

The Persistence and Transformation of Kindergarten Teachers in the Digital Age

Gangjing Ouyang*

Faculty of Education, Guangxi Normal University, Guilin, China

*Corresponding Author

Abstract: Educational digitalization is a key driver of high-quality early childhood education development, yet it poses comprehensive challenges to kindergarten teachers as frontline practitioners. Currently, kindergarten teachers face practical dilemmas including erosion of professional subjectivity, structural imbalances in digital literacy, and expanding role boundaries. Without clarifying what to preserve and what to transform in the digital context, educators risk falling into the trap of "technology supremacy." Adopting a literature review approach, this paper systematically examines the challenges confronting kindergarten teachers in the digital age and proposes three essential bottom lines to uphold: fidelity to educational essence, defense of professional autonomy, and adherence to ethical standards. Correspondingly, three transformation dimensions are identified: role reconstruction, literacy enhancement, and development model innovation. The study argues that persistence and transformation form a dialectical unity: persistence constitutes the educational foundation and bottom line, guiding the direction of digital development; transformation represents the pathway of the times, determining educational vitality and quality. Both serve the core goal of promoting children's comprehensive and healthy development. This research provides practical guidance for teacher digital transformation and references for improving training systems and digital governance.

Keywords: digital age; kindergarten teachers; digital literacy; professional development; educational digital transformation

1. Introduction

Educational digitalization is the core engine for high-quality educational development in China and a vital support for advancing universal, inclusive, and quality early childhood education [1]. As big data, artificial intelligence, and virtual reality technologies permeate early childhood education settings, smart terminals, interactive courseware, and digital management platforms have become widely applied in teaching, care, management, and home-kindergarten communication. Digital technology has expanded educational resource boundaries and implementation forms, enabling personalized care, immersive inquiry, and refined management, while providing new pathways for narrowing urban-rural quality gaps and promoting equitable resource allocation [2].

The digital transformation of early childhood education is not merely technological addition but a systemic reform involving educational philosophy, care models, and teacher-child relationships, which poses multifaceted challenges to kindergarten teachers. Currently, the digital literacy of China's kindergarten workforce remains at an initial stage, characterized by superficial technology application, emphasis on form over substance, and weak digital security awareness. Risks include technological alienation of educational essence and diminished teacher-child emotional interaction [3]. Without clarifying the core question of "what to preserve" versus "what to transform," educators may easily succumb to "technology supremacy" and deviate from educational goals.

Against this backdrop, systematically examining the practical challenges faced by kindergarten teachers, clarifying the educational bottom lines and ethical standards they must uphold, and exploring pathways for digital literacy improvement carry significant theoretical and practical value. Theoretically, this study enriches research on teacher professional development in early childhood education and refines the framework of teachers' professional literacy in the digital age. Practically, it offers actionable guidance for teacher digital transformation and decision-making references for educational authorities and kindergartens to optimize training systems and digital governance.

2. Practical Challenges Facing Kindergarten Teachers in the Digital Age

2.1 Erosion of Professional Subjectivity

Teacher subjectivity emerges from multi-agent interaction and integrates teachers' social and individual values. While digital technology facilitates teaching, it also erodes professional subjectivity through weakened consciousness, shaken subject status, and infringed subject rights [4].

Some teachers habitually adopt ready-made instructional designs and courseware from the internet without adapting them to their children's characteristics, gradually losing innovative drive and becoming mere executors of technological tools. Excessive pursuit of visual impact and interactive formality leads to neglect of children's genuine needs and educational connotation, resulting in "form over essence" alienation [5].

The proliferation of intelligent teaching aids has partially replaced teachers' functional work, weakening their dominant position. Children are more attracted to digital content than face-to-face interaction, reducing the frequency and depth of teacher-child engagement and diluting teachers' value as emotional supporters [6]. Additionally, the surveillance nature of some digital management systems compresses teachers' professional autonomy space and undermines their judgment and teaching sovereignty [7].

2.2 Imbalanced Structure of Digital Literacy

Significant structural disparities in digital literacy constrain the balanced advancement of digitalization in early childhood education. Regionally, kindergartens in developed eastern areas and cities have better digital infrastructure, with teachers demonstrating significantly stronger technology proficiency and resource integration ability than those in central-western and rural regions—the digital divide persists.

Generationally, younger teachers readily adopt new digital tools but lack experience in deep integration with early childhood education principles. Veteran teachers possess rich care experience but feel apprehensive about digital technology, with weak application skills. Neither group achieves effective technology-education integration [8].

