

School Digital Transformation in the Era of Society 5.0

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ABSTRACT

School digital transformation in the era of Society 5.0 has become a strategic necessity for developing an educational system that is adaptive to technological advancement and changing societal needs. This study aims to analyze school digital transformation from the perspective of Society 5.0 by examining shifts in educational paradigms, learning transformation, human resource competency development, implementation challenges, and development strategies. This study employed a descriptive qualitative approach using library research. Research data were obtained from scientific articles, books, reports of international institutions, and policy documents published in the last five years. Data were analyzed using content analysis to produce a comprehensive conceptual synthesis. The findings indicate that school digital transformation extends beyond technological digitalization and encompasses changes in learning processes, leadership, governance, and organizational culture. The success of digital transformation requires strengthening digital infrastructure, improving digital competencies, fostering adaptive leadership, and promoting stakeholder collaboration to establish innovative, inclusive, and sustainable education in the era of Society 5.0.

Keywords: *Digital Education, Digital Leadership, Digital Learning, School Digital Transformation, Society 5.0.*

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1. | INTRODUCTION

The rapid development of digital technology has driven fundamental changes in various sectors of life, including education. Advances in information technology, artificial intelligence, cloud computing, big data, and the internet of things have changed the way humans acquire, manage, and distribute information, giving rise to new demands for a more adaptive, flexible, and innovative education system (OECD, 2021; UNESCO, 2023). In this context, schools are no longer only seen as a place for knowledge transfer, but as learning organizations that are required to be able to build a digital-based education ecosystem to prepare students to face the dynamics of the future society (Bond, 2020; Bozkurt et al., 2020).

The transformation of society towards the Society 5.0 era further strengthens the urgency of changing the educational paradigm. Society 5.0 is a concept of society that places humans at the center of technological development through the integration of physical space and cyberspace to improve the quality of life in a sustainable manner (Hamedani et al., 2024). From an educational perspective, Society 5.0 requires educational institutions to produce human resources who not only master technology, but also have the ability to think critically, creatively, collaboratively, communicatively, and have adequate digital literacy (Ahmad et al., 2023; Ihsan, 2024). Therefore, education in the era of Society 5.0 requires a transformation that is not only technological, but also touches aspects of organizational culture, governance, leadership, and the learning process as a whole.

School digital transformation is one of the important strategies in answering these demands. Digital transformation is not only about transforming conventional systems into technology-based systems, but also includes fundamental changes in the way schools manage resources, organize learning, make decisions, and build a culture of innovation in a sustainable manner (Allouche, 2024; Sihombing et al., 2024). Schools that successfully carry out digital transformation are generally able to integrate technology in various aspects of education delivery, ranging from administration, data management, learning, to evaluation more effectively and efficiently (OECD, 2023; Paputungan & Mashudi, 2022).

In the learning aspect, digital transformation encourages a paradigm shift from teacher-centered learning to learner-centered learning that places students as active subjects in the learning process. The use of digital technology allows for the creation of more personalized, adaptive, and collaborative learning through various digital platforms and the use of artificial intelligence (Aulia et al., 2024; Chakraborty, 2024). In addition, the use of technology also opens up opportunities for teachers to develop various innovative learning models that are able to increase student engagement and learning experience in a more meaningful way (Amel & Miterianifa, 2024; Whalen, 2020).

On the other hand, the digital transformation of schools still faces various complex challenges. Gaps in access to technology, limited digital infrastructure, low digital competence of educators, and resistance to change are obstacles that are often found in the implementation of digital transformation in various educational units (Dermawan & Sumarni, 2024; Nadifa & Ambarwati, 2024). In addition, the development of digital technology also presents new issues related to data security, the ethics of using artificial intelligence, and the need for accountable and sustainable digital governance (UNESCO, 2023; OECD, 2023).

Various previous studies have discussed Society 5.0, the digitalization of education, and the implementation of technology in partial learning (Wahyudiono, 2024; Paputungan & Mashudi, 2022). However, studies that comprehensively position school digital transformation as a systemic change process involving leadership dimensions, human resource competencies, organizational culture, and educational development strategies in the Society 5.0 era still require conceptual strengthening. In fact, a comprehensive understanding of school digital transformation is important as a basis for formulating education development strategies that are relevant to the needs of the future society.

Based on this description, this study aims to analyze the digital transformation of schools in the era of Society 5.0 through a study of changes in educational paradigms, strengthening human resource competencies, implementation challenges, and sustainable digital school development strategies. This study is expected to make a conceptual contribution to the development of educational policies and practices that are adaptive, innovative, and oriented to human needs in the Society 5.0 era.

2. | RESEARCH METHOD

This study uses a qualitative approach with a descriptive method. The descriptive qualitative approach was chosen because this study aims to gain a deep understanding of the digital transformation of schools in the era of Society 5.0 through the study of various concepts, phenomena, and dynamics that develop in the implementation of education. This approach is not oriented towards hypothesis testing or measuring the relationship between variables statistically, but seeks to describe, interpret, and analyze various information systematically so that a comprehensive picture is obtained about the urgency, challenges, and strategies for developing school digital transformation in the Society 5.0 era.

