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*Research article*

# **The practical Development of Library in Digital Humanistic Ecology**

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## **ABSTRACT**

By using the literature research method and qualitative analysis method, this paper takes CNKI literature on digital humanities related topics as the object, sorts out the overall development route of digital humanities, and focuses on the induction and analysis of the practice of libraries in the digital humanities ecology. Based on this, this paper proposes the future practice and development direction of libraries in the digital humanities ecology.

**Keywords:** literature research; qualitative analysis; libraries in the digital humanities ecology

## **1. Introduction**

Digital humanities has shown its far-reaching research significance and development vitality under the macro background of the digital age, the integration of disciplines and the construction of new liberal arts. After the encounter of traditional humanities with computing thought and digital technology, it shows the meaning of “having a different taste in my heart”. From the initial poetic, perceptual research based entirely on the essence and connotation of human spirit to embracing rational scientific methods, it endows humanistic research with the characteristics of calculability, visualization and diversification. With the continuous application of data processing in the field of humanities, digital humanities brings humanities into a data-driven or data-intensive era.

Based on the development path, core technology and objects of concern, there is a high degree of similarity and overlap with the literature digitization work that has been paid close attention to and devoted to in the field of library. the internal and external relationship between digital humanities and library has become the focus of academic circles. Many scholars try to clarify the basic relationship between digital humanities and libraries from the aspects of the internal relationship between them, the practical relationship between them, and the ways of two-way construction. Before that, the first thing we need to make clear is “what is digital humanities?”. According to the current academic point of view,

many scholars think that digital humanities is a research method, a discipline, a space or a practice.

This paper holds that digital humanities is a new ecology of academic environment spawned by the change of social context under social development, technological renewal and the birth of the digital age. It nurtures many humanities such as language, history, archaeology, art, literature, religion, law, sociology, anthropology and so on, makes visualization technology such as knowledge map, VR/AR technology, machine learning technology as tools and nutrients. With the joint efforts and creation of many cross-disciplinary scholars, it shows a harmonious and diverse academic new ecology.

## **2. Description of the development route of digital humanities**

### ***The development route of digital humanities abroad***

The predecessor of digital humanities was “humanistic computing” in the middle of the 20th century. Roberto Busa, an Italian scholar, first applied computer technology to the compilation of books in the field of humanities, and described the development blueprint of numeral humanities through the Thomas Index of works. It is recognized as the founder of the digitization of humanities and the forerunner of related interdisciplines [4]. From the end of the 20th century to the beginning of the 21st century, with the emergence of the Internet and the development of computer technology, the object of “humanities calculation” showed an

obvious surge trend and diversification. from the original electronic text to hypertext, images, video, audio, web pages, digital maps and so on. In April 2001, Blackwell Publishing House published for the first time a book entitled “Digital Humanities”: a Guide to Digital Humanities. It introduces the connotation and technology of digital humanities. since then, “digital humanities” has quickly replaced the outline of “humanistic computing” in western academic circles as a new academic term [5]. At the annual meeting of the Modern language Association in 2009, the regional study of digital humanities was recognized by the North American humanities community. With the continuous enrichment of the theoretical research on digital humanities, more and more digital humanities centers have been opened in the United States, Britain, Europe, Canada and other places. All kinds of colleges and universities have begun to set up digital humanities centers or their libraries to carry out digital humanities projects. Subsequently, some special associations have emerged to associate digital humanities centers in different schools and regions to form a digital humanities academic community, and digital humanities academic journals have gradually emerged.

