Visual Design of University Library Collection Resources

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Abstract—In the information age, the data resources of university libraries are growing day by day. On the one hand, the construction of informatization has improved the service quality of the library. On the other hand, due to the lack of detailed management and analysis of data, users cannot find the required information from the vast amount of data in a short period of time. By analyzing the difference between university libraries and public libraries, this paper accurately locates the service population of university libraries, and visually designs the resource distribution, retrieval process and search results of university library collection resources. In order to improve the service quality of university libraries and promote the construction and development of data visualization of university libraries in China.

Keywords-university library; collection resources; information visualization

1. Introduction

In recent years, the collection resources have been increasing, and the number of digital collection resources has increased exponentially. Under the new situation, how to make users use collection resources effectively has become a problem worth exploring. This paper visually designs the resource distribution, retrieval process and retrieval results of university library collection resources, improves information processing capabilities, realizes effective information transmission, and makes it more convenient and faster for users to obtain data information.

2. The difference between a university library and a public library

2.1 Functional differences

The essential attribute of libraries is to serve society, and the functional differences referred to here are mainly the differences in social functions between the two [1]. As an important part of the school, the university library first serves the school's scientific research and teaching work, and its function directly affects the teaching quality and scientific research level. The new edition of the Regulations for Libraries of Ordinary Colleges and Universities positions university libraries as literature and information resource centers [2], which clearly expounds the nature and status of university libraries. Public libraries mainly serve the public, the operation is supported by government taxes, the operation is responsible for public officials, which is different from professional or academic libraries, the service object is for the whole people, so in terms of collection resources, many times will specialize in providing various books and

BDEIM 2022, December 02-03, Zhengzhou, People's Republic of China

DOI 10.4108/eai.2-12-2022.2328738

consultations related to the local area, and are also equipped with certain activity venues and spaces.

2.2 Service object differences

University libraries mainly serve research and academic readers to meet the needs of teaching and research. Public libraries serve recreational, recreational and learning patrons. Although domestic university libraries clearly put forward the goal of socialized services, they are not classified in open services. From a domestic point of view, it is mainly concentrated for community students, off-campus high-level talents with scientific research and learning needs or related cultural and educational units, high-tech scientific research industry technology units, etc. [3]. Public libraries mainly serve the surrounding residents, and in the purpose of readers using the library, self-study and leisure occupy the first place in the library, followed by study, research and work.

2.3 Differences in collection resources

Library collection resources include the number of collection resources, staffing, funding investment, equipment, digital and network construction level, etc., these indicators together constitute library resources [4], and the differences between university libraries and public libraries in these aspects directly determine the advantages and disadvantages of the two. Taking the structure of collection resources as an example, as the biggest difference between university libraries and public libraries, it directly determines the scope, nature and level of serving the society. Colleges and universities have a number of divisions such as comprehensive class, science and engineering, teacher training category, etc., and have their own emphasis on collection resources, science and engineering universities have more professional works and academic resources, comprehensive universities are involved in all aspects, public libraries are not professional in nature, more collection resources to meet public entertainment, learning needs, the huge difference between the two in the internal collection structure directly affects the reading needs of readers.

3. Analysis of the current situation of university library collection resources

3.1 A shift in library service models

The rich physical collection resources provided by university libraries are convenient for readers and users to inquire and borrow. In contrast, digital libraries store information in digital form [5] and occupy a small footprint compared to paper materials in the past. It effectively avoids the wear and tear problems that occur after multiple data reviews [6].

With the continuous expansion of the scale of data resources and the continuous improvement of network information transmission efficiency, users urgently need a platform that can obtain knowledge information simply and quickly. As a social information transmission hub, libraries should not only understand the needs of users, but also use the knowledge service platform to mine information resources in order to provide readers with efficient knowledge services and cope with possible challenges in the future [7]. As a special form of library, university libraries not only undertake the functions of basic book collection, sorting, collection, reading, etc.,

but also undertake a large number of teachers and students to do scientific research, so the demand for digital resources far exceeds that of social libraries.

