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Research on the Development Dilemma and Path of Digital Transformation in the Field of Integration of Sports and Education

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Abstract: From the perspective of digital transformation, this paper explores a new path for the high-quality development of the field of integration of sports and education. By using the methods of literature and logical analysis, this paper comprehensively analyzes the value connotation and current development dilemma of the field of integration of sports and education. Specifically, the study identifies several critical bottlenecks hindering progress, including the serious phenomenon of information islands that isolate data, the severe imbalance of coordination mechanisms among various stakeholders, and the persistent difficulty of the integration of management resources. Furthermore, the research highlights the inefficiency of current management practices, the difficulty of the unification of implementation standards across different regions, the non-standard operation mechanisms that disrupt workflow, the imperfect supervision mechanisms, and the overall lack of transparency and supervision in daily operations. To address these multifaceted challenges, this paper proposes a series of targeted optimization strategies. It is strongly suggested to integrate information resources to break down data silos, realize coordinated development across educational and athletic departments, and integrate management resources to release management efficiency. Additionally, policymakers must establish unified standards to realize standardized development, strengthen the supervision mechanism, and ensure transparency and fairness throughout the entire system. Ultimately, this research provides a robust theoretical framework and practical guidelines for leveraging digital technologies to foster the sustainable and high-quality evolution of sports and education integration.

Keywords: sports education; digital transformation; quality development; resource integration; management efficiency

Received: 02 March 2026

Revised: 24 April 2026

Accepted: 09 May 2026

Published: 13 May 2026



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1. Introduction

The concept of integration represents a significant development trend in contemporary society, and the integration of sports and education emerges as a necessary response to this trend [1]. In 2020, the General Administration of Sports and the Ministry of Education issued the Opinions on Deepening the Integration of Sports and Education to Promote the Healthy Development of Adolescents, which outlined six specific areas of focus. These include strengthening school sports programs, enhancing the system for youth sports events, optimizing the layout of youth sports training, advancing reforms in sports schools, fostering the healthy development of youth sports clubs, and improving the infrastructure for grassroots coaches and sports educators. Despite these efforts, the integration of sports and education involves numerous stakeholders, each with distinct interests and responsibilities. Effective coordination among these stakeholders is essential to achieve a co-governance model that maximizes the benefits of integration. However, the efficiency of coordination plays a critical role in determining the responsiveness of all parties involved, which in turn affects the overall quality and degree of integration. At the

grassroots level, disparities in objectives and tasks between sports and education departments often lead to conflicting interests. Furthermore, the absence of a mature coordination mechanism for implementing shared goals and tasks can result in inefficiencies in the integration process. Addressing these challenges requires the establishment of robust operational frameworks, effective response mechanisms, and clear communication channels among all stakeholders. These measures are crucial for enhancing the efficiency of integration and resolving existing contradictions. Scholars have explored various approaches to address these issues, such as improving physical education teacher resources, developing innovative educational models, and fostering local cooperative governance. However, there has been limited exploration of the role of digital transformation in advancing the integration of sports and education. Digital transformation, as an inevitable trend in societal development, offers significant potential for addressing current challenges and elevating the integration process to new heights. Digital technologies have already been widely applied across various domains within sports and education, yet their application to the holistic integration of these fields remains insufficient. By leveraging digital transformation, it is possible to overcome existing barriers, streamline processes, and create a more cohesive and efficient system for integrating sports and education.

Building on this foundation, this study employs Bourdieu's field theory as an analytical framework to examine the intrinsic value of digital transformation within the context of sports and education integration. This theoretical approach facilitates a deeper understanding of the structural dynamics and interactions within this field, enabling the identification of key development challenges and potential solutions. By analyzing the current dilemmas faced in the integration process, this study aims to propose actionable pathways for improvement. Specifically, the research focuses on enhancing operational efficiency, fostering fairness and inclusivity, and promoting collaboration among stakeholders [2–4]. The ultimate goal is to construct a more equitable, transparent, and cooperative ecosystem for sports education, thereby ensuring the healthy development of young individuals. Digital transformation plays a pivotal role in achieving these objectives, as it offers innovative tools and methodologies for streamlining operations, improving communication, and facilitating data-driven decision-making. By integrating digital technologies into the core processes of sports and education, stakeholders can overcome traditional barriers and create a more adaptive and responsive system. This approach not only addresses immediate challenges but also lays the groundwork for sustained progress and innovation in the integration of sports and education. Through the application of Bourdieu's field theory and the strategic utilization of digital transformation, this study seeks to provide a comprehensive framework for advancing the integration process, ultimately contributing to the broader goal of fostering youth development and societal well-being [5, 6].

