

DIGITAL LEADERSHIP MODEL FOR KINDERGARTEN ADMINISTRATORS IN QINGYUAN CITY

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ABSTRACT

Digital transformation is profoundly reshaping the educational landscape, and the field of early childhood education faces unprecedented opportunities and challenges. As core decision-makers and strategic leaders, kindergarten principals play a pivotal role in their institutions' ability to adapt to change and improve care and education quality. Based on the Technology Acceptance Model (TAM), educational leadership theory, and situated learning theory, this study analyzes the key challenges faced by Chinese kindergarten principals in the digital era, including cognitive bias, insufficient technical skills, resource integration difficulties, and organizational cultural lag. A four-dimensional digital leadership training framework—comprising cognitive reframing, technological empowerment, resource integration, and cultural leadership—is proposed. The study elaborates on practice-oriented content design, blended training methodologies, and scientific evaluation mechanisms. It argues that targeted and systematic training is a strategic lever to empower principals to lead intelligent transformation in kindergartens and achieve high-quality development in early childhood education. It calls for coordinated efforts across policy, research, and practice domains.

Keywords: Digital Transformation; Kindergarten Principal; Digital Leadership; Leadership Training; Early Childhood Education (ECE)

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INTRODUCTION

China's education sector is undergoing a significant historical transformation. The development of emerging technologies such as big data, artificial intelligence (AI), and the Internet of Things (IoT) has not only altered societal production methods and lifestyles but is also reshaping the educational ecosystem with unprecedented depth and breadth. Early childhood education serves as the foundation of the national education system and the bedrock of building an "education powerhouse." The quality of ECE development is crucial for children's lifelong learning, inevitably drawing ECE into the currents of this era's transformation. The emergence of smart classrooms, digital educational resources, home-kindergarten collaboration platforms, and intelligent management systems opens broad prospects for optimizing care and education processes, enhancing management efficiency, and deepening home-kindergarten partnerships. Simultaneously, it poses severe challenges to kindergartens' adaptability and innovativeness.

Amidst this transformative wave, kindergarten principals, as the "helmsmen" and "soul figures" of their institutions, are entrusted with new era-specific demands. They must not only possess traditional educational management competencies but also acquire "digital leadership" that is an ability to harness digital technologies to lead kindergartens towards intelligent development. Digital leadership specifically refers to a leader's capacity to leverage digital technologies to discern trends, optimize decision-making, empower teams, innovate practices, and foster an adaptive organizational culture, ultimately achieving organizational goals (Sheninger, 2019). For principals, this entails strategically integrating digital technology into core areas such as kindergarten development planning, innovation in care and education practices, internal management optimization, external resource linkage, and organizational culture shaping.

However, the current reality is concerning. Substantial research (e.g., Zhang Mei, 2021; Wang Li, 2022) indicates that kindergarten principals in China commonly face issues such as weak digital awareness, insufficient technological application skills, lack of experience in data-driven decision-making, and a deficit in the confidence and strategies needed to lead digital transformation. Traditional principal training systems often focus on policy regulations, routine management, or pedagogical methods, with systemic attention to and targeted cultivation of digital leadership as an emerging core competency significantly lagging. This capability gap has become a bottleneck constraining kindergartens' ability to embrace the digital age and achieve high-quality development.

Therefore, systematically researching and designing digital leadership training programs for kindergarten principals holds strong practical urgency and strategic significance. This study aims to conduct an in-depth analysis of the core challenges principals face during digital transformation. Based on solid theoretical foundations, it seeks to construct a scientific, systematic, and actionable digital leadership training framework. This will provide theoretical references and practical pathways for enhancing principals' digital literacy and empowering kindergartens' intelligent transformation, thereby supporting the high-quality development of ECE in the digital era.

CORE CHALLENGES FACED BY KINDERGARTEN PRINCIPALS IN THE CONTEXT OF DIGITAL TRANSFORMATION

In guiding kindergartens through digital transformation, principals are confronted with several pressing challenges that demand urgent attention:

1.1 Inadequate Understanding of Digital Transformation

Investigations reveal that many kindergarten principals in China lack a comprehensive understanding of the essence of digital transformation and its impact on early childhood education. Some principals narrowly equate digital transformation with the purchase and use of digital hardware, such as equipping classrooms with tablets or interactive whiteboards. While others focus excessively on the technology itself, neglecting its ultimate goal of supporting

children's holistic development and enhancing the quality of care and education (Feng Xiaoxia, 2023). This cognitive bias leads to an absence of forward-looking digital development visions and strategic planning in some kindergartens. As a result, technology applications tend to be fragmented and superficial, failing to generate systemic momentum for meaningful change.

