

# *College Archives Service College Education: Feasibility Study of College Audio-visual Archives Management Platform Based on DSPACE*

Xiqiao Liu

Northeast Normal University

People Street No. 5268, Changchun, Jilin Province, China

**Abstract**—With the rapid development of digital technology, the method of traditional archive resource management cannot meet the demand for current audio-visual archives management. New audio-visual archives management and service methods must be put forward to ensure the smooth development of audio-visual archives work. This paper starts with the analysis of the current situation of college archives and puts forward the feasibility and practical significance of DSPACE in college audio-visual archives management. It aims to provide a useful reference for the audio-visual archives management reform and service innovation of the current colleges and universities and other systems through the establishment of DSpace-based audio-visual archives management platform and promote the scientific and standardized management of college audio-visual archives resources. At the same time, the utilization of audio-visual archives resources can be improved, and the role of college archives in the construction of college culture and the prosperity and development of national culture can be brought into full play.

**Keywords**—*DSpace application; audio-visual archives management platform; feasibility study; service college education*

## I. INTRODUCTION TO DSPACE SYSTEM

### A. DSpace system features

DSpace, an open source digital storage system centered on content management release jointly developed by MIT and Hewlett-Packard, is one of the most widely used and influential institutional knowledge base systems in the world. At present, many institutions in China, including Hong Kong University, Taiwan University, Xiamen University, Tsinghua University, Chinese Academy of Sciences, are using the institutional storage system constructed by DSpace. As a kind of open source software, DSpace is featured by openness, universality and extensibility, and a wealth of these features is one of the reasons why DSpace has been accepted in many universities and scientific research institutions around the world. From the foregoing, the first feature is openness. DSpace is a software platform based on the BSD open source license agreement. Any organization or individual can download and use it for free, and it can also be modified, copied, redistributed and so on. DSpace's main code is written in Java and run on UNIX, MacOSX, and Windows systems. The second feature is universality. DSpace is a kind of open source software built on the OAI reference model. It supports the OAI-PMH-based interoperability and has a strong

universality. In the meantime, it is conducive to the construction of institutional warehousing alliance, the promotion of cooperation among different institutions, and the realization of information resource integration, sharing and intercommunication with other heterogeneous systems. Moreover, the third feature is extensibility. DSpace simplifies and accelerates the development of digital collection resources through built-in programs that support the API interfaces, which makes it possible to extend and modify the system. DSpace's open source features ensure that some programs are modified without touching the core code, in order that users can further extend and deepen software functions.

### B. DSpace system architecture

The architecture of the DSpace system can be divided into three layers: the storage layer, the logical layer, and the application layer. The first one is the storage layer, which is at the bottom of the DSpace system, with the effect of storing digital contents and metadata. The local file system is used by DSpace to store the received digital contents with any format. While, for the metadata collected by the system, they need to be stored by JDBC to run the relational database of PostgreSQL. The second one is the logical layer, which is located in the middle of the system and is the functional integration layer, with the most of the functionality of retrieval, content management, workflow management, history record, and permission management. The third one is the application layer, which is at the top of the entire system, and the DSpace system interacts with the outside world through this layer. Users can enter the system through the Web user interface, upload and download various electronic resources via the data input/output port. Meanwhile, users can also batch access, and even operate metadata submission, data statistics tools and other functions. Moreover, Servlet and Jsp in JAVA implement the functions of various components in the third layer. In addition, each layer in the DSpace system structure is connected by means of a common API interface. The upper layer can only call the components of the lower layer, and it cannot be called cross-layer. At the same time, the application layer cannot directly call the components of the storage layer.