2. The Concept of Digital Transformation of Sports Integration Field

Bourdieu, a French sociologist, posited that in a highly differentiated society, the social world consists of smaller social worlds that possess relative autonomy. These smaller worlds are spaces governed by their own logic and necessity of objective relations, which cannot be reduced to the overarching principles that dominate other fields. He likened society to a large field composed of various sub-fields that are both interrelated and independent. From an analytical perspective, a field can be understood as a network or configuration of objective relationships that exist between different positions. As a dynamic and productive practice space, the field is structured and ordered, yet it remains adaptable to new social elements. The introduction of new elements into an existing field inevitably leads to the reorganization of the positions of the original elements and the transformation of their relationships, thereby creating a new spatial structure within the field. Digitalization and informatization are deeply intertwined, with their foundational logic rooted in the application of technology. This involves utilizing technical methods to characterize the form of systems or entities and subsequently controlling their functions.

Such technological applications serve as the driving force behind the evolution of fields, reshaping their dynamics and enabling new forms of interaction and organization.

Building upon this framework, the digital transformation within the field of sports and education integration can be conceptualized as a multifaceted process. It leverages advanced information technologies such as artificial intelligence, big data, and the Internet of Things as communication channels to enhance the interconnectivity among stakeholders. This transformation is guided by the restructuring of the field's inherent structure and order, aiming to optimize the operational efficiency and resource integration within the domain. By opening responsive links and fostering deeper collaboration, the field can achieve a new spatial structure that supports high-quality development. The essence of this transformation lies in its ability to create a cohesive and adaptive environment where technological advancements drive progress. Through the integration of resources and the establishment of streamlined processes, the field can address existing challenges and unlock new opportunities for growth. This approach not only enhances the functionality of the field but also promotes sustainable development, ensuring that the integration of sports and education evolves in alignment with broader societal and technological trends.

3. The Development Dilemma of Digital Transformation in the Field of Integration of Sports and Education

3.1. The Phenomenon of Isolated Information Island Is Serious, and the Coordination Mechanism Is Out of Balance.

The digital transformation in the field of sports and education integration involves two major domains, namely sports and education. These two domains contain abundant information resources, including students' sports performance, health data, academic achievement, and records of sports events. However, in practice, the integration and use of such data still face prominent structural obstacles. First, because the administrative responsibilities related to youth sports are distributed across education and sports management systems, governance boundaries are not always clear, which can easily result in gaps in implementation, high coordination thresholds, and increased governance costs. Owing to differences in institutional objectives, management priorities, and operational logic, relevant departments may formulate separate policies, act independently, and shift responsibilities to one another. This segmented institutional structure causes information resources to be dispersed across different agencies, platforms, and databases, making effective sharing, cross-validation, and comprehensive utilization difficult. As a result, the phenomenon of isolated information islands has become increasingly evident. It not only constrains the scientific formulation of policies for the integrated development of sports and education, but also weakens the technical foundation, organizational efficiency, and practical momentum of digital transformation in this field. Second, due to the lack of an effective information-sharing mechanism, cooperation between sports and education remains insufficiently close, and communication barriers between departments hinder the timely exchange of research findings, governance experience, and practical achievements. This situation directly affects the scientific rigor, forward-looking character, and operational feasibility of policy design. At the same time, fragmented coordination among regions and departments can easily lead to an imbalance in the coordination mechanism, meaning that sports and educational resources in different areas fail to form a complementary, mutually beneficial, and sustainable pattern of cooperation. In some cases, high-quality training resources, digital platforms, and professional guidance concentrated in one region cannot effectively support the development of school sports in another region. For example, the training resources of high-level athletes in the north cannot effectively support the development of school sports in the south. In the long term, if data standards, platform interfaces, and interdepartmental governance procedures are not further unified, the digital

transformation of sports and education integration may remain at the level of partial application rather than achieving systematic, coordinated, and high-quality development.