The type of research used is library research. Literature research is research that uses various written sources as the main data to be analyzed critically and in-depth. The use of this method is considered appropriate because the discussion of the digital transformation of schools and Society 5.0 is a conceptual and contextual study that requires the exploration of various theories, research results, and relevant scientific documents. Through literature studies, researchers can identify the development of the concept of digital transformation of education, changes in learning paradigms,

competencies needed in the Society 5.0 era, as well as various challenges and strategies for the implementation of digital schools based on the findings of the latest research.

The source of research data consists of secondary data obtained from various scientific documents relevant to the research theme. These sources include national and international journal articles published in the 2020–2024 range, scientific books, seminar proceedings, reports of international educational institutions, as well as policy documents related to the digital transformation of education, Society 5.0, digital education, artificial intelligence in education, digital leadership, and 21st century competency development. The selection of the time range is carried out to ensure that the data and information used are up-to-date, in accordance with the development of digital technology and contemporary education dynamics.

The data collection technique was carried out through documentation studies. The researcher conducts a search, identification, selection, and collection of various literature that has relevance to the research focus. The literature that has been collected is then classified based on the themes of discussion, such as the concept of Society 5.0, school digital transformation, learning transformation, teacher and student competence, digital leadership, implementation challenges, and digital school development strategies. The grouping of data aims to facilitate the systematic analysis and preparation of arguments.

The data analysis technique uses content analysis. The analysis is carried out through several stages, namely reading and understanding all documents that have been collected, reducing data by selecting relevant information, grouping data based on certain themes, interpreting various findings from the literature, and compiling a conceptual synthesis of school digital transformation in the Society 5.0 era. Through this process, this research is expected to be able to produce a complete and in-depth description of the school's digital transformation as a strategic effort in building an education system that is adaptive, innovative, sustainable, and oriented towards human development in the era of Society 5.0.

3. | RESULTS AND DISCUSSION

The digital transformation of schools in the era of Society 5.0 is a necessity that emerged in response to technological developments and changing needs of the global community. Society 5.0 is understood as a concept of society that harmoniously integrates physical space and cyberspace by placing humans at the center of the use of technology (Hamedani et al., 2024). The concept emphasizes that technology is no longer positioned as the ultimate goal, but rather as an instrument to improve the quality of life and human welfare. In the field of education, Society 5.0 encourages a paradigm shift from an education system that is oriented towards knowledge transfer to education that is able to develop 21st-century competencies and form individuals who are adaptive to change (Ahmad et al., 2023; Dermawan & Sumarni, 2024).

These changes require schools to carry out a comprehensive transformation. It is not enough for schools to only provide technological tools or implement administrative digitalization, but also need to build an education system that is able to utilize technology to improve the quality of learning, governance, and decision-making more effectively and efficiently (Allouche, 2024; Sihombing et al., 2024). In this context, school digital transformation is a systemic change process that involves the dimensions of technology, human resources, leadership, organizational culture, and educational policy. OECD (2023) explained that the success of educational digital transformation is highly determined by the ability of educational institutions to build a digital ecosystem that is integrated with each other and oriented towards improving the quality of learning.

The use of digital technology has changed the learning paradigm in schools. Learning no longer takes place exclusively in the classroom, but can be done flexibly through various digital platforms that allow learning interactions anytime and anywhere (Paputungan & Mashudi, 2022). Technological developments also allow the application of more personalized and adaptive learning according to the needs, abilities, and characteristics of students (Aulia et al., 2024). Through various digital learning applications, students can have a more independent, interactive, and collaborative learning experience. This condition shows that digital transformation does not just move conventional learning to digital media, but creates a new learning paradigm that is more responsive to the needs of students in the Society 5.0 era.

The presence of artificial intelligence also provides new opportunities in the digital transformation of schools. Artificial intelligence is able to support the learning process through an adaptive learning system, analysis of student learning progress, providing quick feedback, and personalizing learning materials (Chakraborty, 2024). In addition, the use of artificial intelligence can help teachers in designing learning, managing academic administration, and conducting evaluations more efficiently. UNESCO (2023) emphasized that the use of artificial intelligence-based technology in education must continue to prioritize the principle of human-centered education so that technology functions as a means of supporting learning and does not replace the role of humans in the educational process.

School digital transformation is also closely related to strengthening teacher competence. Teachers are the main actors who determine the success of technology implementation in education. Changes in the learning environment require teachers to have digital literacy, digital pedagogic skills, and skills in integrating technology into the learning process (Whalen, 2020). Teachers no longer play the role of the sole source of knowledge, but function as facilitators, mentors, and drivers of learning innovation. Research conducted by Nadifa and Ambarwati (2024) shows that digital culture in the school environment requires the support of educators' digital competencies so that the use of technology can take place optimally. The same thing was also stated by Sihombing et al. (2024) who stated that the transformation of technology-based

education is greatly influenced by the readiness and capacity of human resources in the school environment.

