

Construction of Library Literature Resources and Reader Demand Survey in Cloud Computing Age

– A Case Study Based on the Survey of Wuhan University of Technology

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Abstract—With the rapid development of the internet technologies and the emergence of cloud computing, the ways in which readers access to information is becoming more and more diversified. The most urgent matter for university libraries in serving readers of different levels is to properly allocate the library resources in order to meet the demand of the readers. This paper bases on the survey of readers of Wuhan University of Technology, analyzes the changes of readers utilizing library resources, and further explores the different construction modes of the resources in university libraries.

Keywords—university libraries; reader survey; literature resources construction

I. FOREWORD

In the internet environment, electronic and paper-based resources together comprise the literature resources collection of university libraries. Although the emergence of the internet library has facilitated the readers in utilizing the services of libraries, entering the cloud computing age presents us with a greater challenge. The modes in which we build the collection of literature resources affects directly how readers use the library resources, while in turn, it's how readers use those resources that dictates how libraries should build their collection. Numerous scholars have already done research on this matter. Hua Liu [5] introduced the concept, background, typical examples and characteristics of reader participated purchases decision model, and explored how it can be applied to Chinese university libraries. Jing Xiao [3] proposed a solution to satisfy the demand of the readers and improve the utilization of electronic resources, based on a survey of electronic resources usage among the readers. Jinrui Li [2] adopted a network assessment using 3 row 9 level metric rating scale, and discussed the reasons why the readers are satisfied with the library. Yu He [1] presented their point of view on how to construct a normal, agile, and long-lasting reader survey and feedback mechanism in the internet environment. This paper approaches the problem through how the readers utilize the literature resources at the library, and analyzes the utilization of library resources as well as readers demand, in order to provide edifying reference for the construction of literature resources collection of university libraries.

II. READERS SURVEY

The library literature resources construction of Wuhan University of Technology has strengthened during the 11th Five-year Period (2006-2010). At the end of 2011, the library possess 3.65 million paper-based books, 1.17 million electronics books, 11,890 Chinese and foreign paper-based periodicals, 29,854 electronic periodicals, and 140 databases (including 75 trial databases and 12 self-built databases). “The literature collection of 15 disciplines, including material science and engineering, nonmetal mining, automobile engineering, and maritime engineering, has reached Research level Collection”. [4]

While the library improved the quality of its collection and the utilization rate of its resources, it also faces the problem of the numerous campuses spreading in a large radius. In order to allocate the resources properly, from April to June of 2012, the library had conducted a 3-month survey of the readers on the ways in which they utilize the resources, the types of resources they usually use, and the purpose for which they use such resources. Until the end of 2011, the university has more than 36,000 undergraduates, 16,000 graduate students, and 3,500 faculty members (of which 670 are professors and 1,300 are associate professors). Of the 2548 questionnaires distributed during the survey, the library collected 2138 copies (83.91% of total). Of those responded to the survey, there are 461 faculty members, 449 graduate students, and 1225 undergraduates, covering the 22 colleges and 91 majors of the university.

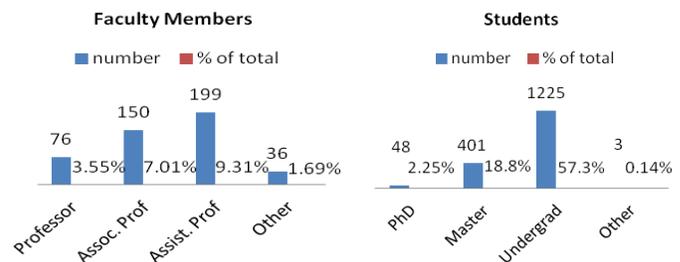


Figure 1. Graph 1 and 2 Breakdown of Faculty Members and Student Body composition

III. SURVEY RESULTS AND ANALYSIS

The value of the library literature resources can only be realized through the utilization of readers. Hence the readers are the main judges that whether the literature resources are properly allocated. The survey has 12 multiple choice questions and 1 open-ended question. From the results we can see the needs of the readers showing the following characteristics:

A. Paper-Based Books and Periodicals are Borrowed Less but Utilization of Books Is Higher Than That of Periodicals

The paper-based literatures are consisted of books and periodicals. As the ways in which readers can access the collection increased, the borrowing of paper-based books and periodicals decreased significantly (see Graph 3). Only 11.42% undergraduates, 19.59% graduate students and 15.18% faculty members went to library and borrowed paper-based literatures more than 20 times a year, while the numbers for those who never did in a year are 38.04%, 24.49%, and 36.82%, respectively. Although electronic resources are convenient, they are restricted by internet access authorization and the copyright restrictions, which is why more graduate students chose paper-based materials. As for undergraduate students, the lower-class undergraduates may not be familiar with the resources that the library offers, and mostly borrows novels and recreational books, so their presence at the library is limited. Faculty members generally have more ways to access resources. Except for special collection, literature retrieval, and novelty search, they don't go to the library very often. In 2011, the Library of Wuhan University of Technology checked out paper-based copies 812,883 times, 49,652 times less than that in 2010, which confirms the result of the survey that the readers come to the library less than before.

