

A Study on Practical Approaches to Digital Empowerment in the Development of School-Based Curricula in Preschools

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Abstract: School-based curriculum development is a crucial foundation for the substantive development of kindergartens, and digital technology offers new possibilities for its transformation. Currently, school-based curriculum development largely relies on experiential judgment, leading to issues such as homogenization of content, limited implementation contexts, one-dimensional evaluation methods, and weak support mechanisms. Based on the intrinsic logic of school-based curriculum development, this study explores practical pathways for digitally empowering such development across four dimensions: curriculum content, implementation models, evaluation systems, and support mechanisms. Digital technology can promote the precision and distinctiveness of curriculum development through data analysis and resource integration; foster the diversification and openness of curriculum implementation through immersive scenarios and cloud-based collaboration; enable a process-oriented and diversified approach to curriculum evaluation through continuous data collection and multi-stakeholder collaboration; and establish long-term safeguards through teacher training, joint resource development, home-school collaboration, and institutional standards. While leveraging digital technology to enhance kindergarten-based curriculum development, educators must remain vigilant against the tendency for technology to become a mere formality. Educators must uphold a child-centered approach and deepen the organic integration of technology and curriculum to drive the digital transformation of early childhood education.

Keywords: Preschool-based curriculum; Preschool; Review

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1. Introduction

In 2025, the “Outline of the Plan for Building an Education Powerhouse (2024–2035),” issued by the Central Committee of the Communist Party of China and the State Council, explicitly stated that “the National Education Digitalization Strategy will be implemented.” Preschool-based curricula are personalized

curriculum systems developed by kindergartens based on their unique operational characteristics, local cultural heritage, and the developmental needs of young children ^[1]. Digital empowerment provides the technological support needed to upgrade these systems. Against the backdrop of the digital transformation of early childhood education, technologies such as big data, AR, and smart devices are breaking down the temporal, spatial, and resource barriers of traditional preschool-based curricula, driving a shift from “experience-driven” to “data-driven” curricula. Digital technology empowers kindergarten-based curricula to more precisely align with the cognitive characteristics and learning needs of children aged 3–6 through personalized resource delivery and the creation of immersive learning environments. At the same time, it facilitates the integration of local culture into the curriculum in a digital format, thereby achieving the goal of cultural preservation. Although kindergartens across the country have attempted to incorporate digital technology into their school-based curriculum practices, they still face numerous practical challenges. Some teachers lack the ability to design “technology-integrated curriculum,” resulting in digital tools being reduced to “mere formalities”; the distribution of digital resources among kindergartens is uneven, making it difficult for kindergartens in rural areas to access high-quality digital curriculum materials; and the digital collaboration mechanism between home and school is underdeveloped, preventing parents from effectively participating in curriculum design and evaluation. Based on this, this paper focuses on the logic behind the development of digitally enabled preschool-based curricula. It conducts an in-depth analysis from perspectives such as practical models and implementation processes. By mapping out pathways for the deep integration of technology and curriculum, it provides practical guidance for enhancing the quality of preschool-based curricula and advancing the implementation of digital transformation in early childhood education.

2. Literature review on kindergarten-based curriculum

The theoretical foundations and practical logic of digitally empowered kindergarten-based curriculum development must be traced back to the fundamental framework of research on kindergarten-based curriculum. Therefore, it is necessary to first conduct a systematic review of relevant research on kindergarten-based curriculum to clarify its conceptual implications, developmental logic, and constraining factors, thereby laying a theoretical foundation for subsequent discussions on pathways to digital empowerment.

