Exploration and Practice of Intelligent Services for Children's Picture Books in Public Libraries: A Case Study of the Children's Area at Shanghai Library East Branch

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Abstract

Purpose/Significance As one of Shanghai's cultural centers, the Shanghai Library faces a critical challenge in providing intelligent picture book services for young readers during its transformation into a smart library to align with contemporary development. This study analyzes the practices implemented in the children's borrowing area of the Shanghai Library East Branch since its opening, focusing on intelligent reading environments and resources, as well as intelligent picture book displays and activities. Methods/Process Furthermore, this research explores optimization directions for intelligent picture book services for children in public libraries, including cultivating smart service awareness among children's librarians, developing smart technology-driven branded series of activities for children, and improving the utilization rates of intelligent activity facilities for children. Results/Conclusion The intelligentization of picture book services is not merely the application of technology, but also a bridge between children's librarians and young readers. Through intelligent services, they can be guided toward the path of independent reading and knowledge creation. In future development, the intelligentization of children's picture book services in public libraries will continue to advance, establishing an important service platform for children's intelligent reading, providing them with high-quality and diversified picture book reading services, stimulating their reading interest, cultivating their reading abilities, and laying a solid foundation for their future development.

Full Text

Exploration and Practice of Smart Services for Children's Picture Books in Public Libraries: A Case Study of the Children's Area at Shanghai Library East Branch

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Abstract

[**Purpose/Significance**] As one of Shanghai's cultural centers, Shanghai Library has been undergoing a transformation into a smart library to adapt to the development of the era. Providing enhanced smart services for children readers has become a crucial issue. [**Method/Process**] This study analyzes the practices of the children's borrowing area at the East Branch of Shanghai Library in terms of smart reading environment and resources, smart exhibition of picture books, and related activities. Furthermore, it explores the optimization direction of smart services for children's picture books in public libraries, including fostering the awareness of smart services among children's librarians, implementing smart technology-driven series of activities for children, and enhancing the utilization of smart activity facilities. [**Result/Conclusion**] The smartification of picture book services is not just about technological applications; it serves as a bridge between children's librarians and young readers. Through smart services, children can be guided towards independent reading and knowledge creation. In future development, the smartification of children's picture book services in public libraries will continue to advance, creating an important service platform for smart reading among children. It will provide high-quality and diverse picture book reading services, stimulate their reading interests, and cultivate their reading abilities, laying a solid foundation for their future development.

Keywords: public library; smart services; picture books; children

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In recent years, new concepts such as big data, artificial intelligence, and the metaverse have gradually entered public consciousness, bringing tremendous changes to people's lifestyles. IBM first proposed the concept of "Smarter Planet" in 2008, and since then, the philosophy of "smartness" has been gradually applied across various industries, including public libraries. As a comprehensive research-oriented public library, Shanghai Library has traditionally focused primarily on adult readers. However, with societal development, the importance of children's services has become increasingly evident. In September 2022, the children's area of Shanghai Library East Branch officially opened to the public, committed to providing comprehensive reading services with an international perspective for children and teenagers aged 0 to 14. Among these,

picture books, as the most popular reading material for preschool children, have made picture book reading services and reading promotion activities a key component of the East Branch's children's area. Picture books, often translated as "picture books" in English, currently represent the most common reading material for preschool children. As attention to picture books grows daily, many public libraries have substantially purchased outstanding foreign picture books and domestic original works, launching various reading promotion services for quality picture books. However, since picture books were introduced to China and became popular relatively recently, public libraries are still exploring the domain of picture book reading service provision and promotion. As one of Shanghai's cultural centers, Shanghai Library faces the critical challenge of how to better provide smart picture book services for young readers during its transformation into a smart library to meet the demands of the times. Therefore, this study takes Shanghai Library East Branch as the research object, focusing on smart picture book services for children, and aims to explore how public libraries can better enhance their children's picture book service levels during the process of smart transformation.

Current Status of Smart Library Services for Children

Since the concept of the smart library was proposed, it has remained a hot topic among scholars. In recent years, many researchers have also focused on the smart transformation of children's services in libraries.

Smart Reading Scenarios and Digital Reading Resources

With the development of the times, the contradiction between traditional children's services in public libraries and readers' growing reading demands has become increasingly prominent. To adapt to the trend of smart development, the National Library of China's Children's Library has constructed a digital multimedia platform through a national-level digital library project, collecting tens of thousands of multimedia e-books that integrate text, images, and audiovisual content, thereby breaking the spatial limitations of children's reading and the singularity of book resources [1]. Children's reading rooms have their particularities, as children have very high rates of book access, which creates numerous challenges for children's librarians in shelving and organizing books. The children's reading area of Baiyun District Library has extensively adopted smart bookshelves, utilizing RFID technology to more conveniently complete functions such as inventory checking, searching, and rapid location of books. Additionally, the children's area employs AR technology to assist young readers in quickly finding book locations through scenario-based approaches, allowing children to experience the convenience of smart services and derive enjoyment from the process of locating library resources.

