



# Research on the Strategy of Embedded Subject Services in University Libraries in the Big Data Environment

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**Abstract.** With the continuous iteration and update of big data technology and more and more in-depth service to summarize, mine and organize network data, university teachers and students have more complex and concrete requirements for library discipline services, and the embedded discipline services of university libraries in the big data environment are the transformation and upgrading of massive heterogeneous data resources and information transmission means in serving university users, which is an important way to improve the discipline services of university libraries. It is an important way to improve the quality and efficiency of university library subject services. Through the study of relevant literature and materials, this paper summarizes the connotation of embedded discipline service, explains the positive significance of embedded discipline service in university libraries under the environment of big data, puts forward the new requirements given to embedded discipline service in university libraries by the development of big data technology, and discusses the strategy of embedded discipline service in university libraries under the environment of big data.

**Keywords:** big data · university library · embedded discipline service

## 1 The Meaning of Embedded Disciplinary Services

The rapid growth in the scale of data and information in university libraries has led to increased difficulty in knowledge discovery, and the development of big data technology has led to more complex and concrete requirements for embedded subject services in libraries, which are also related to factors such as the optimal path principle and path dependence in the process of information retrieval behaviour of university users [1]. Embedded subject services originated in the United States, and the “embedded information specialist” at the Johns Hopkins University Medical Library is the most representative [2]. In China, the subject librarian system was first introduced by Tsinghua University Library, and in 2006, the National Science Library of the Chinese Academy of Sciences created a second-generation subject librarian service model marked by “integration into the front line and embedding in the process” [3].

Regarding the concept of embedded subject services, many scholars in the field have made valuable elaborations from different perspectives: Professor Chu Jingli proposed a service model with eight aspects such as “embedding objectives, embedding functions and embedding processes” [4]; Summit believes that the concept of embedded subject services emphasizes the synergy between librarians, professional teachers and students [5]. Zhang Juan and Zhang Xiaomei believe that personalized service is one of the important development directions of embedded disciplinary services [6]; Li Ping emphasizes that in addition to the traditional practice of embedding in physical space, the new service concept brings innovative highlights to the embedding in virtual space [7]. After reviewing and studying the relevant literature and referring to the research results of the above experts and scholars, the author summarises the embedded subject services in the big data environment as follows: embedded subject services require subject librarians to co-ordinate the application of library data and information resources to actively embed in the teaching and research process, accurately grasp the needs of teaching and research staff, provide accurate data support and reliable resource support for teaching and research staff, propose Subject librarians should participate in the whole process, actively collaborate with teachers and students, and play the role of data mining and information guidance of big data technology to promote the teaching and research activities.

## **2 The Necessity of Embedded Subject Services in University Libraries in the Big Data Environment**

### **2.1 Promoting the Diversification of Service Models**

In the big data environment, the massive data information is thematicized, characterized and personalized in delivery, and the service conditions, service environment and service content of users have also changed [8]. Therefore, when providing information services, university libraries need to explore various data resources, innovate information service mode, analyze the value of information resources in depth, and promote information resources to further penetrate into teaching and research activities. College libraries should fully understand and appreciate the implicit needs of college users, apply embedded discipline service methods and approaches, not only to meet the explicit needs of users, but also to tap data association to make the implicit needs of college users get accurate information service on this basis, so that the development of college library discipline service mode is diversified.

### **2.2 Promotion of Teaching and Research**

The innovative development of teaching and research in higher education requires abundant literature and data resources to guarantee. Teaching and research users are confronted with massive, complicated and heterogeneous information resources. Therefore, university libraries need to provide active embedded subject services in an innovative mode to assist university users to complete their teaching and research tasks from multiple perspectives. The embedded subject service improves the service quality with the

“close” embedded service, which reflects the role of university librarians in the innovation of teaching and research, and ensures the high quality and high efficiency of teaching and research work while the librarians achieve self-value enhancement.

### **2.3 Promoting the Capacity of Disciplinary Services**

In the big data environment, the subject service needs of university users are personalised, dynamic, precise, multidimensional and in-depth. For the specific needs of university teachers and student users, the content and mode of retrieval are determined to the maximum extent when jointly analysing literature knowledge, and in this process, in addition to the teaching and research tasks of teacher and student users also refer to the user’s interaction history with the system and other information scenarios to explore the knowledge required by users [9]. Embedded subject services are embedded in both teaching and research literature knowledge content and user scenarios to improve the efficiency of library intelligence analysis for teaching and research users and to advance the research process in an efficient and high quality manner, while at the same time assisting teaching and research users to have a comprehensive grasp of the literature [10].

## **3 Requirements of University Users for Embedded Disciplinary Services in the Big Data Environment**

### **3.1 Discipline Specialisation**

Embedded subject services in the big data environment require subject librarians to have solid professional knowledge and high information literacy in big data. Excellent subject librarians can be integrated into the teaching and research process more quickly and can provide professional data resources with high reference and application value to university users. When formulating the plan of training subject librarians, university libraries should appropriately set up specialized subject librarian business positions, the percentage of the number of subject librarians should be no less than 20%. College libraries also need to optimize the design and redefine the subject service procedures to achieve a new mechanism of high quality and efficient subject service services.

