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Education Management Strategy In Improving the Quality of Learning in the Digital Era

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Abstract: *Digital transformation in the world of education has brought significant changes in learning methods and governance of educational institutions. This research aims to analyze education management strategies in improving the quality of learning in the digital era and identify challenges and solutions in its implementation. The method used in this study is a literature study, by examining various scientific sources, journals, books, and policy reports related to education digitalization. The research steps include (1) identification and selection of relevant literature, (2) analysis of digital education management concepts and theories, (3) evaluation of challenges and opportunities for technology implementation in education, and (4) preparation of recommendations for digital-based education management strategies. The results of the study show that the success of education management in the digital era is influenced by leadership factors, infrastructure, readiness of educators, and educational policies that support technological innovation. The benefits of this research are expected to provide insights for educational institutions in developing effective management strategies, assisting educators in adopting technology-based learning methods, and providing input for the government in formulating inclusive and sustainable digital education policies. This study shows that the application of technology in education management is able to increase the effectiveness of the learning process, administrative efficiency, and active participation of students in academic activities. Therefore, education managers must implement the right management strategies in order to create an effective, innovative, and in accordance with the demands of the times.*

Keywords : *Education Management, Digital Era, Learning Quality, Educational Technology, Educational Innovation.*

INTRODUCTION

In the digital era, technological transformation has brought fundamental changes in various sectors of life, including in the world of education. Advances in information and communication technology have changed the way humans interact, access information, and acquire knowledge. In the context of education, digitalization has opened up various new opportunities in the learning process, ranging from the use of e-learning, hybrid learning, artificial intelligence (AI), to digital-based learning management systems (Learning Management Systems / LMS) (Legi et al., 2022). This transformation

not only changes teaching methods, but also requires innovation in educational management strategies so that educational institutions can adapt to changing times and provide better and more effective learning quality for students. Therefore, the role of education management in managing this change is very crucial so that technology can be optimally integrated in the education system.

Along with the development of technology, the challenges in the world of education are also increasingly complex. One of the main challenges is the readiness of infrastructure and human resources in adopting digital technology. Not all educational institutions have adequate access to stable technological and internet devices, especially in remote areas and developing countries (Priyambodo & Saputri, 2021). In addition, not all educators have sufficient skills and understanding in utilizing technology to support the learning process. Lack of training and adaptation to digital technology is often the main obstacle in the implementation of education digitalization strategies. Therefore, good education management must include aspects of training and developing the competencies of educators so that they can optimize the use of technology in teaching.

In addition to infrastructure challenges and the readiness of educators, digitalization of education also faces challenges in terms of learning effectiveness. While online learning offers flexibility in when and where to learn, there are concerns about student engagement and motivation in participating in online learning. The lack of direct interaction between teachers and students can lead to a decrease in learning effectiveness, especially for students who need more intensive guidance. In addition, students who do not have adequate access to technology are at risk of falling behind in the learning process(Astini, 2020b). Therefore, education management strategies must be designed in such a way as to ensure that all students get equal opportunities in accessing digital learning, including by providing technology assistance to underprivileged students.

On the other hand, the use of technology in education also brings various great opportunities in improving the quality of learning. With technology, students can access a wider and more diverse range of learning resources, including materials from various leading educational institutions in the world. Technology also allows for personalized learning, where students can learn at their own pace and learning style. Artificial Intelligence (AI) and data analysis (Big Data) can also be used to identify students' learning needs and provide more appropriate learning recommendations (Dyulicheva & Glazieva, 2022). With the right management strategy, technology can be a very effective tool in improving the quality of learning and preparing students to face future challenges.

Education management in the digital era also demands changes in the leadership and governance patterns of educational institutions. Leadership in educational institutions must be able to accommodate changes quickly and make data-driven decisions. Approach Transformational Leadership is particularly relevant in this context, where education leaders must be able to inspire, encourage innovation, and

create an environment that supports the effective use of technology (Wijaya et al., 2016). In addition, educational institutions must develop data-driven management strategies, where policies and decision-making are based on data analysis regarding learning effectiveness, student engagement, and educator performance. Thus, educational institutions can optimize their resources to improve the quality of learning.