## II. THE PRACTICAL SIGNIFICANCE OF DSPACE SYSTEM APPLICATION TO THE MANAGEMENT OF COLLEGE AUDIO-VISUAL ARCHIVES

A. *It is of great significance to solve the common problems in the long-term preservation of college audio-visual archives.*

The audio-visual archives have the advantages of intuition, reality, and vividness that written materials cannot compare with. After a long period of development and historical accumulation, domestic colleges and universities have produced a large amount of audio-visual archives, which are important school historical cultural resources and precious knowledge assets. However, the traditional audio-visual archives carriers are mostly tapes, which are greatly influenced by external factors such as light, air temperature and humidity. At the same time, they should be stored in demanding conditions. If the storage conditions are not eligible, then there will often occur deformation, magnetic powder shedding and demagnetization. In addition, audio-visual equipment technology has been updating in a rapid speed, and it is difficult to repair when the equipment is damaged or malfunctioned, which will bring great difficulties to the long-term storage of audio-visual files. Compared with traditional media, digital technology simplifies the storage, retrieval and usage of audio-visual archives. It stores audio-visual files in the form of data signals, with the advantages of large storage capacity, high security and uniform format, and archives information can be used online at all times and places. Nevertheless, digital audio-visual archives also have the problems of long-term preservation and management. On this account, search for long-term storage technology and method has become a major issue in the field of modern archives management technology, and has been paid more and more attention by archives departments at all levels.

B. *It is of great value to solve the theoretical and practical problems of digital audio-visual archives scientific organization, metadata disclosure and storage management effectively.*

This paper takes basic theory and business process of collection-storage-management-utilization of audio-visual archives as the research basis and the open source system as the application platform to carry out the collection of digital audio-visual archives, organization of metadata indexes, and management of and release of storage management, and finally receives the solution to the utilization of digital audio-visual archives storage management and integration services of colleges and universities on the basis of theoretical and practical research of content retrieval and acquisition. A lot of problems will lead to the failure of archives to meet users' demands, so the paper mainly solves the problems existing in the management and utilization of audio-visual archives in college archives, including the defect of data from backward technology, the difficulty of secondary utilization of audio-visual archives from inconsistent standards, the difficulty of retrieval from the lack of feature descriptions, and the insufficiency of management system functions, and so on. It is significant to explore the user-centered digital

audio-visual archives integration service mechanism because it will be attached great practical significance and value for deepening the development and utilization of audio-visual archives resources, with giving full play to its unique functions, in order to effectively serve school history research and culture construction, preserve history and politics, and even serve and educate people.

## III. ANALYSIS OF THE CURRENT SITUATION OF COLLEGE AUDIO-VISUAL ARCHIVES MANAGEMENT

A. *A lack of manpower for audio-visual archives management*

In the survey, the author found that there is no deeper division for the work of audio-visual archives, and none of the 22 colleges and universities has set up a special audio-visual archives management department, but implemented the audio-visual archives management work into a certain department or librarian. In fact, the audio-visual archives management is a systematic archives management work, with the characteristics of high technical requirements, complicated and tedious process, and heavy workload. Therefore, the digitization, collection, sorting, cataloging, and retrieval of audio-visual archives need higher professional skills for managers. At the same time, audio-visual archives are rich in content, which covers various fields such as science and technology, culture, economy, and politics. For this reason, it requires managers to have a wealth of knowledge reserves, broad knowledge horizons, high cultural literacy, strong learning capacity and the ability to accept new things, and keep abreast of social development and change to update their own cognitions. It is obvious most of the college archives in China are not only lack of manpower at present but also many of the librarians are "halfway established" without a professional background, resulting in the weak audio-visual archives management, accordingly, the service quality and efficiency are of difficulty to meet the high-level demands of users.

B. *A lag of audio-visual archives collection and digital processing*

Most of the college archives preserve precious historical audio-visual archives, which mostly exist in more traditional forms such as tapes and videotapes. The traditional audio-visual archives storage medium is very fragile, after a long period of storage and utilization, the signal will gradually decay, the magnetic material will naturally ageing, and thus it is difficult to be used normally. Additionally, the equipment for playing these audio-visual materials will have been gradually eliminated, the audio-visual archives of the carrier will face the risk of permanent loss, and thus digital processing is the best solution to solve this problem. According to survey, 15% of college archives have not carried out digital work, or the digital work is lagging behind without collecting and digitizing in time, which is not conducive to the protection, permanent preservation, development and utilization of audio-visual archives.

