DIGITAL TRANSFORMATION OF EDUCATION IN CHINA: IMPLICATIONS FOR INSTITUTIONAL ADMINISTRATION

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ABSTRACT
Digital transformation serves as China's strategic pathway to modernize education, expand high quality resource access, strengthen governance and prepare learners for an intelligent society. Institutional transformation cannot be simplified to hardware procurement, record migration or superficial AI adoption. This paper defines digital transformation as coordinated changes across educational purpose, governance, organizational capability, pedagogy, services, data practices and institutional culture. Drawing upon Chinese policy documents and international scholarship concerning digital ecosystems, leadership, institutional readiness, professional competence, data governance, equity and ethical technology use, this study argues that infrastructure and platforms create opportunities, yet real educational value relies on consistent leadership, interoperable systems, administrator teacher capacity, trustworthy data, learner centered redesign and continuous evaluation. Key national policies including Education Informatization 2.0 Action Plan, National Education Digitalization Strategy, Smart Education of China platform, China Education Modernization 2035, and the 2024 2035 education power master plan provide top down guidance and public digital infrastructure. Institutions must translate national priorities into context adapted arrangements for schools, vocational colleges, universities and lifelong learning providers. This article proposes the DIGITAL Institutional Administration Framework with seven dimensions: Direction and public value; Integrated governance and architecture; Governance of data, platforms, and artificial intelligence; Investment in people and professional capability; Transformation of learning and services; Assurance of equity, quality, security, and resilience; Learning through evidence and iterative improvement. Technology is framed as an institutional enabler rather than an end. For sustainable digital transformation, administrators should align national strategies with local educational needs, balance standardization and professional judgment, and assess outcomes by learning quality, inclusion, trust, efficiency and organizational adaptability.
Keywords: Digital Transformation, Institutional Administration, Digital Governance, Smart Education, China

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INTRODUCTION

Digital technologies reshape teaching, assessment, communication, resource allocation, student support, staff management, knowledge production and accountability in educational organizations. Cloud platforms, learning management systems, digital credentials, educational data systems, artificial intelligence, virtual simulation and online resources diversify educational provision. Their core value lies not in technical novelty but in reorganizing relationships among learners, teachers, administrators, knowledge and public services. Digital transformation represents institutional-level organizational change instead of mere technology adoption.

China's educational digital development has shifted from large-scale network construction toward integrated platforms, data-driven governance, intelligent services and nationwide coordination (Ministry of Education of the People's Republic of China, 2018; Communist Party of China Central Committee & State Council, 2019; Ministry of Education of the People's Republic of China, 2022, 2023; Communist Party of China Central Committee & State Council, 2025; Ministry of Education of the People's Republic of China, 2025). These successive documents mark China's evolutionary shift from educational informatization construction toward systematic institutional-level digital transformation, from infrastructure building to governance-oriented smart education development. National-level infrastructure enables cross-regional resource sharing, better service accessibility and data-supported decision-making.

Nevertheless, scale does not guarantee transformation. Platform deployment may coexist with fragmented workflows, duplicated databases, insufficient data protection, unequal access and unchanged pedagogy. Strategy, organizational culture, competence, infrastructure, finance, interoperability and leadership are mutually-shaping conditions instead of isolated technical problems (Castro Benavides et al., 2020; Gkrimpizi et al., 2023; Mohamed Hashim et al., 2022). Educational administrators face a core challenge: how to govern digital initiatives to enhance educational and public value rather than expanding technology without substantive institutional reform. Differentiated implementation is required given diverse users, risks and responsibilities across different educational sectors. This conceptual literature-based paper analyzes relevant theories, explores institutional-administration implications within China's context and puts forward the DIGITAL Institutional Administration Framework. It contains no field-collected empirical data or hypothesis testing.

CONCEPTS AND THEORETICAL FOUNDATIONS

From Digitization to Digital Transformation

Digitization converts analogue information into digital format, for instance scanning paper-based student archives. Digitalization optimizes pre-existing workflows with technologies such as online registration or automatic timetabling. Digital transformation refers to comprehensive organizational change empowered by digital technologies, covering institutional strategy, structures, roles, culture, processes, services and value-creation mechanisms (Vial, 2019). In education, transformation is judged by improved learning outcomes, access, responsiveness and accountability, instead of simply whether activities move online.

This conceptual distinction helps resist technological determinism. Digital tools do not produce uniform educational effects; their consequences depend on objectives, design, context, implementation, and institutional power relations.Technology should augment rather than displace the human relationships at the center of education (Global Education Monitoring Report Team, 2023). Administrators should start from educational problems and public-value goals instead of commercial tech products.