In addition to the leadership aspect, the collaboration aspect is also an important factor in the education management strategy in the digital era. Educational institutions cannot run alone in facing the challenges of digitalization, but need to collaborate with various parties, including the government, the technology industry, the academic community, and students' parents. Collaboration with the technology industry, for example, can help educational institutions in developing digital infrastructure and provide training for educators in using technology. On the other hand, cooperation with the government is indispensable in providing policies and regulations that support digital transformation in education. By building a collaboration-based education ecosystem, digitalization in education can be implemented more effectively and sustainably.

From a policy perspective, the government also has a very important role in supporting digital transformation in education. The government must provide clear regulations regarding the use of technology in education, including policies related to digital-based curriculum, protection of students' personal data, and standardization of online learning platforms. In addition, investment in digital infrastructure is one of the strategic steps that must be taken to ensure that all students have equal access to technology. Some countries have successfully implemented progressive digital education policies, such as South Korea and Finland, which provide equal access to technology to students and integrate technology into national curricula. The study of these successful policies can be a reference in the development of education digitalization strategies in various countries, including in Indonesia.

Taking into account various challenges and opportunities in education digitalization, education management strategies in the digital era must be designed comprehensively, including aspects of leadership, infrastructure, educator training, learning effectiveness, and supporting policies. Educational institutions must dare to innovate in adopting technology, but still maintain fundamental values in education, such as human interaction and character-based learning. With the right strategy, digital transformation in education will not only improve the quality of learning, but also prepare a generation that is more adaptive, creative, and ready to face future challenges. Therefore, this study aims to examine various education management strategies that can be applied to improve the quality of learning in the digital era and identify challenges and solutions in its implementation.

The development of digital technology has brought fundamental changes in the education system. Conventional education, which was previously face-to-face, is now increasingly adopting technology-

based learning models. Therefore, education management must design effective strategies in order to improve the quality of learning by taking advantage of technological advances. This article aims to analyze education management strategies that can improve the quality of learning in the digital era. By understanding the challenges and opportunities that arise, education managers can implement innovative measures to create a more adaptive and dynamic learning environment.

METHOD

This study uses a library research method with a descriptive-qualitative approach to analyze education management strategies in improving the quality of learning in the digital era. Data sources consist of primary sources, such as scientific journals and previous research results, as well as secondary sources, such as books, academic articles, and digital education policies. Data was collected through documentation and analyzed using qualitative analysis, which included data reduction, presentation of data in key categories, and drawing conclusions. The results of this research are expected to make a theoretical contribution in enriching insights into digital education management as well as practical contributions as a guide for educational institutions in optimizing learning technology, improving the competence of educators, and adjusting the curriculum to the digital era.

RESULTS AND DISCUSSION

Education Management Strategies in the Digital Era

Digital transformation in the world of education has presented a great opportunity to improve the quality of learning, but it also requires the right management strategy so that technology integration can run effectively and sustainably. One of the main strategies is digital transformation in learning, namely by integrating various technologies in the teaching and learning process. The use of a Learning Management System (LMS) allows educational institutions to manage learning more systematically with features such as online classes, online assignments, and digital-based evaluations. In addition, the use of video conferencing platforms such as Zoom and Google Meet has become a key solution in remote learning, especially since the COVID-19 pandemic (Astini, 2020a). Not only that, the development of artificial intelligence (AI) and interactive technologies such as Virtual Reality (VR) and Augmented Reality (AR) also allows for more effective personalization of learning, where students can learn at their own pace and style. However, to ensure the effectiveness of this digital transformation, educational institutions must develop policies that encourage the optimal use of technology, including in curriculum design, evaluation methods, and interactions between educators and students so that there is no gap in the application of technology at various levels of education.

