Research on integration of library information resources based on the digital trend

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ABSTRACT

With the rapid development of information technology, information resources and achieving access based on digital development are increasing accordingly. And libraries which carry a large amount of information own enormous information resources. China and down to the whole world had built innumerable libraries; in order to eventually achieve information resource sharing and union search platform, the information resources of library need to be integrated. Efficient integration of library information resources not only can eliminate heterogeneous among different documents, but also can achieve sequential and systematic information resources on the basis of different needs of users, shortening the search time to quickly acquire new knowledge and meeting readers' diverse and individual needs eventually. The research mainly applies field surveys, comparative analysis, systems analysis, literature and other research methods, combing with information science, computer network science and other methods, focusing on the elaboration of library information resources' integration concept, principles, process, structure and pattern within the digital trend, and makes certain comparison about the typical resource integration system in China and abroad. The research aims to assist the users to acquire information efficiently, so that the relatively independent and closed information resources can win more readers of all ages by integration of library information resources.

KEYWORDS

Digitization; Library; Information resources; Integration.
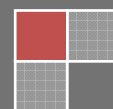
INTRODUCTION

A lot of research had been done about integrated research of library information resources. For example, Sun Mei pointed that information integration of library has upgraded as knowledge integration, and considered semantic web technology and ontology as the effective platform and foundation for knowledge integration[1]. Huang Huijuan and Li Juan pointed out that the level of integration on library information resources is data integration - information integration – knowledge integration, and analyzed five digital resource integration models which based on resource navigation, cross-database research, ontology and hyperlinks[2]. Liu Gaoyong and other scholars take Wuhan university\for example, analyzed information resources integration's three layers of operating mechanism (supporting environment, information resources, information services) and three integration model(resources and services integration based on resource navigation, integrated retrieval and S FX)[3]. Li Jie pointed out digital resource integration's feature, influencing factor, integration methods and optimization strategy[4]. In addition, Shen Li feng, Wang Yuhong, Qiu Chunlan, Ling Zhengqiang and other scholars have made different discussion about library's information resource integration from different perspectives, which is no longer discussed[5-8]. The study based on the digital trend, analyzed integration structure, object and model around the principles and procedure of library information resource integration, with the purpose of maximizing retrieval efficiency and wining acceptance from readers.

OUTLINE ON INTEGRATION OF LIBRARY INFORMATION RESOURCES

Connotation definition on integration of library information resources

"Integration" means to apply scattered information resources to achieve the effect of resource sharing and collaborative work in a certain way in order to operate efficiently, making meaningless information combined into meaningful information. Library information resource integration refer to put the original self-existent information resources (bibliographic resources, online virtual resources, CD-ROM data resources, self-built database, etc) into cluster and recombination based on the searching needs of users, so as to provide clients a unified search platform and search results representation and achieve an orderly organization and quickly location of information resources.

Necessity on integration of library information resources

With the rapid development of big data and internet, information resources are no longer considered as scarce resource in a certain extent. As for the library, finding required information resources quickly is becoming an obstacle for clients. Modern information technology should be applied into the management of libraries, which means display all kinds of information stored in light and magnetism through computer technology or network technology, as well as other methods, which requires the integration of library information resources in order to achieve information organization's four nature (dynamic, usability, accuracy, compatibility), three features(automation, transparency, standardization) and a type (multi-mode) requirements.

PRINCIPLES, DEDUCTION AND PROCEDURE OF INTEGRATION ON LIBRARY INFORMATION RESOURCES BASED ON THE DIGITAL TREND

Principles of integration on library information resources based on the digital trend

In the digital trend, in order to achieve information sharing and elimination of time and space constraints, library information resource integration not only needs to follow the general construction principles, such as realistic principle, systematic principle, but also needs to possess the following principles:

First, the principle of integrity, that is to maintain the integrity of information resources disciplines and cover the internal functions of each subsystem.

Second, the multi-dimensional principle, which requires forming hierarchical and networked tridimensional information resources system, so as to meet the information needs of clients and reflect the inner relation of information resource sources.

Third, standardized principle, mainly including standardization of indexing language, describing language, data format and security technology, to ensure information resource sharing.

Fourth, the principle of continuity, library information resources maintain uninterrupted dynamic in order to fully maximize the effectiveness of the library.

Fifth, security principle, in the integration of information resources, library must ensure that viruses, hackers, information garbage and other issues will not easily occur; otherwise the integration will be meaningless.

