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# Digitalization in Chinese Education: Implications for Management and Administration

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**Abstract**: China's education system has witnessed a rapid acceleration in digitalization, driven by national digital transformation strategies and further intensified by the COVID-19 pandemic. While considerable focus has been placed on the expansion of online learning platforms and technological infrastructure, there is a growing imperative to examine how digitalization is reshaping the management and administrative dimensions of education. This paper investigates the implications of digital transformation for school governance, leadership, strategic planning, data management, and decision-making processes within Chinese educational institutions. Employing a narrative literature review methodology, the study synthesizes findings from national policy documents, peer-reviewed academic literature, and case studies published between 2010 and 2024. The review highlights that digitalization has contributed to improved operational efficiency, more transparent administrative procedures, and the rise of data-informed decision-making practices. At the same time, significant challenges have emerged, including disparities in digital access between urban and rural regions, concerns regarding data privacy and security, the centralization of digital control, and increased complexity in the managerial roles of school leaders. The evolving nature of educational administration in China now demands a shift from traditional oversight to the strategic coordination of digitally mediated ecosystems. To fully leverage the benefits of digital transformation, policy frameworks must prioritize equity, support digital capacity-building at the institutional level, and ensure the ethical governance of data systems. This study provides practical and theoretical insights for education administrators, policymakers, and scholars navigating the evolving digital governance landscape in Chinese education.

**Keywords:** Digital education, Education management, China, Data-driven decision-making, School administration, Educational technology governance

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## 1. Introduction

The digital transformation of education has become a defining feature of 21st-century schooling, reshaping how learning is delivered, how institutions are managed, and how educational systems operate at scale (Díaz et al., 2022). While much of the global discourse has focused on the pedagogical and technological aspects of digital learning, an equally critical but less-explored dimension is the impact of digitalization on education management and administration especially within large, centralized systems like China (Liu, 2024). In recent years, China has emerged as a global leader in education digitalization. Government initiatives such as the Smart Education of China strategy and the Digital China 2035 Plan have positioned digital technology as a cornerstone of national development, including in the education sector (Ministry of Education, 2021) (Sciences, 2023, Zeng et al., 2025, Zeng et al., 2023). The outbreak of COVID-19 further accelerated digital adoption, pushing millions of schools and universities to pivot to online and blended learning models. However, beyond instructional delivery, this shift has also transformed how educational institutions are governed, how decisions are made, and how school operations are managed (Peurach et al., 2019).

Digital tools ranging from big data analytics, cloud platforms, AI-based evaluation systems, to integrated education management information systems (EMIS) are now embedded in key areas of school and university administration. These systems enable real-time attendance tracking, automated grading, student performance dashboards, centralized teacher evaluation, and digital planning tools (SUNDAY et al., 2025, Wang et al., 2024). They offer the promise of improved efficiency, transparency, and evidence-informed decision-making. In higher education, digital systems are used to coordinate resources, manage research outputs, and align performance indicators with institutional goals. However, the rapid pace of digitalization has also introduced significant challenges for educational administrators and policy planners. These include widening digital divides between urban and rural areas, increased managerial complexity due to data overload, and ethical concerns around data privacy and surveillance (Naudé and Vinuesa, 2021, George, 2024, Ijaiya, 2024). Moreover, school leaders must adapt to new roles that require technological fluency, strategic planning capacity, and the ability to manage distributed digital infrastructures skills often not covered in traditional educational leadership training (Kamran, 2025). Despite these developments, the scholarly literature in China has tended to focus on digital pedagogy or infrastructure readiness, with comparatively less attention to the management and administrative dimensions of digital transformation. There remains a gap in understanding how digitalization is reshaping leadership roles, governance practices, and organizational structures in Chinese education.