The success of digital transformation in education is highly dependent on improving the competence of educators in using technology as part of the learning process. Many teachers and lecturers still face difficulties in adopting technology effectively, both due to lack of training and due to unfamiliarity in using digital tools (Legi & Toruan, 2024). Therefore, educational institutions need to develop sustainable training programs to improve the digital literacy of educators, including in the use of e-learning platforms, the creation of interesting digital content, and technology-based evaluation methods. In addition, educators also need to be given an understanding of the importance of digital security in online learning, especially in protecting students' personal data and maintaining ethics in communicating in cyberspace. With continuous training, educators can be more confident in adapting technology and creating a more interactive learning environment that is in accordance with the needs of students in the digital era.

On the other hand, digital transformation also requires strengthening digital-based curricula so that students not only become technology users, but also be able to understand and develop digital skills that are relevant to future needs. The educational curriculum must include aspects of digital literacy, coding, data analysis, and the development of critical and collaborative thinking skills that are key in facing the industrial era 4.0 (Lase, 2019). In addition, the Project-Based Learning approach and the STEAM (Science, Technology, Engineering, Arts, and Mathematics) method can be applied to develop problem-solving and innovation skills among students. Educational institutions also need to integrate digital skills in various subjects, not only in the field of information technology, but also in other fields such as social sciences, arts, and business. Thus, students not only become consumers of technology, but also have a deep understanding of how technology can be used to create solutions in various areas of life.

In order for digital transformation in education to run effectively and sustainably, an inclusive digital education policy is needed, which includes aspects of regulation, data protection, and policies that support equal access to technology (Suhendar, 2021). The government must have clear regulations regarding the use of technology in education, including policies related to digital-based curriculum, evaluation standards in online learning, and the protection of personal data of students and educators. In addition, digital education policies must also include support for students from underprivileged families so that they can still access technology-based learning. Several countries have implemented progressive policies in the digitalization of education, such as South Korea and Finland, which provide free access to technology for students and integrate technology into national curricula. The study of these policies can be a reference for educational institutions and the government in designing more inclusive and sustainable education digitalization policies. With supportive policies, digital-based education can

become more equitable and provide benefits for all students, without being constrained by social or economic disparities.

Overall, education management strategies in the digital era must be designed comprehensively, including aspects of learning transformation, strengthening infrastructure, improving the competence of educators, developing digital curricula, innovative leadership, and inclusive education policies. With the right strategy, educational institutions can ensure that technology is used effectively to improve the quality of learning and prepare a generation that is more adaptive, creative, and ready to face global challenges. Therefore, collaboration between various parties, including educational institutions, the technology industry, and the government, is the key to success in managing digital transformation in the world of education.

Utilization of Technology in Learning

The use of technology in learning has become a major factor in increasing the effectiveness and efficiency of the educational process in the digital era. Technology allows access to a wider range of learning resources, flexibility in teaching methods, and personalized learning tailored to the needs of each student. With the presence of Learning Management Systems (LMS) such as Google Classroom, Moodle, and Edmodo, educational institutions can manage learning more systematically, starting from material delivery, assignments, online discussions, to evaluation of learning outcomes (Wahyono et al., 2020). Technology also allows the use of Artificial Intelligence (AI) in supporting adaptive learning, where the system can adapt the material to the student's level of understanding and learning speed. This is very helpful in creating a more effective learning experience, especially for students with different levels of understanding. In addition, technology also supports gamification-based learning methods, which increase student motivation and engagement through the element of play in the learning process. Thus, the use of technology in learning not only makes the educational process more efficient, but also more interesting and interactive for students.

Technology also provides a great opportunity in supporting experiential learning, where students can engage in interactive simulations and virtual explorations to understand concepts in more depth. The use of Virtual Reality (VR) and Augmented Reality (AR) in education allows students to experience situations that are difficult to realize in a traditional classroom environment (Vindhyana, 2020). For example, in science subjects, students can explore cell structures in three dimensions through VR, or in history subjects, they can visit historical places virtually. This technology not only increases students' absorption of the material, but also makes learning more immersive and fun. In addition, in the field of technical skills, technology-based simulations have been widely used in medical, engineering, and aviation training, where learners can practice in a realistic digital environment before facing real-world

situations. With these innovations, technology is increasingly proving its role in improving the quality of learning and providing a more in-depth and meaningful learning experience for students.

