

Current Status and Inspiration of Knowledge Base Construction for Libraries in “Double First-class” Colleges and Universities

Xiao-Feng Xu¹, Chi Zhang^{2,*}

¹ Library, Wuhan Sports University, Wuhan City, Hubei Province, China

² Library, Huazhong University of science and technology, Wuhan City, Hubei Province, China

*Corresponding author. Email: 2003210078@hust.edu.cn

ABSTRACT

For obtaining the real-time data and construction trends of knowledge base construction in Chinese colleges and universities library, this work adopted the methods of website survey, telephone interview confirmation and CALIS alliance library knowledge base construction list comparison verification. The construction of 36 "double first-class" knowledge base in colleges and universities library and the functional service status of 13 "double first-class" colleges and universities library were investigated. Based on the survey results of scientific research achievements storage, resource sharing service and personalized service satisfaction, the main problems existing in the construction of "double first-class" knowledge base in colleges and universities library were deeply explored. Accordingly, the solutions were put forward on this basis. To some extent, it is expected to improve the effect of building "double first-class" knowledge base in colleges and universities library and promote the development process of "double first-class" in colleges and universities library.

Keywords: *Colleges and universities library; knowledge base; Construction status; Application effect*

1. INTRODUCTION

Scientific research achievements in colleges and universities are one of the important indicators to highlight the quality and core competitiveness of colleges and universities. Chinese colleges and universities attach great importance to scientific research work, and there are many scientific research papers, projects and achievements every year. Many of them have high academic value and scientific research value, and are important contents of library collection construction. It has become the most important task in the construction of colleges and universities library to save and utilize these papers, projects and achievements and serve the teaching and scientific research [1]. The knowledge base started from the open access movement, which is a new mode of academic exchange and resource sharing with the development of open access. It has become an important tool and mechanism for public education and scientific research institutions to preserve, utilize and disseminate their own knowledge assets. At present, the quantity of knowledge base construction in colleges and universities library is not ideal, only part of "double first-class" colleges and universities library has formed discipline knowledge base system and knowledge base service mode. Its construction strategy and function structure are relatively simple [2]. The open access degree of knowledge base is low, and there are errors in data authentication and matching. It can neither meet the needs of open access to the public nor meet the data support

services for schools, departments and functional departments, which needs to be further improved.

2. THE IMPORTANCE OF "DOUBLE FIRST-CLASS" KNOWLEDGE BASE IN COLLEGES AND UNIVERSITIES LIBRARY

2.1. Realizing the Long-Term Storage of Data

The research results of "double first-class" colleges and universities researchers are scattered in thousands of journals, databases and websites, which is not conducive to long-term storage. Due to the high price and large quantity of periodicals, and the limited subscription funds of the library, no university library has ability to collect all the periodicals, thus limiting its access to the research results of this institution. It is expensive to have the ownership of the professional database. When the "double first-class" colleges and universities library orders the database, it only purchases the right to use the database in the same year. Once it does not renew the subscription, most digital resources will no longer be available. Therefore, the "double first-class" colleges and universities must establish a library knowledge base in order to offer a long-term centralized storage and effective management safety place for the collection, sorting, storage, preservation and display of scientific research materials.

2.2. Promoting the Sharing of Academic Resources

The "double first-class" knowledge base in colleges and universities library converges the previously scattered resources, greatly improving the retrieval and acquisition of papers. Readers can easily and quickly obtain the required materials through the knowledge base, which promotes the rapid dissemination, transformation, exchange and innovation of academic research results. After the completion of "double first-class" knowledge base in colleges and universities library, the academic competitiveness and development trend analysis service can be carried out in the institution. Also, the academic influence of key disciplines, specialties and scientific researchers can be counted and analyzed, thus offering timely and comprehensive evaluation information for the scientific research management department of the university.

