

The Dilemma and Optimization Path of Reading for the Blind in the Era of Smart Media in China

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Abstract

In the context of the era of smart media, the blind community in China faces a significant reading gap. The structural contradiction between technological empowerment and the social support system exacerbates their cultural marginalization. This article analyzes the deep-seated dilemmas of reading for the blind from three dimensions: technological adaptability defects, imbalance in the supply of resources for the blind, and lagging service support system. Specifically, the accessibility design of smart media has long been marginalized; Braille books suffer from lagging technological iteration and limited content; and there is a universality trap in blind devices. Braille reading materials and audio resources are subject to exorbitant prices and scarce supply due to the exclusion of rights in the production mechanism. Furthermore, the public service system is trapped in formalism due to institutional stagnation and practical dysfunction. Based on this, a three-pronged collaborative governance framework of "technology adaptation, resource integration, and institutional guarantee" is proposed, advocating the construction of a universally accessible public goods supply system, promoting the deep integration of intelligent technology ethics and humanistic care, and reconstructing the service ecosystem through multi-stakeholder collaboration.

Keywords

Smart Media Era, Blind Reading, Barrier-Free Design, Service Supply System.

1. Introduction

Millions of books are published worldwide each year, but only 1% to 7% of these books reach the 285 million blind and visually impaired people globally, 90% of whom belong to low-income groups in developing countries. In China, the blind are a large and unique group. Statistics from the China Disabled Persons' Federation show that as of the end of 2023, China had 17.5 million visually impaired people collectively referred to as blind, accounting for about one-fifth of the world's total blind population, of whom about 8 million are completely blind, and the number of newly blind people reaches as high as 450,000 each year. Against this backdrop, the 31st meeting of the Standing Committee of the 13th National People's Congress of China approved the Marrakesh Treaty on Facilitating Access to Published Works for the Blind, Visually Impaired, or Other Persons with Print Reading Impairments in 2021. This treaty officially came into effect in China in May 2022, gradually highlighting the growing demand for accessible reading among the blind in China. In April 2023, the Second National Congress of Reading for All of China proposed an initiative to "Focus on Reading for the Visually Impaired," calling for attention to the cultural needs of the visually impaired in China. In April 2024, the Third National Congress of Reading for All of China established the "Consortium for Accessible Reading Copyright Services for the Visually Impaired" and released the "Initiative for Accessible Reading Copyright Services for the Visually Impaired," aiming to continuously improve the accessible reading

copyright service system and ensure the effective protection of the reading rights of the blind. During the 14th Five-Year Plan period, 900 Braille books are published annually by the China Braille Publishing House, including 400 new Braille books, 400 reprinted Braille books, and 100 new books with both sight and blind comparisons.[1-2]

However, although the Chinese government has gradually begun to pay attention to protecting the reading rights of the blind, in the era of smart media, technological empowerment and information dissemination innovation have still failed to effectively bridge the reading gap for the blind. The structural contradiction between technological tools and social support systems has also exacerbated the cultural marginalization of the blind community. This article, based on the theory of information accessibility and the research paradigm of digital inclusion from the perspective of the sociology of technology, and combined with the structural contradictions in the localized practice scenario in China, analyzes the predicament of reading for the blind in China in the era of smart media from three dimensions, and proposes corresponding optimization paths to better protect the reading rights of the blind in China.[3]