However, in order for the use of technology in learning to run optimally, it is necessary to have the right education management strategy, including in terms of training educators, managing digital infrastructure, and developing technology-based education policies. Teachers and lecturers need to be given adequate training in the use of educational technology so that they can integrate technology with effective teaching methods. In addition, educational institutions must ensure that digital infrastructure such as stable internet networks and learning tools are available to all students, especially for those from remote or underprivileged areas. The government and the private sector also need to work together in providing regulations and policies that support the use of technology in education, including in terms of protecting students' personal data and digital curriculum standards. With synergy between various parties, technology can be used to the maximum to create education that is more inclusive, innovative, and relevant to the needs of the times.

Human Resource Management in Education in the Digital Era

Human resource management (HR) in education in the digital era is a crucial factor in determining the success of technology-based education transformation. In this context, educators, administrative staff, and leaders of educational institutions must have the appropriate competencies to effectively manage digital-based learning. Therefore, the main strategy in human resource management is to increase the competence of educators through training programs and digital skills development. Teachers and lecturers must be equipped with an understanding of the use of Learning Management System (LMS), digital-based learning design, and interactive teaching strategies that integrate technologies such as Artificial Intelligence (AI), Virtual Reality (VR), and Augmented Reality (AR). In addition, they also need to have skills in managing online classes, compiling technology-based evaluations, and understanding the concepts of digital literacy and cybersecurity in order to protect students' data and privacy. This training is not only one-time, but must be carried out on an ongoing basis to ensure that educators are always up to date with changing technological developments. In addition to teachers and lecturers, administrative and managerial staff also need to receive training in the use of digital-based academic information systems, so that academic data management, financial administration, and communication systems with parents and students can run more efficiently and transparently. With targeted human resource management, educational institutions can create a more adaptive and innovative learning ecosystem in the face of the digital era.

In addition to improving competence, human resource management in education must also include aspects of the welfare and motivation of educators and education staff. Along with the increasing

demands of digitalization, the workload of educators often increases because they have to adapt to new technologies, develop digital learning materials, and adapt to data-based evaluation methods. Therefore, educational institutions need to implement policies that support the welfare of educators, both in the form of financial incentives, work flexibility, and technical support in the use of technology. In addition, a system of rewards and recognition for innovations in technology-based teaching can increase the motivation of teachers and lecturers to continue to innovate in the learning process. In addition to the welfare aspect, leadership in educational institutions also plays an important role in building a collaborative and innovative work culture. Education leaders must be able to create an environment that encourages active participation of educators in technology exploration, provide space to share best practices, and build networks of cooperation with the technology industry and the digital education community. With a welfare-based and innovation-based approach to human resource management, educational institutions can create educators who are not only technically competent but also have a high spirit in presenting a more quality learning experience that is relevant to the times.

Digital-Based Curriculum Development

The development of a digital-based curriculum is one of the main strategies in educational transformation to adapt the learning process to technological developments and the needs of the times. The digital curriculum not only focuses on the use of technology as a learning aid, but also includes designing materials that are more flexible, interactive, and in accordance with the needs of students in the digital era (Legi & Wamo, 2023). One of the approaches that can be applied is Project-Based Learning (PBL) and the STEAM (Science, Technology, Engineering, Arts, and Mathematics) approach, which emphasizes critical thinking skills, problem-solving, and collaboration in real-world-based task solving. By integrating technologies such as virtual simulations, artificial intelligence (AI), and interactive media in the curriculum, students can gain a more in-depth and applicable learning experience. In addition, the use of Learning Management Systems (LMS) such as Moodle, Google Classroom, or Edmodo allows learning materials to be delivered more systematically, with features such as online quizzes, discussion forums, and data-driven evaluation systems that provide direct feedback to students and educators. The development of a digital-based curriculum must also consider the concept of personalized learning, where each student can adjust their learning rhythm and style with the support of adaptive technology that provides material according to their abilities and interests. With this flexibility, students can be more active in developing their potential, and be better prepared to face the challenges of the increasingly digital and technology-based world of work.

In addition to designing innovative learning methods, digital-based curricula must also include digital literacy and technology skills as part of the core competencies that must be mastered by students.

