteille et al. (2020) also noted that providing these opportunities supports educational personnel in continuously developing their knowledge and skills. This study found that principal support motivated teachers to increase their digital skills, consistent with Talibo's (2023) statistical research showing a positive relationship between e-leadership and teacher performance, with a significance value of 73%.

Other research, such as Ilham et al. (2022), indicates that digital leadership positively impacts teacher satisfaction and loyalty during the e-learning process. Hidayat (2023) found that teachers using search engines and social media platforms like YouTube, TikTok, and Instagram positively impact learning by inspiring them to create open media content. However, challenges remain, such as the digital divide among teachers, with some senior teachers reluctant to use digital teaching materials due to difficulties with IT, as noted by Hazizah and Rigianti (2021). Age factors affect senior teachers' memory and learning abilities, making it hard to develop teaching materials and learning media.

Further obstacles include insufficient human resources to maintain and operate digital media equipment and limited budgets to purchase necessary hardware and software (Baidi et al., 2020; Hulu, 2023). Infrastructure issues like incomplete equipment (e.g., projectors) and uneven internet access in classrooms also hinder digital implementation. Despite the existence of education digitization policies, there remain significant gaps in the quality of internet services (Miftah & Fahrurrozi, 2022; Anita & Astuti, 2022). These issues include poor internet quality and a lack of creativity and technical skills to utilize e-learning platforms effectively.

Theoretically, the findings of this research contribute to the existing literature on digital leadership by providing empirical evidence of its impact on teacher competence and school effectiveness. The study underscores the importance of digital organizing skills and continuous professional development in enhancing teachers' digital literacy. These insights can inform future studies and theoretical frameworks in educational leadership and digital competence. Practically, the results highlight the need for targeted interventions to address the digital divide and infrastructure gaps in schools. Policymakers and school administrators should focus on providing adequate resources and training to ensure all teachers can effectively use digital tools in their teaching

practices. Additionally, forming innovation teams and fostering a supportive environment for digital initiatives can enhance the overall effectiveness of school programs. By addressing these practical challenges, schools can better prepare teachers and students for the demands of the digital age.

Conclusion

As described in the findings and discussion section, aspects of digital leadership and 21st-century teacher competencies have been implemented by principals and teachers in three junior high schools in Sukabumi City. Because digitalization is something that must be accepted, the application of the principal's digital leadership significantly affects teacher performance. In sum, technological developments bring benefits to school members. For example, teachers who utilize social media such as Instagram, TikTok, and YouTube effectively will gain new knowledge to make learning media more interesting. In the increasingly widespread digital era, school leaders strive to continue developing innovations and creative ideas to attract students' interest in learning to achieve the expected targets. In addition to support from school principals, teachers' digital awareness is crucial to supporting the effectiveness of digital leadership. However, there are still some obstacles, such as a lack of teacher competence, insufficient infrastructure, and limited budget.

This research has several limitations. First, the study was conducted in a small scope, with changes occurring dynamically. Second, the use of Atlas.Ti in processing data has limitations, as it only provides simple tools that assist with basic processes and does not fully analyze the data. As a result, researchers must have a large vocabulary to create codes. Therefore, future research on digital leadership is encouraged to include more schools and an expanded list of interview questions, observations, and documents. Furthermore, quantitative methods such as experiments and surveys can be used for more detailed results to determine whether this digital leadership strategy is the most suitable for the digital era or if other leadership models are more effective. Additionally, the digital literacy of teachers needs to be investigated further to identify other factors that hinder the implementation of digital leadership by school principals.

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References

Abbu, H. R., & Gopalakrishna, P. (2021). Synergistic effects of market orientation implementation and internalization on firm performance: Direct marketing service provider industry. *Journal of Business Research*, *125*(1), 851–863. https://doi.org/10.1016/j.jbusres.2019.06.004

Abdul Musid, N., Mohd Matore, M. E., & A. Hamid, A. H. (2023). Communication significance in digital leadership: Does it matter? *International Journal of Academic Research in Business and Social Sciences*, *13*(5), Pages 1256-1264. https://doi.org/10.6007/IJARBSS/v13-i5/16923

Abdussamad, Z. (2021). *Metode Penelitian Kualitatif*. Syakir Media Press

Afif, N. (2019). Pengajaran dan pembelajaran di era digital. *IQ (Ilmu Al-qur'an): Jurnal Pendidikan Islam*, *2*(01), 117–129. https://doi.org/10.37542/iq.v2i01.28

Anita, & Astuti, S. I. (2022). Digitalisasi dan ketimpangan pendidikan: studi kasus terhadap sekolah dasar di kecamatan Baraka. *Jurnal Pendidikan Dan Kebudayaan*, *7*(1), 1–2. https://doi.org/10.24832/jpnk.v7i1.2509

Aryawan, I. W. (2019). Strategi kepemimpinan kepala sekolah di era revolusi industri 4.0 berlandaskan pada konsep panca upaya sandhi. *Jurnal Ilmiah Ilmu Sosial*, *5*(2), 132. https://doi.org/10.23887/jiis.v5i2.22519

