



Blueprint for Integration of University Archive Resources Based on City Memory

Wenli Jia*

Department of Archives, Shandong University of Science and Technology, Qingdao, Shandong
266590, China

jiawenli2123@163.com

Abstract. The specifications of archive resource construction in one university are usually different from others, and university archive resources are mostly scattered outside of city memory. The origin, necessity and basis of university archive resource integration are analyzed in this article, and it is proposed that based on city memory network platform, university archive resources can be integrated by constructing work mechanism, formulating technical standards, coordinating resource construction, and establishing data integration platform. The blueprint proposed here for university archive resource integration helps the establishment of systematic and complete city memory besides the improvement of university archive resource construction itself.

Keywords: University archive resource; city memory; information platform; resource integration

1 Introduction

The cultural elements in university archives are significant for city memory [1]. However, archive resources of one university were usually scattered in other institutions in China due to campus relocation, university separation and integration in the history of its development, which broke the connection between archives and consequently resulted in the break-up of university memory chain. Moreover, the specifications of archive resource construction in one university are usually different from those in other universities, which is not conducive to information interconnection and memory construction [2, 3]. The integration of university archive resources is important for the establishment of systematic and complete university memory and even city memory [4, 5]. University archive departments can make great contributions to city memory construction, and here the blueprint for the integration of university archive resources based on city memory is proposed.

2 Basis of university archive resource integration

(1) Policy support. At the national level, China State Council issued the National In-

formatization Plan, in which it was proposed that the government will formulate measures for information resource management to promote cross-department and cross-level communication and collaboration to remove information barriers. At the authority level, some protocols were issued for the elimination of information segmentation through integration of resources in different departments of one institution, in different institutions of one region, and those in different regions, by which to promote scientific management and efficient utilization of information resources. The implementation of these plans and protocols provides policy basis for the co-construction and sharing of university archive resources.

(2) Theory basis. The first is archive memory theory. The basic view of archive memory is summarized that archive is a significant and irreplaceable element in the construction of collective memory. Archive workers have the responsibility to actively participate in the construction, maintenance, and inheritance of collective memory. The shortage and islanding of university archive resources are not conducive to the construction and inheritance of university memory and even city memory. University archive departments should improve archive resource construction to complete the memory chain. The second theory is about the co-construction and sharing of archive resources. Its key point is that the archive departments should establish extensive cooperation mechanism under network environment in the whole process of archive resource construction and utilization. Under the macroscopical layout and scientific planning, archive departments can cooperate to make full use of related technologies and measures to reveal, construct, exploit and utilize archive resources to meet the demand for archives in all activities. The effective theoretical exploration provides an action guide for the co-construction and sharing of university archive resources.

(3) Data resource foundation. Chinese universities strengthened and improved archive work in recent years. They accelerated the digitization of traditional archive collections. They constructed some basic databases, full-text databases, and multimedia databases of archives with high value and utilization rates through digital processing and data conversion according to specific technical standards. In addition, for the needs of archive publicity, most universities constructed thematic archive databases, such as "Centennial University Database" of Wuhan University, "Natural and Humanity Landscape Database" and "Academic Celebrity Growth Database" of Shandong University of Science and Technology. These databases provide resource basis for the integration of university archive resources.

(4) Technology support. The archive management system established by Nanjing University has already been widely applied in Chinese universities. It follows the national standards and specifications of software design and archive management. It can manage electronic files, images, videos, audios, and other multimedia resources, and it has the functions of file reception, resource sorting, database management, etc. It provides technical support for the whole process management of university archive resources. Moreover, the National Archive Bureau issued digital archive resource construction standards, such as "Paper Archive Digitization Standard DA/T31-2017" and "Standards for the Collection and Management of Oral Historical Materials DA/T59-2017", which provide guidelines for the standardization of resource construction.

(5) Practice experience. At the national level, a national archive information resource sharing platform has been set up, and it received more than 1.02 million pieces of data uploading in recent 10 years from over 40 archive departments, and it already generated more than 170 special subjects. At region level, Zhejiang Archive Bureau constructed regional archive reconstruction and sharing platform, in which it integrated livelihood archive resources of several social sectors. Another example is website "Beijing Memory" run by Beijing Archive Bureau has displayed the scripts, pictures, works and oral materials of the university celebrities in Beijing in the module "Beijing Documents". At university level, the main pages of university archive websites mostly link to the archive websites of administrative authorities and other universities. The construction practice of different levels provides reference for the co-construction and sharing of university archive resources.

3 Approach to integrating university archive resources

Through macroscopic deploying and overall planning and based on city memory network platform, resource integration of the universities in Qingdao city was successful by employing the strategies such as constructing work mechanism, formulating technical standards, coordinating resource construction, and establishing data integration platform.