3.2. Management Resources Are Difficult to Integrate and Management Efficiency Is Low

In the digital transformation of the sports and education integration field, the management resources and functions of various departments often differ significantly, leading to challenges in coordination and efficiency. A primary issue is the decentralization of management resources, where the education department typically oversees educational policies and student academic management, while the sports department focuses on organizing sports events, training programs, and health monitoring. This clear division of responsibilities often results in departments operating independently, with limited willingness or ability to share resources and collaborate effectively. Consequently, this lack of integration hampers cooperation and creates inefficiencies. Furthermore, the use of disparate information systems and technology platforms by different institutions exacerbates the problem. Without unified data interfaces and standardized protocols, cross-departmental data sharing and management become fragmented, further reducing operational efficiency. This fragmentation not only limits the overall effectiveness of digital transformation efforts but also leads to suboptimal resource allocation and inconsistent management objectives, making it difficult to achieve unified goals [7, 8]. Additionally, traditional management processes are often lengthy and inefficient, posing significant challenges to implementation and service delivery. For instance, individuals frequently need to navigate between multiple departments to address sports and education-related matters, which involves cumbersome and time-consuming procedures. The independent decision-making processes within departments, coupled with the absence of comprehensive cross-sectoral supervision, undermine the scientific rigor and accuracy of decision-making. Departments often rely solely on their own data and information, making it challenging to develop unified action plans or coordinated strategies. These inefficiencies highlight the critical need for streamlined processes, integrated management systems, and enhanced interdepartmental collaboration to improve the overall efficiency and effectiveness of digital transformation in the sports and education integration field.

3.3. It Is Difficult to Unify the Implementation Standards, and the Operation Mechanism Is Not Standardized.

In the process of digital transformation within the integration of sports and education, establishing a unified and standardized operation mechanism for implementation standards is a critical factor to ensure the system's efficient functioning and the accuracy of data analysis [9–11]. However, achieving this standardization is fraught with challenges [12–14]. The differences in systems and mechanisms, the complexity of interest relationships, the imperfections in policy frameworks, and technological barriers collectively hinder the unification of implementation standards, creating significant obstacles to the overall transformation process [15, 16]. Historically, there have been substantial discrepancies in the operational norms between sports and education sectors [7]. For instance, education departments often prioritize academic performance, theoretical knowledge, and comprehensive quality evaluations to assess students, while sports departments focus on metrics such as sports performance, physical fitness tests, and competition results [3, 4]. This inconsistency in evaluation standards complicates the integration of data between the two systems [13]. For example, physical fitness test results from sports departments may not align with the criteria used by education departments to evaluate students' overall sports literacy, leading to inefficiencies in data utilization and integration [16].

At the macro level, the lack of clarity in data standards, technical protocols, operational guidelines, and management frameworks among sports, education, and societal institutions further exacerbates the problem [5]. Without unified guidance, governments and institutions at various levels often operate independently during the digital transformation process, making it difficult to achieve cohesive progress [10, 15].

For example, central, provincial, municipal, district, and township governments may lack a clear division of responsibilities and standardized technical protocols, impeding the establishment of a comprehensive operational mechanism and hindering the standardized development of sports-education integration [4].

At the micro level, the absence of specific digital operation mechanisms and clearly defined responsibilities among government departments, communities, schools, and families has led to inadequate promotion and dissemination of the sports-education integration concept [16]. This deficiency makes it challenging to alter the subjective habits of individuals and groups, thereby affecting grassroots-level implementation [8, 15]. Furthermore, the lack of coordination among stakeholders often results in fragmented efforts, reducing the overall effectiveness of the transformation process [6]. Addressing these issues requires a concerted effort to establish clear standards, enhance interdepartmental collaboration, and promote widespread awareness of the integration's benefits to ensure its successful implementation [6, 7].

