Digital library development and services for visually impaired juveniles

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Abstract: In the beginning of 1990s, China had begun to pay attention to the living circumstances of the disabled, and formulated various policies to ensure their studying and living. At that time, Chinese library community stirred an upsurge of studies on services for the disabled. Information accessibility is the hot topic of library research and practice in recent years. Digital library service for visually impaired juveniles is the important manner of libraries to provide humanized, convenient and remote services for the special group of people. This paper introduced the website of China Digital Library for People with Disabilities (CDLPD), which has especially made vigorous exploration and practice on resources construction, accessibility technology application, service manners, and so on, providing a new manner for healthy growth and culture access of visually impaired juveniles.

Keywords: visual impairment, juveniles, digital library, services

1 Introduction

As a special group, people with disabilities should be paid special attention to in the society. There are about 82.96 million people with disabilities in China, covering 6.34% of Chinese population [1], and presenting a distinguished feature of knowledge poverty. Among of those people, there are about 130,000 visually impaired juveniles aged from 6 to 16 [2]. Because of their physical limitations, their studying and living are affected to different extent, they encounter with the special plight of information access, and they have a relatively high dependency on the government and society. Therefore, that how to acquire knowledge, happily grow up, and equally participate

social activities becomes a survival and development problem for visually impaired juveniles. As the knowledge dissemination center, libraries should assume the responsibilities of knowledge services, providing a platform for equal share of public cultural services by various manners.

It is very important for visually impaired juveniles to acquire education and knowledge, but that how to provide efficient knowledge information services for them has always been the bottleneck for library services to special groups. Before the establishment of China Digital Library for People with Disabilities (CDLPD) [3], Chinese library community provides information services for visually impaired people mainly by setting up Reading Room for People with Visual Impairment. According to available statistics, there are more than 100 public libraries which have specially established reading room or reserved seats for people with disabilities (especially visually impaired people), but their service manners are very traditional, which just purchase Braille books and facilities, and lack systematic digital resources for visually impaired people. Moreover, service clients of public libraries are adults aged above 18. So it is impossible for visually impaired juveniles to enjoy the special service provided by public libraries. The contradiction between strong information demands and weak position of information becomes increasingly prominent, which makes visually impaired people have urgent needs to change information dilemma by advanced technologies. As a national public culture dissemination institution, National Library of China (NLC) has the responsibility of providing more public culture learning and education opportunities for them. Over the years, the NLC has always been devoted to doing research on services for visually impaired juveniles, and explored efficient approaches for providing services for this special group continuously. The CDLPD website, co-developed by the NLC and Information Centre of China Disabled Persons' Federation, serves visually impaired juveniles aged from 6 to 16, providing accessible resources for them.

2 Development and Services

CDLPD is an open knowledge and information centre, which is committed to providing universally equal service for the society, showing humanism concern, eliminating the difficulties that vulnerable groups utilize libraries, and providing humanized, convenient and remote public cultural services for visually impaired juveniles who can't come to the NLC to enjoy reading.

2.1 User survey

In order to make the services satisfy the demands, the website developers visited Beijing School for the Blind and Special Education College of Changchun University, and comprehended the interests and reading orientation of visually impaired students. There were two survey methods: first, questionnaire survey method. Visually impaired juveniles' information demands and website usage behaviors, including frequently used resources types, resources contents, service manners, shortcuts setting preference, etc., were surveyed; second, onsite testing method. The students were invited to visit the preliminarily established website, and the staff observed their using behaviors and collected their feedback and suggestions for the website.

2.2 Resources planning and services

User survey helps us grasp users' information demands comprehensively. Based on the survey results, the CDLPD website sets up a column of Juvenile Services. According to the features of different ages and different education levels, heterogeneous knowledge information services are provided. We formulate personalized resources selection mechanism, and the contents focus on education, literature, arts, and psychology resources; meanwhile, considering the special needs and plight of visually impaired juvenile education, we specially purchase remote education databases for different ages, helping them finish education stage by stage. The website adheres to the principle of "serving while developing", and resources

amount and types are increasing continuously. Resources selection implements user-oriented principle, and maintains close contact and interaction with users. The resources processing and selection of some columns adopt user recommendation manner. As of the end of April 2012, there have been 4,899 pieces of music, more than 3,200 E-books, and about 700 lectures issued in the CDLPD website, amounting to 26 TB. In the future, we will make greater efforts on processing and production of audio books.

Simpleness and practicability are the important factors when designing the website. According to the practical demands of people with disabilities, the CDLPD website contains the following columns: E-books, Lectures Online, Music, E-Newspapers & Periodicals, Talking Books, and so on, integrating videos, network courses, and other different lively resources types.

2.3 Technology application

The traditional library services, with the walk-in services as the core, have gradually become unable to adapt to the changes of information access manners. Digitalization services will be the future development trend of libraries. The establishment of service platform with network as medium will greatly solve the dilemma that this special group of people with disabilities can't walk very easily, and benefit a wider range of readers, changing the communication pattern of human-human into human-machine, which transfers the digital resources stored in network platform to the readers sitting beside the computers, with the disabled readers included.

We are now in a digital era that new technologies are booming and new applications are springing out. When traditional library is gradually replaced by digital library, and more and more technologies are included into library resources development and service system, that how to make use of new technologies and new applications to strengthen resources development and innovate service manners is given higher

priorities in current information service accessibility work.

