

Research on Strategies for the Aging Population in the Intelligent Digital Library of Wenzhou City under the All-Age Friendly Concept

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Abstract: The article explores aging-friendly strategies tailored for the Wenzhou Smart Library by amalgamating network and literature reviews. Employing the 5W1H analysis method, the study meticulously examines the why, when, who, what, where, and how of advancing the evolution of an aging-friendly smart public library within an all-age-friendly context. The primary goal is to introduce novel approaches and recommendations to enhance aging-friendly initiatives within the scope of the Wenzhou Smart Library.

Keywords: Digital library; Aging-friendly environments; 5W1H analysis

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1. Introduction

According to the “Statistical Communique of the People’s Republic of China on the 2022 National Economic and Social Development”, China’s elderly population aged 60 years old and above was 280 million by the end of 2022, accounting for 19.8% of the total population. China has now entered a moderately aging society. Among them, the proportion of people aged 65 years old and above in Zhejiang Province has exceeded 14%, making its transition into a deeply aging society. However, with the widespread adoption of information technology, China is confronted with the dual impact and overlapping influence of aging and the information technology revolution. In response to this challenge, the state has issued the “Implementation Program on Effectively Solving the Difficulties of the Elderly in the Use of Intelligent Technology” and other guiding documents. These directives aim at establishing a long-term mechanism to address the “digital divide” among the elderly. The 2022 Wenzhou Municipal Government emphasizes the imperative need to expedite the establishment of an age-friendly society, foster innovation in geriatric education, and introduce livelihood initiatives such as “Happy Nursing” to comprehensively advance the creation of a society that caters to individuals of all ages. As one of the pioneering “national reading demonstration cities”, Wenzhou City must leverage grassroots libraries as focal points to synchronize library digital intelligence construction with the aging process, thus propelling

the elderly livelihood projects forward. This initiative aims to assist seniors in bridging the digital gap, fostering a digitally inclusive society, and unlocking the potential of the “silver economy” to hasten the growth of the digital economy. Thus, effectively harnessing the “silver economy” potential and expediting digital economic development are urgent issues that demand immediate attention.

2. Literature review

2.1. A study of smart aging in grassroots reading spaces

Chinese scholars’ research on library wisdom for the elderly service began around 2000 and continued to rise with the development of intelligent technology and the deepening of China’s aging degree. The research mainly focuses on the content of library intelligent services for the elderly and the portrait of elderly readers.

In the domain of intelligent elderly care services, significant research has centered on enhancing the accessibility of digital tools for older readers. This includes developing intelligent reading recommendation systems using information technology and disseminating health and medical information utilizing databases and multimedia technologies ^[1-2]. Furthermore, investigations have explored methods to integrate older adults into the digital landscape, such as encouraging participation in senior university education programs with libraries, hosting community lectures to ensure reader services for the elderly, and organizing specialized activities through rural libraries to promote digital literacy among elderly farmers ^[3-5]. Regarding the demographic characteristics of elderly readers, numerous studies have been conducted to understand reading behavior patterns and preferences among older populations. For instance, Huang conducted comprehensive interviews to assess the satisfaction levels with digital services among the elderly, while Zeng identified male retirees in professional and technical roles with higher educational backgrounds as the primary readers within the elderly demographic ^[6-7].

2.2. Study of the dilemma and countermeasures of the digitized library

Research on the compatibility of aging-friendly research with the increasingly digitized library lags, both domestically and internationally. There is insufficient study on the information behavior characteristics of elderly readers and a lack of research on strategies to address challenges faced by aging-friendly digitized libraries.

Many studies abroad have noted the uneven distribution of elderly services due to inadequate employee capabilities and financial constraints ^[8-9]. Researchers are also gradually focusing on the heterogeneous characteristics of elderly needs and suggesting ways to meet the diverse needs of elderly populations in an economically sustainable manner ^[10]. In China, research on age-related obstacles in digitalized libraries is still in its early stages, mainly revolving around standard formulation and social surveys. Wang and Xie provided suggestions for management models based on their study of the senior user management model at public libraries in New South Wales ^[11]. Xiao outlined the content framework of the foreign library association guidelines on elderly services, emphasizing the necessity of developing standards for elderly library services in China ^[12]. Zhao et al. compared web layouts of elderly services in 140 public libraries in China and the United States, stressing that public libraries should aim to meet the lifelong learning needs of older adults and adhere to the principles of “accessibility” and “aging-friendly” services ^[2].