A Socio-Technical and Institutional Perspective

Educational institutions are socio-technical systems where technologies interact with personnel, formal rules, professional knowledge, daily routines, incentives and policies. Transformation fails

if staff distrust platforms, data definitions conflict or new digital workflows merely replicate old manual work. Teaching, curriculum, administration, infrastructure, governance, digital literacy and stakeholder relations form interconnected domains. Reform coordination cannot be fully delegated to IT departments alone.

Dynamic Capabilities, Organizational Learning, and Digital Leadership

Dynamic-capability theory highlights three core organizational abilities: sensing external changes, seizing opportunities, and reconfiguring internal resources and workflows. In education, sensing monitors learner demands, technological trends, policy updates and implementation risks; seizing sets priorities and allocates resources; reconfiguring revises roles, curricula and professional development arrangements.

Digital leadership activates these capacities by integrating educational missions, technical awareness, strategic judgment, participatory reform and ethical accountability. Leadership is not limited to individual senior figures. Senior leaders set directions; cross-functional teams operationalize strategies; front-line practitioners deliver context-based judgments; end-users provide feedback. Organizational learning treats implementation as reflective inquiry rather than mechanical task completion.

Public Value, Data Governance, and Human-Centered Ethics

The value of digital transformation should be assessed against public-value criteria, including learning quality, equitable access, learner agency, trustworthy services, professional capability, efficiency, and institutional resilience.Data governance regulates authority, standards, quality, access, security, sharing and accountability across full data lifecycles. Interoperability and trusted governance are prerequisites for data-driven improvement (OECD, 2023). Chinese universities still confront data fragmentation and ambiguous responsibility allocation (Zhang et al., 2025).

AI expands the scope and complexity of institutional governance, particularly in relation to privacy, algorithmic bias, explainability, intellectual property, academic integrity, cybersecurity, and accessibility (UNESCO, 2024). Human-centered administration does not reject automation, but defines proper automation boundaries, mandatory human-review scenarios, appeal channels and clear accountability subjects.

Review and Synthesis of Academic Literature

This study uses a critical conceptual synthesis rather than a systematic review or meta-analysis. The literature was selected purposively to cover five analytical domains central to institutional digital transformation: digital transformation theory, organizational and dynamic capabilities, educational digital leadership, data and AI governance, and equity and public value. Priority was given to peer-reviewed international research and authoritative policy reports published between 2018 and 2026, while selected earlier conceptual works were retained when they provided foundational theoretical definitions. Chinese policy documents were analyzed separately to identify the institutional and governance conditions within which digital transformation is implemented.

Recent scholarship shifts focus from hardware and standalone applications toward integrated educational ecosystems coordinating platforms, data, services, competence and governance. Real transformation depends on practical user adoption and alignment between technology, institutional mission and stakeholder demands (Alenezi, 2021; Bond et al., 2018; Mohamed Hashim et al., 2022). Administrators need to clarify connections among multiple information-systems, and promote unified definitions, ownership and access permissions across departments to avoid duplicated work and fragmented innovation.

Transformation will fail if digital projects are treated as pure IT work decoupled from academic practice, or if ambitious visions lack decision-making authority, funding, staff capacity and personnel participation. Common barriers include staff resistance, digital-skill shortages, infrastructure constraints, budget limits and security risks (Gkrimpizi et al., 2023). Institutional readiness includes infrastructure reliability, data quality, workforce competence, governance,

procurement and financial sustainability. Organizational culture can shape how institutional members interpret, accept, and enact digital transformation: participatory communication and continuous training facilitate reform; psychological safety enables staff to report practical obstacles instead of concealing system defects through informal workarounds.

Digital transformation produces real educational value only when reshaping teaching, learning, assessment and student support. Digital competence represents contextual organizational capacity more than individual operational skills (Pettersson, 2018). AI brings higher capability requirements. Capacity-building should be embedded within daily work, offering opportunities for scenario co-design, risk assessment and local-guideline formulation.

Data-driven administration relies on fit-for-purpose data rather than mechanically-collected datasets. Administrative data are human-constructed outputs instead of objective neutral reflections. Missing records, conflicting categorization and misaligned indicators may produce misleading conclusions. Trustworthy data practice reserves professional interpretation space. Institutions should collect only legally-and-educationally-justified data and enforce role-based access control. National platforms advance resource sharing, while local institutions bear main responsibilities for data quality, legal processing, cybersecurity and ethical usage (Zhang et al., 2025).