2.1. The concept and essence of kindergarten-based curriculum

A kindergarten-based curriculum refers to a curriculum developed and implemented through the joint participation of kindergarten teachers, children, and parents, with the kindergarten serving as the foundation and children’s development as the core. It emphasizes that the curriculum should be adapted to the actual conditions of the kindergarten and the specific needs of the children, while highlighting the kindergarten’s unique characteristics and cultural heritage. In China, there has been extensive research on kindergarten-based curriculum. Chinese scholar Chen Shijian (2001) emphasized that, in essence, kindergarten-based curriculum is an open and democratic decision-making process for curriculum development rooted in the kindergarten setting. More specifically, kindergarten principals, teachers, curriculum specialists, young children, parents, and community workers all participate in every stage of the kindergarten curriculum—

including planning, implementation, and evaluation. During the development phase of the school-based curriculum, teachers should actively participate, while the final decision-making process should be carried out jointly by all professionals involved in integrating educational experiences. Furthermore, we need to take a forward-looking approach to avoid the formalization of school-based curricula. We should strengthen the integration of play, ensuring that the curriculum aligns with the guidelines, is consistent with the physical and mental developmental characteristics of young children, respects the active nature of their development, and is scientifically structured ^[2]. Yu Yongping (2001) argued that kindergarten-based curriculum is not merely a curriculum plan, but rather a process that is generated and continuously refined within the kindergarten. At the same time, kindergarten-based curriculum requires proper coordination with regulations, theories, and the external environment. From a systems perspective, he emphasized that kindergarten-based curriculum must not only coordinate internal relationships but also refine external relationships; only in this way can long-term development be achieved ^[3]. Li Jimi (2002) argues that within China's kindergarten curriculum system, kindergartens serve as both the rights-holding entities and the entities responsible for curriculum development. Therefore, educators must take the kindergarten as the "center"; the essence of the kindergarten curriculum is the "kindergarten-based curriculum," rather than content that is all show and no substance. We should focus on the essence of the kindergarten-based curriculum and ensure that the curriculum is effectively implemented ^[4]. In short, the kindergarten-based curriculum is not a curriculum system detached from reality, but one that conforms to the developmental laws of early childhood education. It is a continuously improving kindergarten curriculum that requires ongoing refinement and strengthening of the curriculum system.

2.2. The development logic of kindergarten-based curriculum

Xu Zhuoya (2002) proposed that a kindergarten-based curriculum refers to a curriculum advocated by a kindergarten and implemented within its own institution. This type of curriculum primarily addresses the professional development needs of kindergarten staff, is grounded in the actual conditions of the kindergarten and the local community, and should be continuously developed and constructed based on available and utilizable curriculum resources. At the same time, the kindergarten-based curriculum should fully consider the need to highlight the unique characteristics of the kindergarten while ensuring compliance with national and local curriculum standards ^[5]. School-based curriculum must respect the leading role of teachers, strengthen the development of the teaching staff, and promote the scientific development of the curriculum. Yu Yongping (2004) pointed out that school-based curriculum is a curriculum constructed based on the actual conditions of the kindergarten. Its development is guided by laws, regulations, and relevant policies; supported by the actual environment and conditions of the preschool; based on the children's real needs; and led by preschool teachers. Preschool-based curricula should not overlook the goal set forth in laws and regulations regarding the promotion of children's comprehensive and harmonious development; this goal must be effectively implemented. A kindergarten-based curriculum must fully tap into the curriculum resources available within the kindergarten and the community, remain closely connected to real life, and give sufficient attention to the growth of both children and teachers in the specific kindergarten. The value of a kindergarten-based curriculum lies not in its mere existence, but in whether it possesses the qualities suitable for early childhood education; appropriateness is its fundamental attribute. A kindergarten-based curriculum is not only suitable for a specific kindergarten but also for the children within that kindergarten. In this regard, a high-quality preschool curriculum should be school-based; however, not all preschools are able

to develop their own school-based curriculum in the short term. For preschools with inadequate teaching staff and other resources, the best approach is to implement a universal curriculum and then adapt it appropriately based on the school's specific characteristics ^[6]. The development of school-based curricula must also place young children at the center, adhere to a child-centered approach, be suited to their physical and mental development, and promote their growth through learning. Yue Yaping (2005) proposed that the development of school-based curricula follows a trajectory that is developmental, foundational, compensatory, and forward-looking. It is believed that the development of kindergarten-based curricula is a long-term and challenging endeavor and will be a key component of curriculum reform in China's kindergartens for the coming years. Clarifying the philosophy behind kindergarten-based curricula and determining the direction of their development will not only influence the sustained advancement of such curricula but will also impact children's future development and the quality of that development ^[7]. In summary, the development of kindergarten-based curricula is a long-term process that requires the joint efforts of kindergartens, teachers, and children to promote its sustainable and scientific development.