Babacan, S., & Dogru, Yuvarlakbas, S. (2022). Digitalization in education during the COVID-19 pandemic: Emergency distance anatomy education. *Surgical and Radiologic Anatomy*, *44*(1), 55–60. https://doi.org/10.1007/s00276-021-02827-1

Baidi, B., Putra, H. R., & Junaidah, J. (2020). The effect of leadership style and work motivation on work productivity for teachers in all state junior high schools of Surakarta. *International Journal of Educational Research, 8*(3):67-72. https://doi.org/10.13189/ujer.2020.081710

Beteille, T., Ding, E., Pushparatnam, A., & Wilichowski, T. (2020). *Three Principles to Support Teacher Effectiveness During COVID-19*. https://documents1.worldbank.org/curated/en/331951589903056125/pdf/Three-Principles-to-Support-Teacher-Effectiveness-During-COVID-19.pdf

Brett, J. (2019). *Evolving Digital Leadership: How to Be a Digital Leader in Tomorrow's Disruptive World*. Apress. https://doi.org/10.1007/978-1-4842-3606-2

Brunner, T. J. J., Schuster, T., & Lehmann, C. (2023). Leadership's long arm: The positive influence of digital leadership on managing technology-driven change over a strengthened service innovation capacity. *Frontiers in Psychology*, *14*, 1–24. https://doi.org/10.3389/fpsyg.2023.988808

Creswell, J. W. (2013). *Qualitative Inquiry and Research Design: Choosing among Five Approaches* (3rd ed.). SAGE Publications. http://www.ceil-conicet.gov.ar/wp-content/uploads/2018/04/CRESWELLQualitative-Inquary-and-Research-Design-Creswell.pdf

Hazizah, Z., & Rigianti, H. A. (2021). Kesenjangan digital di kalangan guru SD dengan rentang usia 20-58 tahun di kecamatan Rajabasa. *Jurnal Pendidikan Modern*, *7*(1), 1–7. https://doi.org/10.37471/jpm.v7i01.284

Hia, E. P. D., Prestiadi, D., Maisyaroh, Maghfiroh, S. I., & Oktaviani, V. M. (2020). The Use of Information and Communication Technology through website and social media as public relations information media. *Proceedings of the 2nd Early Childhood and Primary Childhood Education (ECPE 2020)*. 2nd Early Childhood and Primary Childhood Education (ECPE 2020), Malang, Indonesia. https://doi.org/10.2991/assehr.k.201112.048

Hidayat, R. (2023). Analisis kemampuan literasi digital sebagai kompetensi profesional guru di SMAN 1 Selayar. *Journal of Educational Technology, Curriculum, Leaning, and Communication*, *3*(4), 102–108. https://doi.org/(https://creativecommons.org/licenses/by-nc/4.0/.

Hulu, Y. (2023). Problematika guru dalam pengembangan teknologi dan media pembelajaran. *ANTHOR: Education and Learning Journal*, *2*(6), 840–846. https://doi.org/10.31004/anthor.v2i6.285

Ilham, R., Dayanti, S. R., Arifana, M. H., & Siregar, C. S. (2022). The Effect of Digital Leadership and Service Quality on E-Learning Student Satisfaction Through E-Learning Student Loyalty at East Java University, Indonesian. *International Research Journal of Modernization in Engineering Technology and Science*, *4*(3), 169–177. https://www.irjmets.com/

Khoeroni, R., Suryadi, S., & Gunawan, A. (2023). Implementation of digital leadership in development digital competence in public services. *The Management Journal of Binaniaga*, *7*(2), 141–156. https://doi.org/10.33062/mjb.v7i2.6

Mahmudah, F. N. (2021). *Analisis Data Penelitian Kualitatif Manajemen Pendidikan Berbantuan Software Atlas.Ti 8*. UAD Press.

Miftah, Z., & Fahrurrozi, F. (2022). Digitalisasi dan disparitas pendidikan di sekolah dasar. *IBTIDA' : Media Komunikasi Hasil Pendidikan Guru Madrasah Ibtidayah*, *3*(2), 149–163. https://doi.org/10.37850/ibtida.v3i02.361

Muslim, M. (2021). Visi misi kepemimpinan digital kepala sekolah dasar di era teknologi digital. *Elementeris: Jurnal Ilmiah Pendidikan Dasar Islam*, *3*(1), 1–13. https://doi.org/10.33474/elementeris.v3i1.8796

Nurrochman, T., Darsinah, & Wafroturrohmah. (2023). Peran kepemimpinan pembelajaran kepala sekolah melalui transformasi digital pasca pandemi di sekolah dasar. *Jurnal Tarbiyah dan Ilmu Keguruan Borneo*, *4*(3), 299–310. https://doi.org/10.21093/jtikborneo.v4i2.6905

Prayuda, R. Z. (2022). Kepemimpinan digital kepala sekolah pada era digital: a mini review article. *International Journal of Social, Policy and Law (IJOSPL)*, *3*(1), 13–18. https://doi.org/10.8888/ijospl.v3i1.94