Digital transformation expands educational access through shared resources, virtual laboratories and flexible services. However, network coverage cannot eliminate the digital divide. Disparities arise from device shortages, unfavourable family conditions, service accessibility defects, insufficient technical support and uneven digital literacy. Equity requires differentiated support, offline alternatives, universal-design standards, targeted funding and continuous outcome monitoring for diverse learner groups. Equity requirements must be embedded within procurement, implementation and evaluation procedures.

Risks, Tensions, and Unintended Consequences

Recurring tensions require administrative judgment. Standardization enables interoperability but may suppress contextual innovation; personalization may improve support but intensify surveillance; automation may reduce work but obscure responsibility; and vendor expertise may accelerate implementation while producing dependency.

Transformation can reproduce inequality when well-resourced institutions or units advance while smaller, rural, administrative, or student-support services lack staffing and maintenance. Staff may also be labeled resistant without receiving appropriate support. Digital transformation is therefore a governance and justice issue.

The synthesis suggests that risk is best managed through proportionate governance. High-risk AI or data uses require formal review, documentation, human oversight, security testing, and appeal mechanisms. Lower-risk classroom experimentation can use lighter approval with clear boundaries. Institutions should maintain incident-response processes, continuity plans, and exit strategies for critical vendors. Ethical governance should enable responsible innovation, not merely delay it.

Analysis from an Educational Administration Perspective

Strategy should shift from scattered technical projects toward a coherent transformation portfolio. Each initiative needs clear educational goals, accountable owners, affected users, resources, dependency conditions, risk classification and evaluation plans. Portfolio governance prevents duplication and permits terminating low-value projects.

Cross-functional steering bodies covering academic administration, student affairs, IT, data governance, finance, procurement, quality assurance and cybersecurity should define architecture, priorities, standards and escalation routes without replacing concrete operational decisions. Cross-domain teams optimize key service workflows such as enrollment, learning support and credentialing.

Human-resource administration should set differentiated digital-competence requirements for different posts. Senior leaders need strategic-ethical judgment; middle managers need reform-promotion competence; teachers need pedagogical-AI literacy; administrative staff need process-and-service-design capacity; technical personnel require both engineering skills and educational understanding. Recruitment, appraisal and incentive systems should reflect such requirements.

Resource management needs total-cost thinking. Procurement decisions must consider system integration, licensing, maintenance, cybersecurity, data portability and vendor-exit arrangements. Institutions should prioritize open standards and modular architecture, and add contractual guarantees for data ownership and service continuity.

Quality assessment covers both processes and outcomes: administrative indicators (timeliness, reliability, cost); educational indicators (learning design, student progress); equity indicators (group-level access and outcomes); trust indicators (privacy incidents, appeal efficiency); resilience indicators (business continuity, vendor dependency). Governance must preserve human accountability. Algorithms may offer suggestions but cannot deliver unchallengeable high-stakes decisions for admission, assessment, discipline and student-risk judgment. Administrators remain responsible for defining legitimate usage, guaranteeing review workflows and correcting harms.

APPLICATION TO THE CHINESE EDUCATIONAL CONTEXT

Translating National Strategy into Institutional Architecture

China’s policy system provides top-level direction and shared public infrastructure (Ministry of Education of the People's Republic of China, 2018, 2022, 2023; Communist Party of China Central Committee & State Council, 2019, 2025; Ministry of Education of the People's Republic of China, 2025). Institutions should treat national policies as reference frameworks rather than excuses for constructing redundant local platforms. Administrators should map multi-level systems across national-provincial-municipal-institutional layers, identify duplication and distinguish shared versus locally-managed functions. Local innovation must satisfy real educational demands while complying with security and interoperability standards. Vertical policy coordination requires horizontal cross-department collaboration. Institutional Party-administrative leadership defines directions and ethical boundaries, and professional units contribute domain-specific expertise.

Differentiated Administration across Educational Levels

Primary and secondary schools should prioritize curriculum-aligned resources, teacher collaboration, home-school communication and appropriate technology application, reducing redundant reporting without replacing age-suitable human interaction. Vocational institutions should strengthen connections among platforms, virtual simulation, industrial standards and competency assessment, with data governance covering school-enterprise cooperation and privacy-protection requirements. Application-oriented universities integrate curriculum, internship and career services matching regional development. Research universities undertake extra duties for research data, open science and international collaboration. Lifelong-learning providers focus on flexible enrollment and credit recognition. Rural and under-resourced institutions benefit more from shared cloud services, county-level technical support and offline backup solutions than self-built advanced systems. Funding mechanisms should cover maintenance and capacity-building costs instead of hardware purchases alone. Evaluation should check whether digitalization narrows or widens inter-institutional gaps. The table below illustrates a common administrative architecture rather than a one-size-fits-all implementation model.Institutional priorities should remain differentiated according to educational mission, learner population, organizational capacity, resource conditions, and risk profile.