2.3. Factors limiting the development of kindergarten-based curriculum

There are also many factors that hinder the development and implementation of kindergarten-based curricula. Zhu Jiaxiong (2006) pointed out that educators should not focus solely on learning content that interests young children; they must also prioritize the content that children need to learn. In the implementation of kindergarten-based curricula, there are many curriculum elements that fail to promote children's learning. For example, asking children to listen to world-famous musical pieces and imagine them as mosquitoes fluttering about is extremely detrimental to their learning, growth, and progress. Furthermore, an excessive focus on kindergarten-based curricula can easily lead to formalism, resulting in a waste of time and energy ^[8]. Developing school-based curricula is a positive initiative, but it should not become a burden; rather, the burden should be reduced to promote quality development. Qin Bing (2007) pointed out that the problems in kindergartens fall into two categories: On the one hand, kindergartens themselves lack sufficient recognition of the importance of curriculum theory and have a lack of initiative in learning, which has prevented them from establishing a theoretical foundation for school-based curriculum development; on the other hand, kindergartens largely imitate and borrow the operational techniques used by other kindergartens in developing their school-based curricula, thereby losing their own distinctive characteristics. At the same time, there are issues with the selection and utilization of curriculum resources; developers, limited by their own curriculum development capabilities, lack a clear understanding of this. Furthermore, the current level of proficiency among early childhood educators in China regarding the application of curriculum development techniques is relatively low. As a result, most teachers often rely solely on experience when developing school-based curricula, without having mastered the theories and techniques of modern curriculum development. This low-level model of school-based curriculum development not only increases teachers' workloads but also heightens their professional stress, causing the goal of promoting teachers' professional development through school-based curriculum development to remain merely an ideal ^[9]. Huang Xiaolian et al. (2021) argue that curriculum resources are a key element in the development of kindergarten-based curricula, and their development and utilization have received significant attention in kindergarten practice. In the "Internet Plus" era, the scope of curriculum resources continues to expand—from traditional natural and social resources to emerging self-media and online resources that transcend time and space, and

from the development and utilization of tangible, explicit resources to the identification of dynamic, implicit resources at the interpersonal level. Its boundaries are constantly being pushed, and its future development potential is limitless. The breadth of curriculum resource development influences the richness of school-based curriculum content, while the extent to which these resources are utilized affects the degree to which curriculum objectives are achieved. It is evident, therefore, that curriculum resource development plays a crucial role in the development of school-based curricula. However, while there is currently a strong call for preschool curriculum reform, the development of school-based curriculum resources has encountered complex issues and has gradually strayed from its original purpose. Therefore, it is essential to correct this situation ^[10].