Although paper-based resources are borrowed less than before, the utilization rate of the paper based books is higher than that of paper-based periodicals. The numbers of readers who borrowed Chinese books and Chinese periodicals more than 20 times a year are 749 and 287, representing 34.71% and 13.42% of total, respectively. The numbers of readers who borrowed foreign-language books and periodicals more than 20 times a year are 202 and 126, representing 9.45% and 5.89% of total, respectively. We can see that the utilization rate of paper-based books are higher than that of paper-based periodicals, which is misplaced against the budget allocation, especially for foreign-language periodicals. In 2011 the library invested 3.2 million Yuan in foreign-language periodicals, while at the same time it spent 3 million on Chinese books. High expenditure categories receive only low utilization, which satisfies only the effect of well-rounded collection and fulfils the requirements of the evaluation. The reason that the paper-based periodicals are less utilized is that they are only available to read within the library and cannot be borrowed out; otherwise it will prevent other readers from accessing. The timeliness and novelty of the periodicals are important to the research and studies of the readers. Although it is for the welfare of the

majority of the readers that the periodicals are not allowed to be borrowed out, this is a problem we must face in the construction of the library literature resources.

B. Electronic Resources is Readers' Top Choice, but the Utilization Varies Greatly Among Databases

The literature resources consists of two broad categories: paper-based and electronic. Paper-based literature is mainly for reading, while electronic resources are better suited for searching. Electronic resources are favored by readers for its easy access and searching. Among the types of electronic resources most used, those who chose electronic books, electronic periodicals, graduation thesis, and conference papers numbers 925, 727, 30, and 124, respectively. Electronic books is the top choice for undergraduates, accounting for 59% of readers of this category. Electronic periodicals' main readers are graduate students, with 53% percent of these two categories of readers listing it as their top choice. The main readers of graduation thesis, and conference papers are graduate students and faculty members, so the number of people that chose these two are comparably less. The actual utilization data of the electronic resources of the Library of Wuhan University of Technology in 2010 are: Chinese and foreign language full paper databases have logged 5,538,011 downloads for 16 databases, including CNKI, Vip, Wanfang, ACS, SDOL etc. Secondary resources databases have been searched 209,722 times. The utilization of most databases has increased compared to 2009. Since the electronic resources tend to be the most updated and relevant to the subject matter, it has become the top choice of the readers.

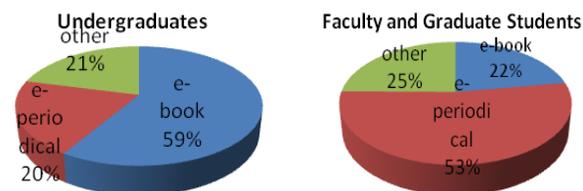


Figure 2. Graph 3 and 4 Electronic Resources used by undergraduates, faculty members and graduate students

C. Readers, Especially Undergraduates Hope There is More Interaction Between the Readers and the Library

Course study, extracurricular study, thesis preparation, and personal interests are the main objectives of the majority of the readers, accounting for 73.43%, 59.87%, 53.23%, and 66.18%, respectively. More than 50% of the readers expressed genuine interest in the resources and training programs of the library (see Table 1), especially the undergraduates who wish to learn more on how to better utilize the resources of the library. Some students suggest that the library add a section on its website with video tutorials on how to use the various resources available, so they can watch at any time. Others propose that the university should add a required course on literature

retrieval, so that they can learn how to use the various tools to search for the information they needed.

TABLE I. READERS' DEMAND ON TRAINING

| Subject | UG | as % | Grad | as % | Faculty | as% |
|-------------------------------|-----|-------|------|-------|---------|-------|
| Literature retrieval | 706 | 57.49 | 226 | 50.33 | 244 | 52.92 |
| Database search | 734 | 59.77 | 282 | 62.81 | 251 | 54.46 |
| Online resource search | 650 | 52.93 | 188 | 41.87 | 194 | 42.08 |
| Open access academic resource | 361 | 29.39 | 131 | 29.17 | 124 | 26.89 |
| Reference and evaluation | 255 | 20.76 | 137 | 30.51 | 143 | 31.02 |
| Guide to paper submission | 176 | 14.33 | 135 | 30.06 | 104 | 22.56 |

IV. CONSTRUCTION OF LITERATURE RESOURCES COLLECTION BASED ON READERS' DEMAND

The key issue of literature resources construction of university libraries is the coordinated development of the electronic as well as paper-based resources. Different readers need different kind of resources. This survey received 1479 suggestions from readers, and they can be summarized into three aspects: 1) Increase the number of new books, broaden their scopes, increase the quality and update regularly. 2) Electronic resources should cover more subjects. Apart from index databases, excerpt databases, and full paper databases, the library should also share resources with other libraries. 3) Readers should participate in the construction of literature resources collection, and there should be more interaction between the readers and the library.