Deduction of integration on library information resources under the digital trend

Library information resource integration aims to achieve information resources' ordering, sharing, harmonization and optimization configuration, and maximize the management process of information value. The Figure 1 below shows the deductive process of integration:
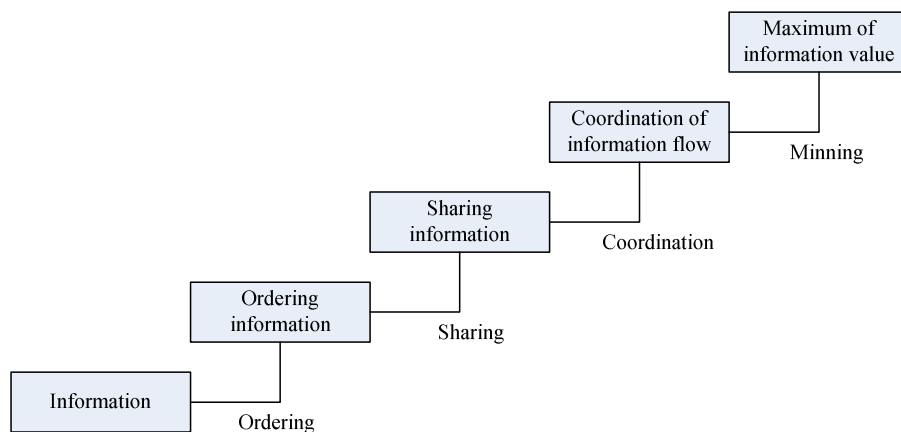
Figure 1 : Deductive process of integration on library information resources

Procedure of integration on library information resources under the digital trend

First, information resource planning. Under the informatization trend, library information resources' demand on timeliness is higher and higher, in order to meet users' different needs. This requires profound analysis on information resources, so as to scientifically integrate information resources and rationally plan the information resources.

Second, information resource acquisition. Library information resources include a variety of discipline knowledge, and each professional discipline all has the latest scientific production. In this way, library can specifically regard collecting subject frontier knowledge as standard and the basis of the relevant literature resources for aid; at the meantime, changes in the social environment also play an important role for the integration of library information resources. Therefore, social environment needs to be analyzed deeply. In this way, information resources can be spread rapidly by maximizing meet different needs of users.

Third, management for information resource system. Library information resources are abundant, which increases the difficulties of information management, and thus require attaching great importance on information management. The following steps are required: Firstly, in term of refinery and management for information, Libraries are not able to manage all the information. Therefore it is necessary to screen and extract document literature, providing clients convenience to search information based on title, serial titles and keywords. Secondly, speaking of the classification of information, information resources of library have a strong categorization, which need to orderly divide according to subject, scope and other principles. Usability should be highlighted. The library information resources should be classified into several categories with the combination of multi-level menus and database. Otherwise messy information resources will reduce utilization value of recall ratio and information. Thirdly, metadata management. It needs the suitable software, such as ILasII system (functional interface of ILasII system shown in Figure 2). At the same time, attention should be paid for the class processing of descriptive metadata, administrative metadata and structural metadata. Fourth, database management for information resource. Establishing a intact database of information resources is essential for the management of the library. It requires a combination of library and users' needs for the selection of construction scheme which concerned with databases and unstructured network database.

Fourth, dissemination of library information resources. Library's main function is to face the outside world and show it through specific retrieval system and publishing platform, therefore selecting the appropriate publishing platform is also very important.
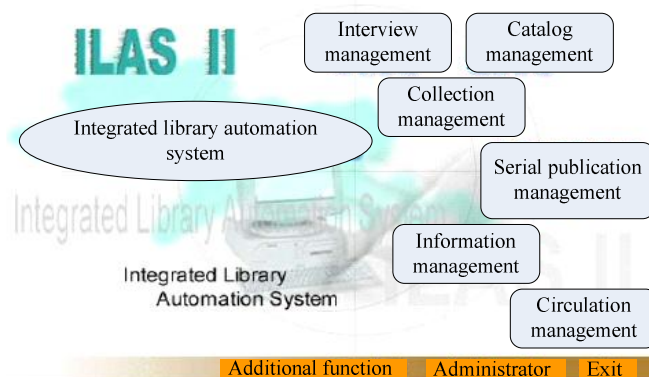

Figure 2 : Function interface of ILasII system

LIBRARY INFORMATION RESOURCE INTEGRATION SYSTEM PLATFORM AND SELECTION CRITERIA

Main information resource integration systems in China and abroad

The main information resource integration systems at abroad include MetaLib / SFX system. SFX (abbreviation of Speci-Effects), is context-sensitive reference link system based on uniform resource locator (Open URL), which provides dynamic linking of a large number of electronic resources. MetaLib / SFX system consists of three parts: data search and retrieval of literature resources; searching electronic journals and browsing original; collecting required document resources according to individual needs. MetaLib / SFX system has finding and navigation information resources, quick index, single-database search and federal search function.

