

Research on the Digital Construction of Gray Literature among Libraries of Regular Higher Education Institutions

-- Based on An Empirical survey of 109 Libraries in Zhejiang Province

Feng Liu

WenZhou Polytechnic, Wenzhou 325000, China

Abstract

Through the investigation of the digital construction of gray literature among 109 libraries of Regular Higher Education Institutions in Zhejiang Province, it can be found that the development ratio is not high, and the development mode is single, but the resources are rich, and the regional and disciplinary characteristics are obvious. The reason is that regular HEIs have the natural advantage of gray literature agglomeration, but HEIs libraries generally face 4 dilemmas of insufficient funds, insufficient number of staff, unreasonable age and knowledge structure of staff. Therefore, HEIs libraries should break down industry barriers, explore the gray literature collection system, strengthen the quality of staff, and deepen the construction of advantageous disciplines to improve the accuracy and breadth of gray literature services.

Keywords

Regular Higher Education institutions (Regular HEIs); HEIs Libraries; Gray Literature; Digital Construction.

1. Introduction

With the development of emerging technologies such as big data, cloud computing, Internet of Things, VR simulation, etc., all kinds of information resources have ushered in an unprecedented explosion and rich growth. With their "strong field" effect, they have rapidly penetrated into major fields such as politics, economy, culture, and science, playing a significant role in national economic construction, scientific research and even social development decision-making, and have become one of the three major strategic resources to promote modern social development. Thus, the development and utilization of "gray literature" with special value has also become a new research topic under the new normal.

"Gray literature" is often referred as unconventional literature or informal published literature by library and information community. In terms of value characteristics research, gray literature is regarded as the core business of the library in the future[1]. Feng Guoquan[2], Yu Wenhong[3] studied the development and utilization strategies of gray literature in China from the perspective of the advantages and measures. Luo Keng[4], Liu Lihua[5] etc. took the construction experience of gray literature in developed countries or regions as a research sample, and deeply excavated the digital construction schemes and policy suggestions of gray resources that meet the needs of social development to achieve wide dissemination of resources.

Regular HEIs as knowledge-intensive units, have a large number and variety of gray literature including the development and academic dynamics of domestic and foreign universities, and the student course papers, graduation designs, clothing design works etc, which can not only expand the richness of library collections, but also strongly support the innovation of teaching and scientific research. Therefore, 109 HEIs libraries in Zhejiang Province are taken as the

research object to conduct in-depth research in the development and utilization of gray literature, to grasp the key issue faced in the process of digital construction and provide a reference for relevant decision-making.

2. Survey Sample

2.1. Sample Sources

The paper conducts online survey and telephone interview among 109 HEIs libraries in Zhejiang Province on the gray literature collection themes, collection types, and development models, which are obtained from 2021 National List of regular HEIs in the Central People's Government of the People's Republic of China (<http://www.gov.cn/index.htm>), so as to fully understand the current situation and existing problems in the construction of gray literature resources.

2.2. Sample Description

(1) Regional distribution. The development of HEIs depends on the deep integration of talents and resources, and the regional distribution will further exacerbate the agglomeration effect of talents and resources. Among 109 HEIs, HangZhou as the capital city has the largest number of HEIs, NingBo follows, and Wenzhou is ranked third (Table 1).

Table 1. Regional distribution of 109 HEIs

Regional	Amount of HEIs	Regional	Amount of HEIs
HangZhou	47	TaiZhou	4
NingBo	14	HuZhou	4
WenZhou	11	ZhouShan	3
JinHua	8	LiShui	2
ShaoXing	8	QuZhou	2
JiaXing	6		

(2) HEIs level. The HEIs level is an important indicator that objectively reflects the ability of higher education institutions to run university or college. Among the 109 HEIs, there are 60 HEIs offering degree programs (including 2 vocational institutions for undergraduates), and 49 higher vocational colleges.