2.4. Current research on the implementation of kindergarten-based curriculum

The implementation of the kindergarten-based curriculum has achieved certain results in promoting the well-rounded development of young children, enhancing teachers' professional competence, and highlighting the kindergarten's unique characteristics. Through this curriculum, children are able to gain richer and more diverse learning experiences and develop their individuality and interests. By participating in curriculum development and implementation, teachers have improved their curriculum design and organizational skills, thereby fostering their own professional growth. The kindergarten has also established a distinctive brand image through the kindergarten-based curriculum and enhanced its reputation in the community. Zhang Haihong (2007) argued that early childhood teacher training needs to be strengthened to enhance teachers' awareness and ability to integrate and utilize kindergarten-based curriculum resources. Teachers should creatively integrate and utilize curriculum resources based on actual conditions and the characteristics of young children, and continuously enhance their ability to integrate and utilize these resources through practice. At the same time, the structure for integrating and utilizing school-based curriculum resources should be reasonably constructed and optimized to achieve a balanced and networked structure, while ensuring that the entities involved in integration and utilization are diverse and varied. Furthermore, the establishment of a comprehensive and effective management and evaluation system for the integration and utilization of school-based curriculum resources is indispensable. Kindergartens must place high priority on the integration and utilization of school-based curriculum resources, efficiently and organically combining all available resources. Only in this way can the development of school-based curricula proceed smoothly ^[11]. It is evident, therefore, that the development of school-based curricula requires a multi-pronged approach, united efforts, and collective dedication to advance the construction of the curriculum system. Lu Mingfeng et al. (2010) proposed that the school-based curriculum should adhere to a strategy in which foundational elements and distinctive features complement one another. The foundational aspect has two meanings: in terms of curriculum philosophy, it is essential to closely align with the spirit of the "Second Phase Curriculum Reform," fully implement the "new textbooks," and ensure the equitable development of young children as the fundamental goal of curriculum development; in terms of curriculum framework and content, the core status of the foundational care and education curriculum must first be established. Distinctiveness has two aspects: On the one hand, the curriculum philosophy must emphasize meeting the diverse developmental needs of children in the new era and rely on distinctive, diverse courses to fulfill their comprehensive developmental needs; on the other hand, when constructing curriculum content and frameworks, the unique characteristics of the preschool must be highlighted to develop selective courses

and conduct integrated arts education activities centered on creative artistic expression. At the same time, the localization of the curriculum must follow a strategy that balances stability and flexibility. Stability is a fundamental requirement of the curriculum; it must not be changed arbitrarily but must remain stable over the long term. Only in this way can its effectiveness and adaptability be evaluated, and teachers be able to accumulate experience. However, the curriculum should not be rigid; it must be adjusted when practice reveals that it does not align with the actual needs of young children. Flexibility is demonstrated by continuously adjusting and supplementing curriculum content and format during implementation based on factors such as “teaching resources” and “user needs,” ensuring the innovative development of the curriculum and maintaining dynamic adaptability to societal and kindergarten developments. Furthermore, the localization of the curriculum should adopt a strategy that interlinks practical application with research. The practical aspect focuses on resolving actual problems in the school-based development of the curriculum and ensures that the localized curriculum is easy for teachers to implement; the research-oriented aspect involves the problem-solving process of school-based curriculum development and the study of specific implementation issues, aiming to explore general principles. In the practice of kindergarten-based curriculum development, educators use research to enhance the effectiveness of curriculum implementation and test research findings through practice^[12]. Wang Jingli (2022) points out that the development of high-quality kindergarten-based curricula involves five steps. The first step is to emphasize long-term commitment; the formation of high-quality kindergarten-based curricula requires sustained practice and exploration over an extended period. The second is to emphasize comprehensiveness, meaning that it is oriented toward the development of all young children and encompasses all dimensions of their moral, intellectual, physical, aesthetic, and labor education. Third, it embodies innovation: based on a comprehensive examination and in-depth analysis of actual circumstances, it gradually shapes new trends, new connotations, and new forms of kindergarten-based curriculum development. Fourth, it embodies collaboration: it involves effectively coordinating various resources—such as those from the kindergarten, the community, and the family—to foster synergistic effects. Fifth, it embodies dynamism: in response to changes in objective circumstances, it continuously generates new curriculum content and formats, demonstrating a coherent pattern of dynamic change^[13].

3. Practical approaches to digital empowerment in kindergarten-based development

A review of the literature indicates that traditional kindergarten-based curriculum development is constrained by an experience-driven development model and a closed implementation environment, making it difficult to precisely meet the developmental needs of young children. The integration of digital technology offers new possibilities for overcoming these challenges. Based on this, this study constructs a four-dimensional practical framework of “content restructuring—implementation optimization—evaluation refinement—mechanism assurance” (according to **Figure 1**) to systematically advance the digital transformation of kindergarten-based curriculum.