1.2 Limited Technical Application and Resource Integration Capacity

Literature reviews indicate that many kindergarten principals have not effectively employed digital tools to improve key administrative processes, such as scheduling, personnel management, financial systems, or safety monitoring and data analytics. In day-to-day pedagogy, principals often fail to facilitate the use of digital tools for selecting high-quality online teaching resources, innovating learning activities through interactive platforms, or applying child development assessment software to deepen educational reform (Li Min, 2022). Moreover, there is often a disconnect between digital technology and core care and education practices, reflecting an inability to meaningfully integrate digital tools across all aspects of kindergarten life.

1.3 Lack of Data-Driven Decision-Making Skills

In the context of big data and information overload, traditional kindergarten administrators often lack both the awareness and the capability to analyze operational data (such as attendance records, meal consumption patterns, and facility utilization rates), pedagogical process data (such as observation records and children's digital portfolios), and child development data (such as physical health monitoring and behavioral assessments). This deficiency hinders their ability to conduct scientific analysis, diagnose problems, forecast trends, and make informed decisions, whether in resource allocation, curriculum iteration, or individualized support strategies (Johnson, 2021). As a result, these valuable multi-source datasets have not been effectively converted into actionable intelligence for management optimization and pedagogical improvement.

1.4 Challenges in Resource Allocation and Kindergarten Development

Digital transformation requires continuous investment. Thus, principals face the challenge of planning budgets effectively and rationally allocating resources across hardware maintenance, software subscriptions, content procurement, teacher training, and technical support personnel. In addition, principals must develop the ability to critically evaluate the appropriateness, educational philosophy, effectiveness, and cost-performance of various digital products and services for young children, avoiding waste and trend-driven decision-making (Smith & Throne, 2020).

1.5 Organizational Culture and Teacher Empowerment Bottlenecks

The digital transformation of kindergartens depends on the collective engagement of all staff. Yet many principals face difficulties in cultivating an open, innovative, and tech-positive organizational culture. Teachers may resist transformation due to technophobia, inertia, or concerns about uncertainty. Principals must therefore find ways to motivate staff, offer sustained pedagogical and technological support, establish fault-tolerant mechanisms, and foster the sharing of successful experiences. Doing so is essential for raising teachers' digital literacy and their ability to integrate technology into teaching that is also an ultimate test of digital leadership (Richardson et al., 2023).

These intertwined challenges point to a central issue: the traditional competency framework for principals is no longer adequate in the face of digital transformation. There is an urgent need to construct a new competency architecture centered on digital leadership through systematic and professional training.

THEORETICAL FOUNDATIONS

Developing an effective training program for digital leadership among kindergarten principals requires a robust theoretical foundation. The following theories offer critical support for setting training objectives, designing content, and implementing strategies:

2.1 Technology Acceptance Model (TAM) and Its Extensions

The Technology Acceptance Model (TAM) proposed by Davis (1989) posits that users' adoption of new technologies is primarily influenced by their perceived usefulness and perceived ease of use. Applied to principal training, this implies that training should demonstrate how digital tools can practically address principals' daily challenges, enhance administrative efficiency, and improve care and education quality (enhancing perceived usefulness). Simultaneously, training must reduce the learning threshold and provide user-friendly interfaces and sufficient support to ensure that principals find the technology easy to learn and use (enhancing perceived ease of use).

Later extensions of TAM—such as TAM2 and the Unified Theory of Acceptance and Use of Technology (UTAUT)—introduced additional factors like social influence (e.g., peer and expert demonstration) and facilitating conditions (e.g., resources and technical support). These suggest that training should create a supportive learning community and provide essential implementation resources (Venkatesh et al., 2003).

2.2 Educational Leadership Theories (Distributed Leadership and Transformational Leadership)

Distributed Leadership emphasizes that leadership is not monopolized by the principal alone but is distributed among members of the organization, especially in the domain of technological innovation (Spillane, 2006). Training should help principals recognize their roles as enablers and coordinators, empowering key teachers, IT staff, and others to take leadership roles in digital integration and to form an internal digital leadership network within the kindergarten.