This paper seeks to address the current gap in research by critically analyzing the implications of digitalization for educational management and administration within the Chinese context. Specifically, it examines how digital tools and systems are transforming the management of educational institutions, explores both the benefits and limitations of emerging digital governance models, and identifies the new competencies and strategic adjustments required of education administrators in a digitally driven environment. Furthermore, the study offers policy and practice recommendations aimed at enhancing the effectiveness, equity, and sustainability

of digital transformation across Chinese schools and universities. By engaging with these issues, the paper contributes to a broader understanding of how education systems particularly those operating under large-scale, centralized governance structures such as China's can adapt their management practices in response to ongoing technological change.

## 2. Methodology

### 2.1 Review Approach

This study employs a narrative literature and policy review methodology to examine the impact of digitalization on education management and administration in China. A narrative review is appropriate for synthesizing findings across diverse sources including empirical studies, conceptual articles, and government policy documents to generate an integrative understanding of a complex and evolving issue (Ferrari, 2015). Unlike systematic reviews, which apply strict inclusion criteria and quantifiable comparisons, narrative reviews allow for greater flexibility in interpreting multi-dimensional issues such as governance, leadership, and organizational change in education.

This approach is particularly suitable for: Mapping existing knowledge and gaps; Analyzing emerging digital trends and administrative practices in Chinese schools and universities, Connecting theoretical frameworks to policy and practice; Providing policy-relevant recommendations grounded in current evidence and national priorities.

### 2.2 Data Sources and Selection Criteria

Two categories of literature were reviewed:

**a) Policy Documents and Government Reports**

Key government policies, white papers, and strategic planning documents were selected based on relevance to national digitalization strategies and their stated impact on educational governance. These included: Smart Education of China Plan (2021–2025); Digital China Strategy; Education Informatization 2.0 Plan; Ministry of Education (MOE) reports and directives between 2010 and 2024. These were sourced from official websites such as: http://en.moe.gov.cn; https://www.gov.cn;

**b) Academic and Research Literature**

Peer-reviewed journal articles and grey literature were identified through: Google Scholar; Web of Science; CNKI (China National Knowledge Infrastructure); ERIC; Scopus

Search terms included combinations of:

> "digitalization in Chinese education," "education management and technology China," "educational leadership digital transformation," "data-driven decision making in schools," "education informatization China," "school administration and digital tools," "education governance in China."

**Inclusion criteria:**

Published between 2010 and 2024; Focus on Chinese educational settings; Related to school or higher education management, administration, governance, or leadership; Discuss digital systems, tools, platforms, or data-driven practices; Written in English or Chinese

In total, approximately 40 academic articles and 10 official policy documents were reviewed for thematic synthesis.

### 2.3 Analytical Strategy

A thematic analysis approach was used to categorize the literature into key focus areas:

1. Administrative transformation through digital platforms
2. Data governance and decision-making
3. Equity and capacity in digital implementation
4. Changing leadership roles and responsibilities
5. Systemic challenges and ethical considerations

Each theme was reviewed to highlight both the benefits and limitations of digitalization in educational management. Special attention was given to the policy-implementation gap, as many reforms in China are centrally designed but vary significantly in local execution.

This method allows for the generation of insights applicable to both policymakers and practitioners, with a focus on practical implications, capacity development, and sustainable implementation of digital management systems in education. Table 1, shows summary of methodology: Narrative literature and policy review approach.

**Table 1**. Summary of Methodology: Narrative Literature and Policy Review Approach

| Section | Description | Purpose / Rationale | Data Sources | Expected Outcome |
|---|---|---|---|---|
| Review Approach | Narrative literature and policy review combining empirical research, conceptual analyses, and policy documents. | To synthesize multi-dimensional insights into digitalization, governance, and leadership within Chinese education. | Academic databases and official government policy documents. | Holistic understanding of national digital transformation in education administration. |
| Rationale for Approach | Flexible integration of diverse literature types (policy + research). | Captures complex contextual and administrative dynamics better than systematic review methods. | — | Generates conceptual synthesis linking theory, policy, and practice. |
| Key Objectives | 1. Map existing knowledge and gaps.<br>2. Analyze digital trends and administrative practices.<br>3. Connect theoretical | To ensure findings are both academically rigorous and | — | Comprehensive thematic understanding of education digitalization. |