2.3 Continuous Expansion of Role Boundaries

The digital age has reshaped kindergarten teachers' responsibilities, expanding roles from traditional knowledge transmitters, activity organizers, and caregivers to multiple new identities. The accumulation of roles significantly increases workload and occupational stress [9].

In care and teaching activities, teachers must serve as cultivators of children's digital literacy and guardians against digital risks, guiding proper tool use while protecting children from harmful content.

In home-kindergarten co-education, they assume the role of family digital education guides, conveying scientific concepts to parents and advising on screen time management.

Furthermore, digital tools blur work-life boundaries, as teachers may need to respond to online parental demands at any time, invisibly extending working hours. Rising societal expectations for digital education add to teachers' anxiety and transformation pressure. Diverse digital literacy levels among parents also increase the difficulty of coordinating educational consensus [10].

3. Pathways of Persistence for Kindergarten Teachers

Digital transformation is inevitable, yet technology always serves educational goals. Kindergarten teachers must uphold the essence and bottom line of education, ensuring digital transformation advances in the correct direction.

3.1 Upholding Educational Essence

The fundamental goal of early childhood education is promoting children's comprehensive development. Digital technology is a means, not an end. Teachers must maintain a child-centered stance, taking children's needs as the starting point of technology application and rejecting formalistic overuse

of technology for visual effects.

Teachers must adhere to play-based learning and value children's direct experiences in real life, nature, and peer interaction. The WHO recommends no screen time for infants under one year, minimal passive exposure for ages 1-2, and no more than one hour daily for ages 3-4 [11]. Digital screens should not replace hands-on experiences and social interaction [12], which are critical for children's sensory and social development.

Additionally, teachers must uphold the core value of teacher-child emotional interaction. Early childhood growth depends on secure, warm human connections—teachers' smiles, listening, and personalized guidance are irreplaceable by any smart tool. Technology should enhance, not replace, face-to-face emotional exchange [13].

3.2 Defending Professional Autonomy

Kindergarten teachers are the core subjects of educational practice, and digital transformation should be "humans using technology," not "technology controlling humans." Teachers must actively defend their professional subjectivity against the encroachment of digital tools.

First, strengthen critical consciousness. Teachers should carefully screen and adapt online resources, conducting secondary design based on their children's age, interests, and developmental levels, rather than uncritically adopting ready-made materials [14].

Second, maintain dominance over the educational process. Technology should serve predetermined goals, and teachers must flexibly adjust activities based on children's responses and generative questions, remaining creative rather than being constrained by fixed digital courseware [15].

Third, safeguard independent professional judgment. Teachers should rationally view quantitative metrics and data assessments in digital management, respecting the situational complexity of early childhood education and prioritizing children's actual development over data-driven evaluations [16].

3.3 Maintaining Ethical Bottom Lines

Early childhood is a critical developmental period, and digital technology must prioritize protecting children's healthy growth. Teachers must uphold dual bottom lines of educational ethics and digital security.

First, protect children's privacy. Teachers should regulate the collection, storage, and use of children's images and developmental data, prohibiting excessive data gathering and unrestrained digital surveillance that erodes children's psychological security [17].

Second, ensure content appropriateness. Teachers must rigorously select digital resources that align with children's cognitive levels and convey positive values, while controlling screen duration and scenarios to protect vision and attention development [18].

Third, uphold educational equity. Teachers should attend to children from diverse backgrounds and digital experience levels, preventing technology from widening developmental gaps and ensuring digital technology serves inclusive and balanced early childhood education [19].

4. Strategies for Teacher Transformation

Persistence provides the foundation, while proactive transformation responds to contemporary demands. The digital age requires systematic, structural role reshaping and capability reconstruction across three dimensions: roles, literacy, and development models.

4.1 Role Transformation

Role expansion is inevitable; the key to reducing occupational pressure lies in proactive role reconstruction rather than passive task acceptance.

First, clarify core role boundaries. Educational practice remains teachers' primary responsibility, and digitally derived administrative tasks should be screened and integrated. Kindergartens should optimize digital management processes to reduce unnecessary online reporting and statistical work that encroaches on teaching time [20].

Second, actively upgrade roles: from "digital resource users" to "resource creators," developing personalized digital materials based on kindergarten-based curricula; from "online task executors" to "digital co-education leaders," establishing clear online communication rules and guiding rational parental participation; and from "traditional caregivers" to "digital growth companions," naturally integrating digital literacy cultivation into daily routines [21].

Third, establish psychological support mechanisms. Kindergartens should address teachers' digital transformation stress through counseling and time guarantees, avoiding shifting all pressure to frontline teachers [20].

4.2 Literacy Transformation

Current structural gaps in digital literacy hinder effective technology-education integration. Teachers must move from fragmented technical skill learning toward systematic digital literacy construction.