A. Sharing the Literature Resources with Other Institutions

Only the literature resources collection or the free resources on the internet cannot satisfy the needs of the readers. Sharing the resources between the libraries is the future direction, and also the effective way to solve the low utilization of paper-based resource. CALIS is a national university library information resources sharing system, which has 3411 member libraries. In 2009 CALIS launched its first cloud service SaaS (Software as a Service). In 2011, the cloud service provides data sharing, literature sharing, knowledge sharing, software sharing, equipment sharing, and service sharing. CALIS currently has approximately 70 million pieces of resources, and serves 1251 universities.

"Until 2009, OCLC had 72,036 member libraries in 147 countries, 1229 of which are in China." [7] The service it provides are electronic periodicals, electronic books, inter-library loan system, digital collection software, and virtual reference consulting systems, etc. CALIS has purchased annual access from 11 of OCLC's databases. The 61 universities of the 211 Project can search these 11 databases for free via their own campus network. Our library is one of the models of inter-library loan and literature delivery service.

B. Optimizing Literature Resources Allocation, and Closely Integrating the Construction of Literature Resources Collection with Readers' Demand

There has been much debate on the issue of optimal allocation of literature resources. No conclusion has been reached on what proportions between paper-based and electronic resources the library should split their resources. From the results of the survey we should collectively consider the needs of the readers and the development of different academic disciplines in order to balance the allocation between paper-based and electronic resources. For those paper-based materials that require long time of studying, such as teaching reference books, distinguished text books, and academic research materials, we should provide enough budgets to satisfy the requirement of the ministry of education. For electronic resources, we take advantage CALIS platform, connects national center, provincial center with library terminal, and build a distributed information sharing database. According to research among engineering institutions such as Georgia Institute of Technology, Massachusetts Institute of Technology and Purdue University allocated 88.83%, 78.56%, and 69.57% of their budget on electronic resources in 2010. In China, Dalian University of Technology, Shanghai Jiaotong University, and Nanjing University of Technology has also spent 71.89%, 58.18%, and 57.87% on electronic resources in 2010. We can see that it is a trend to allocate more of the budget on electronic resources. With limited budget, our library took the demands of the readers into consideration and allocated 41.05% of the 2010 budget on electronic resources, and that increased to 50.41% in 2011.

C. Building Collection with Our Own Characteristics; Building Our Own Applications

Special collection refers to the collection of resources on some field that is well structured and has accrued considerable size from years of construction. It is the most competitive resource of the library and the basis of the literature resources sharing. Currently the library has 12 self built databases such as compound materials new technologies, traffic and transportation, shipping and maritime engineering, information technology. Of which the compound materials new technologies and the traffic and transportation database were referenced by many professional website. This means that only the special collection with true competitive advantage can be useful under the network sharing environment. In the meantime, our library actively uses the cloud service platform and develops our own applications, such as "Wuhan University of Technology Key Disciplines Construction". The specialists in the platform are categorized according to academic disciplines and fields. There readers can create or join groups they are interested in, to share resources as well as ideas. It not only satisfied the needs of the readers, but also improved the accessibility and utilization of library's resources.

D. Strengthening the Interaction Between the Library and the Readers; Create a New Mode of Literature Resources Construction

The emergence of mobile libraries, the implementation of cloud computing technologies provides new platforms for readers to participate. Since students now are more dependent on internet than before, we build mobile libraries, providing services like cell phone reminders and email newsletters, in order to inspire readers' interests and initiatives. We improve their technological literacy so that they can benefit from the resource sharing. For example, the literature retrieval course consists of 1 broadcasting classroom and 2-3 receiving classroom, using network technologies to have the same class. This realizes the sharing of literature retrieval course resource on three levels: the library, the classroom, and the readers. Incorporating the needs of the readers into the teaching in the classroom we have developed a literature retrieval course with our own characteristics. "The library not only must provide information resources, but also should possess the ability to develop new applications so as to provide the readers with accurate and useful literature resources." [6] This is also the direction of the construction of literature resources collection at our library.

V. CONCLUSION

The construction of university libraries' literature resources collection cannot be done without the participation of the readers. In the modern management framework that centers on the readers, survey is an important method to get to know the readers' demand in order to research and analyze how readers utilize library

resources, and build a scientific and proper literature resource system according to the principle of readers first, supporting academic discipline, and priority on research. Based on assuring the quality of the resources, with resource sharing and special collection, we develop the sustainable new mode of literature resources collection construction suitable to cloud computing environment.

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