Digital literacy includes an understanding of how to use technology ethically and safely, data analysis skills, basic programming, to artificial intelligence and cybersecurity. By including these digital skills in the curriculum, students not only become passive users of technology, but can also develop skills relevant for the future, such as coding, digital graphic design, big data analysis, and artificial intelligence. In addition, the curriculum should be supported by rich digital learning resources, such as e-books, interactive learning videos, MOOC (Massive Open Online Courses) platforms, as well as access to scientific journals and global educational databases (Sulasmi et al., 2020). The government and educational institutions need to ensure that the digital curriculum is inclusive and accessible to all students, including those in areas with limited access to technology. Therefore, collaboration between educational institutions, the technology industry, and the government is urgently needed in creating a digital-based learning ecosystem that is quality, innovative, and relevant to the needs of the 21st century. Thus, a digital-based curriculum can be the main tool in producing a generation that is more adaptive, creative, and ready to face global challenges in the digital era.

Implementation Strategy

The following are the implementation strategies of the Utilization of Technology in Learning, Human Resource Management, and Digital-Based Curriculum Development in the form of a table:

Aspects	Implementation Strategy	Concrete Actions
Utilization of Technology in Learning	Integrasi Learning Management System (LMS)	Use platforms like Google Classroom, Moodle, and Edmodo to manage online learning.
	Use of interactive technology in learning	Applying Artificial Intelligence (AI), Virtual Reality (VR), and Augmented Reality (AR) in learning to increase student engagement.
	Implementation of hybrid learning model and flipped classroom	Combining face-to-face and online methods, as well as providing digital materials before discussion and practice sessions.
	Utilization of digital platforms for evaluation	Use technology-based online quiz and exam systems such as Kahoot, Quizizz, and Google Forms for more flexible learning evaluation.
Human Resource Management	Improving the competence of educators	Conduct training and workshops on the use of technology in learning, such as digital material design, LMS management, and cybersecurity.
	Providing incentives and rewards for innovation in learning	Providing appreciation and awards to educators who have succeeded in developing innovative technology-based learning methods.
	Strengthening digital leadership in educational institutions	Increasing the capacity of school/university leaders in managing digital transformation through educational technology management training.

Aspects	Implementation Strategy	Concrete Actions
Digital-Based Curriculum Development	Implementation of welfare and work balance policies	Providing work flexibility, technical support, and a work environment that supports digital innovation for educators.
	Integration of digital literacy in the curriculum	Adding special subjects or modules on digital literacy, coding, data analysis, and cybersecurity in the curriculum.
	Use of STEAM and Project-Based Learning (PBL) approaches	Develop a curriculum that is project-based and integrates science, technology, engineering, arts, and mathematics to improve critical thinking skills.
	Provision of quality digital learning resources	Provides access to e-books, interactive learning videos, MOOC (Massive Open Online Courses) platforms, as well as scientific databases and digital journals.
	Data-driven curriculum evaluation and updates	Use data analysis systems to evaluate curriculum effectiveness and make adjustments based on educational trends and industry needs.

In the face of the digital era, the education implementation strategy must include the use of technology in learning, human resource management, and the development of a digital-based curriculum. The use of technology in learning can be done by integrating Learning Management Systems (LMS) such as Google Classroom and Moodle to manage materials and assignments online. In addition, the use of interactive technologies such as Artificial Intelligence (AI), Virtual Reality (VR), and Augmented Reality (AR) can increase student engagement in the learning process (Han et al., 2022). Hybrid learning models and flipped classrooms can also be applied to combine face-to-face and online methods, so that students are more active in understanding the material. Additionally, technology-based evaluation systems such as Kahoot and Quizizz allow for a more flexible and accurate assessment process.

Human resource management (HR) in digital education emphasizes improving the competence of educators through technology training and digital material design. Educational institutions must provide incentives and awards for teachers and lecturers who innovate in technology-based learning. Strong digital leadership is also needed so that school and university leaders can manage digital transformation well. In addition, the welfare of educators must be considered by providing work flexibility and technical support in adapting new technologies.