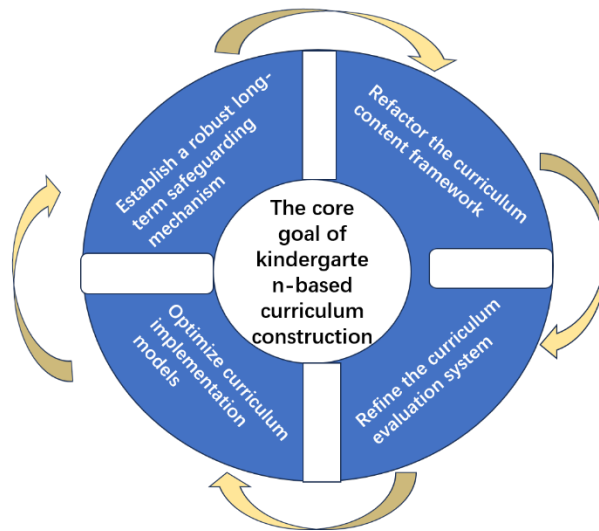


Figure 1. Core objectives of digital empowerment in developing kindergarten-based curriculum

3.1. Digitally restructuring the curriculum framework to achieve distinctive curriculum development

Preschool-based curriculum content serves as the core vehicle for curriculum development. Traditional development methods often rely on teachers' experiential judgment, leading to shortcomings such as insufficient adaptability, a lack of distinctive features, and slow iteration. By leveraging the advantages of digital technology in data analysis and resource integration, educators can drive the transformation of curriculum development from an "experience-led" approach to a "data-driven" one, thereby building a modern content system that precisely aligns with children's development and reflects the unique characteristics of the preschool and local culture. First, by relying on big data analysis, educators can achieve precise curriculum development. Kindergartens can utilize digital management platforms to routinely collect process-based data on children's daily routines, play activities, inquiry-based learning, and social interactions. By modeling and analyzing the cognitive levels, interests, preferences, skill gaps, and developmental needs of children across different age groups, they can precisely identify entry points for curriculum development. By optimizing content allocation based on children's developmental profiles and moving away from traditional "one-size-fits-all" and "template-based" approaches, kindergartens can introduce tiered and differentiated modules tailored to individual needs, thereby effectively implementing a curriculum philosophy centered on children's development. Second, educators will develop distinctive curriculum content by integrating digital resources. Grounded in the preschool's educational philosophy and local cultural heritage, educators will leverage diverse channels—such as cloud-based resource libraries, social media education platforms, and digital collections of regional culture—to uncover high-quality resources related to local folklore, natural ecosystems, rural life, and traditional culture. Educators will then digitally integrate, process, and reconstruct these fragmented local resources. We transform abstract local culture, traditional aesthetic education, and natural science education into curriculum materials tailored to young children's cognitive development, effectively addressing the homogenization of traditional curricula and highlighting the localized and distinctive core of the kindergarten-based curriculum. Third, establish a dynamic, iterative mechanism to ensure the timeliness and innovation of the curriculum content. Based on

feedback from curriculum implementation data, and taking into account children's developmental changes, current trends in social education, and the need to preserve local cultural heritage, the curriculum content should be regularly reviewed, optimized, and updated to eliminate content that is no longer appropriate, outdated, or rigid, thereby ensuring the timeliness, innovation, and appropriateness of the kindergarten-based curriculum.