C. *The imperfection of audio-visual archives management system*

According to the survey, 19 colleges and universities have established audio-visual archives systems or incorporated

audio-visual archives management into the existing archives management systems, but only 6 of them are equipped with more than 5 basic function management systems, less than one third of the total. Moreover, there are even not the basic functions such as archives collection, editing, retrieval, borrowing, and display in most management systems, and the system performs practically no function, so it is difficult to implement the efficient management and effective use of audio-visual archives. The root cause of this problem is that many audio-visual college archives management systems are too old, even archives management systems were purchased more than a decade ago. At the same time, these systems cannot meet the requirements of today's audio-visual archives management, and the archives management systems cannot play their roles.

*D. The insufficient opening and utilization of audio-visual archives*

At present, the opening and utilization of audio-visual archives in most college archives of China is obviously insufficient. Most colleges and universities in China hold a relatively conservative attitude toward the issue of archives opening, and insist that archives should not be open to the public. In fact, a large number of the audio-visual archives kept by the archives can be opened to the public, but the professional identification is required before opening. According to the survey, there are 7 colleges and universities providing online browsing services for audio-visual archives, but there are 13 colleges and universities only providing archives access services. It can be seen that the method of service utilization of college audio-visual archives is still mainly archives access services.

**IV. FEASIBILITY ANALYSIS OF THE CONSTRUCTION OF COLLEGE AUDIO-VISUAL ARCHIVES MANAGEMENT PLATFORM ON THE BASIS OF DSPACE**

*A. The construction of DSpace platform is supported with various professional and technical talents.*

As a kind of open source software, DSpace is simple to install and operate, and can be easily accomplished by persons with relevant knowledge and technology. As an intelligence-intensive institution, colleges and universities have various kinds of professional and technical talents. Many of the staff members in the archives have a professional background of computer or software, and they can independently complete the construction of the audio-visual archives management platform. Even if some staff are limited by their specialties and cannot independently complete the audio-visual archives management, they can also ask the teachers of the computer or software for help. Therefore, the technical talent reservation in colleges and universities can fully meet the needs of building an audio-visual archives management platform.

*B. There is a certain theoretical and practical basis for DSpace research.*

The research results of DSpace are rich theoretically and practically. Although there is no precedent that DSpace has applied to college audio-visual archives management, DSpace has already been widely used in the institutional knowledge

base of Chinese colleges and universities. The domestic institutions that have used DSpace to establish the storage system include Hong Kong University of Science and Technology, Hong Kong Polytechnic University, Xiamen University, Tsinghua University, Peking University, Zhejiang University, National Science Library of the Chinese Academy of Sciences, etc. Most colleges' institutional knowledge bases are mainly created and maintained by their libraries, and China's colleges' libraries are relatively mature in terms of hardware. It can be seen that many colleges and universities in China have rich experience in using DSpace to build an electronic resource management system. Different colleges and universities or different departments of the same college or university can exchange experience and information, which to some extent reduces the difficulty of using DSpace to build an audio-visual archives management platform.

*C. The construction cost of using DSpace to build the audio-visual archives management platform is relatively low.*

In the establishment of audio-visual archives management system in college archives, many factors need to be considered. On account that here are also great differences in the cost of using different development modes, it is also necessary to consider the cost of construction in addition to fully understanding the demands of users. It is difficult for university archives to develop their own audio-visual archives management system using database software, so there will be a choice between purchasing commercial software and using open source software. The source code of open source software can be obtained free of charge with relatively simple installation process, low costs of system operation and maintenance, and high users' recognition and acceptance. The commercial software is equipped with more comprehensive functions compared with high cost, and then many small archives may be unbearable for it. Furthermore, the general commercial software requires fixed system maintenance costs every year, and the training costs of relevant personnel may also be higher on account of the complicated operation and low cognition degree for the system.