2.3. Assisting Scientific Work Innovation

The library knowledge base directly and vividly reflects the scientific research field and development of "double first-class" colleges and universities, and reflects the research results and academic development vein of each specialty. It is the characteristic resource of construction in colleges and universities, and offers a strong guarantee for the development of "double first-class" colleges and universities. At the same time, the library knowledge base also offers supporting data for the construction of collection resources. The annual purchase funds of "double first-class" colleges and universities library are limited. It is an important responsibility of the library to effectively use the funds to serve teachers and students. According to the situation of scientific research results, analyzing the guarantee rate of literature resources can strengthen the collection construction more pertinently, thus enhancing

the core competitiveness of "double first-class" colleges and universities library [3].

3. THE PRESENT SITUATION OF "DOUBLE FIRST-CLASS" KNOWLEDGE BASE IN COLLEGES AND UNIVERSITIES LIBRARY

3.1. Overview on Knowledge Base Construction

Among the 36 "double first-class" A-class colleges and universities investigated in this work, 21 colleges and universities have built library knowledge base. 12 colleges and universities are building library knowledge base, and 3 colleges and universities have not established library knowledge base through telephone interviews. Among the established colleges and universities library knowledge base, 7 colleges and universities library knowledge base links can't be opened. 12 colleges and universities library knowledge base can be accessed, and 2 colleges and universities library knowledge base partial functions can be accessed. The access speed of knowledge base website in Southeast University library is slow, only the homepage and list page of department library can be opened.

3.2. Function Design and Service Status

After investigating the function mode and service mode of 13 "double first-class" knowledge base in colleges and universities library, it is found that the function structure is relatively single, and the service effect is not ideal, as shown in Table 1.

Table 1. Survey results of "double first-class" knowledge base in colleges and universities library

No.	Colleges and universities name	Site visits (times)	Replacing metrological indicators	Number of meta-data	Full text rate (%)	Full text download	Commentary function	Search function
1	Beihang University	17481444	Popularity index, download times, browse times	188257	46.98	No, login required	Open to registered users	Primary
2	Northwestern Polytechnical University	26018119	Popularity index, download times, browse times	170328	36.79	No, login required	Open to registered users	Senior
3	Renmin University of China	9998856	Popularity index, download times, browse times	215186	36.34	No, login required	Open to registered users	Senior
4	Dalian University of Technology	48035084	Popularity index, download times, browse times	261999	0.03	Yes	No	Senior

Cont. to Table 1								
5	Central South University	No	No	364539	No	No	No	Senior
6	Huazhong University of Science and Technology	No	No	200125	No	No	No	Senior
7	Xi'an Jiaotong University	8057508	Browse times	327564	30.22	No, login required	No	Senior
8	Lanzhou University	No	No	No	No	No	No	Senior, specialty
9	Beijing Normal University	No	No	302451	53.69	No	No	Primary
10	WuHan University	55269	No	494354	2.21	No	No	Senior
11	China Agriculture University	134834566	No	179748	No	Yes	No	Primary
12	Beijing Institute of Technology	No	No	237189	No	No	No	Primary
13	South China University Of Technology	No	No	No	No	No	No	Senior

3.2.1. Quantity, type and open access of resources

About 92% of knowledge base in colleges and universities library has more than 100000 pieces of metadata, including journal papers, conference papers, degree papers, patents, books, open courses, work reports, scientific research projects, award-winning achievements, software copyrights, etc. About 46% of knowledge base in colleges and universities library has no full-text knowledge base, only 2 colleges and universities library can obtain full-text unconditionally, and other colleges and universities library can obtain full-text conditionally. The library knowledge base in Beihang University, Northwestern Polytechnical University, Renmin University of China and Xi'an Jiaotong University needs to be logged in before downloading the full text. It can be seen that the amount of metadata stored in the knowledge base of colleges and universities library is relatively high [4]. Also, the resources collected are mainly formal publications. The full-text coverage rate is low, and the degree of open sharing is limited.