Smart Services and Integrated Development

Integrated education was first proposed in the United States in the 1960s. Its philosophy holds that the education of children with special needs should avoid restrictions, focusing on a "people-oriented" service spirit to enhance services for all children and satisfy the spiritual and cultural needs of every child. Meng Ping argues that when facing special groups of children, children's libraries should follow the pace of the times and gradually transform children's services toward smart services, such as utilizing technologies like 5G, AR, and VR to create smart integrated reading experience zones for children, reducing restrictions on children's reading and helping them regain interest in reading. Yang Fan discovered that when libraries conduct science popularization reading promotion for young readers, they can also use emerging technologies such as 3D interactive screens as media to fully engage children's senses and thereby deepen their knowledge impressions.

From existing research, the smart transformation of children's services in public libraries remains in an exploratory stage, and libraries' children's services require long-term practice to achieve smart transformation.

Smart Reading Environment and Resources at Shanghai Library East Branch

Smart Reading Environment and Resources

The children's borrowing area at Shanghai Library East Branch features a youth reading zone at its entrance and a toddler reading zone on the other side. The toddler reading zone, primarily a picture book area, is a reading space and open activity area specially designed for children aged 6 and under. The reading room includes rich facilities such as a picture book theater, children's activity classrooms, and silent pods for parent-child reading. In addition to picture book shelves, there are specialized shelves for different types of materials, including Chinese-English graded readers, low-age toy books, books compatible with Caterpillar/Chick-Chick-Ball point-reading pens, and periodical shelves. Children can explore, create, and enjoy quiet parent-child time here.

At East Branch's children's reading room, picture book paper resources account for 60.58% of the collection, while other books comprise 39.42%. Picture books are categorized by the author's nationality, using colors inspired by the Olympic rings to distinguish continents, with orange added to differentiate domestic original picture books. In addition to paper resources, Shanghai Library East Branch has partnered with OverDrive to provide nearly ten thousand original electronic resources accessible via mobile phones and computers. Currently, all paper collections in the East Branch's children's area have been fully RFID-enabled, making the borrowing and management of children's books increasingly contactless (through automated sorting systems, self-service borrowing machines, and robotic inventory equipment). Since resources remain primarily paper-based,

this aspect will not be elaborated upon further.

As a distinctive collection resource of East Branch's children's area, the library has been equipped since opening with 100 Caterpillar point-reading pens, Chick-Chick-Ball pens, and Niuniting series point-reading pens along with their companion books. These point-reading pens primarily utilize OCR technology and digital voice technology. Since OCR technology entered public view in the early 1960s, it has undergone decades of development, resulting in relatively mature technology and stable products. As a new generation of smart devices and tools for reading picture books with children, point-reading pens can achieve easy point-reading, repetition, recording, entertainment, and other functions, deeply loved by young readers and their parents, and greatly enhancing children's reading interest.

Smart Picture Book Exhibition and Activities

The exhibitions "Chinese Dream in Picture Books" and "Go, Chase the Rabbit—Alice in China Centennial Exhibition" both opened on September 28, 2022, in the children's reading area of Shanghai Library East Branch. The "Chinese Dream in Picture Books" exhibition displayed 150 picture books, representing the first step by children's librarians to recommend outstanding collection materials to young readers through exhibition formats. By carefully selecting exhibition books and designing display lines, children can understand stories within picture books and absorb the energy of traditional culture in the designed smart reading environment upon entering the East Branch's children's area, thereby establishing cultural confidence from an early age.

To create better audio-visual experiences for children, the opening exhibitions in the children's area no longer limited themselves to traditional, flat display methods but instead adopted interactive projection. Through projection, sensing, and other smart technological means, illustrations from literary works were transformed into visualized images, allowing children to interact with glass projections and presenting different versions of Alice's image to attract young readers' attention.

Relatively speaking, preschool and primary school children are in the stages of accompanied reading and independent reading initiation, respectively, with broad reading interests and more time and energy for reading. As children's librarians, they should demonstrate greater subjective initiative by actively focusing on core authors and outstanding picture books. To this end, the children's librarians at East Branch have collaboratively created the "Four-Thirty School" suitable for children. This series of courses primarily relies on an immersive classroom featuring three characteristics: "immersive, digital, and interactive." Taking the course "Marine Life Illustrated" as an example, the course plot is based on the picture book of the same name, with the storyline set as animals from the book having escaped, requiring children to assist librarians in retrieving them through fun game interactions and story plot performances. The immer-

sive classroom allows young readers to break free from traditional classroom boundaries, realistically simulating scenes such as ancient creatures and ecological environments. The interesting interactive experiences also enable children in the reading initiation stage to better grasp knowledge in a short time.