3.2 Types of resource data in university library collections

The construction of collection resources of university libraries focuses on themes, centralized storage, systematic classification, standardized coding, and orderly use, so as to realize the resource management and operation of literature and data. According to the current situation of university libraries, digital resources can be divided into four types: electronic books (including publications similar to books); electronic journals (including periodical-like serials); secondary bibliographic databases (including bibliographies, abstracts, indexes, etc.); Other databases [8]. In university libraries, students mainly use computers to find the books and literature they need, taking the author's school, Wuhan Institute of Technology, as an example. Table 1 shows that the electronic resource catalog of Wuhan Institute of Technology Library is: Chinese database, foreign language database, free database, trial database, thematic database, database usage regulations, patent standard website. However, university libraries have a rich collection of books, and it is difficult to describe the location of the books and newspapers that students need only through text or static pictures [9]. Therefore, it is necessary to visualize the search process and search results to make it more conducive to readers and users.

Table 1 Wuhan Institute of Technology Library Electronic Resources

Electronic resources of Wuhan Institute of Technology Library						
Contents	**Chinese database**	**Foreign language databases**	**Free database**	**Try the database**	**Thematic databases**	**Patent website**
Number	20	15	20	20	6	8

3.3 Status quo of visualization construction of collection resources of university libraries

Collections are the foundation of libraries. At present, the visualization construction of collection resources of university libraries has entered the practical stage, and most university libraries have established paper-to-electricity integration platforms. University library electronic literature has the characteristics of practicality, efficiency, speed, diversification and sharing. The visualization of collection resources is conducive to helping university teachers and students understand the electronic literature resources covered in the library and the types of services that the library can provide. The visualization construction of electronic resources makes teachers and students in colleges and universities change from passive use of library electronic literature resources to active use of library electronic literature resources, so as to provide better services for teaching, scientific research and thesis writing of teachers and students in colleges and universities.

Taking Wuhan Institute of Technology as a sample, a total of 100 questionnaires were put into place, 93 valid questionnaires were put in, and the following conclusions were drawn, and 0 shows that 75% of the users of the survey respondents used electronic resources for scientific research needs; 50% of users are on the look; 50% of users are there to complete assignments;

Understanding subject dynamics, expanding subject knowledge, solving problems in life and other purposes accounted for 25%, 25%, 12.5% and 12.5% respectively. 0 shows that the factors affecting the inconvenience of users using digital resources can be retrieved, accounting for 100%; imperfect resources accounted for 62.5%; 25% of the content is not suitable; The remaining factors accounted for 25%, 12.5%, 12.5% and 12.5% respectively. 0 shows that only 12.5% of users can successfully find and use the required electronic resources; 62.5% are basically OK; 37.5% of users occasionally encounter difficulties in using electronic resources; Proportion of users who frequently encounter difficulties in using electronic resources12. 5%.

It can be seen from the conclusion that the main purpose of college students using digital resources is the needs of academic research, and users will encounter difficulties in the process of use due to inconvenient retrieval, imperfect resources and other influencing factors, therefore, the visual design of university library collection resources is conducive to helping college teachers and students better use digital collection resources.