(3) HEIs nature. According to China's education policy, the HEIs nature is divided into HEIs under government and non-government. The characteristics of HEIs under government are that they rely on government financial appropriations, stable student sources, stable teachers, and high social recognition. And the characteristics of HEIs non-government are that they are self-financing and loss, and the tuition fees are higher, but the talent training meets the market demand, and the professional dynamic adjustment responds quickly. Among 109 HEIs, 76 HEIs are under government and 31 HEIs are non- government. Additional, 2 HEIs are Sino-foreign cooperation institution.

3. Empirical Analysis of Digital Construction of Gray Literature in HEIs Libraries in Zhejiang Province

Digital resources are favored because of the advantages like convenient retrieval, no replica restrictions, rich collection, small space occupation, and convenient use. Under the wave of the "Internet +" era, the construction of distinctive digital resources is not only an important task

and goal of HEIs libraries, but also an important way to enhance the competitiveness and social recognition of HEIs[6].

3.1. The Overall Digital Construction of Gray Literature in HEIs Libraries

(1) Ratio of digital construction is not high. Zhejiang Province is in the upstream in China's GDPt, and the construction of HEIs libraries is also complete. According to the survey, more than 90% have built library websites, including 85 that can be accessed on wide area network and 14 that can be accessed on local area network. However, in the digitization of gray literature among 109 HEIs libraries, results show that : only 65 have developed relevant characteristic resource databases, and 4 have stopped serving (Table 2); if 13 independent HEIs libraries attached being excluded, less than 50% of the libraries carry out gray literature digitization construction.

Table 2. List of gray literature digitization construction of 109 HEIs libraries

Utilization Status Library Website	Yes		NO	total
	available	abandoned		
WAN Access	55	/	30	85
LAN Access	6	2	6	14
No	0	2	8	10
total	61	4	44	109

(2) Mode of digital construction is single. The results show that: only 1/5 choose to cooperate with other public libraries, research institutions or library association among 65 HEIs libraries that have developed the gray literature resources, such as 10 HEIs libraries (like Ningbo University library, Ningbo University of Finance & Economics library and NingboTech University library ect.) and Ningbo Library as well as majority of enterprises participating in the construction of "Ningbo Digital Library" service platform, Zhejiang Institute of communications and Zhejiang Tongji Vocational College of Science and Technology cooperateing with ZADL Association to develop a special resource database. But most of them construct characteristic independently. On the aspect of development mode, construction on the existing service platforms is still the mainstream trend, and there are less than 10 HEIs libraries using the self-built model.

(3) Kinds of gray literature resources are abundant. 65 HEIs libraries surveyed have a rich variety of gray literature, including ancient bridges, opera, rice wine, calligraphy, celebrities from past generations, customs and human feelings, corporate newsletters, medical images, marine culture, etc., and exhibite in the form of videos, pictures, electronic books, periodicals, newspapers, online resources and other forms. For example, the Ancient Books & Special Collection Database of Zhejiang University library covers 203 volumes of miniature film, which is a diverse collection of family trees, genealogies, local histories, and Republic of China periodicals from 1745 to 1949. China Academy of Art library incorporates shadow puppetry and shadow play into digital resources collection, including carving works, singing documents, performance, oral history, animation, graphic design of shadow puppetry.

(4) Collection has obvious regional characteristics. HEIs libraries in Zhejiang province like Wenzhou University Library, Jiaxing University Library, Zhejiang Ocean University Library etc. focus on the materials generated in various fields of politics, humanities and economy in region. For example, Wenzhou University library has focused on collecting papers, pictures and multimedia materials related to celebrities, operas, languages, folklore, overseas Chinese culture and other related topics in Wenzhou, and has gradually built some special collection databases. Jiaxing University library focuses on the original manuscripts, audio, video, art

works, audio documents produced in the process of development of the red boat spirit and red culture in Jiaying area. Zhejiang Ocean University library collects fishery production, fishing customs and beliefs related to marine culture in Shengsi County, Zhoushan New District.