4. The Cracking Path of Digital Transformation in the Field of Integration of Sports and Education

4.1. Integrating Information Resources to Achieve Coordinated Development

The integration of information resources is a critical step in achieving the deep and effective integration of sports and education. By dismantling information barriers and fostering seamless information sharing across departments and fields, the operational efficiency of the sports-education ecosystem can be significantly enhanced. This process optimizes resource allocation and fosters the coordinated development of sports and educational objectives. The first step involves breaking down information silos to eliminate the isolation of data between sports and education departments. This ensures that sports data, such as students' health metrics and skill levels, can be directly linked and shared with educational resources, including teaching materials and curriculum designs. A unified platform or centralized database can facilitate the collection of sports-related information while integrating diverse educational resources, enabling smooth and uninterrupted data transmission. Furthermore, achieving comprehensive information sharing requires not only collaboration between sports and education departments but also active engagement with other related fields, such as scientific research and the health industry. Cross-sectoral information sharing allows stakeholders to exchange research findings and practical experiences efficiently through the establishment of multi-disciplinary interactive platforms. This approach ensures that resource allocation becomes more rational and effective. For instance, regional initiatives aimed at co-constructing and sharing sports information have demonstrated the potential to support complementary and mutually beneficial development across competitive sports, school sports, social sports, and the sports industry. The integration of information resources also promotes multi-regional, multi-field, and cross-sectoral collaboration, thereby addressing the challenges posed by information barriers. This collaborative framework strengthens the construction of a unified operational logic within the sports-education integration domain, reducing the relative independence of these fields and fostering their synergistic development. Additionally, this approach lays the groundwork for future advancements, such as the incorporation of artificial intelligence and big data analytics, which can further enhance decision-making processes and resource optimization. By addressing these challenges and leveraging technological innovations, the integration of sports and education can achieve sustainable and dynamic growth, ultimately benefiting students, educators, and society as a whole.

4.2. Integrate Management Resources and Release Management Efficiency

In the process of digital transformation within the integration of sports and education, the implementation of a management grid significantly enhances operational efficiency, streamlines processes, and ensures the optimal allocation of resources. The management network facilitates seamless connectivity across various departments through effective

information sharing, enabling cross-level, cross-regional, cross-system, cross-departmental, and cross-business collaboration. This interconnected framework not only strengthens decision-making processes but also revolutionizes the efficiency of execution and service delivery. For instance, initiatives such as one network operation, one network management, city brain, "second batch," "second operation," and running at most once exemplify the transformative impact of such systems on digital transformation in sports and education. By consolidating management resources, this approach fosters consensus on developmental strategies, paving the way for a unified trajectory in digital transformation. Furthermore, it encourages multi-sectoral collaboration during implementation, optimizing resource allocation structures and significantly enhancing service quality and efficiency. This integrated approach dismantles the traditional siloed operational models, where departments independently plan and execute decisions, and instead promotes a more scientific, precise, democratic, and efficient decision-making process. The concentration of management resources under this framework generates maximum synergy, driving the deeper integration of sports and education. Additionally, this model holds potential for future advancements, such as the incorporation of artificial intelligence and predictive analytics to further refine resource allocation and decision-making processes. By fostering a culture of collaboration and innovation, this approach not only addresses current inefficiencies but also lays the groundwork for sustainable development in the integration of sports and education, ensuring long-term benefits for stakeholders and participants alike.

4.3. Establish a Unified Standard to Achieve Standardized Development

The integration of sports and education faces significant challenges, particularly in the operational mechanisms of sports and society, the sports and education systems, and the competitive sports and internal education systems within universities. These challenges are compounded by the collective subjective habits and individual subjective habits that persist in both the sports and education fields, leading to inconsistencies and inefficiencies in implementation standards. Addressing these issues requires the establishment of a unified standard for the digital transformation of the integration of sports and education. By developing comprehensive data standards, technical standards, operational standards, and management standards, it becomes possible to ensure seamless information sharing and coordination among various departments and institutions. This approach can facilitate standardized development and improve efficiency across the field. For instance, the implementation of a county-township integration model, featuring a unified responsibility system, enhanced services, intelligent perception functionalities, digital empowerment, personalized experiences, intelligent analysis, and closed-loop supervision, provides a valuable reference for achieving digital transformation in this domain. Such a model demonstrates the potential to bridge the gap between top-level design and grassroots implementation, thereby extending service coverage and addressing implementation deviations effectively. Furthermore, at the macro level, governments at all levels should take the lead in constructing data, technical, operational, and management standards for the digital transformation of sports, education, and social integration. Leveraging advanced digital technologies such as big data, the Internet, and cloud computing, these standards can be implemented across central, provincial, municipal, and district levels to clarify responsibilities, functions, services, execution, and management processes. This hierarchical approach ensures efficient reporting and coordination. At the micro level, it is essential to develop a digital operation mechanism encompassing government departments, communities, schools, and families. This mechanism should promote the integration of sports and education concepts, foster coordination across different entities, and gradually eliminate subjective habits at both individual and collective levels. By achieving precise implementation at the grassroots level, the integration of sports and education can be significantly enhanced. Additionally, future research should explore innovative digital tools and frameworks to further refine these standards, ensuring adaptability to evolving societal needs and

technological advancements. This will not only address current inefficiencies but also pave the way for sustainable development in the integration of sports and education.

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