Zhou Chen [6] systematically commented on the progress of international digital humanities based on the core collection data of WoS, using the methods of knowledge graph and content analysis. Shang Xiaoqian [7] investigated and analyzed the current situation of the

development of digital humanities in European academic research libraries. Zhang Hongyan and others analyzed the development of digital humanities in foreign university libraries from the aspects of librarian post setting, department or project establishment. Huang Hongmei [9] and others made a perspective on the form and focus of digital humanities practice in foreign university libraries, while Xu Tongyang [10] investigated the practice path and content of digital humanities in first-class university libraries in Australia. Throughout the development and practice of digital humanities abroad, their research shows the characteristics of clear knowledge base, diverse practice subjects and profound research efforts. The European Association of Research Libraries has raised digital humanities to a strategic level. as an important part of open science, digital skills and services, digital humanities has been listed as the key development area of its strategic planning. it also emphasizes that libraries should be built as an important position to carry out digital humanities activities. Li Chenglin [11] investigated and analyzed the construction and contents of digital humanities centers in 40 university libraries in Europe and the United States. Many scholars who have summarized and studied foreign digital humanities have pointed out that the main bodies of foreign digital humanities construction are diverse, but the positioning of university libraries is very clear. it occupies and bears the mainstay position and role that can not be underestimated in the

research of digital humanities.

***The development route of digital humanities in China***

According to literature records, the “humanities” in Chinese first appeared in the Book of changes [12]: “Elegance and intelligence (denoted by the lower trigram) regulated by the arrest (denoted by the upper) suggest the observances that adorn human (society). We look at the ornamental figures of the sky, and thereby ascertain the changes of the seasons. We look at the ornamental observances of society, and understand how the processes of transformation are accomplished all under heaven.”The ancient Chinese library revolves around such humanistic materials to explore the origin, examine the version, catalogue and store the lost, collate the true and false, distinguish and annotate, and the current digital humanities has a profound connection with it. The study of digital humanities in China started relatively late. In 1977, the electronic computer reorganization in China was successful for the first time. On this basis, the construction of the database was put on the agenda. Since then, we have the technical basis for the realization of digital humanities. Automation technology and database tools bring hope for data digitization, which lays a foundation for the follow-up local development of digital humanities.

In 2009, Professor Wang Xiaoguang [ 13 ] of Wuhan University first introduced ‘digital humanities’ into China. He pointed out that digital text is an emerging field in the process of continuous development, change

and redefinition. At present, it is an interdisciplinary research field that deeply applies modern computer and network technology to traditional humanities research. Xu Miaomiao [ 14 ] summarized the development of digital humanities in China as the structural context of ‘point-line-plane-network’, and digital humanities gradually entered a good situation in the diffusion of ‘point-line-plane-network’. Gao Shenghan [ 4 ] digs out the domestic research hotspots through the high-frequency keyword knowledge map. At present, the domestic digital humanities research mainly includes the basic theory of digital humanities [ 15 ], the connotation and nature of digital humanities, digital humanities technology and development path [ 16 ], the relationship between libraries and digital humanities, and specific project data construction. By retrieving the National Social Science Foundation project database and using “digital humanities” as the name of the project, it can be found that since the application of digital humanities projects began in 2017, the vast majority of projects have been distributed in the field of library and information, literature and linguistics. There are also studies in the field. In addition, from the results of the paper, the research field involves literature, history, literature, linguistics, philosophy and so on.

In March 2022, the China Office and the State Office jointly issued a document to promote the implementation of the national cultural

digitization strategy [ 17 ], indicating the direction for the rise and layout of China 's digital culture in the new era, the construction and application of national cultural big data. This strategy aims to realize the cross-time domain presentation of Chinese culture for five thousand years, fill the time gap between ancient and modern times with digital humanities, and make digital bridges to eliminate the boundary between then and now, and draw a panoramic view of diachronic Chinese culture at present, so as to realize the creative transformation and innovative development of Chinese culture. This will undoubtedly create a cultural feast in which the past and the present, and the past and the present meet across time and space.

### **3. The practice development of library in digital humanities ecology**

#### ***The practice of library participation in the construction of digital humanities institutions***

On the basis of trying to clarify the relationship between digital humanities and library collection resources, Zhang Weidong [18] designed and constructed a digital humanities-oriented visualization model of library collection resources. he pays attention to library collection resources retrieval visualization, presentation visualization and statistical visualization. The practice of digital humanities requires that in the process of transforming library resources from traditional to visual, the construction of semantic relational data repository is the same as the



construction of digital library. Gao Shenghan [4] briefly combs the current practice of digital humanities at home and abroad. Zhang Xu et al. [19] counted the hot spots and trends of digital humanities research in China, and pointed out that under the theme of digital humanities and library research, library services, digital humanities services, digital academic, digital humanities librarians, university libraries and so on are the key points that academic circles pay more attention to.