Governing Smart Education and Artificial Intelligence

Each institution should establish an AI application inventory and implement risk classification. Low-risk applications such as translation and routine drafting need clear guidance and result

verification. High-risk scenarios related to assessment, admission, student profiling, discipline and student wellbeing demand strict review, validity documentation, human oversight and appeal channels. Institutions should issue plain-language policies regulating acceptable usage, personal-data protection, intellectual property, assessment integrity and cybersecurity. Rules should coordinate with curriculum and teacher professional development. Controlled experimental spaces with restricted datasets, user scope and time boundaries can support pilot projects. Successful pilots may scale after formal review; unsuccessful pilots should generate documented lessons and close responsibly.

The DIGITAL Institutional Administration Framework

The proposed DIGITAL Framework converts the literature and Chinese policy analysis into seven connected administrative commitments. Direction and public value begin with learner benefit, institutional mission, and national priorities. Integrated governance and architecture aligns decision rights, portfolios, processes, platforms, and interoperability. Governance of data, platforms, and artificial intelligence establishes trustworthy stewardship, security, ethics, and human oversight. The distinction between the two governance dimensions is intentional. Integrated governance concerns institutional decision rights, organizational coordination, process architecture, and system interoperability, whereas data, platform, and AI governance concerns the responsible management of digital assets, algorithmic systems, security, privacy, and human oversight. The former addresses how institutional functions are coordinated; the latter addresses how digital resources and intelligent technologies are governed responsibly.Investment in people and professional capability develops role-specific competence, secure adequate time, provide institutional support, and foster a collaborative culture. Transformation of learning and services redesigns pedagogy and user journeys rather than digitizing inefficient routines. Assurance of equity, quality, security, and resilience protects users and evaluates educational and organizational value. Learning through evidence and iterative improvement uses disciplined trials, systematic feedback, and iterative adaptation to sustain transformation.

These seven dimensions are synthesized inductively: drawing on socio-technical institutional theories, public-value scholarship, and thematic analysis of Chinese national education policies, this study clusters recurring themes into seven mutually-dependent administrative commitments, represented by the acronym DIGITAL.

Administrative Guidelines for Implementation

Implementation can proceed through four recurring stages. First, authorize and diagnose by defining the public-value problem, accountable leader, affected users, current processes, digital maturity, equity conditions, risks, and dependencies. Second, co-design and prepare by aligning architecture, data rules, professional learning, procurement, accessibility, cybersecurity, and evidence criteria. Third, implement and support through limited releases, user assistance, protected learning time, incident monitoring, and removal of redundant work. Fourth, evaluate and institutionalize by examining outcomes, costs, equity, trust, workload, security, and resilience before scaling, revising, or discontinuing the initiative.

Decision rights should be explicit. Senior leaders approve mission, risk appetite, major investment, and accountability. A digital-governance body maintains architecture, standards, portfolio coherence, and ethical review. Academic and service leaders own educational outcomes and redesigned processes. Data stewards define quality and access practices. Technical teams assure reliability, interoperability, and security. Teachers, staff, and learners participate in design and evaluation. Vendors supply services but do not determine educational purpose or institutional policy.

Institutions should use balanced evidence. Adoption indicators such as logins or uploaded resources show activity but not value. Evidence should combine user experience, service performance, learning quality, teacher capability, equity, data quality, cost, risk, and unintended effects. Decisions should be documented in an institutional transformation register so that

assumptions, changes, incidents, and lessons remain available when personnel or technology changes.

The framework is diagnostic rather than a fixed maturity ladder. One institution may have excellent infrastructure but weak governance; another may have committed teachers but fragmented data; a third may have efficient administration but little pedagogical transformation. DIGITAL helps leaders locate the weakest connection and select proportionate action. Its central proposition is that transformation becomes sustainable when educational purpose, institutional capability, trustworthy governance, and continuous learning develop together.

