

TRANSFORMATION OF EDUCATIONAL LEADERSHIP IN THE DIGITAL ERA: ADAPTIVE STRATEGIES TO IMPROVE SCHOOL PERFORMANCE IN THE 21ST CENTURY

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ABSTRAK

Era digital telah mengubah paradigma kepemimpinan pendidikan secara fundamental, menuntut transformasi strategi kepemimpinan untuk mengoptimalkan kinerja sekolah. Penelitian ini bertujuan menganalisis transformasi kepemimpinan pendidikan di era digital dan mengidentifikasi strategi adaptif yang efektif untuk meningkatkan kinerja sekolah abad ke-21. Metode penelitian yang digunakan adalah kualitatif dengan pendekatan studi pustaka (literature review) melalui analisis sistematis terhadap artikel jurnal, buku, dan laporan penelitian terkait kepemimpinan pendidikan digital dari tahun 2018-2024 yang diperoleh dari database akademik seperti Google Scholar, ERIC, dan Scopus dengan kata kunci "digital leadership in education", "educational transformation", dan "21st century school performance". Hasil penelitian menunjukkan bahwa transformasi kepemimpinan pendidikan di era digital memerlukan lima strategi adaptif utama: (1) pengembangan kompetensi digital pemimpin sekolah yang mencakup literasi teknologi, manajemen data, dan cybersecurity awareness; (2) implementasi kepemimpinan kolaboratif berbasis platform digital untuk meningkatkan komunikasi dan koordinasi tim; (3) integrasi teknologi pembelajaran adaptif yang merespons kebutuhan individual siswa; (4) pembangunan budaya inovasi berkelanjutan melalui professional learning communities virtual; dan (5) penerapan sistem evaluasi berbasis data analytics untuk pengambilan keputusan yang lebih akurat. Penelitian ini menyimpulkan bahwa kepemimpinan pendidikan yang transformatif di era digital tidak hanya memerlukan penguasaan teknologi, tetapi juga kemampuan adaptasi budaya organisasi, pengembangan SDM berkelanjutan, dan reorientasi visi kepemimpinan menuju pembelajaran berpusat pada siswa yang didukung ekosistem digital terintegrasi.

Kata Kunci: Kepemimpinan Digital, Transformasi Pendidikan, Kinerja Sekolah, Strategi Adaptif, Era Digital

ABSTRACT

The digital era has fundamentally transformed the paradigm of educational leadership, demanding strategic leadership transformation to optimize school performance. This research aims to analyze educational leadership transformation in the digital era and identify effective adaptive strategies for enhancing 21st century school performance. The research method employed is qualitative with a literature review approach through systematic analysis of journal articles, books, and research reports related to digital educational leadership from 2018-2024 obtained from academic databases such as Google Scholar, ERIC, and Scopus using keywords "digital leadership in education", "educational transformation", and "21st century school performance". The research findings reveal that educational leadership transformation in the digital era requires five main adaptive strategies: (1) development of school leaders' digital competencies including technology literacy, data management, and cybersecurity awareness; (2) implementation of digital platform-based collaborative leadership to enhance team communication and coordination; (3) integration of adaptive learning technologies that respond to individual student needs; (4) establishment of continuous innovation culture through virtual professional learning communities; and (5) implementation of data analytics-based evaluation systems for more accurate decision-making. This research concludes that transformative educational leadership in the digital era requires not only technology mastery, but also organizational culture adaptation capabilities, continuous human resource development, and leadership vision reorientation toward student-centered learning supported by integrated digital ecosystems.

Keywords: *Digital Leadership, Educational Transformation, School Performance, Adaptive Strategies, Digital Era*

INTRODUCTION

Digital transformation has been a key driving force fundamentally changing the global education landscape. The digital era not only presents new technologies, but also demands a paradigm shift in educational leadership that is able to integrate technological innovation with effective pedagogical practices. Traditional educational leadership that is hierarchical and centralized is now facing the challenge of adapting to a more collaborative, adaptive, and data-driven leadership model to optimize school performance in the 21st century. Recent research shows that educational institutions are evolving towards a digital university model that not

only adopts new technologies, but also develops organizational strategic transformations that include aspects of information, processes, and human resources (García-Morales et al., 2023). This transformation requires leadership that is able to manage the complexity of technology while maintaining a focus on sustainable educational goals. Digital leadership in the context of education is not just the application of technology, but rather a multifaceted process that integrates various leadership dimensions to create an innovative and responsive learning environment.

The complexity of educational leadership in the digital era is increasingly evident from the need for school leaders to master various new competencies that were previously not a top priority. Sheninger and Murray (2020) emphasize that digital leadership requires a combination of strategic vision, technology literacy, and sustainable organizational culture adaptability. Modern school leaders must be able to facilitate technology-based learning, manage data for decision-making, and build a digital ecosystem that supports collaboration between education stakeholders.