3.2. Optimizing the curriculum delivery model through digitalization to promote open learning environments

The implementation of traditional school-based curriculum is often limited to in-person group instruction and fixed play settings, resulting in a one-dimensional approach that lacks sufficient engagement from young children and limits the curriculum's extensibility. By leveraging immersive digital technologies and cloud-based collaboration platforms, educators can innovate implementation scenarios, expand the boundaries of the curriculum, and build a new model of implementation that is gamified, immersive, and open-ended—one that aligns with the intuitive, visual thinking and gamified learning characteristics of children aged 3–6. First, create immersive digital environments to enhance the learning experience for young children. By leveraging technologies such as AR, VR, smart interactive screens, and virtual simulation, abstract curriculum content is transformed into visual, interactive, and experiential immersive learning scenarios, breaking free from the limitations of traditional classroom settings—which are often static and one-dimensional. In thematic courses such as nature exploration, traditional culture, arts and aesthetics education, and life education, the creation of digital environments guides young children to replace passive listening and observation with immersive experiences. This fully stimulates their curiosity and enthusiasm for independent learning, thereby fulfilling the requirements for implementing preschool education through play-based and life-oriented approaches. Second, Educators will establish a platform for collaboration across time and space to expand the boundaries of curriculum implementation. Leveraging digital tools such as cloud-based teaching and research platforms, online collaborative communities, and remote interactive classrooms, we will break down spatial barriers between classrooms, preschools, and regions to carry out project-based, preschool-specific curriculum activities that involve inter-preschool collaboration and cross-regional cooperation. Through resource sharing, online interaction, and joint inquiry, we integrate educational resources from multiple sources to enrich the forms of curriculum implementation, transforming the kindergarten-based curriculum from a single-kindergarten setting into open, diverse practical scenarios, thereby broadening young children's learning horizons. Third, educators will establish an integrated online-offline model to overcome the temporal and spatial limitations of the curriculum. Building on the in-person early childhood education and care setting and addressing the need for educational extension at home, educators will leverage the digital home-school platform to provide curriculum extension assignments, engaging inquiry activities, and materials for independent play. This will ensure an effective transition between the curriculum implemented at the preschool and its extension at home, establishing a dual-track implementation model where the preschool serves as the primary setting and the home as the supplementary setting, thereby addressing issues such as the temporal and spatial constraints of traditional curriculum implementation and the lack of sufficient extension opportunities.

3.3. Use digital technology to improve the course evaluation system and achieve a diversified approach to course evaluation

Curriculum evaluation serves as the core basis for the optimization and iterative improvement of kindergarten-based curricula. Traditional evaluation methods rely primarily on teachers' subjective judgments and summative assessments; they feature a limited number of evaluation dimensions, lack robust data support, and provide delayed feedback, making it difficult to accurately reflect the effectiveness of curriculum implementation and the developmental status of young children. By leveraging the advantages of digital technology—including real-time data collection, intelligent analysis, and multi-stakeholder collaboration—the evaluation system can be restructured to transition from “outcome-based evaluation” to a model that integrates “process-based evaluation, multi-dimensional evaluation, and data-driven evaluation.” First, implement real-time data collection to strengthen process-based assessment. Using an intelligent early childhood education and care evaluation system, the system automatically and continuously collects data throughout the entire process—including children's participation in the curriculum, performance in play-based exploration, changes in skill development, and social behavior—while simultaneously recording data on the teaching process, such as teachers' curriculum design, classroom organization, and activity guidance. This shifts away from the traditional summative evaluation model, which relies solely on end-of-term observations and subjective scoring, and enables dynamic monitoring of the entire curriculum implementation process and all dimensions of children's development. Second, establish a multi-stakeholder collaborative framework to enhance the objectivity of evaluations. Leveraging a digital evaluation platform, create channels for diverse stakeholders—including teachers, parents, childcare providers, and educational researchers—to participate in the evaluation process. Teachers conduct professional evaluations focused on the effectiveness of curriculum implementation; parents provide growth assessments based on children's behavior at home; and educational researchers perform quality evaluations using curriculum data. This creates a multifaceted evaluation system characterized by multi-stakeholder collaboration and mutual validation, thereby avoiding the subjectivity and one-sidedness associated with evaluations by a single party. Third, establish a feedback loop to drive continuous curriculum optimization. Using big data and intelligent analysis technologies, various types of evaluation data are integrated and analyzed to precisely identify gaps in curriculum content, issues in the implementation process, and areas of weakness in children's development, thereby generating visualized curriculum quality analysis reports. With evaluation data as the core basis, this approach drives the optimization of curriculum content, adjustments to implementation models, and updates to teaching strategies, thereby establishing a closed-loop curriculum optimization system of “implementation—evaluation—analysis—iteration” to continuously improve the educational quality of the kindergarten-based curriculum.