In addition to teachers, students are also required to have various competencies that are relevant to the demands of Society 5.0. Critical thinking skills, creativity, communication, collaboration, and digital literacy are important competencies that need to be developed through the educational process (Ihsan, 2024). Society 5.0 places humans as subjects who are able to use technology wisely and responsibly. Therefore, schools need to design learning that not only focuses on mastering academic material, but also on developing high-level thinking skills, problem-solving skills, and the ability to adapt to rapid changes (Ahmad et al., 2023; Hamedani et al., 2024). Thus, the digital transformation of schools is essentially an effort to build a generation that is ready to face future challenges.

The success of school digital transformation is also influenced by the leadership and governance of educational organizations. Digital leadership is a strategic factor in driving organizational culture change and building a vision of sustainable transformation. School leaders are required to have the ability to manage change, utilize data in decision-making, and create a work environment that supports innovation and collaboration (Allouche, 2024). The OECD (2021) emphasizes that the digital transformation of education requires leadership that is able to integrate technology, pedagogy, and management aspects in a balanced manner. Therefore, developing digital leadership capacity is an important part of realizing schools that are adaptive to technological changes.

Despite having various opportunities, the digital transformation of schools still faces a number of challenges. The digital divide is one of the most common problems found in the implementation of technology-based education. Not all education units have the same level of readiness in providing adequate infrastructure, internet access, and digital devices (Bond, 2020). In addition, differences in digital capabilities among educators and students also have the potential to cause gaps in the use of learning technology (Dermawan & Sumarni, 2024). These conditions show that digital transformation requires systemic and sustainable support.

The global experience during the COVID-19 pandemic provides an important lesson about the urgency of digital transformation of education. Disruptions to the learning process due to the pandemic show that schools that have digital readiness tend to be more able to maintain the continuity of the educational process than schools that have not developed an optimal digital system (Bozkurt et al., 2020). The results of Bond's study (2020) also show that digital technology plays an important role in maintaining the continuity of learning and opening up opportunities to develop more flexible education models in the future. Therefore, the digital transformation of schools cannot be seen as a temporary response to a specific situation, but rather as a strategic need in the development of future education systems.

In addition, the development of digital technology presents new challenges related to data security, ethics in the use of technology, and privacy protection. The use of artificial intelligence, learning analytics, and digital data management requires accountable governance so as not to have a negative impact on students and educational institutions (UNESCO, 2023). The OECD (2023) also emphasizes the importance of developing a digital education ecosystem that pays attention to aspects of cybersecurity, data protection, and ethical principles in the use of technology. Thus, the digital transformation of schools must be carried out responsibly and oriented towards human interests.

In the context of implementation, the digital transformation of schools requires a comprehensive and sustainable strategy. Schools need to have a clear vision regarding the direction of digital transformation and make technology an integral part of the development of educational organizations. Strengthening digital infrastructure, improving teacher competence, developing a culture of innovation, and integrating technology into the curriculum and learning are steps that need to be taken simultaneously (Wahyudiono, 2024). In addition, collaboration between schools, governments, communities, and various other stakeholders is an important factor in creating an effective and sustainable digital education ecosystem (Amel & Miterianifa, 2024).

In the end, the digital transformation of schools in the Society 5.0 era is a multidimensional change process that is not only related to the use of technological devices, but also concerns changes in educational paradigms, strengthening human resource capacity, governance reform, and building an organizational culture that is adaptive to innovation. The transformation is directed to realize an education system that is able to utilize technology optimally without eliminating the essence of education as a human development process. With a systemic, inclusive, and student-oriented approach, school digital transformation has the potential to be an important foundation in building a quality, sustainable, and socially conservative future education in accordance with the characteristics of society in the Society 5.0 era.

4. | CONCLUSION

The digital transformation of schools in the era of Society 5.0 is a strategic need in the development of education that is responsive to technological changes and the dynamics of future society. The transformation cannot be interpreted only as a process of digitizing educational tools and administration, but is a comprehensive and systemic change that includes learning, governance, leadership, organizational culture, and human resource development. In the context of Society 5.0, technology is positioned as an instrument oriented to human interests so that its use in education must be directed to improve the quality of learning and develop the potential of students optimally.

The implementation of school digital transformation provides opportunities for the creation of more flexible, personal, collaborative, and adaptive learning through the use of various digital technologies and artificial intelligence. On the other hand, the

transformation also presents various challenges, including the digital divide, limited infrastructure, low digital competence, data security issues, and the need for accountable and sustainable technology governance. Therefore, the success of school digital transformation requires the readiness of all educational components in building an integrated digital ecosystem.

School digital transformation in the Society 5.0 era must ultimately be seen as a long-term change process that requires a clear vision, adaptive leadership, strengthening the competencies of educators and students, and collaboration of various stakeholders. With a systemic and human development-oriented approach, school digital transformation has the potential to be an important foundation in realizing an education system that is innovative, inclusive, sustainable, and able to prepare a generation that has competence to face the challenges of the future society.

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The authors declare that there is no conflict of interest.

Ethical Approval and Originality Statement

Ethical approval was obtained for this study. The manuscript represents original work and has not been previously published, nor is it under consideration by another journal.

Data Disclosure Statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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