Meanwhile, the development of a digital-based curriculum must integrate digital literacy in every aspect of learning. Skills such as coding, data analysis, and cybersecurity need to be included in the curriculum so that students are ready to face the challenges in the world of work. The STEAM (Science, Technology, Engineering, Arts, and Mathematics) and Project-Based Learning (PBL) approaches can

be applied to improve critical and collaborative thinking skills (Kye et al., 2021). In addition, the availability of digital learning resources such as e-books, interactive videos, and MOOC (Massive Open Online Courses) platforms should be expanded so that students have access to quality materials. Data-based curriculum evaluation is also needed to ensure its effectiveness in responding to the needs of the industry and the times. With the right implementation strategy, digital-based education can improve the quality of learning, optimize the role of educators, and prepare students to be more competitive and adaptive to technological developments.

Challenges in Education Management in the Digital Era

Education management in the digital era faces various complex challenges, one of which is the gap in access to digital technology and infrastructure. Not all educational institutions have adequate facilities and infrastructure to support technology-based learning, especially in remote areas that still experience limited access to the internet and digital devices (Legi & Kainara, 2022). Differences in economic ability also make it difficult for some students to have adequate learning tools, thus creating a gap in access to digital education. In addition, the readiness of educators in adopting technology is also an obstacle. Many teachers and lecturers are not familiar with digital-based teaching methods, so continuous training is needed so that they are able to integrate technology with effective learning methods.

In addition to infrastructure factors and human resource readiness, education management is also faced with challenges in aspects of data security and digital ethics. With the increasing use of digital platforms in learning, risks related to cybersecurity, student data privacy, and misuse of technology are increasing. Educational institutions must ensure that the digital systems used have strong security protections to prevent data leakage or misuse of personal information of students and educators. In addition, the challenge of building a healthy digital culture is also a major concern, considering the increasing cases of plagiarism, social media abuse, and distractions in learning due to the uncontrolled use of technology. Therefore, education management must have clear regulations in the use of technology, including digital ethics guidelines and data protection policies to create a safe, inclusive, and effective learning environment in the digital era.

CONCLUSIONS

Education management in the digital era presents various opportunities and challenges that must be overcome with the right strategy. The use of technology in learning through Learning Management System (LMS), Artificial Intelligence (AI), Virtual Reality (VR), and Augmented Reality (AR) has opened up new opportunities in increasing the effectiveness of learning and access to information more

broadly. In addition, the hybrid learning model and flipped classroom allow students to be more active in understanding the material through a combination of online and face-to-face learning. However, the success of digital transformation in education does not only depend on technology alone, but also on optimal management of human resources (HR). Improving the competence of educators through technology training, providing innovation incentives, and strong digital leadership are the main factors in ensuring the sustainability of digital-based education. In addition, the development of a digital-based curriculum must include digital literacy, problem-solving skills, and project-based learning so that students have better readiness to face global challenges. However, the transformation of digital education still faces various obstacles, such as gaps in access to technology, the readiness of educators, and data security and digital ethics issues that require serious attention. Therefore, a holistic approach is needed that not only focuses on the application of technology, but also builds an education system that is inclusive, safe, and adaptive to the times.

Based on the various challenges faced, several recommendations can be given to ensure the successful implementation of education management in the digital era. First, the government and educational institutions must expand access to digital infrastructure, especially in areas that still have limited internet networks and learning devices. Second, educators need to receive continuous training in order to integrate technology with effective learning methods. In addition, incentives and awards for educators who innovate in digital learning need to be given to increase their motivation and creativity. Third, the development of a digital-based curriculum must adapt to the needs of the industry and global trends, by emphasizing digital skills, programming, data analysis, and cybersecurity so that students are better prepared to face the era of the industrial revolution 4.0. Fourth, educational institutions must establish clear policies regarding data protection and digital ethics to avoid the misuse of technology in the learning process. Fifth, collaboration between the government, educational institutions, the technology industry, and the community must be strengthened to create an inclusive, innovative, and sustainable digital education ecosystem. With these steps, the digital-based education system can run more effectively and provide maximum benefits for all stakeholders, thus producing a generation that is better prepared to face challenges and opportunities in the digital era.

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