Systematic digital literacy comprises three interrelated dimensions. First, digital consciousness and mindset—the cognitive foundation including recognition of digital transformation necessity, openness to technology-enabled education, and awareness of risks and ethical boundaries. Teachers should transcend "techno-fear" or "techno-worship" and develop a rational, dialectical view of technology [22].

Second, digital technology knowledge and skills—encompassing operational proficiency with common tools and platforms, resource acquisition and development ability, and basic understanding of emerging technologies like AI-assisted teaching. Importantly, technical knowledge should extend beyond operations to understanding educational value—knowing not just "what to use" but "why" and "what it means for children" [22].

Third, digital teaching application and innovation—the core practical dimension, referring to the ability to organically integrate digital technology into educational design and implementation, creatively using technology to support children's inquiry, expression, and interaction [23].

4.3 Development Model Transformation

Traditional teacher professional development relies on individual experience and master-apprentice oral instruction. The digital age demands a shift toward open, collaborative, symbiotic growth paradigms.

First, engage in digital professional learning communities. Online communities enable teachers to transcend temporal and spatial constraints, sharing resources and collaborating across distances. Through online research, lesson observation, and experience sharing, teachers gain peer support and compensate for individual limitations [24]. For rural and less developed region teachers, such communities are vital for bridging the digital divide and accessing quality resources [25].

Second, use digital tools to empower reflective practice. Video recordings of activities enable self-analysis of teaching behaviors; systematic child development data supports evidence-based strategy adjustment; and online platforms provide multi-perspective feedback. Digital tools should serve as powerful assistants for daily reflection and professional judgment refinement [26].

Third, adopt a "human-machine collaboration" mindset. AI does not diminish teacher professionalism but requires collaborative work with intelligent systems, combining machines' data processing strengths with human capabilities in value judgment and emotional care. Teachers' uniqueness lies in irreplaceable domains: perceiving individual differences, adapting to contexts, making ethical decisions, and providing warm companionship [27].

These three transformations—roles, literacy, and development models—form a mutually supportive, co-evolving organic whole. Role transformation calls for literacy upgrading; literacy upgrading requires development model innovation; and model changes in turn deepen roles and iterative literacy, together constituting the complete picture of digital-era teacher transformation.

5. Conclusion and Prospects

The fundamental question for kindergarten teachers in the digital age is: amid accelerating technological change, how can teachers neither be overwhelmed by technology nor bound by tradition, but instead achieve professional growth through the dialectical unity of persistence and transformation?

This study demonstrates that persistence and transformation form a complementary dialectical unity:

persistence represents the educational foundation and bottom line, determining the direction and humanistic warmth of digital development; transformation embodies the pathway of the times, shaping educational vitality and quality. Both serve the core goal of promoting children's comprehensive and healthy development.

As AI and VR technologies continue to advance, early childhood education digitalization will deepen. Educational authorities and kindergartens should further improve teacher support systems, optimize digital governance, reduce burdens, and create inclusive transformation environments. Future research can explore differentiated transformation pathways for diverse teacher groups and develop deep integration models aligned with children's developmental laws, ensuring digital technology truly advances universal, inclusive, and quality early childhood education.