3.2.2. Data retrieval setup is perfect

About 70% of knowledge base in colleges and universities library has advanced retrieval function. The common

searchable fields are title, author, source, key words, abstract, and the knowledge base of individual colleges and universities library has retrieval fields such as department, work number, submission time, ORCID, etc. The knowledge base website not only has advanced retrieval function, but also supports professional retrieval, editing retrieval and Chinese and English retrieval.

3.2.3. Data usage and statistical functions to be improved

About 46% of knowledge base in colleges and universities library has the function of visiting and using statistics. China Agriculture University library has the highest number of visits, about 134.83 million times. According to the national statistics of visits in the past two years, more than 90% of users in colleges and universities library come from China. For example, the survey data of knowledge base in Dalian University of Technology shows that the total number of views is basically the same as the number of views inside the university, with only a small number of foreign visitors. On March 15, 2018, the knowledge base website in Lanzhou University library published the article "the number of visits to the knowledge base in Lanzhou University library at home and abroad has exceeded 3 million times". It is pointed out that the domestic visits to the knowledge base in Lanzhou University library account for 63.7%, and the American visits account for 26.4%.

Accordingly, the users of knowledge base in domestic colleges and universities library mainly come from institution members, and the effect of academic exchange and communication is not ideal.

3.2.4. Results statistics and evaluation need to be further expanded

About 92% of knowledge base in colleges and universities library has expert (or scholar) achievement display, department (or subordinate organization) achievement statistics, as well as various index statistics (SCI, EI and other database collection marks) and literature reference data. 38% of knowledge base in colleges and universities also has alternative metrology indicators, which can be

evaluated from different perspectives. At the same time, most of knowledge base in colleges and universities library also has the function of "claim results", which can more accurately divide the people and departments of the results.

3.3. Application Effect Analysis

A questionnaire survey was conducted among 21 established knowledge base and 15 "double first-class" colleges and universities teachers who are under construction and without knowledge base. The value and function of library knowledge base on discipline research are studied in depth. The results are as follows.

Table 2. Survey results of "double first-class" colleges and universities teachers

Aspect	Degree of satisfaction (%)	
	Teachers of knowledge base institutions	Teachers with or without knowledge base
Storage of scientific achievements	87.5%	35.8%
Resource sharing services	78.3%	45.9%
Personalized services	89.4%	28.1%

3.3.1. Storage of scientific achievements

It can be found from the survey results that the teachers in the established knowledge base are very satisfied with the storage effect of their scientific achievements, which reaches 34.5%, and relatively satisfied with 53.0%. This proves that it can meet the needs of digital scientific research service, realize the open access of scientific research results and improve the visibility of scientific research data in the world. For example, the knowledge base in Beihang University library can support varieties data formats, and realize large-scale data import and export in batches. On the basis of meeting the needs of traditional data management, it can identify, store and integrate new data types in time, and promote the conversion of data in different formats [5]. The knowledge base in Renmin University of China library has advanced retrieval, information link and other service functions, which guarantees the systematicness and integrity of scientific research results, which to a certain extent improves the satisfaction of researchers.

3.3.2. Resource sharing services

In the process of knowledge base resource sharing in 13 "double first-class" colleges and universities library, scientific research data (including academic reports, periodical documents, manuscripts, etc.) are stored separately by professionals according to resource types. A stable, safe and long-term storage environment has been

formed, and digital and professional management of scientific research materials has been realized. In order to achieve the unified processing of knowledge base resources and user data, some "double first-class" knowledge base in colleges and universities library even introduced intelligent recommendation system, relying on appropriate recommendation algorithm and data mining technology. This can not only find the deficiencies in the current work and promote the improvement of management procedures, but also fully grasp the needs of users and improve the library service level under the new situation.