| | | | | |
|---|---|---|---|---|
| | frameworks to practice.<br>4. Provide policy-relevant recommendations. | practically applicable. | | |
| Data Sources | a) Policy Documents: *Smart Education of China Plan (2021–2025), Digital China Strategy, Education Informatization 2.0 Plan, MOE Reports (2010–2024)*. | To understand top-down policy intentions and strategies. | https://www.gov.cn/ | Identify alignment between policy goals and school-level practices. |
| | b) Academic & Research Literature: ~40 peer-reviewed articles + 10 policy papers. | To capture empirical and theoretical evidence on digital governance. | Databases: Google Scholar, CNKI, Web of Science, ERIC, Scopus. | Evidence synthesis and critical analysis of trends, gaps, and impacts. |
| Selection Criteria | 2010–2024; focus on Chinese settings; management/leadership focus; inclusion of digital tools and governance themes; English or Chinese. | Ensures relevance and recency of literature. | — | High-quality, context-specific evidence base. |
| Analytical Strategy | Thematic analysis of selected sources across five focus areas:<br>1. Administrative transformation<br>2. Data governance<br>3. Equity and capacity<br>4. Leadership change<br>5. Systemic/ethical challenges | To synthesize recurring patterns and contrasts across literature and policy. | All selected studies and policy documents. | Structured, theme-based understanding of the digital education management landscape. |
| Output Focus | Identification of gaps, best practices, and contextual factors influencing digital education governance. | To inform evidence-based policy and capacity building. | | |

## 3. Literature Review

The digital transformation of education systems has introduced profound changes not only in instructional practices but also in how schools and universities are managed and governed (Mohamed Hashim et al., 2022b, Mohamed Hashim et al., 2022a). In the context of China, where policy is centrally driven and implementation is often rapid, digitalization is reshaping administrative structures, decision-making processes, and leadership responsibilities (Peng, 2022, Wang et al., 2018). This section reviews the emerging body of literature on these developments, focusing on four major themes: (1) the rise of digital governance platforms, (2) the use of data-driven decision-making, (3) leadership adaptation and capacity, and (4) systemic and ethical challenges.

### 3.1 The Rise of Digital Governance Platforms

One of the most visible aspects of education digitalization in China has been the proliferation of integrated digital management platforms, developed at both national and provincial levels. These

systems support a wide range of administrative tasks, including attendance tracking, curriculum planning, budgeting, exam management, and teacher evaluations (Kellaghan and Greaney, 2003, Gaynor, 1998, Kumar and Limbachiya, 2023). The Smart Education of China initiative, launched by the Ministry of Education in 2021, exemplifies the government's push to embed digital tools across all education levels for "intelligent, data-informed governance" (MOE, 2021).

These platforms are part of China's broader Digital China Strategy, which promotes the use of big data, AI, and cloud computing to enhance public service delivery. In education, digital governance tools are intended to improve administrative efficiency, streamline reporting, and support centralized oversight. However, researchers have noted that such systems can also reinforce top-down control, reducing the autonomy of school-level actors in decision-making (Tan and Hung, 2020, Bento et al., 2023, Nguyen, 2019). While digital governance platforms offer functional improvements, they also raise questions about bureaucratic standardization and the potential for administrative overload due to excessive data reporting requirements.

### 3.2 Data-Driven Decision-Making in School Administration

Datafication the process of turning educational processes into quantifiable data has become a core feature of Chinese educational governance. School leaders are increasingly expected to make decisions based on learning analytics, performance dashboards, and algorithmic indicators (Chen & Qian, 2022). These tools are promoted as a means of achieving evidence-informed leadership, improving transparency, and supporting targeted interventions.