From the perspective of public library children's service content, children's picture book services are no longer limited to providing children with picture book resources and electronic resources. Children's librarians need to actively assist children in obtaining information, internalizing it into their knowledge reserves, and ultimately developing the willingness to create knowledge, achieving the goal of "transforming knowledge into wisdom" [2]. Shanghai Library East Branch's children's area has introduced desktop projector equipment preloaded with multiple electronic picture book courseware. Through cooperation with surrounding kindergartens, a series of light-and-shadow book activities have been conducted for young readers on a class basis. The desktop projector allows page-turning by lightly touching the desktop and interaction with characters in the picture book by long-pressing the screen, bringing a unique and interesting reading experience to children through a large desktop interactive projection screen. After the activities, young readers enter the children's reading room to browse paper picture books. Through the linkage between light-and-shadow books and paper resources, children are immersed in a strong picture book learning atmosphere, generating interest in independent picture book reading.

Public library reader groups are diverse, and smart services for young readers are gradually being explored. Shanghai Library East Branch has applied the library's smart activity reservation platform for children's activity booking services, allowing readers to regularly book activities for their children through the mini-program platform. Since its opening, Shanghai Library East Branch has collaborated with multiple institutions and social organizations such as Magic Children's Book Club and Xiaobien to jointly conduct activities including picture book selection and promotion. Combined with smart reading equipment in activity classrooms, these initiatives provide children with a series of picture book activity promotion services. The activity classroom located in the children's borrowing area is equipped with recording and broadcasting all-in-one machines, interactive terminals, image tracking all-in-one machines, and MAX-HUB devices. When conducting activities for young readers, the system can automatically capture children's participation and interaction processes through multi-camera positioning based on "image analysis technology" without requiring involvement from children's librarians. The overall recording and broadcasting system demonstrates high stability, also laying a good foundation for librarians to review activities afterward.

Optimization Directions for Smart Services

Fostering Smart Service Awareness Among Children's Librarians

During the smart transformation of public libraries, the role of children's librarians is undergoing significant change. Children's librarians are no longer merely traditional information providers but need to become facilitators who can transmit information to children and transform it into their knowledge. More importantly, children's librarians must maintain awareness of smart services in the future development of public libraries, guiding and assisting young readers to utilize various library resources more efficiently. This smart service awareness includes not only the application and mastery of smart facilities and information technology but also keen insight into the needs of young readers. In the future, children's librarians' smart service awareness will require understanding, application, and practice of emerging technologies. For example, AR, VR, and AI technologies have already been applied in various aspects of smart libraries, and children's libraries can greatly enrich young readers' reading experiences if these technologies are properly utilized. Additionally, children's librarians need to possess innovative consciousness, continuously exploring and experimenting with new children's service models to meet the increasingly diverse needs of young readers.

Smart Technology-Driven Branded Activity Series

Children's picture book brand activity series driven by smart technology can attract more young readers to participate in library activities, enhancing their reading interest and habits. The audience for picture books is often young children, whose reading focus tends to be relatively lacking. Currently, Shanghai Library East Branch has been open for less than one year, and there remains room for improvement in both the volume and quality of activities. For example, the library could leverage whole-library resources and smart equipment to hold educational and entertaining children's brand series picture book reading promotion activities, providing immersive picture book reading experiences for young readers. Smart methods can enrich the forms and content of children's activities and effectively improve young readers' participation and concentration, thereby enhancing their enthusiasm and interest in reading.

Enhancing Utilization of Smart Activity Facilities

The children's borrowing area currently possesses many intelligent picture book activity devices. In the future, the library can make full use of these smart facilities to improve the utilization rate of activity equipment, innovate children's service methods, and hold events such as technology experience activities and innovation workshops to attract young readers to use smart facilities. This realizes additional functions beyond traditional public library services, aiming to stimulate young readers' reading interest and meet their diverse needs.

With continuous technological progress and innovation, public libraries, as im-

portant venues for enlightening young readers' reading thinking and knowledge dissemination, will continuously integrate smart elements to bring more surprises and fun to young readers. The smartification of picture book services is not merely about technological application but serves as a bridge between children's librarians and young readers. Through smart services, children can be guided toward independent reading and knowledge creation. In future development, the smartification of children's picture book services in public libraries will continue to advance, opening up a broader reading world for young readers. Through continuous innovation and improvement, public libraries will become important service platforms for children's smart reading, providing high-quality and diverse picture book reading services that stimulate their reading interest, cultivate their reading abilities, and lay a solid foundation for their future development.

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Note: Figure translations are in progress. See original paper for figures.