3.3.3. Personalized services

Establishing knowledge base can collect, store and manage digital academic resources, reduce the time for scientific research users to collect information, and assist them to carry out scientific research activities better. In particular, the library of 13 "double first-class" colleges and universities has made great achievements in achievements collection, resource integration, knowledge service, etc. Teachers' satisfaction with personalized service survey is much higher than that of other colleges and universities. The above institutions have accumulated rich experience in scientific research data management, with stable user groups, and a large number of user access data is stored in their service system. If they can integrate these user data with the help of intelligent recommendation system, and deeply mine and analyze them, the hidden knowledge can be found. According to the mining results, services are

offered in the way of intelligent recommendation to improve the core competitiveness of knowledge base.

4. THE ENLIGHTENMENT OF "DOUBLE FIRST-CLASS" KNOWLEDGE BASE IN COLLEGES AND UNIVERSITIES LIBRARY

Generally speaking, the construction of "double first-class" knowledge base in Chinese colleges and universities library is still in the development stage. The construction of knowledge base lacks effective data fusion and management mechanism, which makes its knowledge base "semi-finished product", as shown in the following:

4.1. Degree of Open Access

In order to avoid infringement, "double first-class" colleges and universities library's full-text acquisition rate is very low under the influence of open access related intellectual property issues. The full text of many "double first-class" knowledge base in colleges and universities library only gives the relevant link, or is only open for the users in the campus, completely deviates from the original intention of the library knowledge base construction--open access.

4.2. Acquisition Accuracy

The results show that the data collected by the knowledge base in "double first-class" library have great errors in achievement certification and matching, and the most prominent problem is the certification of scientific research achievements. Due to the lack of policy support in the school, the teachers' enthusiasm to claim results is not high. It is difficult to achieve the achievement certification of each teacher in the library knowledge base by relying on the human resources of the library itself.

Therefore, the "double first-class" colleges and universities should give full play to the existing business foundation and business network advantages, and fully launch the existing service objects (such as school management departments, departments, teachers, etc.). By using the existing communication channels, the strategic and academic significance of library knowledge base construction are publicized. It is necessary to actively seek the policy support of the school, and strive for human resources, policies and funds support for the construction and development of the library knowledge base. It should expand the services of subject management, scientific

research management, talent evaluation, etc., help the development and innovation of the school and open up a new development direction for the think tank service of the library.

5. CONCLUSION

The "double first-class" knowledge base in colleges and universities library has the data base of offering subject service, scientific research management and talent evaluation. It can connect with the scientific research management platform of the university data center and offer effective scientific research results support, which is of great significance to the institution development. However, the data structure and function modules of "double first-class" knowledge base in Chinese colleges and universities library are not perfect at present. It is necessary to form a diversified design from the scientific research needs to ensure that the personalized needs of users are met, and then attract more users to participate in the construction of the knowledge base, thus fundamentally promoting the development process of "double first-class" in colleges and universities.

REFERENCES

- [1]Mayer, Richard E., Terrence R. Smith, Christine L. Borgman, and Laura J. Smart. "Digital libraries as instructional aids for knowledge construction." *Educational Technology* 42, No. 6 (2002): 38-42.
- [2]Wright, Dustin. "NormCo: Deep disease normalization for biomedical knowledge base construction." PhD diss., UC San Diego, 2019.
- [3]Inclezan, Daniela. "RestKB: a library of commonsense knowledge about dining at a restaurant." arXiv preprint arXiv: 1909.08239 (2019).
- [4]Chen, Yu, Ruimin Hu, Jing Xiao, Liang Xu, and Zhongyuan Wang. "Multisource surveillance video data coding with hierarchical knowledge library." *Multimedia Tools and Applications* 78, no. 11 (2019): 14705-14731.
- [5]Winn, John Michael, John Guiver, Samuel Alexander Webster, Yordan Kirilov Zaykov, Maciej Kukla, and Daniel Fabian. "Knowledge base construction" U.S. Patent Application 15/898,211, filed July 11, 2019.