Studies have shown that data-driven practices are used for: Resource allocation based on performance metrics; Early warning systems for student dropouts; Teacher effectiveness tracking; Real-time student progress monitoring

However, researchers caution against an overreliance on quantifiable indicators, noting that complex educational goals such as well-being, creativity, and inclusiveness are often difficult to measure (Zhao, 2016). Furthermore, in schools with limited digital literacy or infrastructure, data systems can become symbolic compliance tools rather than meaningful leadership aids. The effectiveness of data-informed decision-making depends on the **capacity** of school administrators to interpret data critically and use it for pedagogically relevant decisions, rather than simply fulfilling reporting obligations.

### 3.3 Leadership Adaptation and Capacity in the Digital Era

Digitalization has significantly changed the role of educational leaders in China. School principals, deans, and administrators are now expected to manage complex digital ecosystems that require not only administrative expertise but also technological fluency, cybersecurity awareness, and strategic foresight (Liu & Hallinger, 2021).

However, many educational leaders in China, particularly in rural or under-resourced areas, lack the training to use digital systems effectively. Leadership development programs have not kept pace with technological change, and existing models often remain focused on administrative compliance rather than digital innovation (Wang, 2021).

At the same time, there are promising examples of digital leadership emerging in reform-oriented regions such as Shanghai, where school leaders are using technology to support teacher collaboration, blended learning models, and real-time feedback systems (Yuan & Leithwood, 2020). For digitalization to enhance educational leadership, professional development must shift from technical training to strategic and ethical leadership in a digital environment.

### 3.4 Systemic and Ethical Challenges

While digital transformation promises improved governance, it also introduces systemic and ethical concerns. One major issue is digital inequality. Research shows a persistent digital divide between urban and rural schools in China, in terms of access to technology, broadband connectivity, and qualified personnel (Hu & Yelland, 2020). This gap can exacerbate educational inequities and create uneven administrative capabilities across regions.

Another challenge involves data ethics and privacy. China's centralized data infrastructure raises concerns about the surveillance of students and teachers, the lack of transparency in algorithmic decision-making, and the absence of robust data protection frameworks in education (Zhang & Lu, 2022).

Additionally, the centralized nature of digital reforms has raised questions about school autonomy. While platforms are efficient in collecting data and enforcing compliance, they may limit the flexibility of schools to innovate, especially if all indicators are predefined and monitored through national systems (Tan, 2020). Effective digital governance in education requires not only technical infrastructure but also policy safeguards, ethical standards, and differentiated support to address diverse school contexts.

**Table 2**. Summary of Key Themes:

| Theme | Benefits | Challenges |
|---|---|---|
| Digital Governance Platforms | Efficiency, integration, central oversight | Top-down control, administrative burden |
| Data-Driven Decision-Making | Evidence-based planning, transparency | Over-standardization, limited data literacy |
| Leadership and Capacity | Strategic use of tech in some regions | Training gaps, uneven readiness, rural-urban divide |
| Systemic & Ethical Considerations | Equity, accountability potential | Privacy concerns, loss of autonomy, digital inequality |

## Conceptual Model: Digitalization and Educational Administration in China

### Purpose of the Model

The conceptual model illustrates the mechanisms and pathways through which digitalization influences educational management and administration in China. It identifies the key enablers, mediators, moderators, and outcomes of digital transformation within the context of a centralized education system. The model aims to explain how policy-driven digital initiatives interact with leadership capacity and contextual conditions to shape administrative practices and governance outcomes.

**Core Structure of the Model**

The model is composed of four primary sequential components, supported by two interactive layers that represent mediating and moderating influences.

**Core Components:**

1. Policy Drivers (Top-down Inputs)
2. Digital Infrastructure and Tools
3. Educational Administration Functions (Core Processes)
4. Outcomes for Governance and Practice

**Interactive Layers:**

- *Mediator:* Leadership and Administrative Capacity
- *Moderators:* Equity, Policy Coherence, Digital Literacy, and School Autonomy

**Detailed Components**

**1. Policy Drivers (Inputs)**

At the top of the model, national-level policy frameworks serve as the primary catalysts for digital transformation in education. These centrally designed strategies outline the vision and implementation pathways for technology integration in educational governance. Major initiatives include:

- Smart Education of China Plan (2021–2025)
- Education Informatization 2.0 Plan
- Digital China 2035 Strategy

These policies mandate the use of technology in management processes, aiming to modernize administrative systems, enhance efficiency, and align education with the nation's digital development agenda.