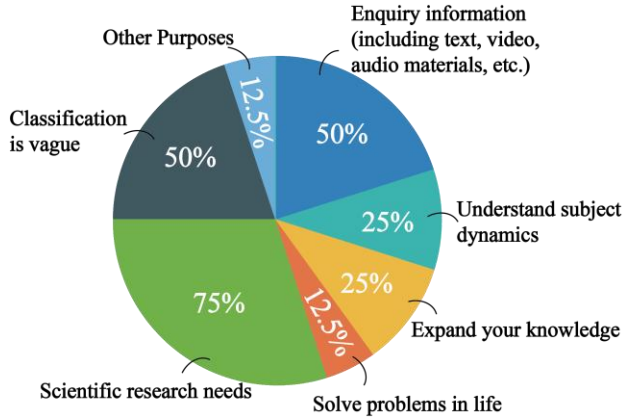

Figure 1 Purpose of accessing library resources. *(self-drawn)*

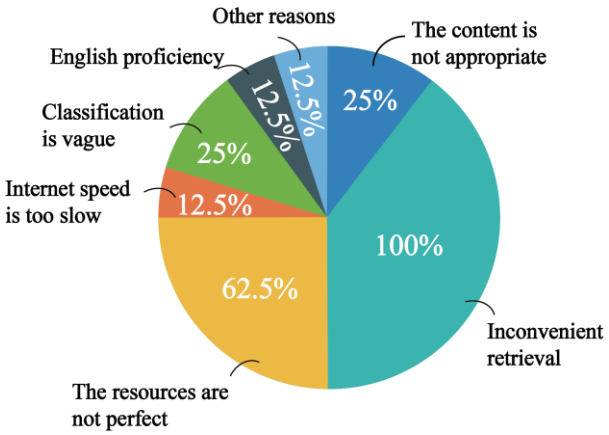

Figure 2 Factors influencing the use of digital resources. (self-drawn)

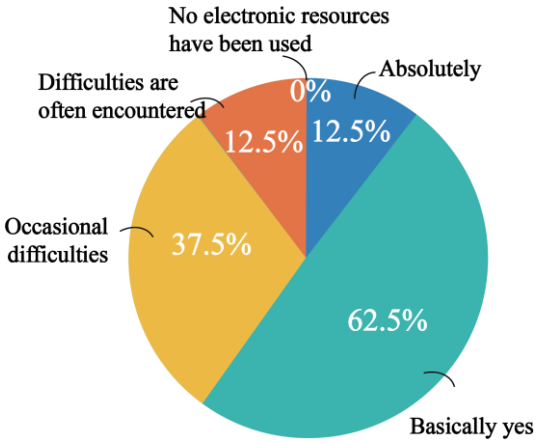

Figure 3 Smoothly find and become proficient in the use of required electronic resources. (self-drawn)

4. Visual design of university library collection resources

The development of cloud computing, big data, interactive technology, and Internet of Things technologies has made it easier and easier to digitize paper resources [10]. The library uses digital twin technology to establish a virtual literature resource system based on the data of physical literature resources, as shown in 0.

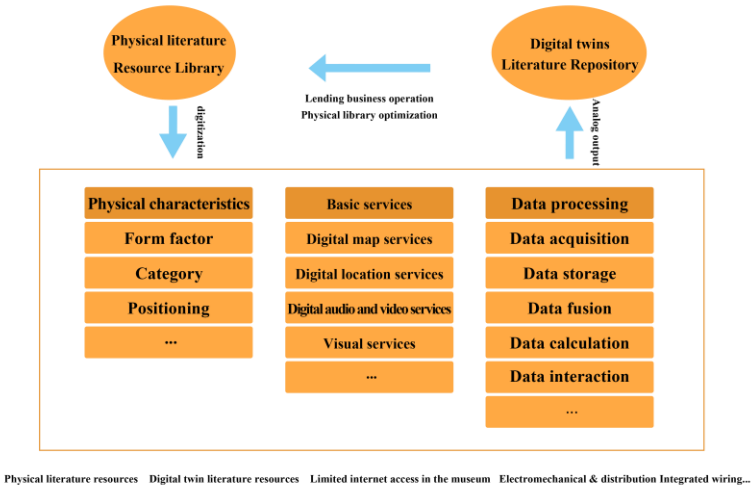

Figure 4 Digital Twin Library Construction Process. (self-drawn)

4.1 Visualization of resource distribution

Digital library is the product of the development of the times, compared with traditional libraries, the collection resources of digital libraries are more complex, digital collection resources

include all digital resources stored by the server. Through the visual presentation of digital collection resources, the resource information is displayed intuitively in the form of icons, which greatly shortens the reaction time of users to obtain information. At the same time, it improves the convenience of users to retrieve and use information.