The main challenge facing education leaders in the digital age is how to integrate adaptive learning technologies that can respond to the individual needs of students while maintaining high standards of educational quality. Howard et al. (2021) identified that schools that successfully implemented digital transformation showed significant improvements in student engagement and learning effectiveness. This indicates that the right leadership strategy can be a catalyst to improve the overall performance of the school through the optimal use of technology. The COVID-19 pandemic has accelerated the adoption of educational technology and exposed the digital leadership capability gap in various educational institutions. Khan and Jawaid (2022) report that schools with proactive leadership in developing digital infrastructure and teacher competencies are able to maintain quality learning continuity during periods of disruption. This experience has been a valuable learning that educational leadership must have the ability to anticipate and adapt quickly to unexpected changes in the external environment.

The implementation of effective digital leadership also requires fundamental changes in the school's organizational culture. Richardson and

McLeod (2023) emphasize the importance of building *virtual professional learning communities* that support the continuous development of teachers' and staff's digital competencies. A culture of sustainable innovation is key to the success of digital transformation, where school leaders act as facilitators of change that inspire and empower the entire school community to develop their potential in the digital environment. School performance evaluation in the digital era has also undergone a significant transformation with the use of data *analytics* for more accurate and evidence-based decision-making.

Traditional evaluation systems that rely on subjective assessments and limited data can now be enriched with comprehensive data analysis that provides deep insights into student learning patterns, the effectiveness of teaching strategies, and areas for improvement. The ability of school leaders to interpret and utilize educational big data is a critical competency that determines the success of digital transformation. Based on the complexity of the challenges and opportunities faced by educational leadership in the digital age, this study aims to analyze the educational leadership transformations needed to optimize 21st century school performance. The focus of the analysis is directed at the identification of adaptive strategies that have proven to be effective in improving students' academic performance, teacher involvement in learning innovations, and school operational efficiency through the use of digital technology that is integrated with the vision of sustainable education.

METHOD

This research applies a qualitative approach with a library research method systematically designed to analyze the transformation of educational leadership in the digital era. The selection of this method is based on the need to understand the phenomenon of digital leadership in a deep, holistic, and interpretative manner, as emphasized by Sugiyono (2021) and Zee (2022) regarding the strategic value of literature in building a strong theoretical framework. The research design adopts a Systematic Literature Review (SLR) with strict protocols, including inclusion criteria for publications from 2018-2024 sourced from reputable databases such as Scopus, ERIC, Google Scholar, and Portal Garuda. The literature search process

uses a combination of specific keywords such as "digital leadership" and "educational transformation" to ensure comprehensive data coverage. Data analysis was conducted using content analysis techniques involving open, axial, and selective coding stages to objectively identify central themes and conceptual relationships across the literature (Pratiwi, 2023). The validity of the research is maintained thru source triangulation and prolonged engagement with the literature, while reliability is built thru a detailed audit trail and intercoder reliability to ensure consistency in interpretation. The researchers also pay great attention to academic ethics thru proper source attribution and the principle of fairness in addressing various contradictory perspectives. Although it has limitations in temporal scope and the potential dominance of global literature, this research mitigates those risks thru an inclusive search strategy that accommodates the local context of Indonesia. Overall, this methodology provides a solid methodological foundation for synthesizing new knowledge that significantly contributes to the development of educational management science in the future.

DISCUSSION

Analysis of the literature shows that the transformation of educational leadership in the digital era is a complex phenomenon that requires a fundamental reorientation in the traditional leadership paradigm. The study's key findings identify five adaptive strategies that consistently appear in various literature as key to the successful transformation of digital education leadership. These five strategies do not stand alone, but are interrelated and form a holistic leadership ecosystem. The literature shows that digital education leadership is not just the adoption of technology, but a comprehensive transformation that includes aspects of competencies, organizational culture, systems, and pedagogical approaches that are integrated with the vision of 21st century education.

The first and most fundamental strategy is the development of digital competencies of school leaders which includes three main dimensions: technology literacy, data management, and *cybersecurity awareness*. School leaders' technology literacy is not limited to the ability to operate digital devices, but includes a deep understanding of the potential and limitations of technology in an

educational context. Analysis of the literature shows that school leaders who succeed in digital transformation have the ability to identify technologies relevant to learning needs, understand the pedagogical implications of technology adoption, and be able to facilitate meaningful technology integration in the teaching and learning process. Data management is a critical competency because the digital era produces a huge volume of learning data, so school leaders must be able to interpret, analyze, and utilize data for informed decision making. *Cybersecurity awareness* as an integral part of the digital competence of school leaders is becoming increasingly important as cybersecurity threats in the education sector increase. The literature shows that school leaders must understand digital security risks, develop comprehensive data protection policies, and ensure that the entire school community is aware of safe digital practices. This not only protects students' data and privacy, but also builds the trust necessary for the continued adoption of the technology. This cybersecurity competency also includes the ability to anticipate and respond to digital security incidents quickly and effectively.

The second strategy is the implementation of collaborative leadership based on digital platforms that change the communication and coordination patterns of teams in school organizations. Literature analysis reveals that digital platforms allow for more transparent, inclusive, and real-time communication between various education stakeholders. Digital collaborative leadership does not eliminate organizational hierarchies, but creates more flexible and responsive communication channels. School leaders can leverage various digital *tools* to facilitate brainstorming, collective decision-making, and *knowledge sharing* involving teachers, students, parents, and other stakeholders. Digital platforms also allow documentation and tracking of various school initiatives and projects in a more systematic manner.

