MANAGING PRIMARY EDUCATION IN THE CONTEXT OF DIGITAL TRANSFORMATION

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Abstract. Digital transformation is increasingly changing the organization, management, and delivery of primary education. The integration of digital platforms, learning management systems, artificial intelligence, cloud technologies, learning analytics, and electronic communication tools creates new opportunities for improving educational quality and management efficiency. However, successful digital transformation requires more than the introduction of technological tools; it requires changes in leadership practices, teacher competencies, organizational culture, data management, and communication with parents and other stakeholders. This article examines the organizational and pedagogical characteristics of managing primary education in the context of digital transformation. Particular attention is given to digital leadership, data-driven decision-making, professional development of teachers, digital infrastructure, cybersecurity, and the creation of an inclusive digital learning environment. The study uses a qualitative analytical approach based on the examination of scientific literature and international educational frameworks. The findings indicate that effective digital management should combine technological innovation with pedagogical objectives, systematic monitoring, professional support, and responsible data governance. A conceptual model of digital management in primary education is proposed, consisting of strategic planning, digital infrastructure, human resource development, data-driven management, stakeholder cooperation, and continuous evaluation.

Keywords: digital transformation, primary education, educational management, digital leadership, learning analytics, digital competence, educational technology, school management.

Introduction. Digital transformation has become an important factor influencing the development of contemporary education systems. The rapid expansion of digital technologies has changed not only teaching and learning methods but also the mechanisms through which educational institutions are managed. Primary schools increasingly use electronic information systems, learning management platforms, digital assessment tools, cloud-based services, artificial intelligence, and online communication technologies to organize educational processes and administrative activities. In primary education, digital transformation has particular importance because management decisions influence pupils, teachers, parents, school administrators, and the broader educational community. Effective management

therefore requires an integrated approach that connects technological development with pedagogical objectives. The introduction of technology alone does not guarantee improved educational outcomes. Digital tools must be incorporated into a coherent management strategy based on clearly defined educational goals. The digital transformation of education also changes the role of school leaders. Traditionally, educational management has focused on planning, organizing, controlling, and evaluating institutional activities. In a digitally transformed environment, these functions are increasingly supported by real-time data, digital communication, automated reporting, and analytical systems. Consequently, school leaders need digital competencies that enable them to interpret information, manage technological change, support teachers, protect data, and coordinate stakeholders. The purpose of this article is to examine the main organizational and pedagogical aspects of managing primary education in the context of digital transformation and to identify the conditions necessary for effective digital educational management.

Literature Review. The concept of digital transformation in education extends beyond the simple digitization of existing educational materials. Digitization involves converting information from analogue to digital form, while digital transformation involves fundamental changes in organizational processes, professional practices, communication, and decision-making. According to UNESCO, technology can contribute to educational development when its implementation is aligned with pedagogical objectives, equity, inclusion, and appropriate governance. The Global Education Monitoring Report emphasizes that technology should serve educational purposes rather than become an objective in itself [1]. Digital leadership has become another important research area. Digital leaders are expected to develop a strategic vision for technology integration, create conditions for teacher professional development, support innovation, and ensure responsible use of digital resources. In this context, leadership competence includes both technological knowledge and the ability to manage organizational change. Learning analytics is also becoming increasingly relevant to educational management. Data collected from digital learning platforms can provide information about pupil participation, learning progress, assessment results, and engagement. When used appropriately, such information can support evidence-based management decisions and enable early identification of pupils who may require additional pedagogical support. However, researchers also identify challenges associated with digital transformation. These include unequal access to digital technologies, inadequate infrastructure, insufficient teacher digital competence, cybersecurity risks, privacy concerns, and resistance to organizational change. Selwyn argues that digital technologies should be examined not only in terms of their technical capabilities but also in relation to social, institutional, and educational contexts [2]. Therefore, the literature suggests that digital transformation requires a systemic approach involving infrastructure, human resources, leadership, pedagogy, data governance, and organizational culture.

Methodology. The study employed a qualitative analytical methodology. Scientific publications, international educational reports, theoretical frameworks, and research on digital transformation and educational management were analyzed to identify major factors affecting the management of primary education in a digital environment.

The analysis focused on five dimensions:

1. digital leadership and strategic management;

2. digital infrastructure and technological resources;
3. teachers' digital competencies and professional development;
4. data-driven decision-making and learning analytics;
5. communication, inclusion, cybersecurity, and stakeholder cooperation.

A comparative and conceptual analysis was used to identify relationships between these dimensions and to formulate a conceptual model for managing primary education under digital transformation. The research process consisted of three stages. First, relevant theoretical approaches to educational digitalization were identified. Second, the organizational implications of digital transformation were analyzed. Third, the findings were synthesized into a conceptual framework for digital management in primary education.

Results. The analysis indicates that effective management of primary education in a digitally transformed environment depends on the interaction of several interconnected components.