Rubach, C., & Lazarides, R. (2021). Addressing 21st-century digital skills in schools – Development and validation of an instrument to measure teachers' basic ICT competence beliefs. *Computers in Human Behavior*, *118*(2), 1–17. https://doi.org/10.1016/j.chb.2020.106636

Ruslan, Z. A., Gh, M., & Sadriani, A. (2023). Peran orang tua dalam mendidik generasi alfa di era digital pada SDN Batulaccu Makassar. *ININNAWA: Jurnal Pengabdian Masyarakat*, *01*(1), 6–10. https://journal.unm.ac.id/index.php/Ininnawa

Shepherd, A. C., & Taylor, R. T. (2019). An Analysis of Factors Which Influence High School Administrators' Readiness and Confidence to Provide Digital Instructional Leadership [Forum Post]. *Forum Post of International Council of Professors of Educational Leadership (ICPEL)*. https://eric.ed.gov/?id=EJ1218848

Sitompul, L. R., Japar, M., Sukardjo, M., Azhar, M. H., & Saepuloh, L. (2023). Kepemimpinan digital masa depan melalui pendidikan karakter generasi alpha. *POLYGLOT: Jurnal Ilmiah*, *19*(2), 139–157. https://doi.org/dx.doi.org/10.1966/pji.v19i2.6465

Sopianingsih, P., & Lukman, E. P. (2022). The establish of 21st century digital skills for young people's lived in the new normal era. *Proceeding of Advances in Social Science, Education and Humanities Research*, *636*, 586–590. https://doi.org/10.2991/assehr.k.220108.105

Suganda, P. I. (2022). The use of digital media to improve students' literacy in English learning in junior high school. *Journal of English Development*, *2*(2), 99–108. https://doi.org/10.25217/jed.v2i01.2517

Sugiyono. (2023). *Metode Penelitian Kuantitatif, Kualitatif, dan R&D*. ALFABETA.

Sulastri, S., Nurkolis, N., & Kusumaningsih, W. (2024). Pengaruh gaya kepemimpinan kepala sekolah dan motivasi kerja guru terhadap digitalisasi pembelajaran di sekolah dasar negeri. *Jurnal Inovasi Pembelajaran di Sekolah*, *5*(1), 329–337. https://doi.org/10.51874/jips.v5i1.230

Sunu, I. G. K. A. (2022). The impact of digital leadership on teachers' acceptance and use of digital technologies. *Mimbar Ilmu*, *27*(2), 311–320. https://doi.org/10.23887/mi.v27i2.52832

Talibo, T. (2023). Hubungan E-leadership dan kemampuan penerapan inovasi teknologi digital terhadap kinerja guru dalam pembelajaran jarak jauh. *Jurnal llmu Pendidikan*, *9*(1), 817–824. http://dx.doi.org/10.37905/aksara.9.1.817-824.2023

Tanucan, J. C. M., Negrido, C. V., & Malaga, G. N. (2022). Digital leadership of school heads and job satisfaction of teachers in the Philippines during the pandemic. *International Journal of Learning, Teaching and Educational Research*, *21*(10), 1–18. https://doi.org/10.26803/ijlter.21.10.1

Timan, A., Mustiningsih, M., & Imron, A. (2022). Digital leadership kepala sekolah hubungannya dengan kinerja guru dan kompetensi siswa era abad 21. *JAMP : Jurnal Administrasi dan Manajemen Pendidikan*, *5*(4), 323–333. https://doi.org/10.17977/um027v5i42022p323

Van Wart, M., Roman, A., Wang, X., & Liu, C. (2019). Operationalizing the definition of e-leadership: Identifying the elements of e-leadership. *International Review of Administrative Sciences*, *85*(1), 80–97. https://doi.org/10.1177/0020852316681446

Wahyuni, U. S. F. (2019). *Korelasi Antara Responsi Kompetensi Profesional Guru, Responsi Pengelolaan Kelas, Hasil Belajar IPA Siswa Kelas IV di MI KHanzul Huda Gundik Slahung Ponorogo Tahun Pelajaran 2018/2019* [Skripsi]. IAIN Ponorogo.

Wijaya, E. Y., Sudjimat, D. A., & Nyoto, A. (2016). *Transformasi Pendidikan Abad 21 Sebagai Tuntutan Pengembangan Sumber Daya Manusia di Era Global*. *1*, 263–278. https://core.ac.uk/download/pdf/297841821

Winda, R., & Dafit, F. (2021). Analisis kesulitan guru dalam penggunaan media pembelajaran online di sekolah dasar. *Jurnal Pedagogi dan Pembelajaran*, *4*(2), 211–221. https://doi.org/10.23887/jp2.v4i2.38941

Yuliawati, S., Suganda, D., & Darmayanti, N. (2021). Penyuluhan literasi digital bagi guru—guru SMP di kota Sukabumi. *Kumawula: Jurnal Pengabdian Kepada Masyarakat*, *3*(3), 477–483. https://doi.org/10.24198/kumawula.v3i3.29604