Research on Special Service Strategy of Public Library Based on the Analysis of Online Reading Behavior of Visually Impaired Users

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Abstract. Visually impaired people are disadvantaged groups that cannot be ignored in the process of promoting the equalization of basic public services. The public library should take the initiative to pay attention to their special needs and study the behavior characteristics of them in order to carry out targeted service. This paper conducts a research on online reading behavior of visually impaired users from several aspects. On the basis of analysis, this paper puts forward suggestions for special service strategies of the public library from three levels.

Introduction
As the core part of modern public culture service system, public libraries should clarify the goal of “guaranteeing the equal basic cultural services for all the people”, and actively promote the balanced socialized development of public cultural services. As a kind of disadvantaged group, visually impaired people have obstacles in their daily work, study and life, and have certain particularity in the use of library services. Public libraries need to pay attention to the physiological, psychological and behavior characteristics of visually impaired group, and to understand the particularity of their reading behavior so as to carry out personalized service and to meet information needs of visually impaired users. The paper studies concept of visually impaired group, divides types of visually impaired users according to domestic and foreign literature and research data, and analyzes online reading behavior of visually impaired users from aspects of behavior characteristics, practical perception, reading needs and reading approaches. On this basis, this paper analyzes strategies that public library should take for visually impaired users to carry out special services.

Definition and Type Division of Visually Impaired Group
Visually impaired group includes patients with impaired visual function which affects their normal life, and can be divided into full blindness and amblyopia. According to the domestic survey report of visually impaired people, visually impaired users on the Internet can be classified according to sex, age, occupation, and disability level, age of impaired vision, education level, braille level and computer level. In the analysis of online reading behavior of the users with visual impairment, we can take further exploration referring to this type of classification.

Analysis of Online Reading Behavior of Visually Impaired Users
Behavioral Characteristics
The visually impaired group is more dependent on hearing and touch because of the loss or damage of vision, so their sense of hearing and touch are much more sensitive than those of ordinary people. There is still large improvement space in the tone and speed of the auxiliary equipment, such as current screen-reading software, reading machine for the blind on the market. The default speed is based on the sense of ordinary people, and the vast majority of visually impaired users first need to take the speed regulation of the screen-reading software when using it, and some users with visual impairment think that the tone of the screen-reading software is not emotional, which sometimes is not clear, and will affect the understanding of the text to a certain extent. Due to the slow learning
of new skills and knowledge, visually impaired people are more likely to open their familiar Web pages for browsing, or to use folders, favorites and so on to place what they need for browsing at any time.

**Practical Perception**

Since the early 1996 when Peter Craddock investigated the research plan of libraries and equipment suppliers targeting the users with visual impairment, many overseas research projects had studied the practical perception of users with visual impairment [5]. For example, at the end of the 1990s, the test room program, jointly conducted by Ireland, Holland and Italy, studied the behavior and perception of visually impaired users when they were using information system. In 2001, the project of the Loughborough University Library in the UK studied the preferred format of the visually impaired users when getting information and the intuitive feelings when using of library services. Domestic research reports show that visually impaired users have intuitive feelings about the diversity of services, the usability of the barrier-free services and technology, degree of satisfaction of their needs, and convenience of auxiliary devices. Most of the visually impaired people believe that there is still much room for growth of the current special service of domestic public libraries, since the service approach should be expanded, and the barrier-free services and technology relatively fall behind.

**Reading Demand**

Different types of visually impaired groups have a large difference in information demand. In this paper, the visually impaired groups are divided according to age, occupation, age and degree of visual impairment, and the information needs of various visually impaired readers are analyzed. At the age of 12-30, the visually impaired users have higher learning enthusiasm and are willing to accept new things. This part of the group is basically in the state of learning in school, working on jobs and trying to find the appropriate work. Their demand for information resources, such as academic documents, subject materials and extracurricular readings is relatively concentrated, and the requirement on the processing of information, the level of information service and the space for reading and learning is relatively high. At the age of 31-50, visually impaired users are relatively stable in work and life, less stressed, and their information needs are concentrated in entertainment, leisure and health from magazines, audio books, urban novels, interesting science books and so on. The reading needs of the visually impaired users over 50 are focused on medical, health, opera and other aspects [6]. The career of visually impaired group is closely related to the degree of education. The visually impaired groups which engaged in the work of education, IT, editing and writing are deeply integrated with society. Their knowledge updates quickly and they communicate with others more frequently. Therefore, the information needs of the group are generally closely related to work, and the requirements for the professionalism and timeliness of the information resources are higher [7]. The information demands of the visually impaired groups working in the field of massage are focused on entertainment, medical care and other aspects, such as music materials and phonetic books. Compared to the visually impaired users with acquired visual impairment or lighter degree of impaired vision, the visually impaired users with a high degree of impaired vision and young visually impaired users, including congenital impairment have lower learning ability and education level, and they do not have a strong desire to improve their work, learning and ability, so the information needs of the group are relatively concentrated in the information resources of leisure entertainment, spiritual comfort and entertaining enrichment, especially audiobooks. The visually impaired users with acquired vision impairment are partially educated and have strong ability to work. After being impaired, their information needs are hindered by the process of acquiring information resources and services, and their information needs are still concentrated on professional academic resources. Visually impaired users with less impaired vision have some difficulties in obtaining information resources and using the library service, but this part of the basic difficulties can be solved by science, technology and auxiliary equipment, so this part of the information needs of the group is relatively broad, to a certain extent equivalent to ordinary users.
Reading Approach