2. The Predicament of Reading for the Blind in China in the Era of Smart Media

2.1. Technological Adaptability Needs Improvement

(1). Technical Limitations of Braille Books

According to a report by Shaanxi.com in May 2024, Li Hao, the operator of Jiakang Blind Massage Shop in Zhouzhi County, stated that in terms of professional skills, Braille books are still limited to traditional Chinese medicine massage. With the development of technology, screen reader software has become widespread among the blind, enabling them not only to perform massage but also to engage in computer programming, copywriting, and musical instrument playing, but he has not yet read Braille books in these areas. The technical limitations of Chinese Braille books are essentially a systemic obscuring of humanistic values by technological instrumental rationality. This predicament can be critically reflected upon from three levels: technological path, media convergence, and cognitive adaptation. In terms of technological production, Braille compilation has long adhered to mechanized printing processes, resulting in a "technology lock-in" effect in standardized production processes. The physical rigidity of dot matrix encoding restricts the dynamic updating ability of text, leading to a structural disconnect between the rate of content iteration and the era of knowledge explosion. In terms of media convergence, there is institutional lag in the collaborative innovation between the Braille publishing system and digital technology. Tactile text has failed to effectively connect to the multimodal interactive scenarios of smart terminals, making printed Braille books "technological islands" in the wave of digitalization. In terms of cognitive adaptation, the linear encoding logic of the tactile symbol system creates a deep contradiction with the three-dimensional needs of blind people for embodied cognition. The spatial arrangement rules of Braille dots are unable to support the representation and transformation of abstract concepts, especially forming a "tactile barrier" for knowledge dissemination in professional fields such as science and art. This technological limitation not only exposes the cognitive bias of accessible design paradigms regarding sensory compensation mechanisms, but also reflects the value misplacement of technological ethics in the protection of cultural rights. When technological innovation in Braille books remains confined to the rudimentary dimension of "accessibility," their cultural enlightenment function as a carrier of knowledge has been systematically weakened in the process of technological alienation.[4]

(2). The compatibility of smart devices for the blind needs improvement

The team at Chongqing Wujie Qihang Innovation Technology Co., Ltd., which developed the "Braille Kindle," discovered during their research and development that traditional single-line

Braille displays only have one line of sixteen Braille characters, making it impossible to display complete phrases like "How can a sparrow know the ambition of a swan?" Furthermore, traditional displays rely on users downloading fixed-format resources from the internet, limiting access to content. In addition, even with a screen reader, blind people face significant obstacles when using mobile phones for reading due to the difficulty of typing and manual input, such as the extreme inconvenience of searching for books and expressing reading experiences. The adaptability dilemma of smart devices for the blind is essentially a structural break between the rationality of technological tools and the ethics of user needs. At the technical design level, smart device development adheres to a vision-centric logic, and the misalignment between standardized technical solutions and the multi-sensory interaction modes of the blind leads to a "universality trap" in functional development—while the devices possess basic information conversion capabilities, they struggle to adapt to the cognitive construction needs of complex scenarios. At the technological iteration level, frequent system upgrades disrupt the stability of existing accessibility interfaces, and device maintenance falls into a "version catch-up" dilemma, forcing users to bear secondary obstacles arising from technological incompatibility. This adaptability deficiency is essentially a concrete projection of technological alienation in the field of devices for the blind, reflecting the systemic collapse of the humanistic care paradigm in the construction of a smart society.[5]

2.2. Structural Imbalance in the Supply of Resources for the Blind

(1). Excessively High Prices of Reading Resources for the Blind

"A Braille version of *Journey to the West*, consisting of 12 volumes, costs 2103 yuan." "A Braille version of *The Legend of the Condor Heroes* costs 981 yuan, roughly the price of a regular edition of *The Complete Works of Jin Yong*." "Compared to ordinary books, Braille books have higher publishing and printing costs, approximately 20 times that of ordinary books. The editing, proofreading, and printing processes for Braille books also require more staff, thus lengthening the publication cycle. This makes Braille books more expensive than ordinary books." The excessively high prices of resources for the blind in China ultimately stem from the exclusion of rights within the resource production mechanism, which drives up marginal costs. China's production system for resources for the blind has long been excluded from the mainstream publishing industry chain. The market logic of visual centrism has led to a "compensatory supply" trap in the production of special cultural products such as Braille books and audio resources. The standardized production of these resources is constrained by a double cost squeeze: bearing the existing copyright licensing fees of the mainstream publishing system while also requiring additional technological investment in sensory adaptation modifications. In the process of cultural capital reproduction, the niche nature of the blind community is distorted into a natural barrier of "diseconomies of scale," and the spontaneous adjustment of the market mechanism actually reinforces price distortions. In essence, this is a structural defeat in the struggle between the subjectivity of rights and economic rationality in the process of cultural capital reproduction, reflecting a deep-seated value paradox between the vision of inclusive social development and the market-based resource allocation mechanism.