2.3.1 Application of webpage accessibility technology

When developing the CDLPD website, we strictly abide by WCAG2.0 (Web Content Accessibility Guidelines) [4] issued by W3C (World Wide Web Consortium) in terms of multimedia information accessibility, webpage structure and representation accessibility, technical accessibility for webpage development and input and output devices-related technologies, and website browsing mechanism accessibility; we deeply study new technologies for information access accessibility which comply with XHTML1.0 technical regulations[5], improve personalized customization services, and upgrade accessibility supporting software according to using behaviors of the disabled, so as to guarantee and strengthen information access accessibility in term of technology.

(1) Perceivable: Information must be presented to users in ways they can perceive

The CDLPD website provides text alternatives for any non-text content so that it can be presented to users in text form. Here, "text form" refers to E-text, not images of documents. E-text has a unique advantage, i.e. it can be perceivable in manner of sight, hearing, touch, or any combination of the above three senses. Thus, information presented by E-text can be perceivable to users in the easiest reception manners. In addition, E-text can be enlarged or read out conveniently, or can be presented by any touch manners, so that the content can be easily understood and disseminated.

(2) Providing synchronized text alternatives for multimedia information

It aims to help people, who have difficulties on information access, acquire multimedia information. In a lot of dialogues, audio description can't be properly inserted to the pause in the dialogue. So it is necessary to provide synchronized text alternatives for multimedia information, helping users to access to all multimedia information. Due to certain reasons, audio description is not applicable in certain

situation. This method helps users to access to visual information in non-visual manner. For multimedia information containing interactive functions, interactive elements can be embedded into text alternatives of all multimedia information.

(3) Guaranteeing that information and structure can be separated from presentation

It ensures that all information can be perceivable to all users in a certain manner. If all information can be perceivable in a format determined by software, the information can be presented to users in various manners (sight, hearing, touch). If information is embedded into a special format so that it can't be separated from presentation, the information can't be changed into other formats according to users' demands.

(4) Distinguishable: Make it easier for users to separate foreground from background

It is to make the default presentation manner suitable for the disabled to the maximum. This guideline aims to make it easier for users to distinguish foreground information and background information. For visual presentation, enough contrast between foreground information and background information is needed; for audio contents, the sound volume of foreground should be louder enough than that of background. Usually, users with visual impairment and hearing impairment have difficulties in distinguishing foreground information and background information.

(5) Understandable: Information and the operation of user interface must be understandable.

Make web pages appear and operate in predictable ways.

(6) Compatible: Maximize compatibility with current and future user agents, including assistive technologies

It supports current and future user agents, especially the compatibility among assistive technologies.

2.3.2 Resources processing and service accessibility

Text content should be readable and understandable. It refers to making text content be read by users, or read by the aid of assistive technologies. For information needed for text content understanding, we should ensure its usability. Users can understand the text content in various manners, such as hearing, touch, or both of hearing and touch. Some users have difficulty in understanding written characters, but when text content is read out loudly or translated into sign language, or the key part of the text content is presented in visual manner, they can even understand the complicated meanings. Some users have difficulty in inferring the meaning of a word or phrase from the context, especially when this word or phrase is used in an unusual manner, or has a special meaning. For those users, whether they can read and understand the text is determined by whether the text provides special definitions or the full names of abbreviations. If the languages and text writing direction can't be recognized, the user agents, which support phonetic function or graphic function, may not accurately express the text meaning. Although it may be a little case for most users, however, for visually impaired users, it is a great obstacle. In some cases, if it is difficult to determine the text meaning without pronunciation, then pronunciation information must be provided.

2.4 Copyright protection measures

The CDLPD adopts technology protection measures: for works within copyright protection term, users can access to those resources after the dual authentication of National Information Database for People with Disabilities and NLC Reader Authentication System, which protects the rights and interests of copyright owners as well as satisfies the reading demands of people with disabilities to the maximum; for digital resources over copyright protection term, users can access to those resources without register.

3 Future development prospect

The quick development of digital libraries doesn't only bring revolutionary innovation for delivery manners and service modes of library resources, but also provides a new entry point for cultural services for people with disabilities. From May 2009 to April 2012, about 13 million visitors from different countries and regions visit the CDLPD website, with over 57 million clicks. This service manner based on Internet has achieved initial achievements. However, it is worth mentioned that for digital library development and services for visually impaired juveniles, the efforts that we have paid have been far from enough. Therefore, we should accumulate experiences through the demonstration effects of completed projects, such as CDLPD, and on-going projects, pay attention to users' demands and feedback, adjust service patterns continuously and launch more new innovative services. Based on the demands of visually impaired juveniles, we should increase new service manners continuously and strengthen resources development by applying advanced technologies and research achievements, providing humanized and convenient services for visually impaired juveniles, creating good learning conditions for them, and ensuring their accessibility for reading and knowledge acquisition.

The manners are as follows:
- We should pay attention to the demands of visually impaired juveniles, collecting demands and suggestions from special education schools, families with disabled juveniles, education experts on disabled juveniles and librarians engaging in reading services for people with disabilities. We should purchase, make and distribute resources according to the reading demands of disabled juveniles; we should optimize website column setting, adding their interested digital resources types; we should strengthen accessibility degree.
- Based on cloud service concept, we should explore the working manner of whole workflow of resources accessibility processing, integration, preservation and

services, and present the integrated resources through various media, providing efficient guarantee for visually impaired juveniles to conveniently acquire information services.

- We should introduce the concept of "ubiquitous library" into information services for visually impaired juveniles, making library information services embedded into various communication facilities in their daily life, helping them access to library services at anywhere in anytime.

4 Conclusions

The service level for visually impaired juveniles is not only a criterion to measure library services level, but also an important mark to measure social civilization degree. Visually impaired juveniles need bright and warmth as well as need culture and convenience. Various culture service institutions at all levels should provide more perfect and convenient services for them, and work together to create good social environment for equal share of cultural information.

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