Digital information resources can be divided into three parts: network information resources, library digital information resources, and archive digital information resources. Library digital information resources are the focus of this article. The digital information resources of university libraries are numerous, fast-growing, rich in content, diverse in form, new in information and rapidly updated. It is characterized by digital storage and transmission. It includes two aspects: on the one hand, the digitization of original materials and documents, that is, the digitization and networking of paper-based information resources; On the other hand, there are information resources that directly form digital form.

4.2 Visualization of the retrieval process

In the traditional library collection bibliographic inquiry system, users can only see the basic information of the book's name, author, publication time and publishing unit. A representative approach to this is the RESACL model. In this model, the knowledge base triplet constitutes a large tensor X, if the triplet (h, r, t) exists, then Xhrt=1, otherwise 0. Tensor factorization aims to decompose the tensor value Xhrt corresponding to each triplet (h, r, t) into entity and relationship representations such that Xhrt is as close as possible to lhMrlt.RESACL optimizes all positions in the tensor, including positions with a value of 0. After upgrading the Online Public Access Catalog (OPAC) and presenting a variety of bibliographies, the visualization effect is greatly improved, not only can you directly see the book cover, click on the embedded link on the cover, but also see the extended content such as book reviews provided by the whole book catalog and other third-party systems, providing users with a good recommendation experience, 0 vividly reflects the modern library service concept of "finding books for people, finding people for books". The upgraded OPAC can automatically generate potential lending networks with big data, locate potential readers, recommend relevant books according to the reading habits of this group, and guide readers' derivative reading

Figure 5 University Library Interface. *(self-drawn)*

4.3 Visualization of search results

The tabular interface display based on the search results refers to the results returned by the retrieval system are divided into multiple categories according to the attributes of the resources, and each category is assigned a certain label, and the number of resources contained under the category is noted, As shown in 0, users can have a quick and comprehensive under-

standing of all search results according to tags, and directly locate the result set of the category of interest. Take TransE as an example, suppose there are 2 triples in the knowledge base, which are (engineering, chemical engineering, chemical pharmaceutical) and (engineering, chemical engineering, chemical process). The relationship here "Engineering is a complex relationship typical of 1-N. If TransE is used to learn the knowledge representation from these two triples, as shown in 0, it will make the vectors of chemical pharmaceutical and chemical processes the same. According to the big data algorithm, the user is recommended to book in the same direction after the user searches. Cluster labels commonly used in this form of interface are subject, time, author, and so on. The core technology of tabular interface display based on search results is clustering technology.

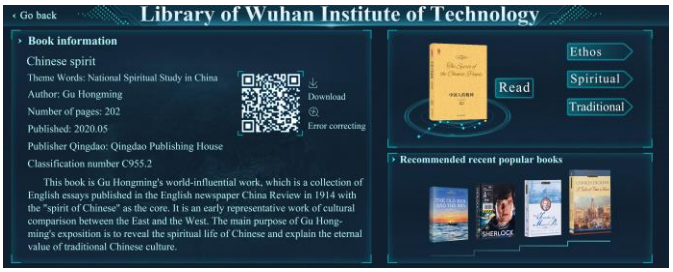

Figure 6 Search results page. *(self-drawn)*

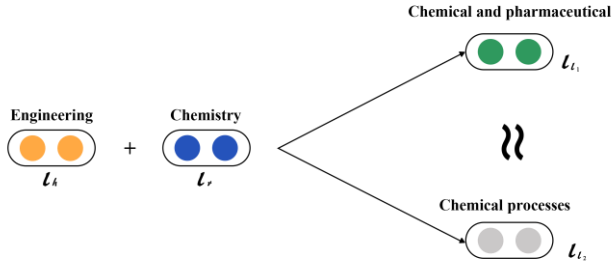

Figure 7 Complex relationship legend..*(self-drawn)*

5. Conclusion

Information visualization technology can represent digital resources in the form of graphics or images, so that humans can intuitively understand, so as to provide computer users with faster and more effective services. This paper has a preliminary discussion on the visualization of digital resources, which is mainly divided into the visualization of resource distribution, the visualization of the retrieval process, and the visualization of the retrieval results, which lays a foundation for the construction of the digital resource visualization model.

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