(2). Limited Reading Resources for the Blind

Currently, there are significant differences in the offline and online collections of public libraries for the blind across different regions and levels in China. Even libraries at the same level have vastly different collections. According to a report by Shaanxi.com in May 2024, Li Hao, the operator of Jiakang Blind Massage Shop in Zhouzhi County, stated that the variety of Braille books is too limited, and the content is outdated. In literature, Braille books are limited to classic works from the past, with content mostly from one or two decades ago, and very few new books in recent years. According to statistics from the World Blind Association, approximately one million books are published worldwide each year, but less than 5.00% of

these are actually converted to accessible formats, and textbooks and supplementary materials account for a large proportion, failing to meet the diverse reading needs of the blind. Furthermore, according to the "China Culture, Cultural Relics and Tourism Statistical Yearbook 2023" (public library section), the Braille book collection in public library reading rooms for the visually impaired is only 1.4665 million volumes, representing only 0.11% of the total book collection. The limited access to reading resources for the visually impaired in China is essentially a structural failure of the cultural rights protection mechanism in the struggle between technological rationality and humanistic values.

2.3. Delayed Response of Service Support System

(1). The Braille Reading Service System is Virtually Ineffective

Taking Shaanxi Province as an example, there are currently nearly 300,000 visually impaired people in Shaanxi. To protect their reading rights, Shaanxi public libraries have established 75 reading rooms for the visually impaired, housing over 20,000 Braille books. Of these reading rooms, 49 offer normal lending services, 34 offer home delivery, and 5 offer mail delivery of Braille books. However, according to statistics, there are only 13 full-time staff members in the visually impaired reading rooms of public libraries throughout Shaanxi Province. Some reading rooms lack initiative in providing services and exhibit a tendency to prioritize the collection over the use of Braille resources. Approximately 40% of the reading rooms did not receive a single visually impaired reader throughout the year, and over 70% of the reading rooms did not lend out a single Braille material throughout the year. Furthermore, research revealed that in many parts of Shandong, visually impaired reading service areas are routinely underutilized, and Braille books in library collections have seen zero borrowings in recent years. The digital reading room for the visually impaired in Qingdao libraries is virtually deserted. The ineffectiveness of China's blind reading service system is essentially a systemic disconnect between institutional promises and practical effectiveness. While the policy framework establishes the legal status of barrier-free services, it fails to construct differentiated pathways for realizing these rights, resulting in a service system that remains merely a "symbolic governance" of physical space coverage. This dual predicament of institutional stagnation and practical incompetence exposes the systemic collapse of inclusive ethics in public service provision.[6]

(2). Difficulty for Blind People to Purchase and Borrow Books

"It's basically impossible to buy Braille books in bookstores, and there are very few Braille books sold online. I mainly rely on the QQ group established by the China Braille Publishing House to get book information. I buy all the Braille books I can, but it's still far from meeting my reading needs," said Li Hao, the operator of Jiakang Blind Massage Shop in Zhouzhi County. "Braille books can be borrowed online, and postal workers will deliver them to the store free of charge. However, when returning the books, I have to take them to a post office branch; the post office doesn't offer door-to-door pickup. This is really inconvenient for blind people who have difficulty getting around." "Braille books don't have Braille on the spine or cover; I can only find out what kind of book it is by taking it off the shelf and opening the cover," said Du Bin, the operator of the Leading Blind Massage Shop in Xi'an. The predicament faced by blind people in China in purchasing and borrowing books is essentially an outward manifestation of the systemic defects in the support system for blind reading services. Service supply theory reveals that when the production, circulation, and distribution mechanisms of public cultural products fail to form a closed loop, the structural contradiction of supply and demand mismatch inevitably exacerbates the cultural poverty of this special group. A deeper institutional obstacle lies in the fact that the existing service system has not yet built a standardized framework for barrier-free reading services, the fragmentation of market participants leads to weak resource integration, and the formalistic tendency in policy implementation makes service commitments

merely abstract texts. This systemic lag not only manifests in the physical difficulty of accessing books, but also reflects the absence of monitoring, evaluation, and dynamic adjustment functions in the cultural rights protection mechanism, ultimately leading to a dual deprivation of the blind community's ability to acquire knowledge and participate in society.

