Deconstruction and Reconstruction: An Exploration of Practical Paths for DeepSeek Empowering Inclusive Education in Kindergartens

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Abstract: The digital technology era has entered the post-intelligent phase, where generative artificial intelligence has rapidly emerged and penetrated early childhood education. However, its application potential in kindergarten teaching scenarios remains under-explored. DeepSeek demonstrates significant advantages in convenience, responsiveness, and integration capabilities, providing a powerful platform for cultivating top-tier young learners, dismantling barriers between knowledge systems, and revolutionizing early childhood teaching methodologies. The integration of generative AI with preschool education can be applied across multiple scenarios including intelligent classrooms, multi-dimensional student profiling, and technology-enhanced instruction. Nevertheless, it is crucial to address limitations accompanying educational technology transformations: mitigating ethical and privacy concerns arising from intelligent data systems, overcoming insufficient conceptual understanding and material support for smart devices, and resolving reliability issues caused by technical constraints. Therefore, early childhood educational paradigms based on children's needs and developmental characteristics. A balanced approach is essential to harness the "double-edged sword" of technology - strategically utilizing its conveniences and advantages while avoiding potential drawbacks, thereby advancing the quality of early childhood education.

Keywords: DeepSeek; Kindergarten; Integrated education

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The rapid advancement of artificial intelligence technology has triggered profound transformations across education, healthcare, finance, and other fields, evolving through four distinct phases: from the 1950 "Turing Test" to Symbolism, Connectionism, and the current stage of AI development. In recent years, numerous generative artificial intelligence (GAI) systems have emerged globally, including notable examples such as AlphaGo, ERNIE Bot, Tongyi Qianwen, Kimi, and similar products^[11]. The debut of ChatGPT in 2022 particularly ignited worldwide attention in the generative AI domain. As a cutting-edge language model of the contemporary era, DeepSeek not only provides technical empowerment in language integration, higher-order cognitive training, and interactive scenario engagement, but also drives innovative transformations in education through intelligent convergence.

1. The Proposal of the Issue

The core characteristics of DeepSeek lie in the profound integration of value orientation and social responsibility, consistently embodying the principles of "people-centeredness" and "upholding the five major ecological concepts." The United Nations Convention on the Rights of the Child emphasizes the protection of children's rights. Currently, the integration of digital technologies into preschool education remains insufficiently innovative and lacks depth, with numerous obstacles such as interaction barriers. The transformation in the artificial intelligence era will

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inevitably bring new opportunities and explorations in technological innovation, talent development, and data renewal, exerting a transformative impact on the field of preschool education. This presents both new challenges and new opportunities. By aligning with the development of the intelligent education era and becoming a "wind rider" in the transformation of preschool education, we can advance kindergarten education and teaching from a single instructional model to a diversified and three-dimensional direction based on the evolving needs of children's growth. This will undoubtedly provide a powerful driving force for cultivating innovative young children.

2. The Value Implication of DeepSeek Empowering Inclusive Education in Kindergartens

In today's era, kindergarten education has evolved from the five major domains of education to inclusive education. The interdisciplinary integration, advanced thinking, and autonomous learning capabilities of generative artificial intelligence align seamlessly with the emphasis on integrated development and the cultivation of well-rounded individuals in early childhood education. As an advanced intelligent education platform, DeepSeek represents the most cutting-edge, open, and shared next generation of artificial intelligence. Leveraging its unique technological advantages, it can effectively promote the development of knowledge integration, advanced thinking, curriculum resource development, interactive teacher-child interactions, and the creation of a collaborative educational environment. Through these capabilities, DeepSeek provides robust support for cultivating high-quality, well-rounded talents with comprehensive development.

(1) Providing a robust platform for cultivating Top-Notch young children

The Kindergarten Work Regulations clearly state: "The mission of a kindergarten is to implement the national education policy, adhere to the principle of integrating care and education, follow the characteristics and laws of children's physical and mental development, and provide comprehensive education in moral, intellectual, physical, and aesthetic domains to promote harmonious physical and mental development of young children." ^[2]. Unlike the learning and talent assessment systems in primary, secondary, and higher education, the development of preschool children is primarily characterized by hands-on experiences and concrete perceptions, requiring a supportive learning environment provided by society, kindergartens, and families.