The International Union of Digital Humanities organizations [20] is the largest comprehensive digital humanities research organization in the world, and now humanities associations from 11 different countries have become its members, aiming to promote and support digital teaching and research in the field of humanities and arts. Its members are institutions at the forefront of research in the fields of text coding, digital library, electronic publishing and so on. Through searching and browsing the websites of member associations, it is found that among the main members of the executive committee of each association, the proportion of members from the field of graphics and information is not large, and more members come from the fields of linguistics, computer science, art and so on.

The construction of digital humanities centers began in the United States. So far, digital humanities centers have been established and put into use in North America, Europe, Oceania and Asia. The Digital

Humanities Center of University College London [21] is a multidisciplinary team composed of staff and doctoral students from the whole college. Most of the team members focus on spatial computing, information research, architectural art and other fields. It is rare to see library researchers. King's College Humanities Computing Center [22] 56.1% teachers have humanities and arts backgrounds, 19.51% teachers have liberal arts and science backgrounds, and 41.46% of teachers have multiple disciplinary backgrounds. A small number of visiting researchers will come from the library community. The Digital Humanities Center of Columbia University in the United States [23] adopts a multi-agent synergy and linkage development mechanism to cooperate with relevant departments, research institutes and libraries to carry out its digital humanities practice. The University of Victoria in Canada [24] relies on its School of Humanities to set up an Electronic text Culture Lab, Humanities Computing and Media Center. Other universities in Canada, such as Malkiel University, Dalhaus University and Simon Fraser University, have set up their digital humanities centers or laboratories relying on their respective libraries.

Taiwan University Digital Repository Research Center [ 25 ] is a university-level research unit established by Taiwan University based on its digital resources and accumulated technology. It was established in 2007 as the “Digital Repository Research and Development Center”.

Since 2012, it has been renamed the “Digital Humanities Research Center”. The center has an advisory committee, in which the library director is a fixed member, coordinating and integrating the relevant teaching units of the university to jointly carry out digital humanities work; the Digital Humanities Research Center of Wuhan University [ 26 ] is the first digital humanities center in mainland China. The core of its research team is experts and scholars in the field of library and information, such as Professor Ma Feicheng and Professor Wang Xiaoguang. In addition, the members also include postdoctoral and research assistants in the fields of publishing and art. Based on the Institute of Humanities and Social Sciences of Nanjing University, the Center for Digital Humanities [ 27 ] gathers multidisciplinary resources of Nanjing University, promotes interdisciplinary cooperation, and builds an international communication and cooperation platform for scientific research and cultural institutions at home and abroad. The research fields of the center personnel are diversified, covering the fields of history, information, art, philosophy, library and information, and the library community does not occupy a leading role. Peking University Digital Humanities Research Center [ 28 ] is located in Beijing.

***Library discourse practice in the development of digital humanities theory***

The theory of digital humanities began with the initial development of humanistic computing, and its evolution has been in line with the

development of academic research hotspots. The establishment of the theory needs to look at it macroscopically from the perspective of philosophy and academic ecological construction in this field, and construct it systematically after thinking about many basic problems. At present, in the theoretical research of digital humanities, *Debates in the Digital Humanities* includes the articles of American experts and scholars in digital humanities, and systematically explores the basic theory, research methods and practical paths of digital humanities. Trying to clarify the future development of digital humanities: the debate on *Digital Humanities* published in 2012 integrates academic research achievements from the aspects of defining digital humanities, theorizing digital humanities, criticizing digital humanities, practicing digital humanities, teaching digital humanities and looking forward to the future of digital humanities. The debate on *Digital Humanities*, published in 2016, combines complete academic papers with shorter articles from academic blogs and conference speeches, revealing the dynamic views, methods and scope in the field of digital humanities. The book “*Creating Things and Drawing Boundaries-experiments in Digital Humanities*” published in 2018 highlights the interdisciplinary characteristics of experimental methods and practical research, and explores the topic of what it means to “make” things in the humanities. In addition, David M. *Digital Humanities: knowledge and criticism in the Digital Age*, written jointly

by Berry and Anders Figjold, is an important work on the theory of digital humanities. It discusses the theoretical construction and discipline construction of digital humanities from the perspective of cultural criticism, and puts forward the stack of digital humanities.