3. Optimization Path for Blind Reading in the Era of Smart Media in China

(1) Collaborative Promotion of a Three-Pronged Approach: Technology Adaptation, Resource Integration, and Institutional Guarantee

At the technology research and development level, iterative improvements to the accessibility design standards of smart media can be promoted, sensory compensation mechanisms can be embedded into the algorithm architecture, and multimodal interactive systems can be developed to break through the visual-centric technological logic. At the resource integration level, the Braille digital resource conversion mechanism can be optimized based on the Marrakesh Treaty, constructing a diversified supply system led by the government, with enterprise collaboration and social organization participation, breaking through the industrialization obstacles of copyright barriers and format fragmentation. At the institutional guarantee level, the supporting implementation rules of the Barrier-Free Environment Construction Law should be improved, a technology adaptability review mechanism for the blind should be established, and mainstream applications should be required to achieve screen reader compatibility certification. Ultimately, through the deep integration of technological innovation, institutional empowerment, and humanistic care, a fair technological ecosystem for blind reading in the era of smart media can be reshaped.

(2) Value Restoration of Braille Reading Resources and Innovation of Diversified and Collaborative Supply Mechanisms

The supply chain needs to construct a composite supply system oriented towards public value. At the institutional level, Braille resources should be positioned as universally beneficial public goods. Legislation should clarify the government's responsibility to provide a safety net and the market's obligation to supplement it. A tiered and categorized price control mechanism and a fiscal subsidy system should be established to reduce the marginal costs of Braille publications and smart reading terminals. At the level of rights protection, quality certification standards and a dynamic monitoring system for Braille resources can be established. Resource suitability should be incorporated into the social responsibility assessment indicators of publishing institutions, forming a sustainable development closed loop of "demand driving supply, and supply creating fairness," ultimately realizing a paradigm shift in Braille reading resources from a scarce privilege to a universally beneficial right.

(3) Service Ecosystem Reconstruction Driven by the Government

The government should take the lead in building a cross-departmental and cross-industry collaborative network for barrier-free services, embedding intelligent technology research and development into the entire process of public cultural services. This includes promoting the transformation of algorithmic logic towards a multi-sensory interactive paradigm and establishing a standardized production and dynamic adaptation mechanism for digital resources for the blind. Simultaneously, it is necessary to deepen collaboration among government, society, and enterprises, using policy levers to activate the market entities' responsibility for technology-driven inclusiveness. For example, tax incentives or copyright exemption mechanisms can incentivize enterprises to develop low-cost reading devices for the blind. Furthermore, a service efficiency monitoring and feedback adjustment system needs to be built, establishing a closed-loop link between collecting blind needs and adjusting technology based on community-level organizations, shifting the service system from one-way supply to a demand-driven, precise response. This reconstruction of the governance ecosystem

essentially breaks the traditional linear supply model of public services, constructing a sustainable and inclusive service system through multi-stakeholder collaboration and the integration of technological ethics.

4. Conclusion

The underlying logic of the reading predicament faced by the blind in China during the era of intelligent media is essentially a structural conflict between the instrumental rationality of technology and the ethics of social fairness. In the technological dimension, the accessibility design of intelligent media has long been marginalized. The visual centrism of algorithmic logic creates a cognitive misalignment with the multi-sensory interaction needs of the blind, and the disconnect between technological iteration and user needs fosters systemic rejection. In the cultural production dimension, the mainstream publishing system has institutionally neglected the standardized production of Braille materials and audio resources, and the commercial orientation of knowledge production mechanisms creates a value paradox against the deep reading needs of the blind. In the service supply dimension, the digital transformation of public cultural services has fallen into a formalistic trap, and the promise of universal accessibility and the lack of accessibility in physical spaces constitute a practical paradox. In the future, it is necessary to further strengthen the humanistic value orientation in technological research and development and promote the deep integration of accessibility design standards and intelligent media. At the same time, it is hoped that through technological innovation, institutional optimization, and ethical reshaping, the reading needs of the blind can be transformed from "symbolic protection" to "substantive fairness," contributing to the sustainable development of an inclusive digital society.

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