**2. Digital Infrastructure and Tools**

This component represents the technological foundations that enable the digitalization of administrative functions. Core elements include:

- Education Management Information Systems (EMIS)
- Artificial intelligence (AI)–based performance monitoring systems
- Online teacher evaluation and appraisal tools
- Cloud platforms for planning, budgeting, and resource allocation

These tools facilitate data-driven decision-making, automate administrative processes, and support transparent and efficient governance mechanisms.

**3. Educational Administration Functions (Core Processes)**

Digitalization has transformed traditional administrative domains. The table below summarizes the major functional shifts:

**Table 3.** Educational Administration Functions

| Administrative Function | Traditional Approach | Digitalized Approach |
|---|---|---|
| Planning and Scheduling | Manual, paper-based systems | Cloud-based scheduling and monitoring |
| Performance Management | Human-evaluated performance | Algorithm-driven KPIs and analytics |
| Budgeting and Resource Allocation | Fixed, static budgeting | Real-time, data-driven allocation |
| Communication and Reporting | Hierarchical, delayed communication | Multichannel, real-time platforms |
| Decision-Making | Experience-based judgment | Evidence-based dashboards and analytics |

Leadership acts as a mediating force, interpreting policies and digital data, prioritizing actions, and ensuring alignment with local school needs.

**4. Outcomes for Governance and Practice**

The outcomes reflect both the benefits and challenges of digital transformation in educational management.

**Positive Impacts:**

- Greater administrative transparency and accountability
- Enhanced efficiency and decision-making speed
- Improved coordination between central and local education authorities
- Integration of predictive analytics in policy evaluation and planning

**Risks and Limitations:**

- Overreliance on technocratic systems and quantitative metrics
- Increased administrative workload for school leaders
- Reduced local autonomy due to centralized digital controls
- Concerns over data privacy, ethics, and regional disparities in adoption

**Cross-Cutting Mediator: Leadership and Administrative Capacity**

Leadership and administrative capacity mediate the translation of digital reforms into effective practice. The success of digital transformation depends largely on leaders' abilities to:

- Interpret and utilize data for strategic planning;
- Adapt centralized digital systems to fit local contexts;
- Provide training and capacity-building for staff;
- Balance compliance with innovation and contextual flexibility.

Strong leadership acts as the interpretive link between technological tools and practical outcomes, determining the effectiveness of reform implementation.

**Moderating Factors**

The effectiveness of digitalized administration is further shaped by contextual moderators that either facilitate or constrain policy enactment:

- Equity of Access: disparities between urban and rural schools, and between well-resourced and underfunded institutions;
- Digital Literacy: technical competence among administrators and educators;
- Policy Coherence: alignment between national objectives and local implementation capacity;
- School Autonomy: the degree of institutional flexibility in adopting and customizing digital tools.

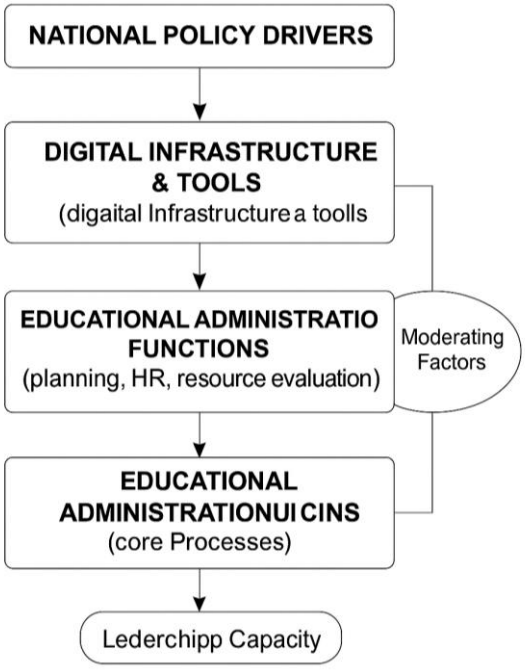


**Figure 1**. Conceptual model showing the interaction between national digitalization policy, digital tools, administrative functions, and governance outcomes in Chinese education. Leadership and contextual factors mediate and moderate the effectiveness of digital transformation in education management.