The main information resource integration systems in China are CNKI systems and CALIS system. The former is known as China National Knowledge Infrastructure; the system integrates multiple databases and classifies subjects. It launches "Chinese scholarly literature online database" and achieves a powerful search function, connecting each knowledge infrastructure, therefore obtaining the required information in the shortest time. The latter is China Academic Library &Information System which aims to integrate heterogeneous databases and digital resources for the improvement of retrieval efficiency. The architecture of digital library is shown in Figure 3.
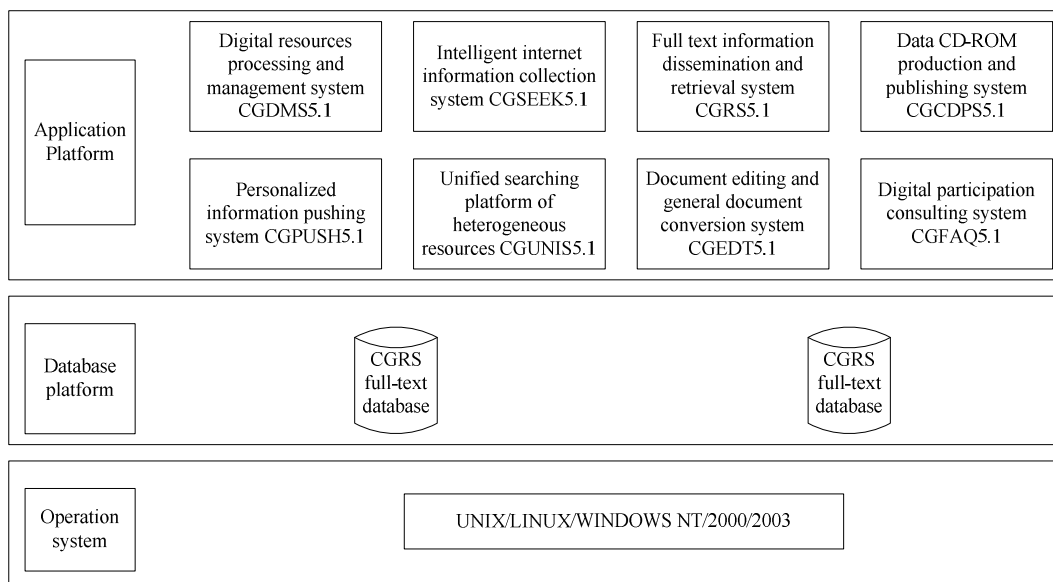
Figure 3 : The architecture of digital library

Evaluation and selection criteria of library information resource integration system

First, pay attention to the flexibility of system service. Library should be able to formulate information system flexibly and self-define management module, and the users should be able to add their own suitable module, reflecting the "people-oriented" principle in the highest degree. Second, compatibility of database. Library's information resources are increasing constantly, which occurs different database function and interface. XML interface gateway is needed to achieve compatibility. Third, real-time of retrieval. Document retrieval time should not be too long; otherwise the function will be abandoned by the users. Fourth, the cost performance of the system. It mainly includes system purchase costs and future upgrade and maintenance costs, which need to be compared, with the purpose of choosing systems suitable for the library's feature.

STRUCTURE, INTEGRATION OBJECT AND BASIC MODE OF LIBRARY INFORMATION RESOURCES UNDER THE DIGITAL TREND

Structural analysis of library information resources under the digital trend

In the digital trend, information resource structure mainly includes presentation layer, processing layer and application layer. Specifically, in term of presentation layer, it mainly aims at information source of resources, and then connects it with logic thread, providing quality services for individual requirements. The integration methods of presentation layer can be experienced on resource navigation webpage. For example, the home page can be set to "finding information" and "Electronic resources"; the page setup can be set as the detailed description of documentation, therefore diversified resources can be classified by category navigation. As for processing layer, it transforms document resourced and audio-video data into digital resources which include metadata and object data. The purpose of processing is to eliminate heterogeneity between different databases. As for application layer, it is mainly about resource content and usability. It

consists of middleware (2239.5, OAI) which support standard protocol, improving integration through cross-database search and hyperlinks.

Integration object analysis on library information resources under the digital trend