References

- [1] Zhu, Z. T., & Hu, J. (2022). *An analysis of the essence of educational digital transformation and research prospects*. *China Educational Technology*, (4), 1–8, 25.
- [2] Fan, M. L., Jing, W. X., Chang, L. Y., et al. (2024). *International experience and China's path for kindergarten teachers' digital competence development: Based on the OECD digital competence framework for early childhood teachers*. *Studies in Preschool Education*, (7), 11–24.
- [3] Wang, S. P., Xu, J. Y., & Shen, H. J. Y. (2025). *A survey on the current status of kindergarten teachers' digital literacy and its optimization paths*. *Journal of Inner Mongolia Normal University (Educational Science)*, 38(3), 67–88.
- [4] Sang, G. Y., & Wang, J. Y. (2024). *Challenges and reconstruction of teachers' subjectivity in the digital era*. *Teacher Development Research*, 8(4), 36–41.
- [5] Hu, H., & He, X. C. (2020). *The dilemma of classroom teaching technology dependence and its transcendence*. *Journal of Teaching and Management*, (21), 15–17.
- [6] Su, H. L., & Zhang, J. W. (2024). *"Humanization" of machines and "machinization" of humans: Subjectivity crisis in education in the intelligent era and its solutions*. *Modern Distance Education Research*, 36(1), 12–20, 28.
- [7] Shen, T. M., & Min, H. Z. (2025). *Promoting high-quality early childhood education through digital curricula: Representations, hidden worries and approaches*. *Journal of Teacher Education*, 12(4), 34–41.
- [8] Chen, X. Q., & Min, L. B. (2024). *A study on kindergarten teachers' digital literacy based on the national standard framework*. *Studies in Preschool Education*, (3), 25–37.
- [9] Fan, W., & Deng, H. (2024). *A review of research on teachers' roles in the digital era: Based on an analysis of journal literature in the recent decade*. *Education Science Forum*, (32), 53–57.
- [10] Wang, Q., & Wang, S. (2025). *Why do teachers suffer from role overload? Reconstructing teachers' roles from the perspective of professional capital*. *Journal of the Chinese Society of Education*, (4), 95–101.
- [11] World Health Organization. (2019). *Guidelines on physical activity, sedentary behaviour and sleep for children under 5 years of age*. World Health Organization. <https://iris.who.int/handle/10665/311664>
- [12] General Office of the Ministry of Education of the People's Republic of China. (2026, April 13). *Notice on carrying out the 2026 National Preschool Education Promotion Month campaign [EB/OL]*. http://www.moe.gov.cn/srcsite/A06/s3327/202604/t20260420_1434185.html
- [13] Zhang, J. (2026). *From "perception" to "empowerment": Exploring the path of AI-driven early childhood emotional education—Taking child H as an example*. *Life Education*, (12), 87–90.
- [14] Liu, Y., Zeng, N., & Zhang, D. H. (2023). *The digital divide in teachers' use of digital resources and bridging strategies: Based on data from a national large-scale survey of teachers' digital literacy*. *China Educational Technology*, (10), 106–110, 119.
- [15] Ma, R. T., & Lü, H. X. (2025). *Teachers' existence in the digital intelligence era: Realistic dilemmas and breakthrough paths*. *Journal of Teacher Education*, 12(5), 84–91.
- [16] Wang, C., & Kong, L. S. (2024). *Hidden worries and value orientation of data-based teacher evaluation*. *Educational Research*, 45(8), 149–159.
- [17] Hu, X. S., Xu, W. D., & Huang, P. S. (2026). *Dilemmas and solutions for the development of kindergarten teachers' digital literacy under the background of digital transformation*. *Journal of Sichuan University of Arts and Science*, 36(1), 55–62.
- [18] Sun, R. M. (2025). *Research on the suitability of AI educational content based on early childhood development characteristics*. In *China University Industry Association Committee for Lifelong Learning (Ed.), Proceedings of the 5th Academic Symposium on Innovation and Development of Educational Information Technology* (pp. 611–613).

- [19] Li, J., & Yu, Y. (2023). *Early childhood education and care under digital challenges: An investigation of the OECD Starting Strong VII report*. *Journal of Comparative Education*, (6), 105–118.
- [20] Feng, T. T., & Yuan, Z. X. (2026). *Performance, causes and elimination paths of teachers' digital stress under the background of educational digitalization*. *Theory and Practice of Education*, 46(11), 36–43.
- [21] Ding, C. Y., Cai, Y. Q., & Zhan, S. W. (2025). *Internal logic and practical paths of kindergarten teachers' role transformation under the digital background*. *Journal of Shaanxi Xueqian Normal University*, 41(5), 58–66.
- [22] Cai, H. M., & Lü, F. (2024). *Mechanism of digital awareness promoting professional development among kindergarten teachers in western China*. *Contemporary Education and Culture*, 16(6), 102–112.
- [23] Ye, Q. Q. (2025). *Effective integration and application of information technology in kindergarten teaching activities*. In China University Industry Association Committee for Lifelong Learning (Ed.), *Proceedings of the 5th Academic Symposium on Innovation and Development of Educational Information Technology* (pp. 778–780).
- [24] He, T. T. (2023). *Construction strategies of kindergarten teachers' learning communities based on social networks*. *Journal of the Chinese Society of Education*, (S1), 180–182.
- [25] Deng, M., & Shao, X. P. (2021). *Online learning communities for urban and rural kindergarten teachers: Connotation, significance and construction strategies*. *Journal of Educational Development (Second Half)*, (9), 48–53.
- [26] Zeng, Z. W., & Yuan, M. (2025). *The value implication, realistic dilemmas and solutions of digital intelligence technology empowering teachers' reflective practice*. *Educational Information Technology*, (9), 3–8.
- [27] Wang, X. H., He, L., & Zhou, M. X. (2025). *Opportunities, role dilemmas and breakthrough paths for kindergarten teachers' professional development in the artificial intelligence era*. *Journal of Changchun Education Institute*, 41(5), 5–11.