## 4. Findings and Discussion

This section interprets and synthesizes the literature and policy analysis to assess the real and potential implications of digitalization on educational management in China. Drawing on the conceptual framework presented, four major findings emerge: (1) enhanced administrative efficiency and data capacity, (2) centralization versus school-level autonomy, (3) shifting leadership roles and capability gaps, and (4) equity, ethical, and implementation challenges. Each is discussed below in relation to policy intent and practical outcomes.

### 4.1 Digital Tools Have Increased Administrative Efficiency and Data Capacity

One of the most consistent findings across national policy reports and academic literature is that digitalization has significantly improved **administrative efficiency**, particularly in routine tasks such as attendance, resource tracking, scheduling, and personnel management (MOE, 2021; Zhang & Lu, 2022). Digital platforms like the Education Management Information System (EMIS) and AI-driven dashboards allow for real-time data collection and rapid analysis at the school, district, and national levels.

These systems have enabled: Faster reporting and accountability processes; Improved coordination across central and local authorities; Integration of school-level performance data into national decision-making systems. Digital platforms support China's policy goals of top-down monitoring and policy responsiveness. However, the data collection burden often falls heavily on school leaders, creating tensions between compliance and autonomy (Tan, 2020).

### 4.2 Centralized Digital Governance Reinforces Control but Limits Local Innovation

The literature reveals a growing centralization of control through digital governance mechanisms. While digital tools are presented as enablers of transparency and standardization, they are also being used as instruments of bureaucratic monitoring (Chen & Qian, 2022). For example, school leaders are required to submit increasingly detailed data to local education bureaus, often through standardized platforms with limited customization options.

In this environment, school leaders and administrators report: A narrowing of local discretion in resource planning; Difficulty adapting national indicators to local contexts; Pressure to prioritize measurable outcomes over holistic education goals. Digital governance in China reflects a technocratic logic aligned with central policy efficiency, but this may inadvertently suppress bottom-up innovation and adaptive leadership at the school level.

### 4.3 Leadership Roles Are Evolving but Capacity Gaps Persist

The rise of digital systems requires education leaders to take on **new roles** that go beyond traditional administrative functions. School principals and university deans must now:

> Interpret complex data dashboards; Oversee cybersecurity and ethical data practices; Lead digital integration in curriculum and staff development; Manage relationships with tech vendors and local government platforms.

Yet, many leaders lack training or support in these areas (Liu & Hallinger, 2021; Wang, 2021). Leadership preparation programs in China are still heavily focused on bureaucratic compliance, with minimal emphasis on digital leadership, innovation, or change management. This creates a mismatch between policy expectations and institutional readiness. The success of digital reforms depends not only on infrastructure and tools, but also on the strategic capacity and professional confidence of those tasked with leading them.

### 4.4 Digital Inequality and Ethical Risks Undermine Reform Goals

While digitalization offers opportunities for improved governance, it also amplifies existing inequalities across China’s diverse regions. Schools in under-resourced or rural areas face

significant challenges in accessing reliable internet, maintaining up-to-date hardware, and hiring qualified digital support staff (Hu & Yelland, 2020).

In parallel, there is growing concern over: Surveillance culture in schools (e.g., facial recognition attendance systems); Student data privacy, especially in systems not protected by national legislation; Algorithmic bias in teacher evaluation and resource distribution systems.