3.1 Constructing work mechanism

(1) Exertion of authority strength. University archive resource integration is a complex, long-term and systematic project. It is highly professional, and it has strong policy orientation. The superiority of authorities should be exerted, including the national and local levels, which can play a key role in top design and system planning for resource integration, whereby university archive resource construction can be promoted, and cross-border cooperation can be achieved for the integration of archive resources of universities in the same region.

(2) Establishment of work system. "Nothing can be accomplished without norms or standards." It is necessary to clarify the laws, regulations and policies related to information construction, wisdom city construction, data fusion, digital resource co-construction and sharing. As a guide for action, a set of scientific work system including principles, policies, standards, norms, cooperation agreements, and intellectual property rights protection protocols needs to be constructed referring to national and local informatization plan and archive resource construction strategy.

(3) Construction of alliance cooperation mechanism. Regional education administration department and archive administration department can strengthen their communication and coordination to guide the archive resource integration of regional universities. They can conclude agreement on resource co-construction and sharing, promote the census and statistics of related resources, formulate standards for the whole work process, construct thematic databases, and design regional network of integration system. The universities should be incorporated into the construction sys-

tem of city memory and play a key role in the project based on the principle of "data are physically gathered up, and access authorities are logically separated."

3.2 Formulating technical standards

(1) Standards and specifications for resource construction. It is suggested to refer to the technical documents, such as Collection Work Standards, Collection Work Procedures, Collection Work Specifications, and Document Digitization Program, formulated by China Association for Science and Technology for the project of Collection of Academic Growth of Old Scientists. Although this project mainly aims at personage archives, the complexity and diversity of its resource carriers almost cover all types of university archives, so it also has strong pertinence and practicability for university archive resource construction. It can ensure the standardization and unification of work procedures, work contents and technical standards.

(2) Archive resource integration technology. The internet of things, cloud computing, internet, and other emerging technologies can be used to collect and sort university archive resources. At the same time, based on regional network, the integration of massive archive data becomes efficient through virtual reality modeling technology, data integration technology, intelligent analysis technology, etc.

(3) Information security technology. The security and reliability of archive data can be enhanced with unified portal management technology for user management, identity authentication, and authorization management. The hierarchical security protection can be strengthened at application, system, network, physical, and management layers. At the same time, to effectively avoid the loss and infringement of extra-legal intellectual property rights, it is suggested to sign cooperation agreement on intellectual property protection. Technical background information is annotated and encapsulated to ensure the security and availability of archive information by electronic authentication (CA), digital watermarking, and replication prevention technologies.

3.3 Coordinating archive resource construction

(1) Resource collection and thematic database construction. Universities should excavate archive collections and supplement related resources through extensive solicitation, photograph and video recording, oral interview, etc., by which to achieve the integrity and systematicity of archive resources as far as possible. At the same time, they carry out digitization processing and metadata description for the resources on various forms of carriers according to specific technical standards. Knowledge mining technology and data association technology can be used to classify and combine the information of a specific subject, and it provides standard element for the integration of archive resources.

(2) Classification of regional university archive resources. In view of the vast geographic distribution, the universities can be classified firstly by their geographic administrative divisions based on their locations, such as provinces (municipalities) and autonomous regions, and then they are divided according to their administration authorities, such as national, provincial, or local administration, and additionally they are

grouped according to their education characteristics, such as the career direction of their students. The classification should be rational, logic, and concise, and it should be convenient for the integration of archive resources of different universities.

3.4 Establishing data integration platform

(1) Online query system. Based on intellectual property rights protection and co-construction and sharing agreement, a universal retrieval platform can be constructed for all thematic archive databases of all universities, relying on digital archives or city memory network platform. The all-in-one retrieval cross databases can realize free access between databases in virtual physical space and data interoperability. Thus, heterogeneous data in scattered archive resources and in different formats can be organized, and university archive resource integration can be achieved for city memory.

(2) Upgrade of information platform. According to specific technical standards, universities can carry out digital processing to their archive collections and establish the modes of structure, storage, management, and application for different types of databases. A standard and extensible archive management system can be established, and it provides the basis for data integration. The city digital archives and city memory network platform can be expanded and upgraded by reconstructing and optimizing whole and partial structure, such as setting up subordinate function module "higher education" under present module "science-education-culture-health". According to resource sharing agreement, resource convergence related to city memory can be realized by integrating the scattered subordinate thematic archive databases of different universities.

4 Conclusions

University archive resources can be involved in city memory after they are rationally integrated, and now the integration work has strong basis including policy support, theory basis, data resource foundation, technology support, and practice experience. Based on city memory network platform, university archive resources can be integrated by constructing work mechanism, formulating technical standards, coordinating resource construction, and establishing data integration platform. The integration of university archive resources helps the establishment of complete city memory besides the improvement of university archive resource construction itself.

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