In general, the current research, while extensive, lacks depth. It is mostly limited to literature reviews and case studies, with a shortage of empirical research reports focusing on specific scenarios in a particular city. The research is primarily theoretical and anecdotal, without forming systematic and actionable strategies. Furthermore, there is a lack of detailed and precise investigation. Increasingly, studies emphasize the importance

of age-appropriate design and in-depth care for older readers, yet research often remains at a superficial level of recommendations. These shortcomings in existing research have laid the foundation for this study.

3. Service model of age-friendly digitized library based on the 5W1H methodology

3.1. 5W1H methodology

The 5W1H analysis method, initially introduced by the eminent American sociologist and politician Lasswell in 1948, has endured through subsequent generations. It has evolved into the refined “5W+1H” model over time. This structured approach serves as a systematic thinking tool utilized extensively in problem analysis and resolution by exploring the six dimensions of Why, What, Who, When, Where, and How. The application of the 5W1H method plays a pivotal role in enhancing the efficiency and quality of problem-solving strategies. Its compelling utility lies in furnishing a clear, step-by-step process instrumental in both understanding core problem dynamics and fostering detailed, coherent solutions.

3.2. Service model of age-friendly digitized library based on the 5W1H methodology

Applying the 5W1H method can systematically analyze the service model of digitalized libraries tailored for the elderly as a new form of library service in the digital era, which combines advanced technology with the needs of the elderly population. By delving into the “What,” “When,” “Who,” “Where,” and “How” aspects, this study aims to explore the reasons behind this service model and how to better implement it. Guided by the “Ws”, from service content to timing, target audience, implementation location, and specific methods of execution, this study will comprehensively dissect the components of the digitalized library service model tailored for the elderly and attempt to construct a smart library based on the 5W1H methodology.

3.2.1. Why – Integrating traditional services with digital technology to help the elderly integrate into the digital age

With the advent of an aging society, digital services are not just a demand but a necessity. Intelligent libraries, as digitized platforms integrating information resources and services, have the potential and advantages to provide more convenient and personalized reading experiences for elderly individuals^[13]. By establishing an elderly-friendly service model in intelligent libraries, not only can it accurately assist the elderly population in gaining knowledge reserves, expanding cognitive boundaries, and enhancing the quality of life in the information society, but it can also advance the in-depth application of digital technology in the construction of community centers in Wenzhou city.

The specific methods of information acquisition and requirements of the elderly pose distinct challenges and traits. Integrating a digitalized library within elderly-friendly services involves not only navigating the elderly through the digital landscape but also ensuring that digital tools can engage with them effectively. Besides actively introducing digital devices, Wenzhou Library should offer comprehensive, considerate, and hands-on non-technical services for elderly patrons by maintaining traditional manual service counters. This strategy effectively tackles practical obstacles encountered by senior citizens, such as challenges in reserving library slots, utilizing self-service kiosks for borrowing and returning books, and operating smartphones proficiently. By streamlining and enhancing intricate digital technologies within the digitalized library, it becomes more feasible for the elderly to embrace and make use of these innovations.

3.2.2. When — Expanding reading coverage to ensure an all-time accessible reading experience

Despite the regular senior-themed reading activities hosted by Wenzhou City Library, there seems to be a

notable deficiency in promoting these events effectively. This inadequacy is evident in terms of publicity, frequency, duration, and coverage, which have collectively led to less than satisfactory outcomes. Many elderly residents remain unaware of these valuable activities. To enhance the reach and impact of elderly reading services, it is imperative for the library to not only set up regular events but also ensure accessibility at any time.

To address this challenge, the library could establish partnerships with community libraries to arrange consistent elderly reading-sharing activities, where seniors are encouraged to gather, exchange wisdom, and share experiences. Moreover, by regularly inviting experts and scholars to deliver tailored lectures aimed at elderly audiences, participants can stay informed and engage with current and detailed knowledge that can stimulate their minds.

It would be beneficial for the library to plan out themed lectures and activities over six months to a year, ensuring early announcements are made. This proactive approach guarantees that elderly individuals with limited digital access are included. Furthermore, the library should focus on providing on-demand reading opportunities. For example, the use of QR code scanning services could enable a “24-hour mini-library” experience, complemented by a WeChat mini program facilitating “one-click borrowing.” These innovative solutions empower elderly readers to explore electronic resources from home, granting access to audiobooks, videos, and other electronic service offerings.

This readily available reading experience not only saves time and transportation costs but also promotes digital reading while enhancing elderly digital literacy. Ultimately, these initiatives aim to bridge the digital gap, creating a more inclusive and engaging library experience for elderly members of the community.