(5) Collection highlights discipline characteristics. Strengthening the gray literature collection of important disciplines can further lay the foundation for HEIs teaching and scientific research work. Focusing on the practical issues of taxation, finance and accounting involved in the field of national and Zhejiang economic and social development, Zhejiang University of Finance & Economics library has built a CRRP database. Zhejiang University of Water Resources and Electric Power library takes the construction of water conservancy and hydropower characteristic discipline groups as the main line, creating a water conservancy information sharing platform that serves peer units with more than 720 millions resources. Zhejiang Industry Polytechnic College well-known for digital control technology, has created a set of CNC expert directory, CNC enterprise directory, academic resources etc. in library, and the total amount of metadata is more than 40,000.

3.2. Existing Problems in Gray Literature Utilization of HEIs Libraries

The digital development of gray literature is a complex and time-consuming systematic project, whether determining the type and scope of information resources in the early time, or the resource collection and data screening and cleaning during medium-term, or the data update and system maintenance in the terminal time, requiring sufficient manpower and financial support. The 2020 statistics of the Ministry of Education's University Library Fact Database show that libraries are faced typical problems such as insufficient funding and uncoordinated number and quality of staff.

(1) funds are not in place. Compared with 2019, the total funding of libraries in 2020 has increased slightly, but interlibrary investment is very different. In addition to normal procurement of paper and electronic resources, there is a serious shortage of funds in other areas.

(2) Amount of staff is not sufficient. Report show that work pressure is increasing, but the average number of staff has fallen from 50 in 2010 to 31 in 2020. The lack of human resources and time is not enough to support more university libraries to invest in the construction of gray literature resources.

(3) Age structure of the staff is unreasonable. Report shows that the age structure of library staff is an "inverted pyramid", with staff aged <29 accounting for less than 5%, staff aged 29-39 accounting for about 1/4, and staff over 50 years old accounting for more than 1/3.

(4) Knowledge structure of the staff is not perfect. The development of university libraries requires sufficient specialized talents such as library science majors and computer science majors to meet the important tasks of deep information processing. But survey results show the proportion of staff in library science and computer science is also seriously insufficient.

4. Analysis of Countermeasures for the Construction of Gray Literature in HEIs Libraries

Through the investigation of the construction status of gray literature among 109 regular HEIs libraries in Zhejiang province and the dilemma of gray literature development, it can be found that there is still a long way to explore in the development of gray literature in China's university libraries due to industry barriers and self-restrictions. In the future construction of gray literature, libraries should base the contemporary situation, formulate a gray literature collection system, strengthen the quality of staff, and deepen the construction of advantageous disciplines to improve the accuracy of gray literature services.

4.1. Strengthen Collection System of Gray Literature

First, at the national level, the collection system of gray literature should be determined in the form of laws and regulations. Secondly, at the level of industry associations or academic groups, efforts should be focused on establishing industry standards to lay the foundation for subsequent cooperation and sharing between different institutions. Finally, HEIs libraries should also refine the collection, organization and evaluation standards of gray literature according to the actual situation to ensure the construction work being carried out and landed.

4.2. Strengthen Quality Construction of Staff

First, a gray literature construction team should be set up, and someone should be arranged to be responsible for the work. Secondly, it is necessary to strengthen the business training of relevant staff, or invite experts to hold lectures, or organize employees to participate in forums and skills competitions. Third, experts and scholars related to the field of gray literature should be hired as project consultants to provide scientific guidance for the construction ideas, construction models, classification standards. Fourth, encourage staff to strengthen communication and contact with peer practitioners of other institutions, and seek broader cooperation opportunities.

4.3. Strengthen Special Collections of Disciplines

Due to the restrictions of human resources and financial support, HEIs libraries should also follow the principles of "from easy to difficult" and "from characteristics to general" in the process of building gray literature, and select special disciplines to construct. The content can be test questions, lecture notes, course videos, PPT, electronic teaching references, etc., so that a variety of gray literature can jointly help the development of teaching and scientific research thus to achieve higher value transmission.

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