These issues are rarely addressed in detail in national policy documents but are highlighted in critical literature (Zhang & Lu, 2022; Tan, 2020). Without stronger regulatory frameworks and localized support, digital reforms may reproduce or worsen inequities and erode trust in education governance systems.

### 4.5 Synthesis: A Dual-Edged Reform Trajectory

The findings suggest that digitalization in Chinese education represents a dual-edged trajectory. On the one hand, digital systems offer unprecedented capabilities for large-scale management, planning, and real-time decision-making aligned with national goals. On the other hand, they introduce new risks: managerial complexity, constrained autonomy, ethical concerns, and regional disparities.

The Chinese case illustrates a broader lesson for centralized education systems: technological innovation must be matched by organizational adaptability, leadership capacity, and context-sensitive implementation strategies. Referencing the conceptual model, the effectiveness of digitalized administration is mediated by: The capacity of school leaders to use and adapt digital tools; The alignment between national policy frameworks and school-level realities; The extent to which equity, ethics, and local flexibility are addressed in implementation.

## 5. Conclusion and Recommendations

### 5.1 Conclusion

Digitalization is reshaping the landscape of educational administration in China. National policy initiatives such as the *Smart Education of China* plan and the broader *Digital China* strategy have embedded digital technologies deeply into education systems not only in classrooms but also across administrative functions and governance structures. School leaders and administrators now rely on digital platforms for planning, resource allocation, performance monitoring, and communication. This literature-based analysis has shown that digitalization has led to measurable improvements in efficiency, standardization, and responsiveness in educational management. Tools such as Education Management Information Systems (EMIS) and real-time data dashboards have enabled faster decision-making, improved reporting, and greater alignment between national goals and local operations.

However, the study also reveals significant challenges and risks: The centralization of digital control can limit local innovation and reduce school-level autonomy; Administrative burden has increased due to data reporting requirements; Digital inequality persists, particularly between urban and rural schools; Many school leaders lack the training and capacity to lead digital transformation effectively; Ethical concerns around student data, surveillance, and algorithmic

decision-making remain under-addressed in policy. The findings underscore that while digitalization offers powerful tools for improving governance, it is not a neutral process. Its success depends on how it is implemented, who is empowered to use it, and whether the systems promote equity, adaptability, and professional growth.

### 5.2 Recommendations

To strengthen the impact and sustainability of digital transformation in Chinese educational administration, several strategic recommendations are proposed. First, there is a critical need to shift from technocratic approaches to more adaptive models of digital governance. Policymakers should design digital systems that not only collect data centrally but also empower school-level decision-making by allowing customization based on local context. This requires the development of flexible modules within national platforms that can be tailored to institutional needs. Second, leadership capacity must be enhanced to support the demands of digital transformation. Training programs for principals and administrators should extend beyond operational management to include digital strategy, data literacy, and ethical decision-making. Establishing regionally supported "Digital Leadership Labs" could provide targeted professional development in this area. Third, addressing digital inequity remains essential. Targeted investment is needed to bridge the divide between urban and rural schools through infrastructure upgrades, IT support, and human resource development, including the deployment of local technical teams and connectivity subsidies. Fourth, clear national guidelines on data ethics and privacy should be established to ensure the responsible use of educational data. These guidelines should cover data governance principles, algorithm transparency, and user consent mechanisms to protect students, educators, and institutional autonomy. Fifth, the administrative burden on school leaders must be reduced. While digitalization enhances data availability, it also risks overwhelming principals with reporting requirements. Streamlining dashboards and removing redundant processes would allow leaders to focus on meaningful data use rather than procedural compliance. Finally, digital transformation should promote distributed and collaborative leadership within schools. Rather than limiting digital tools to top-down monitoring, platforms should facilitate shared decision-making by involving teachers, department heads, and support staff. Establishing formal school-level digital governance teams with clearly defined roles and performance incentives can foster a culture of inclusive and participatory leadership in the digital age.

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### Conflicts of Interest

The authors declare that they have no conflicts of interest that could have influenced the work presented in this manuscript.

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