3.2.3. Who — Team building for digital inclusion of the elderly in public libraries

The evolution to a digital society poses challenges for the elderly, particularly regarding access and empowerment in utilizing digital technologies. To address this, establishing a targeted, customized, sustainable, and creative support system for integrating digitally disadvantaged groups into the digital realms stands as a crucial initiative worldwide. In both domestic and international settings, the notion of a “digital mento” service within public libraries has been widely embraced ^[14–15].

Firstly, in adapting these principles to local contexts, Wenzhou City Library can pioneer a diverse digital team, notably creating a specialized digital wisdom service specifically tailored for the elderly. By strategically situating these services within public libraries and other communal spaces, convenient access is provided for older generations. Reflecting on successful global practices, Singapore’s introduction of a dedicated digital office recruiting 1,000 digital ambassadors, deployed across public libraries, has actively supported and inspired the elderly towards digital literacy.

Secondly, to ensure the quality of digital services for the elderly, public libraries can forge partnerships with governmental bodies, corporations, and social organizations. Collaborating with government agencies ensures policy backing and financial sustenance. Moreover, active engagement can influence the development of legislation conducive to higher-tier services for elderly patrons. Partnerships with corporations serve to amplify social responsibility and invigorate the aging industry market.

Furthermore, this cooperative spirit extends to fostering innovation and enhancing service provision through strategic alliances. Enterprises can aid in enriching the digital landscape by bolstering research and development for technology catering to the elderly demographic. Embracing technological advancements like big data and artificial intelligence opens doors for an “Internet + Aging” service model, leveraging digital intelligence to expand service horizons in libraries and integrate aging resources. Noteworthy collaborations

exemplified by institutions such as Hangzhou Library and Queensland State Library underscore the success possible through cross-sectoral cooperation ^[15].

For instance, Hangzhou Library, in partnership with the Hangzhou Municipal Library Career Fund and Municipal Health and Health Career Development Center, birthed a senior health branch. This initiative offers a voluminous collection of over 5,000 books on various subjects alongside engaging activities including health lectures, reading salons, and handicraft events tailored for seniors. The overarching aim is to enhance the cultural experiences of the elderly community. Drawing inspiration from such models, Wenzhou Municipal Library can scale its professional capacity toward a more digital-savvy, elder-friendly service approach, embodying civilianization, ubiquity, specialization, and adaptability within the workforce.

3.2.4. Where — Breaking through field limitations to establish a multidimensional reading space

When catering to elderly readers, it is crucial to address potential physical obstacles such as vision and hearing impairments. Improving age-friendly infrastructure plays a pivotal role in enhancing the reading experience for older users. Looking at the broader picture, public libraries should concentrate on developing digital and intelligent age-friendly services in response to the aging population, while enhancing funding support for digital transformation. Additionally, public libraries should broaden auxiliary reading services and establish grassroots cultural service stations, self-service bookstores, and 24-hour mini-reading rooms, among other facilities, to cultivate a more inclusive reading promotion platform. This approach allows public cultural resources to significantly impact the community.

Concerning physical reading environments, public libraries need to optimize internal layouts, expand indoor spaces, create dedicated areas for elderly reading, offer comfortable seating, and provide resources such as reading glasses and wheelchairs to ensure quality service for elderly readers. Facility renovations targeted at the elderly can help reduce digital barriers. Furthermore, integrating and emphasizing books, periodicals, and digital resources for elderly readers through regional labeling and enlarged font sizes enhances accessibility within the library.

In terms of online reading environments, libraries should focus on establishing specialized online platforms tailored for elderly users by enlarging text and icons, improving contrast, adjusting button sizes, and expanding clickable areas to meet the digital reading needs of older populations. Providing user-friendly websites and reading applications designed for seniors helps expand ubiquitous reading experiences among the elderly. For instance, promoting reading through community posters paired with QR codes enables elderly readers to easily scan and access reading content in the community, thus reducing time and energy costs.

3.2.5. What — Tailoring team building to meet seniors' needs

With the rapid societal changes and the aging population trend, Chinese elders today require more than just traditional medical care and health services ^[16]. Their needs have expanded to encompass community culture development, home care, and ongoing education. The requirements of the elderly have become increasingly intricate and multifaceted after the pandemic. As per the 2023 analysis of microblogging big data, elderly needs are primarily categorized into four dimensions: health maintenance; creation of conducive living spaces for aging individuals; cognitive well-being and social engagement; and protection of elderly rights and interests ^[17]. Notably, topics like sleep quality, retirement aging, challenges arising from policies on fertility leading to entrusted aging, and inheritance concerns were ranked highest in terms of attention. Currently, public libraries grapple with insufficient focus on meeting the evolving demands of the elderly, resulting in a bewildering array of literature choices. Hence, Wenzhou libraries must not only augment the array of resources for seniors but also

implement nuanced management techniques by categorizing and organizing materials effectively. This targeted approach aims to foster elder participation in communal activities and enhance awareness regarding healthy aging principles.