Most visually impaired users read through radio, television, Internet, libraries and mobile devices, and they tend to acquire information passively and in the independent space. Most visually impaired users choose familiar and convenient ways to get information. Radio and television are traditional ways of information transmission, and are favored by users with visual impairment. Some visually impaired users also use public libraries as one of the most important reading sites, which can identify their needs, search and read actively. There are still a considerable number of people with visual disabilities in our country who are unable to read braille, so they usually use phonetic ways to obtain information. Through various ways, visually impaired users hope to achieve the purpose of learning professional skills, leisure and entertainment, finding jobs, consulting specific problems, and meeting the needs of work and study.

Special Service Strategy of Public Library

Strategy of Public Service Consciousness

**Strengthening Publicity and Social Cooperation in Various Forms.** Public libraries should strengthen cooperation with all kinds of media, and conduct long-term and effective publicity activities for the special services of the visually impaired group by TV, radio, library websites, blogs and social networking sites. At the same time, they should actively cooperate with the association for the blind, foundation, public welfare organizations, call for social concern for the visually impaired groups, improve the understanding of the public library services by more visually impaired people, and make them go to the library actively to use the service and learn to communicate. This also provides a platform for the visually impaired group to give feedback to the library.

**Carrying out Interactive Activities of Readers.** The visually impaired groups are less involved in social activities because of their physiological barriers, inner inferiority and inconveniences, and they cannot be integrated into the public. If public libraries completely separate them from ordinary users, they will not be able to dispel their inner inferiority or feel satisfaction and happiness when involved in the collective. So public libraries can carry out some activities for common users and visually impaired users to interact with each other, where they can share their inner thoughts, reading experience and life stories. By this means, ordinary readers can further understand the spiritual world and life experience of the visually impaired readers, and also visually impaired readers will be brave to be open, confident and integrated into the society.

**Carrying out Volunteer Activities.** Public libraries should organize a wide range of volunteer activities and call for more volunteers to help the library carry out services for visually impaired users. Through professional training, volunteers can assist the visually impaired users in web search, data collection and sorting, and also help them learn the use of special computers, reading software and other auxiliary equipment. With their help, the needs of visually impaired users will be largely met and their reading experience will be enhanced. In addition, special community volunteer activities can also be carried out. When visually impaired users are inconvenient to go out, they can use online consultation or remote communication to inform the public librarian. After the librarian retrieves and handles the loan procedures, the books are sent by community volunteers to the visually impaired users, which is convenient for the visually impaired group to use the library collection.

Guarantee Strategy for External Conditions

**Improving Barrier-free Service Facilities and Creating a Barrier-free Environment.** The public library should fully consider the special needs of visually impaired groups in terms of infrastructure, such as the creation of wheelchair access, induction door, and the setting of the special elevator with the braille and voice broadcast and so on. In addition, public libraries should pay attention to the development and application of accessibility, auxiliary technology and equipment. The auxiliary equipment with all kinds of functions can greatly facilitate access to
library services for visually impaired groups, such as braille printers, braille typewriters, electronic screen magnifier, DAISY player and so on. The visually impaired users' special readers and computers should be set up with barrier-free webpages. Website design should abide by the following principles: "the strongest technical means", "the lowest number of clicks", "the simplest arrangement" and "the best content selection". For example, it supports the voice input instead of text input, navigation browsing function, adjustment function of font and brightness, and keeps the continuity and stability of the content. The site should be equipped with a special simplified search engine, reduce the complexity of the operation and module settings, remove redundant pictures and animation, avoid interference of advertising and unused links, and also, be arranged in a straight line and a unified format of web content, which is convenient for the search and identification of the reading software, so that the visual handicapped users can obtain the relevant information with the least time and click times. Besides, many websites will adopt complex verification codes when validating identities, which is a great challenge for visually impaired users. Public libraries should actively provide website services with no verification code.