3.4. Establish a robust, long-term digital support mechanism to standardize curriculum development

The long-term implementation of digitally-enabled preschool-based curricula relies on a multidimensional support system encompassing faculty, resources, collaboration, and institutional frameworks. Given the current challenges faced by preschools—including a shortage of digitally skilled teachers, imbalanced resource allocation, a lack of home-school collaboration, and lagging institutional development—there is an urgent need to establish a comprehensive digital support system to lay a solid foundation for the digital transformation of preschool-based curriculum. First, establish a tiered teacher development mechanism

to enhance the ability to integrate digital technology into teaching. Recognizing the current disparities in teachers' digital literacy, educators will build a tiered, categorized, and routine school-based professional development and training system. For new teachers and those with weaker foundational skills, provide training in basic skills such as operating digital devices, creating digital teaching materials, and basic data analysis to strengthen the digital application capabilities of the entire faculty. For lead teachers and key members of the teaching and research teams, offer advanced training in "digital + curriculum" integration design, digital curriculum development, data-driven instructional assessment, and curriculum innovation research to cultivate core talent for digital curriculum development. By leveraging kindergarten-based digital teaching and research activities—through case studies, collaborative lesson planning, review of outcomes, and inter-kindergarten exchanges—teachers are guided to avoid the pitfall of using technology merely as a formality and to embrace the core philosophy that "technology serves the curriculum, and digital tools empower education," thereby effectively enhancing their ability to deeply integrate digital technology with kindergarten-based curricula. Second, a regional mechanism for the joint development and sharing of resources is established to ensure equitable distribution of resources for curriculum development. To address the imbalance in the allocation of digital curriculum resources between urban and rural areas and among preschools, we will leverage the regional early childhood education digital platform to systematically integrate high-quality resources within the region—including preschool-based curriculum case studies, digital teaching materials, specialized curriculum resources, and assessment plans—and establish an operational mechanism for the joint creation, sharing, utilization, and updating of regional resources. By extending high-quality resources to underserved areas, implementing paired assistance programs for underperforming preschools, and facilitating the mutual exchange of digital resources, we will address the digital resource gaps in rural and grassroots preschools, narrow regional disparities in the digital development of preschool-based curricula, and promote balanced development in the quality of regional early childhood education curricula. Third, improve the digital collaboration mechanism among kindergartens, families, and communities to pool diverse educational resources. By leveraging the digital home-school co-education platform and digital community education channels, we will break down barriers to education among kindergartens, families, and communities. Kindergartens will regularly share curriculum objectives, content, activity schedules, and updates on children's development through digital channels, guiding parents to provide targeted support for curriculum implementation; parents will provide real-time feedback on their children's growth—including home-based learning, interest development, and life experiences—and actively participate in curriculum evaluation and content optimization; by leveraging community resources in culture, science popularization, and public welfare education, kindergartens will integrate these into their school-based curriculum development through digital platforms, thereby establishing a digital collaborative education framework characterized by "kindergarten leadership, family participation, and community support."

4. Conclusion

Currently, the use of digital technology to enhance kindergarten-based curriculum development remains at a superficial stage of integration. Issues such as insufficient digital integration capabilities among teachers, an imbalance in the allocation of digital resources between urban and rural areas, inadequate digital collaboration among families, kindergartens, and the community, and the overly formalistic application of

technology remain widespread. The four-dimensional practical framework developed in this paper closely aligns with the principles of early childhood education and the logic of kindergarten-based curriculum development. By balancing theoretical rigor with practical applicability, it effectively addresses the current challenges in digital transformation and provides actionable guidance for frontline kindergartens in the digital development of their school-based curricula.

In the future, the development of preschool-based curricula must remain steadfastly committed to the child-centered philosophy of education, grounded in the laws governing the development of early childhood education, while avoiding the pitfalls of utilitarian and superficial applications of digital technology, and continuously deepening the integration of digital technology with the curriculum system. Building upon the digital practice framework outlined in this paper, educators must continuously optimize curriculum content, implementation models, evaluation systems, and support mechanisms to fully unleash the educational value of digital technology. By continually exploring the distinctive characteristics of school-based curricula, balancing regional educational resources, and enhancing the quality of care and education, we can drive the effective implementation of digital transformation in early childhood education and contribute to its high-quality, sustainable development in the new era.

Disclosure statement

The author declares no conflict of interest.

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