The role of public libraries should also extend beyond traditional book reading services to better cater to a diverse demographic, particularly focusing on the elderly population. Current library services are mainly youth-oriented, with limited personalized digital offerings for older users. Existing programs such as digital device training, health seminars, and fraud prevention initiatives fall short in addressing the unique needs of visually impaired, deaf, or physically challenged elderly individuals. This deficiency underscores a lack of diversity and innovation in inclusive digital services tailored to this group, thus inadequately meeting their deeper requirements and hampering the effectiveness of digital interventions designed for elderly patrons.

Public libraries need to introduce a range of empathetic non-technical activities that are warm, practical, and customized to the specific needs of elderly individuals. In addition to assisting elderly users unfamiliar with digital platforms, libraries could organize specialized digital training sessions targeted at teaching older adults how to navigate apps like WeChat and “One-Click Borrowing”, facilitating their proficiency in using digital tools, boosting digital literacy, and fostering integration into the digital landscape.

Furthermore, libraries should revamp service content to address the distinct needs of older adults with special requirements, offering tailored services that align closely with their individual preferences. For instance, they could provide sleep-related workshops for elderly individuals experiencing insomnia or deliver scientific parenting courses tailored to older adults who are actively involved in caregiving roles for younger family members. Such innovative approaches can enhance the overall quality of service delivery, improve user satisfaction, and foster a more inclusive environment within public libraries.

3.2.6. How — Creating an innovative audiovisual reading methodology in line with the “Internet Plus” era

In the age of “Internet Plus”, the landscape of reading has evolved into a diverse and inclusive space. With advancing age, individuals often experience diminishing eyesight, leading to challenges with prolonged reading and potential blurriness. The advent of audiobooks has emerged as a valuable convenience for elderly readers facing visual impairments, facilitating a seamless transition from traditional “eye reading” to embracing “ear reading.” Libraries both domestically and internationally are paving the way for innovative reading methods and tailored adaptations suitable for various age groups.

Notably, Hangzhou’s Linping Library stands out with its innovative listening wall in the electronic reading zone, powered by the Himalaya app. Through simple QR code scans using their smartphones, elderly readers can access a selection of audio materials effortlessly, enhancing their reading experiences. As intelligent reading continues to progress, prominent museums and libraries are integrating technologies like AR augmented reality, VR virtual reality, immersive tech applications, and AI advancements to craft immersive digital cultural ecosystems. These initiatives aim to deliver readers an interactive, interconnected, and perceptible environment, shaping a fresh era of intelligent reading adventures.

Taking cues from the Linping Library model, Wenzhou Library has the opportunity to pioneer a “VR interactive magic wall” catered towards elderly readers, fostering engaging interactions with the wall interface for immersive reading encounters. For instance, by leveraging a mobile application for scanning AR display images, readers could access informative content on healthcare massage techniques, presenting resources vividly through real-life demonstrations. Libraries might also introduce intelligent robots equipped to offer services such as warm greetings, real-time voice-activated book searches, and efficient information retrieval, all

geared toward enhancing the convenience and enjoyment of elderly readers.

4. Conclusion

In today's society, the convergence of aging and a digital revolution underscores the critical importance of adapting public libraries to meet the needs of the elderly. The primary challenge lies in bridging the “digital divide” and fostering a harmonious relationship between older adults and digital technologies. To address this issue, this paper proposes innovative strategies through a comprehensive 5W1H analysis, aiming to drive the aging reform of digital libraries in Wenzhou City.

This age-friendly development approach first emphasizes inclusivity and accessibility for older individuals, fostering an environment where they can seamlessly engage with digital information technologies. Additionally, digitally intelligent libraries should aim to expand reading access by developing tailored services integrated with community activities to enhance reading accessibility; collaborate with governmental bodies forging partnerships with enterprises and institutions to establish a comprehensive team delivering sustainable aging-friendly services and expanding smart aging initiatives; create multidimensional reading spaces by innovating beyond physical and online boundaries to construct versatile reading environments; address elderly reading preferences by continuously monitoring and enriching reading materials catering to elderly readers; implement audio-visual intelligent methods by transitioning from traditional “eye reading” to “ear reading” and “immersive reading” techniques to enhance the reading experience.

In conclusion, by implementing these strategic transformations, digitally intelligent libraries in Wenzhou City can foster a new era of age-friendly services, reshaping the landscape of library accessibility and enriching the lives of older adults through immersive and engaging reading experiences.

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