### **3.2 Personalisation**

The diversity of knowledge structures and specialisms of students and teachers in universities has led to a trend towards embedded subject services that are specifically “tailored” and personalised. The authors randomly interviewed 50 students who came to study in our library. Among them, 5 students were not clear about the concept of subject services; 8 students did not need subject services; 37 students expressed the hope that the library could provide subject services that suit their needs, accounting for 74%. Personalisation requires personalisation of service time and space, personalisation of service mode and personalisation of service content. The application of big data mining technology provides effective prediction and decision making for personalised services.

Subject librarians should start by analysing the individual diversity and personalised needs of university teachers and students, and provide personalised services through multiple service channels. This is also one of the paths to realise the people-oriented and service-oriented service characteristics and development ideas of university libraries.

### **3.3 Value Added Services**

Big data analysis technology can promote embedded discipline services to achieve value-added. Applying big data analysis technology to deep mining and intelligent analysis of the fused massive heterogeneous data, a series of data including data information related to teaching and scientific research and personalized data of university users, driven by discrete deconstruction and holographic reconstruction of big data, discovering the hidden knowledge information and its associated information in the big data of university libraries, assisting university users to obtain the required information resources efficiently and realizing multiple rounds of utilization, value-added data services and recreation of big data [11, 12]. Such value-added services are also one of the main directions for the future development of embedded subject services.

## **4 Strategies for Embedded Discipline Services in the Big Data Environment**

### **4.1 Big Data Resource Sharing**

Intellectual resources are gradually increasing in the proportion of information needs of university teachers and students users, and university libraries should make use of big data analysis technology to transform the advantages of their information resources into intellectual resources. Embedded subject services will reflect the characteristics of randomness, multiplicity and complexity in the process of multi-level and three-dimensional knowledge services embedded in teaching and research. In the big data environment, it is difficult to meet the diversified learning and research needs of teachers and students simply by relying on subject librarians and the resources of the library. Therefore, the cooperation and sharing of inter-library resources among university libraries plays an important role. Universities establish resource cooperation and sharing partnerships, establish the concept of big data sharing, carry out extensive cooperation on various kinds of big data intellectual resources, and adopt the operation mode of “departmental counterpart - disciplinary sub-division - teaching and research department docking”. The operation mode of “mutual collaboration” [13] is adopted to provide rich and diversified subject services around the teaching and scientific research of university users, so that the library data resources of universities can be innovatively applied to the greatest extent.

### **4.2 Accurate Embedding in the Whole Process**

Embedded discipline service should make full use of big data information service methods and approaches to innovate discipline service, and provide whole process, precise

and appropriate professional discipline service to different types of users. In the embedded course teaching, teachers can provide the latest materials of relevant professions in the preparation stage, subject librarians can assist teachers to complete the teaching tasks in the lecture stage, and provide information retrieval consultation services to students after the class. In serving scientific research projects, subject librarians can be organised to sink into the project team to carry out literature search, information literacy training, establish thematic databases, and analyse the latest development of the proposed research topic; in the implementation stage of scientific research, they should use various information resource platforms to push literature information and carry out information consultation and information training work related to it [14]; in the project completion and project results management stage, subject librarians can provide information search for results. Librarians can provide accurate docking services for each link such as result checking and data mining.

### **4.3 Improve the Construction of Virtual and Real Space**

The virtual and real space refers to the construction of virtual space and the construction of physical space. The construction of the physical space includes the transformation of the internal space of the library and the expansion of the outreach space. The transformation of the internal space should create a multi-functional scene space combining precision and diversity, and maximize the library space designed as a new type of multi-dimensional combination space, so that the teachers and students visiting the library can experience the high quality discipline services in multi-dimensional space. Extensive space expansion means that subject librarians should go into teaching and research departments, laboratories and classrooms to carry out subject services. For example, they regularly visit the teaching and research departments of schools to understand the changes in teaching plans and progress of subjects, and use the space of campus public places to carry out services such as information resource promotion and consultation. The construction of virtual space refers to pushing information to teachers and students through service platforms such as WeChat public number and campus network, so that the majority of teachers and readers can use resources anytime and anywhere in the virtual space, saving time and space costs and improving the efficiency of library services.

### **4.4 Building a Team of Embedded Subject Librarians**

The core element for university libraries to carry out embedded subject services in the big data environment is subject librarians with high information literacy and diversified subject backgrounds. The most effective way to build the talent team is to transform ordinary librarians into embedded subject librarians. Embedded disciplinary services in the big data environment require librarians to have comprehensive abilities in data mining, graphical analysis, academic identification, publication and transformation of results, as well as certain disciplinary knowledge. In addition to sending librarians for exchange and learning, inviting experts for training and strengthening peer research, it is more important to cultivate the learning enthusiasm of all librarians, formulate librarian training plans and form a strong learning atmosphere.

## 5 Conclusion

To sum up, embedded subject service in university libraries is based on university teachers and students, providing them with targeted and personalized services. Embedded subject service in the big data environment is a comprehensive innovation and application of information technology and subject teaching in colleges and universities. It can provide high-quality services for school teachers and student users and has important innovative value. Keeping pace with the development of big data information technology and the knowledge era, we explore the methodological strategies of embedded subject services to continuously improve and enhance the quality of embedded subject services in university libraries.

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