Transformational Leadership focuses on how leaders articulate a shared vision, stimulate intrinsic motivation, offer intellectual stimulation, and provide individualized support to inspire organizational members to transcend personal interests for collective progress (Bass & Riggio, 2006). In the context of deep institutional change driven by digitalization, principals must adopt a transformational leadership style to communicate the value of digital innovation, motivate teachers to overcome obstacles and embrace experimentation, and support their individualized professional growth.

2.3 Situated Learning Theory and Communities of Practice (CoP)

Situated Learning Theory, proposed by Lave and Wenger (1991), asserts that knowledge is constructed through participation in authentic contexts. Hence, cultivating digital leadership among kindergarten principals must be rooted in their real-world working environments and practical challenges. Training design should emphasize inquiry-based learning, case analysis, action research, and workplace-based practice that centers on authentic problems (e.g., "How can data analysis improve our kindergarten's nutritional planning?" or "How can we enhance family engagement on our digital communication platform?").

Furthermore, training should encourage the formation of Communities of Practice (CoP), where principals can share experiences, collaboratively solve problems, and co-construct digital knowledge through ongoing social interaction. Such peer learning and professional dialogue are vital for fostering deep, sustained learning (Wenger, 1998).

A FOUR-DIMENSIONAL FRAMEWORK FOR PRINCIPAL DIGITAL LEADERSHIP TRAINING

Based on the challenges identified and the theoretical foundations outlined above, this study proposes a four-dimensional core training framework for kindergarten principals' digital leadership, comprising: Cognitive Reframing, Technological Empowerment, Resource Integration, and Cultural Leadership.

3.1 Cognitive Reframing and Strategic Vision

This dimension focuses on reshaping principals' understanding of digital transformation and guiding them to establish a clear and actionable strategic vision. The goal is to deepen their

comprehension of the essential characteristics, evolutionary trends, and educational value of digital transformation in early childhood education. It also aims to clarify the components of digital leadership and its strategic significance for high-quality development. Central to this is embedding the principle of “child-centeredness, with technology serving education.”

To achieve this, the training content integrates a multidimensional knowledge system, including:
An in-depth analysis of macro trends and policy orientations in early childhood education in the digital age;

Clarification of digital leadership frameworks, core competencies, and strategic value;

Ethical considerations in technology application (e.g., child data privacy, screen time management, information literacy);

SWOT-based diagnostic tools for assessing the current digital infrastructure of kindergartens;

Methodologies and tools for formulating a strategic digital development plan, including vision-setting, goal design, phased implementation, and dynamic evaluation.

Training methods combine cutting-edge theory and practical wisdom through expert lectures, critical readings of seminal literature, in-depth case discussions of exemplary principals, participatory strategic planning workshops, and structured peer reviews to promote cognitive restructuring and strategic planning capabilities.

3.2 Technological Empowerment and Integrated Application

This dimension seeks to systematically strengthen principals’ professional competencies in applying digital tools to enhance school management, pedagogical practices, and family–school collaboration. It focuses on three practice domains: Training Content (Focused on Three Practice Areas):

(1) Administrative Optimization

Covers the use of intelligent office tools (e.g., scheduling, collaborative documentation), management platforms (e.g., HR, finance, inventory, safety monitoring), and data visualization software.

(2) Pedagogical Innovation

Focuses on evaluating and constructing digital resource libraries, integrating interactive teaching tools (e.g., interactive whiteboards, educational apps) into lesson planning, and using digital tools for child observation and electronic portfolio development.

(3) Family–School Collaboration

Emphasizes the strategic operation of platforms like XiaoHeiban, ClassDojo, and customized WeChat workspaces—including content dissemination, activity sharing, feedback collection, and personalized communication—as well as the organization of online parent conferences and workshops.

A critical cross-cutting theme is the integration of technology across curriculum and daily routines. This includes applying the TPACK framework to design educational activities using technology, integrating it into areas like free play, outdoor activities, and life routines, and establishing valid evaluation frameworks for assessing technology’s impact.

Methods include immersive technical workshops, in-depth case analysis, scenario-based tasks (e.g., handling digital platform complaints), collaborative learning, and micro-project implementation all designed to ensure that operational skills translate into meaningful pedagogical and administrative innovation.

3.3 Enhancing Data-Driven Decision-Making Capacity

This dimension aims to develop a comprehensive skill set for data-informed leadership. The objective is to instill awareness of data’s value, teach principals how to collect and interpret key early childhood data, and support them in using data for diagnosis, decision-making, evaluation, and continuous improvement.