Zhou Chen, a domestic scholar, systematically reviewed the research progress of international digital humanities in 2017, focusing on the research characteristics and knowledge structure of international digital humanities. In 2017, “Discussion on the Technical System and Theoretical Structure of Digital Humanities” by Liu Wei and Ye Ying<sup>3</sup> profoundly, comprehensively and systematically constructed the six-dimensional technical system of digital humanities and the theoretical structure of the nine elements, and expounded the methodology and theoretical structure of digital humanities from the macro level. Wang Lihua et al.<sup>1</sup> constructed the theoretical framework of digital humanities research, which is composed of basic theory, methodology, specific work content and research field. In addition, the “methodological community” proposed by McCarty reveals the commonness of all humanities research in the process of digital transformation, and it is also in line with the development trend of “the fourth paradigm” in scientific research, that is, data-intensive science. The methodology of digital humanities can also be discussed on this basis.

Throughout the whole process of the construction and development

of digital humanities theory, the practice of libraries in it is not enough, and the degree of intervention in the basic theory research, technology development research and service theory research of digital humanities still needs to be further improved. Based on the literature collected by CNKI and WoS, Hu Jing [ 30 ] analyzed the research situation of digital humanities in the field of library and information science at home and abroad by combining quantitative and qualitative methods. The data show that since the formation of the knowledge base of digital humanities in 2013, the results of papers in the field of library and information science have shown a significant upward trend, but the research on digital humanities theory is very few. In the evolution process of digital humanities theory, how much power the library exerts in it and how far it still needs to go is the direction that needs to be considered urgently and needs to invest energy to coordinate practice. Participating in the research and development of digital humanities theory is a necessary and sufficient condition for libraries to occupy a leading position in the digital humanities ecology, and a prerequisite for libraries to hold the right to speak in the digital humanities ecology.

#### ***Library leading practice in the promotion of digital humanities work***

In the promotion of digital humanities work, on the one hand, the library, as the main body, is responsible for the implementation of the work, and the other side is based on the digital library technology, which has strong

collection resources and highly overlaps with digital humanities technology. can become the cooperation leader of other departments or institutions. In view of the above two aspects, the library needs to include and consider reasonably the factors of digital human text in the construction and development of its collection resources, the overall planning of departments, the setting of librarians, the service system and so on.

Since the 1990s, the library has begun the digital practice of collection resources, and it is a leader in the construction of digital resources. More than 20 years of development has made great achievements in the digitization of library resources, but there is still a little gap with its ideal construction goal. The requirement of digital humanities for digital resources is not only the simple digitization of the traditional text, but also the result of deep indexing of its content. this result must accurately respect the actual semantics of the text. it is integrated, fine-grained, relevant, calculable, and covers many disciplines in the field of humanities. Therefore, in the process of indexing, indexing workers must have a deep understanding and grasp of the humanities, and deepen the professionalism of data, data fusion, data association and release work. At present, the library has not put much effort into this aspect, and it has hardly tried to cooperate with scholars in related fields such as linguistics, literature and history in the indexing process. This

requires the library to carefully consider the depth and breadth of the digitization of its collection resources and the working mode and cooperation mode in the digital process such as indexing.

In addition, digital humanities has been developed for many years, during which the integration of digital human resources is not high, heterogeneous distribution in the digital humanities center database or library database. The international CenterNet [31] is an international network of numeral humanities centres designed to carry out cooperative and collaborative actions to benefit the digital humanities and related fields, especially as the centre of the humanities network infrastructure, based on the new publication DHCommons, it enables the DH centres to establish an international network-sharing and building projects, tools, personnel and expertise. CenterNet provides a virtual DH center for isolated DH projects and a platform for digital humanities education for the wider academic community. At present, an integrated and unified platform has not been built to store digital human resources and provide unified retrieval or a humanities network infrastructure center to connect domestic digital humanities scholars.