**Set up Special Space.** At present, part of the public libraries have reading rooms or reading areas for the visually impaired people in China, equipped with visual aids, such as special computer auxiliary equipment and specialized computers. There are braille books in reading rooms or reading areas for the visually impaired people, which can facilitate the reading of the visually impaired groups. In addition, some visually impaired groups with less impaired vision are less limited by visual and reading carriers during reading, so the public library can choose to set up a small special area for the visually impaired group in the common reading area for the priority use of them and ordinary people can also use it. The special area should be equipped with brightness adjustable lighting, and the surrounding space and field of vision should be relatively open, which is convenient for volunteers, librarians and enthusiastic people to pay attention to the visually impaired group and provide timely help for them. [9] What’s more, within allowable scope of the space and funds, public libraries can provide specialized learning centers, communication centers and entertainment centers for users with visual impairment to exchange and learn.

**Rich Collection Resources.** Special collection of public libraries in our country is still incomplete, and except for special braille books, public libraries should further improve the structure of library collection, investigate the reading needs of the visually impaired groups, and provide all kinds of paper and e-book periodicals and sound resources, including vocational skill training, leisure and entertainment according to their needs. Also public libraries should provide a special database that can be remotely landed and accessed for visually impaired groups. For example, the Toronto Public Library in Canada attaches great importance to the construction of special collections, which include audiovisual materials, oral images, big characters, braille publications and audio and video data with hidden subtitles. Among them, books, records and online audio books have provided detailed paragraphs for the visual handicapped users, and have fully considered the reading needs of the visually impaired users. [10]

**Internal Strategy for Ability Promotion**

**Attaching Importance to Technical Research, Development and Application.** As a link between users with visual impairment and information resources, public libraries must attach importance to the research, development and application of science and technology, so as to protect users' access to resources accurately and conveniently. Network technology, mobile technology, digital technology and barrier-free science and technology for serving visually impaired groups can support the user's retrieval, browsing and communication platforms. The DAISY format is widely used in the world as a special digital resource format for the blind. It is based on the standard of the Internet Alliance. Its hierarchical structure enables the visually impaired group to browse any segment, and supports synchronization of speech and text, adding tags, and so on. [12] The number of electronic resources in the DAISY format in domestic public libraries is relatively less, and the application and promotion of such technology should be strengthened.

**Training Special Service Team.** The professional quality and level of librarians directly
determine the quality of the special services for the visually impaired. The physiological defect and the sensitive heart of the visually impaired groups determine that librarians should master all the skills in helping the visually impaired users use assistive devices, and guiding their recognition of braille and browsing of the web. More importantly they should convey the love, patience and meticulous care of the public library as a public cultural organization, so that the visually impaired group will pay more attention to and trust the public library service. Therefore, public libraries need to improve the training mechanism of librarians, let librarians recognize the importance of special services, strengthen the "people-oriented" service concept and take the initiative to take social responsibilities.

**Innovating the Form of Barrier-free Service.** Oral image service is an increasingly barrier free service in libraries both at home and abroad. American oral image service has developed into a mature stage, and more than half of the films that are shown will have a corresponding oral channel. At present, domestic public libraries in Beijing, Shanghai, Chongqing and Changsha have already carried innovative forms of humanized services for visually impaired users \(^{[13]}\). The oral library set up by the Chinese blind library in the information barrier-free center can provide movie services for visually impaired groups, and transmit images that are not accessible to or accessible to the visually impaired people in the form of language to help them perceive the world. Oral image service is one of the important humanistic care measures of public libraries for visually impaired communities to enhance the ability of the visually impaired group integrating into the society, following the trend of the times and improving the sense of belonging. Oral image service requires a lot of oral staff, perfect information technology and full media platform. So public libraries should actively promote the establishment of digitalization and resource reconstruction and sharing of the library, and strengthen cooperation with the public cultural service institutions. Besides, they should call, organize and train volunteers to join the team of professional oral staff.

**Setting up a Special Service Alliance of the Library.** Public libraries need a lot of manpower, material and financial resources to provide special services for the visually impaired group. In order to save cost and improve efficiency, public libraries should set up a special service alliance, adopt a unified barrier-free standard to achieve interlibrary loan and sharing of resources, interconnect the collection resources and website links provided by public libraries, and make more visually impaired groups enjoy individualized special services.

**Conclusion**

Visually impaired users are the disadvantaged groups in the public library users. Due to physical defects, they have many inconveniences in the use of library services, which should be paid more attention to by public libraries and the society. Based on the analysis of the reading behavior of visually impaired users on the network, public libraries should carry out special services from three perspectives, namely, the visually impaired users, the library itself and the public, aimed at meeting the reading needs of the visually impaired groups, improving social attention to the visually impaired groups and promoting the construction of the public cultural service system.

**Conferences**