Training centers on the data value chain, including:

Identifying core data types (operational, pedagogical, developmental) and their value for quality

improvement;

Standardized data collection methods and tools (e.g., structured surveys, digital observation logs, system analytics);

Basic data analysis techniques (e.g., descriptive statistics) and data visualization interpretation.

Building on these, training introduces complete data-driven workflows: from defining the problem, collecting targeted data, conducting multidimensional analysis, generating intervention strategies, to evaluating outcomes through evidence-based methods.

Typical application scenarios include:

Using nutrition and health data to optimize meal planning;

Combining activity load and fitness data to adjust outdoor schedules;

Identifying children with special needs through behavior observation;

Evaluating new digital resources through empirical validation.

Methods include progressive skill-building models, hands-on training with spreadsheet tools and dashboards, data-based case workshops, decision-making simulations, and site-based micro-projects under expert guidance that ensuring data literacy translates into actionable leadership.

3.4 Cultural Leadership and Team Empowerment

This dimension addresses the reconstruction of organizational culture and activation of human capital during digital transformation. The aim is to enable principals to foster open, innovative, and supportive digital cultures and to design empowerment strategies that encourage staff engagement and ongoing professional growth.

Training content is anchored in organizational change theory and includes: Psychological models of teacher technology adoption and strategies for overcoming resistance; Building learning organizations through Communities of Practice (CoP), peer support systems, and experiential knowledge sharing; Diagnostic tools for identifying teacher digital literacy gaps and personalized support strategies; Innovation-driven incentive mechanisms, including recognition systems and reflective practice in a culture of tolerable risk; Strategic communication techniques to co-construct shared meaning, build consensus, and strengthen organizational commitment. Methodologically, training follows a situated cultural construction model, using critical analysis of change management cases, resistance scenario simulations (e.g., role-plays in difficult conversations), action plan design workshops, expert interviews with leading principals, and hybrid (online/offline) platforms for ongoing community engagement (e.g., asynchronous forums, structured salons). The goal is to shift from tool-level application to cultural and organizational transformation.

IMPLEMENTATION PATHWAYS FOR TRAINING

To translate the aforementioned framework into effective practice, a carefully designed implementation pathway is required. The following key elements must be emphasized:

4.1 Differentiated Targeting and Needs-Based Diagnosis

Training must avoid a one-size-fits-all approach. Prior to implementation, comprehensive needs assessments should be conducted using questionnaires, interviews, and competency evaluations. These should explore the specific needs, current competencies, and unique challenges faced by principals in different regions and types of kindergartens, especially regarding their varying levels of digital readiness. The results should inform differentiated and modular training content.

4.2 Practice-Oriented and Problem-Centered Content Design

Training content must align closely with principals' daily work scenarios and actual pain points. Adopting a Problem-Based Learning (PBL) model, the program should structure learning tasks and projects around common leadership challenges (e.g., resource allocation, teacher resistance, or data utilization). Theoretical instruction should be supported by a wealth of real-world cases from frontline kindergartens, making knowledge acquisition immediately relevant and applicable.

4.3 Blended and Immersive Training Methodologies

The training program should adopt a blended and immersive methodological paradigm, moving beyond the limitations of traditional lecture-based formats. Following a blended learning model that integrates online and offline experiences, it leverages mainstream platforms (e.g., Chinese University MOOC, regional teacher development portals) to enable ubiquitous access to theory modules, resources, and asynchronous peer interactions. Offline sessions then focus on high-level cognitive development through deep discussions, hands-on simulations, community building, and project coaching.

The approach is grounded in action learning cycles, requiring participants to bring real challenges from their kindergartens into the training system. With mentor guidance and peer support, they engage in a full cycle of “problem diagnosis – solution design – practical implementation – reflective iteration.” This ensures that training outcomes are translated into measurable improvements in institutional effectiveness.

Crucially, a cross-temporal Community of Practice (CoP) should be established to serve as the long-term foundation for capability growth. Regional and thematic CoPs allow for ongoing interaction through both asynchronous digital platforms and structured offline activities (e.g., thematic salons, co-development of case libraries, expert-led workshops). This fosters a knowledge ecosystem that evolves through mutual support, collective intelligence, and continuous professional learning—marking a shift from episodic training to a sustainable professional development paradigm.