Table 1. Main components of digital management in primary education

Management component	Main function	Expected result
Digital leadership	Strategic planning and coordination of digital transformation	Coherent institutional development
Digital infrastructure	Provision of platforms, devices, networks, and software	Stable digital learning environment
Teacher digital competence	Development of teachers' technological and pedagogical skills	Effective technology integration
Data-driven management	Collection and analysis of educational data	Evidence-based decision-making
Digital communication	Interaction among school, teachers, pupils, and parents	Faster and more transparent communication
Cybersecurity	Protection of educational data and digital systems	Safe digital environment
Continuous evaluation	Monitoring technological and pedagogical outcomes	Sustainable improvement

The first major result is that digital leadership represents the organizational foundation of transformation. School administrators need to formulate a clear digital development strategy that establishes priorities, responsibilities, implementation stages, and evaluation mechanisms. The second result concerns teacher competence. Digital transformation cannot be sustainable if teachers do not possess the knowledge and skills necessary to use digital tools effectively. Professional development should therefore combine technical training with pedagogical methods for integrating technology into lessons. The third result is the increasing importance of data-driven management. Digital platforms allow administrators to collect information about attendance, assessment results, learning activity, and other indicators. The systematic analysis of such data can improve planning and monitoring. The fourth result concerns stakeholder communication. Digital technologies create additional channels for communication between school administrators, teachers, parents, and pupils. Electronic diaries, messaging platforms, online consultations, and school information systems can facilitate continuous communication. The fifth result is related to digital safety and inclusion.

Effective digital management requires mechanisms for protecting personal data and ensuring that pupils have equitable opportunities to access digital resources.

Discussion. The findings demonstrate that digital transformation changes the traditional understanding of primary education management. Management is increasingly moving from periodic and largely administrative decision-making toward continuous monitoring, data-supported planning, and flexible organizational coordination. One of the most significant changes concerns the role of the school administrator. In a traditional management environment, administrators may rely primarily on reports, meetings, and periodic assessments. Digital systems provide opportunities to access information more quickly and to monitor educational processes continuously. However, the availability of large amounts of data does not automatically result in better decisions. Administrators need analytical competencies to distinguish relevant indicators from unnecessary information and to interpret data within the pedagogical context. Digital leadership should therefore be understood as a combination of strategic, technological, pedagogical, and organizational competencies. School leaders should not simply encourage teachers to use digital tools; they should establish an institutional environment in which technology supports clearly defined educational objectives. Another important issue is teacher professional development. Digital transformation creates new expectations for teachers, including the ability to use digital learning platforms, multimedia resources, electronic assessment systems, collaborative tools, and emerging artificial intelligence applications. Professional development should therefore be continuous rather than limited to short-term technical training. The findings also demonstrate the importance of learning analytics. Digital data can support early identification of learning difficulties and provide information for differentiated pedagogical interventions. Nevertheless, educational data should be interpreted carefully because quantitative indicators cannot fully represent pupils' motivation, creativity, emotional development, or social circumstances. The development of digital management also influences relationships with parents. Digital communication tools can increase the speed and accessibility of communication, enabling parents to receive information about attendance, academic progress, assignments, and school activities. At the same time, schools should avoid excessive digital communication and should establish clear principles concerning privacy, communication frequency, and responsible use of information. Cybersecurity represents another essential dimension. Primary schools process sensitive information concerning pupils, parents, and teachers. Consequently, digital transformation should be accompanied by appropriate access controls, secure authentication, data protection procedures, regular system updates, and staff awareness of cybersecurity risks. The issue of digital inequality also requires attention. If pupils have unequal access to devices, internet connectivity, or digital learning resources, digital transformation may unintentionally increase educational disparities. Therefore, school management should consider accessibility and inclusion when developing digital strategies. Overall, the findings support a systemic understanding of digital transformation. Technology should not be introduced as an isolated innovation but as part of an integrated educational management strategy. The effectiveness of digital transformation depends on the alignment of technological resources, leadership, teacher competencies, pedagogical objectives, data governance, and stakeholder cooperation.

Practical Recommendations. Based on the findings, several practical recommendations can be proposed for primary education institutions. First, schools should develop a Digital Transformation Strategy that defines institutional objectives, technological priorities, implementation stages, responsible personnel, and evaluation indicators. Second, school leaders should establish a continuous professional development system for teachers. Training should include not only technical skills but also digital pedagogy, online assessment, learning analytics, cybersecurity, and responsible use of artificial intelligence. Third, schools should gradually introduce data-driven management systems that integrate attendance, assessment, learning activity, and other relevant indicators. Data should be used to support—not replace—professional pedagogical judgment. Fourth, primary schools should strengthen digital communication with parents while maintaining opportunities for direct interpersonal communication. Fifth, educational institutions should establish clear digital safety and data protection policies. Teachers, administrators, pupils, and parents should understand basic principles of responsible digital behavior. Sixth, digital transformation initiatives should be evaluated continuously. Evaluation should include technological, pedagogical, organizational, and social indicators.

Conclusion. Digital transformation is fundamentally changing the management of primary education by introducing new approaches to leadership, communication, professional development, monitoring, and decision-making. The analysis demonstrates that successful digital transformation cannot be achieved through technology alone. It requires coordinated development of digital infrastructure, leadership capacity, teacher competencies, data-driven management, stakeholder cooperation, cybersecurity, and inclusive educational practices. The proposed conceptual approach views digital management as a continuous process consisting of strategic planning, technological implementation, professional development, data analysis, stakeholder engagement, and evaluation. Within this framework, digital technologies function as instruments for achieving educational and managerial objectives rather than as independent goals. For primary education institutions, the central task is therefore to create a balanced digital environment in which technological innovation supports pedagogical quality and organizational effectiveness. Sustainable digital transformation requires strong leadership, continuous learning, responsible data use, and systematic evaluation. Such an approach can provide the organizational foundation necessary for adapting primary education management to the demands of the contemporary digital environment.

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