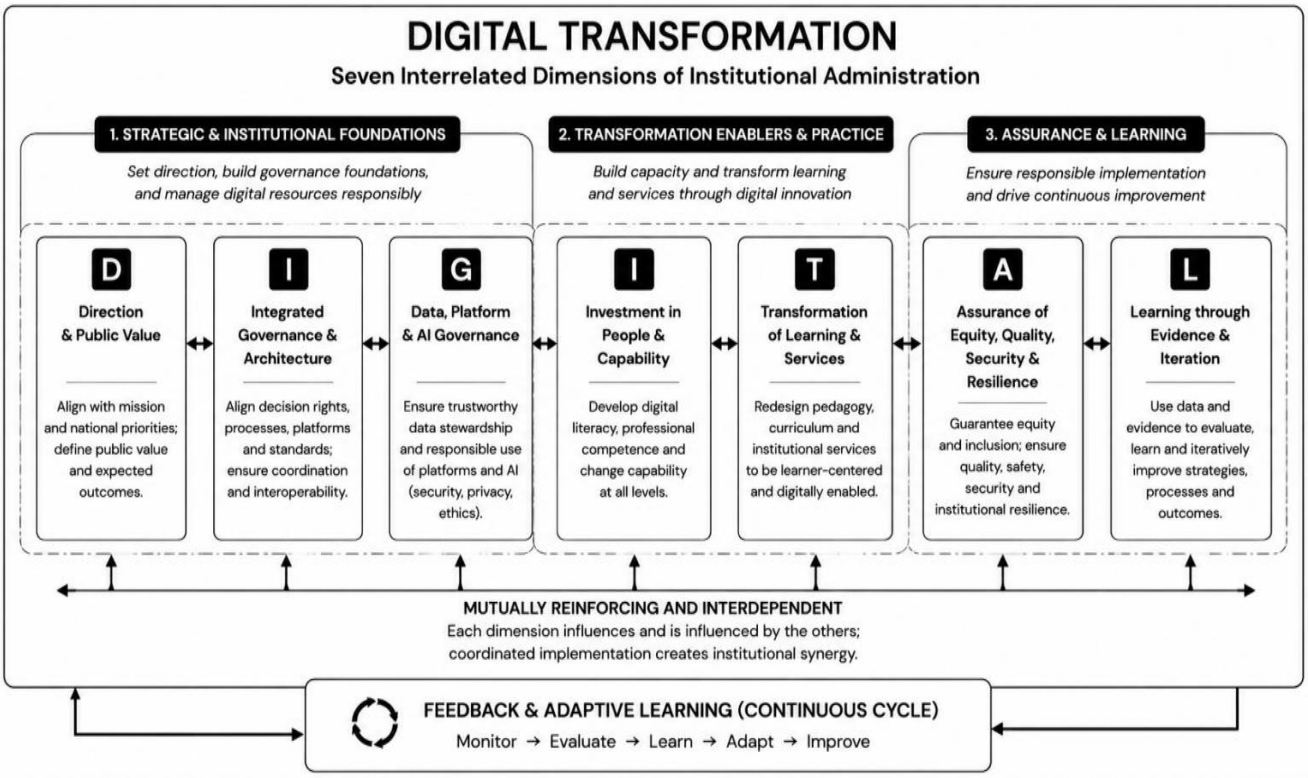


Figure 1. Visualization of the DIGITAL Institutional Administration Framework.

CONCLUSION

Digital transformation is reshaping education in China at a scale that extends from national platforms to classroom practice and institutional administration. China's policy trajectory has established strong direction, shared resources, expanding infrastructure, and a transition toward smart education. The administrative challenge is now to convert this capacity into coherent, trustworthy, equitable, and educationally meaningful institutional change.

The literature demonstrates that technology alone does not transform an institution. Sustainable change depends on strategy, leadership, culture, professional competence, integrated architecture, data governance, learner-centered service design, and evidence-informed adaptation. It also requires administrators to manage tensions among standardization and contextual judgment, innovation and risk, personalization and privacy, efficiency and human support, and national coordination and institutional responsibility.

The DIGITAL Institutional Administration Framework provides a coherent response: establish direction and public value; integrate governance and architecture; govern data, platforms, and AI; invest in people; transform learning and services; assure equity, quality, security, and resilience; and learn iteratively from evidence. Applied across Chinese schools, vocational institutions,

universities, and lifelong-learning systems, these commitments can turn digitalization from a collection of projects into institutional capability.

The principle implication for educational administration is that digital transformation should be governed as organizational learning in service of educational purpose. Administrators must decide not only which technologies to adopt, but which relationships, processes, capabilities, and safeguards must change around them. When national strategy, local context, professional agency, public value, and trustworthy governance are aligned, digital transformation can strengthen the quality, accessibility, responsiveness, and resilience of education in China.

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