

# Research on Strategies of Big Data Assisting Children's Literature Reading

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## ABSTRACT

With the rapid development of information technology, big data is profoundly affecting the field of children's literature reading. The purpose of this study was to explore the strategies to guide children's reading in the digital age and to stimulate children's reading interests and cultivate good reading habits by using intelligent technology. In order to influence children's reading strategies, a four-layer intelligent system framework was designed, covering data collection and analysis, behavior interpretation and content analysis, personalized program customization and dynamic optimization, and immersive reading experience. Research has proven that reading strategy combined with intelligent recommendation and augmented reality technology can improve children's participation in reading, their understanding of reading, and their reading decision. This study provides help for educators, parents, and publishing institutions to choose reading materials and help children grow up healthily.

## KEYWORDS

Big Data, Reading Strategy, Children's Literature Reading, Intelligent System, Intelligent Decision-Making

## INTRODUCTION

Under the background of the rapid development of information technology (IT), big data, artificial intelligence (AI), and immersive technology are profoundly reshaping the educational ecology, especially in the field of children's reading (Alam & Mohanty, 2023; Wang & Huang, 2025; Yıldız, 2024). The traditional reading of children's literature is transforming from paper media to multi-modal and cross-platform digital reading, and the availability of reading behavior data provides a technical basis for accurate and personalized reading guidance (Connor, 2019; Xu et al., 2019). However, how to effectively integrate multi-source data, build a scientific and operable intelligent reading support system, and balance the relationship between technological innovation and children's cognitive development law is still the key challenge in the current educational technology practice (Li, 2022; Yiğit Gençten & Aydemir, 2023). The purpose of this study was to explore a reading guidance strategy for children's literature based on big data and intelligent technology, so as to improve children's reading participation, understanding ability, and long-term reading habits. In order to achieve this goal, a four-layer intelligent system architecture integrating data-driven and cognitive theory was studied and constructed, covering a data foundation layer, an intelligent analysis layer, a strategy generation layer, and an experience interaction layer. Through online and offline multi-source data collection (including electronic reading behavior, interactive data of paper books, etc.), the system combined an interest association algorithm, natural language processing (NLP), and knowledge mapping technology

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to realize automatic generation of personalized book lists. At the same time, augmented reality (AR) technology is integrated to create an immersive reading experience and enhance the interactive and situational learning effect. The empirical results showed that the experimental group with intelligent recommendation + AR strategy was significantly superior to the traditional group and the control group with only intelligent recommendation ( $p < 0.001$ ) in the monthly reading volume (11.3 books), comprehension test score (89.7 points), and six-month reading persistence rate (78.9%). This study provides a practical paradigm that can be replicated and popularized for the in-depth application of IT in educational scenes. The research not only shows the remarkable advantages of intelligent technology in improving reading efficiency but also provides methodological reference for the design and evaluation of educational IT products.

The innovation of this study is as follows: (1) A complete four-layer intelligent reading system framework of data-analysis-strategy-experience was proposed and verified, which realized the closed loop from theory to landing. (2) The AR immersion experience was deeply integrated with personalized recommendation for the first time, and its synergistic effect in promoting deep reading and high-order thinking was demonstrated. (3) The technology adaptation matrix based on Piaget's cognitive development stage was constructed, which provided a scientific basis for the age suitability of the technology application.

## **LITERATURE REVIEW**

In the digital age, with the rapid development of IT, the field of children's literature reading is undergoing unprecedented changes (Ozbay & Ugurelli, 2023). The application of big data technology has not only changed the way books are created, published, and disseminated but also provided possibilities for personalized reading guidance (Kucirkova & Flewitt, 2020; Zhang et al., 2022). Dinç et al. (2021) demonstrated how integrating paper circuits and LEDs into children's picture book designs through a multidisciplinary university course bridges human-computer interaction and literary education, fostering innovative storytelling and deeper reader engagement. Furenes et al. (2021) conducted a meta-analysis revealing that while digital books with story-congruent enhancements can surpass paper books in supporting children's learning, overall comprehension tends to be lower for digitized texts without such features, particularly when adult mediation is absent. Çetin and Ulusoy (2023) found that AR-based reading environments significantly enhanced oral retelling skills among third-grade primary school students, as demonstrated through a formative experiment integrating both quantitative and qualitative data. Kucirkova (2019) critiqued the personalization logic in children's reading recommendation systems for lacking alignment with constructionist learning theories, arguing that they limit children's agency, and he calls for designs that support self-discovery, experimentation, and algorithmically informed diversification to foster deeper cognitive engagement. Danaei et al. (2020) found that children who read an AR storybook demonstrated significantly better overall reading comprehension and performance on implicit questions compared to those reading a traditional print version, indicating that multimedia integration through AR can enhance children's engagement and understanding of narrative content. Maresca et al. (2022) demonstrated that virtual reality-based neurorehabilitation significantly improved word-reading and homophonic writing skills in children with dyslexia, outperforming conventional treatment and enhancing cognitive engagement through immersive, motivating experiences. Bai et al. (2022) reviewed the application of technical features and emotional design in digital picture books, highlighting their potential to support children's emergent literacy while discussing the varying effectiveness and ongoing skepticism surrounding their integration in early learning contexts. Frederico (2024) analyzed three children's literary apps to explore how digital literature constructs emotional experiences through multimodal semiotic resources, proposing an interdisciplinary framework that links phenomenology and social semiotics to highlight the embodied nature of affective engagement in digital reading. Yuan et al. (2025) found that AI-based chatbots in shared book reading differentially affect language learning

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