4.4 Multidisciplinary, Practice-Oriented Faculty Teams

The instructional team should follow a model of interdisciplinary collaboration and experiential expertise, forming a composite support matrix of five core professional roles:

Educational technology experts—offer insights into digital transformation trends and system architecture design; Experienced frontline principals—share contextualized solutions and case-based wisdom grounded in real school practice; Early childhood education researchers—provide theoretical frameworks and ensure alignment with educational policy and ethics; Professional adult trainers—design learning experiences in line with adult cognition and motivation principles; Data analysts and tech consultants with educational backgrounds—ensure the feasibility of data-informed decision-making practices.

All trainers must have hands-on experience in leading digital change in kindergartens, ensuring that their instruction is rooted in authentic problem-solving rather than abstract theorizing. The training program thus fosters a synergy of theoretical insight, practical wisdom, and technical support.

4.5 A Comprehensive and Evidence-Based Evaluation System

A scientific evaluation system must be embedded across the entire training cycle to ensure continuous improvement and long-term impact. This includes:

Reaction level—real-time satisfaction surveys capture participants’ perceptions of training relevance and design quality;

Learning level—pre- and post-training assessments, competency-based performance tasks (e.g., assignments, project reviews, practical exams) measure knowledge and skill acquisition;

Behavior level—assessed over 3–6 months post-training via a mixed-method approach (structured surveys, interviews, observational analyses, and review of institutional plans), to determine behavioral transfer of digital leadership into actual practice;

Results level—long-term longitudinal research connects training outcomes to measurable improvements in institutional variables, such as management effectiveness, quality of care and education, family–school engagement innovation, and teacher digital literacy.

Triangulated evaluation data should feed into a data-informed decision support system, driving iterative refinement of training content, delivery methodologies, and resource allocation.

CONCLUSION

Digital transformation is no longer an optional undertaking for early childhood education, it is an inevitable and essential response to the demands of future survival and development. In this far-reaching and complex process, kindergarten principals serve as critical agents of change. Their digital leadership directly determines whether kindergartens can seize emerging opportunities, navigate complex challenges, and ultimately achieve high-quality, child-centered, and modernized transformation.

This paper proposes a four-dimensional training framework for digital leadership—cognitive reframing, technological empowerment, resource integration, and cultural leadership which along with an implementation pathway that emphasizes practice orientation, blended methodologies, community-based support, and evidence-based evaluation. Together, these form a feasible and comprehensive solution for systematically and professionally cultivating digital leadership among kindergarten principals.

Digital leadership is not merely about technical proficiency. Rather, it represents a high-level composite competency that integrates strategic vision, technological fluency, data-informed intelligence, humanistic values, and organizational change capacity. The ultimate goal of training is to empower principals to become visionary strategists, empowering leaders, intelligent decision-makers, and cultural architects in the digital era. These leaders can then guide their entire school communities through change with confidence, ensuring that technology truly serves children's development and the sustainable excellence of early childhood education.

Looking ahead, the advancement and widespread adoption of digital leadership training for principals will require the construction of a collaborative, multi-stakeholder ecosystem:

At the policy level, educational authorities should embed digital leadership into national professional competency standards for principals, formulate development plans, and provide institutional guarantees, such as dedicated funding mechanisms, demonstration school selection criteria, and policy incentives which to elevate it from a peripheral skill to a mandatory core competency.

At the academic level, scholars must address the current lack of localized theoretical frameworks. Research should focus on conceptualizing digital leadership in early childhood contexts, modeling its developmental trajectory, validating evaluation tools, and conducting evidence-based studies on training effectiveness. This theoretical foundation will support sound practice and policy decision-making.

At the practice level, a strategic alliance should be formed among universities, training institutions, and exemplary kindergartens. This alliance would drive the co-development of high-quality course resources, the innovation of hybrid training models, the professionalization of trainer teams, and the sustainable operation of Communities of Practice (CoPs).

More importantly, the awakening of professional agency among principals themselves is essential. Through the internalization of lifelong learning mindsets and the cultivation of transformational capacity, principals can embrace digital leadership as a core professional mission in response to the digitalization of education. Ultimately, this will foster a systemic development ecosystem characterized by the synergy of policy traction, academic support, practical innovation, and individual empowerment.

Only through such an approach can we cultivate a generation of kindergarten leaders capable of guiding early childhood education through digital transformation and laying the groundwork for a more prepared and promising future for millions of children in the digital era. As the renowned educator John Dewey once said, “If we teach today’s children using yesterday’s methods, we rob them of tomorrow.” To empower principals is, in essence, to invest in the future of early childhood education.

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