*D. The DSpace system has reasonable designs and complete functions, which is suitable for college audio-visual archives management software.*

The DSpace software itself meets the needs of colleges and universities to build audio-visual archives management platform, which is showed as follows:

Firstly, DSpace follows the OAIS reference model and OAI-PMH protocol, and supports the installation and use of UNIX, Mac OSX and Windows operating systems with easy operations and a wide range of applications. Secondly, users can change program and optimize software according to their demands to construct a management system that meets their needs because of DSpace's open source software features. Thirdly, corresponding to the organizational division of colleges and universities, DSpace divides its digital resources into different levels of community, collection, entry, data packet, and bitstream. Fourthly, DSpace embeds Lucene as a search engine, while providing users with a simple retrieval and an advanced retrieval, and the search method is simple, so

users can quickly find the resources they need. Fifthly, DSpace can restrict access to specific digital resources by controlling the permissions of user groups, satisfying the requirement that some archives can only be opened to specific people, and protecting resource information that is not suitable for opening in the archive. Sixthly, DSpace provides a unique and permanent identifier Handle for each community, collection, and entry through CNRI Handle System. That is to say, no matter how the content and location of the entry, collection, community of the resource change, the corresponding ones can all be found through the Handle that runs normally. Seventhly, the audio-visual archives contain various forms and formats such as photos, audio, and video. The DSpace system can collect and store digital resources in all formats, which is very suitable for managing audio-visual archives. Although DSpace supports only 35 kinds of common initial file formats, but it supports content storage in any format, that is, the system can extend any file format. Eighthly, when the DSpace system submits resources, it can set up workflow to review the submitted content and modify metadata, which is in line with the archiving process and has a high degree of rigor. DSpace software has many advantages in building the college audio-visual archives management platform. Of course, it does not mean that DSpace must be selected for the establishment of college audio-visual archives management system. In addition, there are also many other open source software available for college archives such as Fedora, EPrints, and new open source software represented by IR+, Zentity, Islandora and Hydra in recent years, which can all be tried as software for building audio-visual archives management platform. As a result, colleges and universities can freely choose according to their own needs and abilities.

#### V. CONCLUSION

With the rapid development of multimedia technology and digital technology, the number of audio-visual archives collected by college archives is increasing, which makes the problems in the management and service of college audio-visual archives increasingly conspicuous. It is necessary to change the existing traditional working mode of audio-visual archives and find a new working method to meet

the needs of various users in colleges and universities. In this paper, the open source system DSpace is used as a tool to construct the college audio-visual archives management platform, which realizes the effective management and hierarchical utilization of college audio-visual archives resources.

Through the construction of the audio-visual archives management platform on the basis of DSpace, the author hopes to solve the current problems of college audio-visual archives management confusion, obsolete system, and low resource utilization, and effectively improve the present situation of audio-visual archives. Although there is no precedent that DSpace software has been used as an audio-visual archives management platform by archives in China, it is convinced that DSpace software will have a very broad application prospect in the field of archives management in the future on account of its natural advantages of open source software.

#### VI. ACKNOWLEDGEMENT

Jilin provincial department of education "13th five-year plan" social science research project Research on the Digital Construction Path of College Audio-visual Archives (JJKH20190318SK) and the project aided by special funds for basic scientific research expenses of central colleges and universities Research on the Repository Management Pattern and Integrated Services of College Audio-visual Archives Based on DSPACE (18XQ007)

#### REFERENCES

- [1] TianLijun.A Comparative Study of User-based Alliance Knowledge Base Services [J], 2015 (06).
- [2] Hong Yi. Principles and Methods of Archives Management [M]. Wuhan: Wuhan University Press, 1997.264-265.
- [3] Bai Yun. Practical Research on Long-term Preservation of Audio-visual Archives at Home and Abroad [J].Archives, 2013 (05): 57-59.
- [4] Gopi Krishna, Vengal Reddy, Jagadamba. A Unified and Scalable Data Migration Service for the Cloud Environments[C].15th International Conference on Management of Data. India: Mysore, 2009.47-48.