DeepSeek adopts an open and shared approach, offering free access to the public. It serves as a generator that can input keywords, voice commands, and other forms to generate personalized suggestions, featuring intelligent dialogue, question-solving, knowledge acquisition, and the creation of concrete content. Its simplicity and user-friendliness make it easy for kindergarten teachers to integrate into teaching. In an era of rapid technological advancement, the new generation of young children frequently encounter similar smart devices in their daily lives, facilitating their learning. Teachers can leverage its convenience and intelligence in teaching, enabling young children to engage in technological innovation as well. This further promotes educational equity and enhances children's initiative in exploration and autonomous learning abilities.

(2) Breaking down the barriers of a fragmented knowledge system

Traditional kindergarten education divides teaching into five discrete domains—language, science, art, health, and social studies—resulting in a fragmented, compartmentalized knowledge structure. This approach disrupts the inherent logic of knowledge systems, potentially leading young learners into "either-or" cognitive traps, where they focus narrowly on isolated subjects like health or social studies while overlooking interdisciplinary connections and missing critical educational opportunities. Similar integrated teaching models have already emerged in primary and secondary schools, significantly enhancing student engagement, enriching classroom interactivity, and fostering vibrant learning environments. DeepSeek facilitates a paradigm shift from "disjointed knowledge delivery" to "multidisciplinary integration" by reconstructing knowledge organization patterns and cognitive training mechanisms, thereby providing structural support for innovative knowledge acquisition^[3]. Young children's

developmental needs and individualized learning styles inherently favor play-based learning approaches. Teaching methods that violate developmental principles—such as fragmented curricula or age-inappropriate content— severely undermine children's enthusiasm and intrinsic motivation. Generative artificial intelligence transforms assistive teaching from an "industrialized" to a "smart" model. Educators and kindergarten teachers must return to the essence of education, continually strengthen their pedagogical expertise, and strategically leverage digital technologies to positively support children's holistic development.

(3) Catalyzing transformation in early childhood education

DeepSeek distinguishes itself from conventional intelligent robotic toys and smart management systems, emerging as a pivotal driver in redefining educational methodologies. Currently integrated into teaching practices, it is reshaping the educational ecosystem across instruction, learning, research, and administration. This innovation fosters breakthroughs in early childhood education models, elevates pedagogical processes, enhances educational guality, and optimizes teaching outcomes. Simultaneously, it offers technical guidance to educators and administrators in practical domains such as classroom management, curriculum resource development, instructional design, and environmental optimization^[4]. The Ministry of Education emphasizes the imperative to "leverage educational digitization to support and lead China's educational modernization," advocating for smarter digital technologies that serve holistic human development. The advent of the digital intelligence era is subtly vet profoundly shifting educational objectives and methods. Traditional passive knowledge acquisition has evolved into active, inquiry-driven learning, prioritizing engagement, interactivity, and the cultivation of innovative thinking and problem-solving skills in children—competencies essential for the new era. Generative artificial intelligence, with its capabilities in text recognition and multi-dimensional knowledge graph linkages, enables more intuitive knowledge delivery, facilitates easier access to information for young learners, and amplifies creative exploration. By strengthening participatory learning experiences, it propels educational paradigms from objective, standardized approaches toward subjective, child-centered innovation.

3. Exploration of Practical Pathways for DeepSeek to Integrate into Early Childhood Education

For early childhood education, generative artificial intelligence provides new developmental pathways. With the evolution of the times, it will exert influence on all aspects of young children's lives. Integrating DeepSeek with early childhood education to promote the healthy development of young children and providing a favorable educational environment for their kindergarten education remains a question that requires further exploration.