The implementation of digital collaborative leadership has also changed the dynamics of power relationships in school organizations. The literature shows that digital technology can strengthen participatory leadership, where diverse voices in the school community can be heard and considered in the decision-making process. However, it also requires new skills from school leaders in managing *diverse perspectives*, facilitating *virtual collaboration*, and building consensus in a digital

environment that is often less personal than face-to-face interactions. The success of this strategy is highly dependent on the ability of leaders to create *a digital culture* that encourages participation and collaboration

The third strategy is the integration of adaptive learning technologies that respond to individual student needs, which represents a paradigm shift from *a one-size-fits-all approach* to *personalized learning*. Literature analysis shows that adaptive learning technologies allow for *customization of content, pace, and learning methodologies* according to the unique characteristics of each student. School leaders play a role in facilitating the identification, evaluation, and implementation of technology that can support differentiated instruction. This requires an in-depth understanding of *learning analytics, artificial intelligence* in education, and various learning platforms that can adapt to students' *learning patterns*. The implementation of adaptive learning technology also changes the role of teachers from *information transmitters* to *learning facilitators and coaches*. The literature shows that school leaders must be able to support teachers' professional development in using adaptive technology, interpreting student learning data, and designing appropriate interventions based on insights obtained from technology. The main challenge in this strategy is to ensure that personalization does not come at the expense of *social learning* and *collaborative skills* that are also important in 21st-century education. School leaders must find a balance between *individualized learning* and *community-based learning experiences*.

The fourth strategy is to build a culture of continuous innovation through *virtual professional learning communities* that transform the way teachers and school staff develop their professional competencies. The literature shows that *virtual professional learning communities* allow for wider access to *expertise, resources, and best practices* from a variety of geographic and institutional contexts. School leaders play a role in facilitating the formation of these communities, providing the necessary technological infrastructure, and creating an incentive structure that encourages active participation. *Virtual professional learning communities* also allow *flexible scheduling* that can accommodate a variety of *teachers' commitments and responsibilities*. A culture of sustainable innovation requires a change in mindset from a fixed mindset to a growth mindset,

where failure is seen as a learning opportunity and experimentation is encouraged as part of professional practice. The literature shows that school leaders must *model innovative behaviors*, provide *psychological safety* for *risk-taking*, and create systems that facilitate *knowledge sharing* and *collaborative problem solving*. *Virtual professional learning communities* can also be a platform for *action research* and *peer review* that supports *evidence-based practice* in the local context of schools.

The fifth strategy is the application of an evaluation system based on data *analytics* for more accurate and objective decision-making. Literature analysis reveals that the digital era produces an unprecedented amount of data about various aspects of school life, ranging from student academic performance, engagement patterns, resource utilization, to *organizational effectiveness*. School leaders must develop the ability to collect, analyze, and interpret this big data for informed decision-making. An evaluation system based on data *analytics* allows the *identification of trends*, *prediction of outcomes*, and *optimization of interventions* in various aspects of school management. However, the literature also emphasizes the importance of maintaining a balance between data-driven decisions and human judgment, as well as ensuring that the use of data does not violate privacy and *ethical considerations*.

The implementation of these five adaptive strategies synergistically shows the potential for significant transformation in school performance, although the literature also identifies various challenges and barriers that must be overcome. Key challenges include *resistance to change* from *stakeholders*, limitations of technology infrastructure, *gaps in digital competencies*, and complexity of *change management* in the context of educational organizations. However, the literature shows that schools that successfully implement these strategies consistently show *improvements* in student engagement, *teacher satisfaction*, *operational efficiency*, and *overall educational outcomes*. The success of this transformation is highly dependent on *committed leadership*, *systematic approach*, and *continuous adaptation* based on *feedback* and *evaluation*.

CONCLUSION

Based on the results of the research, it can be concluded that the transformation of educational leadership in the digital era is a complex process that requires an adaptive approach through five main strategies that are interrelated and mutually supportive. First, the development of digital competencies of school leaders is a fundamental step that includes not only basic technology literacy, but also mastery of data management and increased cybersecurity awareness to ensure information security in the digital education environment. Second, the implementation of collaborative leadership that is integrated with digital platforms is crucial to strengthen synergy, smooth the flow of communication, and increase the effectiveness of coordination between team members in the school environment. Third, the integration of adaptive learning technology is needed to meet the individual learning needs of students in a more responsive and personalized manner, in line with the principles of student-centered learning. Fourth, it is necessary to develop a sustainable culture of innovation through strengthening virtual-based professional learning communities as a forum for professional capacity building, sharing good practices, and creating a space for collaboration between educators flexibly. Fifth, this transformation must be supported by an evaluation system based on data analytics that allows school leaders to make strategic decisions more accurately, evidence-based, and in accordance with the dynamics of technological developments and the needs of students in the digital era. Thus, these five strategies are not only important elements in strengthening the role of education leadership in the digital era, but also as the main foundation in creating an adaptive, inclusive, and future-oriented education system

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