#### **4. The practical prospect of library in digital humanities ecology**

The rise of digital humanities essentially reflects a new change in the way scholars acquire and utilize resources in the digital era: first, academic



research is more and more dependent on data; second, how to use data technology to obtain, organize and utilize related resources quickly and effectively. Under this ecological background, the library is not only the aggregator of resources, but also the vanguard of the development of digital humanities and the mainstay of the construction of new liberal arts. The main contradiction has changed: from the original contradiction between users' multicultural experience needs and library services to the high requirements for the depth and refinement of platforms and resources in the development of multi-disciplines and the contradiction between the current library work mode and resources construction.

This paper holds that in the ecology of digital humanities, which contains rich implications and new forces, the future practice direction of the library should be actively extended to the following directions.

#### ***Integration-Building a unified digital humanities platform***

It is mentioned above that there is a digital humanities exchange platform CenterNet which has been built for the majority of scholars in the world. China should also begin to integrate the distributed and heterogeneous digital humanities research achievement database as soon as possible to build a unified digital humanities platform. As an institution with profound resources, the library should seize the opportunity and give full play to its own advantages to integrate the existing research achievements of domestic digital humanities centers, academic digital humanities

projects and related papers and works. the scattered research achievements of digital humanities should be integrated, organized and indexed. Establish a database of digital humanities achievements in the fields of linguistics, literature, history and art, build an integrated digital humanities platform, and then open access to the academic field and jointly build and share. As said in the view of the function of the pavilion in the thought of ancient Chinese library:one of the most important functions of the ancient library is to enable the society to inherit the context like water. As an “instrument of preaching”, libraries must shoulder such responsibilities, own “Tao” and spread “Tao”. Today, people might as well give the library the name of an elegant collection of rivers and rivers, give the meaning of “water” to its hidden sources of capital, and let resources such as water benefit all things, and nourish academic circles with warmth and nourishment like water.

***Cooperation-Leading the research on the systematization of digital humanities***

The interdisciplinary and cross-territorial nature of digital humanities requires that there is a core hub and cooperation platform in the research process. The library can provide services for the whole life cycle of digital humanities projects, take the lead in implementing the overall planning of digital humanities practice, and lead the top-level design of digital humanities in various disciplines. Rehearse the team formation of digital humanities, the specific growth plan of the follow-up development,

and the performance evaluation scheme and system of scholars involved in digital humanities research. Attach importance to the incubation of digital humanities projects, such as vigorously carrying out face-to-face communication activities for digital humanities scholars, training graduate students in the direction of digital humanities, etc., and jointly build a multimodal digital laboratory with the college to form a long-term cooperation mechanism with relevant groups inside and outside the school to provide academic space for teachers and students to study, research and test digital technology.

***Renewal of library value philosophy in accordance with the background of the times and academic context***

The construction of the new liberal arts, the planning of the 14th five-year Plan, the rise of cultural self-confidence and the advance of the cultural power make the library coincide with a beautiful background of the times. the universal multicultural needs of the society and the pursuit of humanistic beliefs have created a social context with strong humanistic colors. the academic orientation of returning to nature, pursuing humanism and building an academic community places the library in a harmonious academic context. Taking the attention of the times, the thinking of the society and the academic pursuit as the anchor, the library should deconstruct the proposition of the times, describe the strategic vision, adjust the business structure, update the value concept with the time, and take the user as the value subject. take enriching and activating

knowledge resources, enabling the integration and development of disciplines as the value ideal, taking the concept of “people-oriented” as the value norm, customer first and service first as the value standard. To construct a library value system with both concept and practice of the times and locality.

## **5. Conclusion**

The transformative nature of digital humanities research and the innovation of new liberal arts construction provide libraries with new and deep opportunities in resource construction, technology upgrading, service renewal and so on. in the face of the new situation, the practice road of the library in the digital humanities ecology needs to embrace new ideas, develop new practices, perceive the times and appreciate the future.

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