(1) Establishing innovative intelligent classrooms

Generative artificial intelligence enables voice input and text recognition capabilities, allowing it to provide scientifically accurate answers when young learners encounter questions beyond a teacher's immediate expertise. This timely intervention not only seizes educational opportunities to stimulate deeper thinking but also generates dynamic, playful classroom extensions. According to research by Sun Jiayun and Yuan Jinxia, artificial intelligence has become an integral part of children's lives, serving as both an emotional connector and an indirect source of companionship^[5]. In kindergarten education, this necessitates a balanced approach: neither over-relying on DeepSeek's efficiency nor neglecting children's developmental needs. Instead, educators should align AI integration with pedagogical principles to promote age-appropriate growth. By embedding AI technology into preschool classrooms, teachers can enhance emotional engagement during activities like picture book reading and language instruction while delivering immersive, multi-sensory experiences that transcend real-world limitations. These interactive environments allow children to discover joy in learning and the fascination of knowledge^[6]. DeepSeek further advances this transformation by cohesively merging fragmented knowledge systems through multidimensional knowledge graphs. It integrates the five traditional educational domains into

unified, interdisciplinary lessons, reinforcing the structural logic of knowledge and enabling young learners to grasp concepts holistically—fostering interdisciplinary connections and transferable learning outcomes.

(2) Constructing comprehensive child profile databases

DeepSeek's personalized navigation capabilities leverage intelligent interactive feedback mechanisms, drawing on the knowledge backgrounds and cognitive levels of both children and educators. By automatically analyzing recent data on children's health, intelligence, cognitive patterns, attention spans, and emotional states, it assesses holistic developmental progress, updates information dynamically based on phased changes, and tracks growth trajectories. This enables educators to intuitively monitor developmental milestones, compare individual performance against age-specific benchmarks, identify strengths and gaps, and refine strategies to nurture well-rounded, intelligent development^[7]. Through continuous data monitoring, DeepSeek generates multidimensional holographic profiles of children, surpassing traditional one-dimensional assessment methods. Tailored to each child's developmental stage and age characteristics, it dynamically adapts learning strategies, provides adaptive evaluations, and delivers precise, differentiated, and personalized learning support^[8]. Generative AI holds particular promise for supporting children with special needs. For those who struggle to articulate emotions or actions verbally, the system analyzes real-time behavioral data input by teachers to generate comprehensive reports. Additionally, it creates customized tasks calibrated to individual abilities, infusing learning with emotional resonance to enhance engagement and motivation.

(3) Intellectually empowering classroom teaching

The digital intelligence era elevates the content of early childhood teaching activities to a new level, fostering new advancements in children's capabilities across language, science, health, art, and social domains. Preschoolers now seek both entertainment and knowledge in their play, driven by their imagination and curiosity about the world, while also demanding higher levels of scientific accuracy and novelty in the knowledge they acquire. Classroom instruction can leverage DeepSeek's strengths in convenient knowledge generation and systematic organization. Before formal classroom lectures, teachers can use DeepSeek to prepare scenario-based lessons that expand children's knowledge, creating engaging introduction segments. Simultaneously, the platform can establish systematic connections across the five domains of knowledge, enabling multi-faceted exploration to enhance children's understanding⁽⁹⁾. Prior to corner activities (e.g., learning centers), DeepSeek can provide popular science content to lay a foundation, and during these activities, it can integrate education with play to better promote children's holistic development. For example, before science corner activities, children can learn about Earth-related environmental protection knowledge and watch demonstration videos on waste sorting; after construction corner activities, DeepSeek can showcase children's works, identify structural issues in their designs, and offer personalized evaluation suggestions^[10]. By using DeepSeek, educational processes and daily activities are integrated in a gamified, scenario-based, and interactive manner. This transforms tedious, repetitive operational tasks into playful activities that align with children's interests, making learning more engaging and effective.

4. Reflection and Prospects on the Integration of DeepSeek into Early Childhood Education

The deep integration of DeepSeek with early childhood education, through intelligent empowerment, cognitive empowerment, and ecological empowerment, has constructed a systematic educational environment that fosters the collaborative development of thinking, literacy, and cognition ^[11]. However, it remains constrained by barriers such as ethical literacy, equipment resources, and technical support, struggling to meet the demands of cultivating innovative talents in synergy with technological advancements. Generative artificial intelligence offers numerous application scenarios in preschool education, yet its usage methods remain relatively monotonous, with insufficient integration and outdated concepts. Privacy and ethical issues pose threats to the sustainability of intelligent

teaching environments. It is crucial to acknowledge these drawbacks and address them appropriately, ensuring that the integration of DeepSeek in early childhood education harnesses its advantages while mitigating risks. This balanced approach will enable the field to fully leverage technological innovation for the holistic development of young children.

(1) Avoiding ethical and privacy issues arising from smart data

While the digital intelligence era brings convenience, it also introduces legal and security concerns such as privacy and ethics. The collection of personal information through big data carries risks of privacy breaches, including potential "doxxing" or "online harassment through personal information exposure, which primarily threaten the personal safety and information security of young children and teachers. When using the generative artificial intelligence tool DeepSeek, ensuring security is paramount. After data analysis, it is essential to regularly recycle or delete data. Clear standards and limits must be established for the accuracy, standardization, and scope of data collection, particularly regarding overly sensitive information. This requires kindergarten administrators and product technicians to strengthen technical supervision and timely regulatory oversight, collectively safeguarding a safe environment for children's healthy development. Additionally, excessive use of such technologies can lead to physical health risks. For example, prolonged screen time may cause vision deterioration and an increased incidence of early myopia. Immersion in high-frequency interactions with virtual technologies and voice dialogues may reduce the quality of teacher-child interactions and peer relationships, fostering over-reliance on virtual emotional connections while neglecting direct, hands-on experiences^[12]. Therefore, during the application of generative artificial intelligence, we must neither overstate its educational benefits nor overlook the potential harm caused by overuse. We should remain vigilant against these risks, adhere to the principle of prioritizing children's safety, and ensure ethical issues are addressed fairly and justly under safe and appropriate conditions, thereby avoiding unnecessary harm to young children.

(2) Insufficient concepts and material support for the use of smart devices

In recent years, the popularity of events like the Shanghai World Expo and smart home appliance exhibitions has been widely recognized. The free availability of DeepSeek, replacing the previous ChatGPT, has truly made it accessible to millions of households, bringing convenience to people's lives. Currently, smart devices have entered daily life, but in kindergartens, equipment updates are slow and have long cycles, and users' information literacy is insufficient, failing to meet the needs of children's development. Many teachers now aspire to integrate teaching with smart information and possess certain information literacy skills, yet they lack practical techniques in usage, apply the technology inflexibly, and lack sufficient practical experience and theoretical foundations. As a result, there is a shortage of frontline early childhood educators who can proficiently utilize such tools ^[13]. Simultaneously, technical support is inadequate, and many kindergartens lack the necessary equipment to support new technologies. Integrating new technologies into education and teaching also requires theoretical guidance. The question of how to select specific educational strategies based on children's developmental patterns and individual differences to better enhance their growth potential remains a challenge for the future. Beyond insufficient technical implementation, teachers also struggle to find generative AI teaching resources and case studies tailored to early childhood education, making it difficult to identify effective reference paths in practice and limiting the possibility of practical application.

(3) Lack of reliability caused by technical limitations

Despite the extensive application scenarios of DeepSeek and its significant potential in the education sector, it still faces limitations in data collection, differentiated analysis, and situation handling, requiring scientific and rational treatment. The content generated by generative artificial intelligence may not fully align with the personalized characteristics and specific needs of young children. Before data input, teachers exhibit both objectivity

and subjectivity in data collection. While macroscopic observations can be made intuitively, there remains uncontrollability in details, potentially leading to content repetition, monotonous teaching, and homogenized or oversimplified instructional materials. After data generation, due to the influence of non-intellectual factors such as children's emotional states and innate temperaments, the depth and flexibility of path design are lacking. Generative artificial intelligence needs to be better integrated with the laws of children's physical and mental development, age characteristics, and individual differences across multiple dimensions. Therefore, a more refined prompt system or comprehensive technical solutions are required to provide support ^[14].

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