In the digital trend, information resource integration object mainly include the integration between paper books and electronic resources, the integration of electronic resources and integration of multiple library resources. Specifically, in term of integration between paper books and electronic resources, they need to be combined together, provide convenient services for users in a unified search interface. As for integration between electronic resources, it is mainly about the orderly integration of overlapping part between electronic journals and books as well as online databases, achieving cross-database search. For the integration between various library resources, the main thing is to build a unified information resource integration system, and display it in the same retrieval system, and then reasonably allocate paper books and networked computers, thus achieving ILL and online teaching. Retrieval structure of the overall system is as shown in Figure 4.
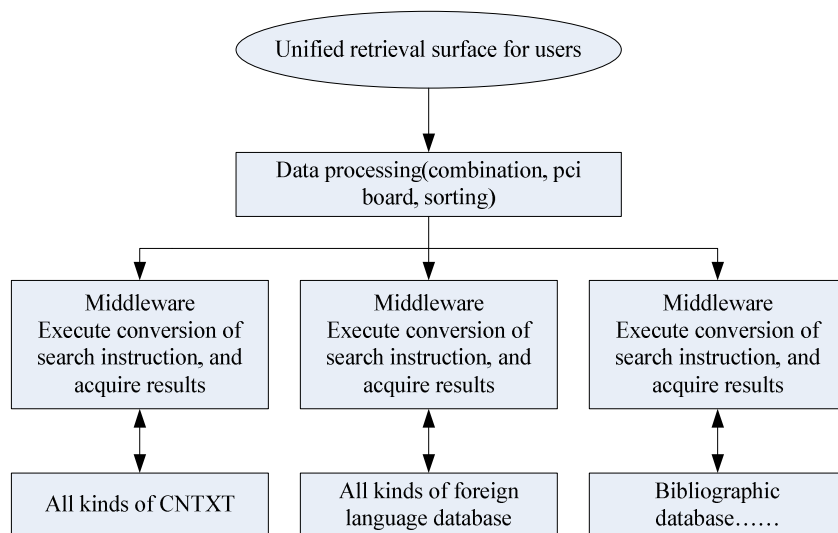
Figure 4 : Retrieval structure of digital library

Basic mode analyses on library information resource integration under the digital trend

In the digital trend, the basic mode of information resource integration is information resource integration based on OPAC, cross-database, resource navigation and hyperlink. Specifically, first, in term of information resource integration for OPAC, OPAL (on line Public Access Catalogue) aims at achieving multi-channel retrieval and union catalog inquiry by integration of library collection, e-books, attached disk as well as library bibliographic data resources. Therefore the limitation of the museum resources and bibliography can be solved effectively, and the utilization of information resources can be improved. In the OPAC resource integration survey (see TABLE 1), researchers found that about one-third of the libraries integrate electronic resources in OPAC system in China. Secondly, as for information resource integration in cross-database search, the system achieves retrieving the database resources once in the same user interface through search interface integration and distributed heterogeneous integration, therefore avoids repeat landing and repeat screening, saving time and enhancing practical efficient. And in the library cross-database search system application survey (see TABLE 2), researchers found about 42 percent of the libraries have built cross-database search system or on trial, especially CALIS resource unified search platform, tsinghua tongfang TPI4.0/Grid20 platform, Metalib platform which occupy large market share ratio. Again, as for information resource integration of resource navigation, it mainly refers to the integration of representation layer, which means integrating search portal and retrieving with the use of certain characteristics, such as title and keywords. In the library resource navigation integration methods survey, researchers found about 70 percent of the library established discipline navigation system (see TABLE 3). Finally, in term of hyperlink information resource integration, the system applies open dynamic linking system through knowledge linking, and searches full-text directly from retrieval device, achieving one-stop retrieval.

TABLE 1 : Library OPAC resource integration survey

Resource integration	CD-ROM	Electronic journals	E-book	Free resources	Dissertation	Other
Quantity	10	12	27	2	3	6
Proportion	27%	32.4%	73%	5.4%	8.1%	16.2%

TABLE 2 : Library cross-database search system application survey

Cross-database search system	CALIS resource unified search platform	Tsinghua tongfang TPI4.0/Grid20 platform	Metalib platform	TRS resource integration portal	Huiwen one-stop retrieval system	Fuxin cross-database retrieval system	Other
Quantity	14	11	7	2	2	1	8
Proportion	31.1%	24.4%	15.6%	4.4%	4.4%	2.2%	17.8%

TABLE 3 : Library resource navigation integration manner survey

Navigation system	Subject navigation system	Database navigation system	Electronic journal navigation system	Other
Quantity	75	42	51	6
Proportion	70.8%	39.6%	48.1%	5.7%

CONCLUSION

This study summarizes the working procedures and principles of integration on library information resources, and analyzes integrated system models and objects deeply. However, study on multiple libraries' information resource integration and books as well as periodicals integration still remain great gaps for improving, the further study is required.

REFERENCE

[1] Sun Mei; Information integration and digital libraries' development [J], Study of library science, **(09)**, 55-58 **(2011)**.

[2] Huang Chuanhui, Li Juan; Research on digital resources integration of China library [J], Library and Information, **(04)**, 66-69+82 **(2009)**.

[3] Liu Gaoyong, Wang Huiling, Hu Jiming; Analysis on university library information resource integration in China-illustrated by the case of Wuhan University library [J], Information Science, **(05)**, 32-36 **(2013)**.

[4] Li Jie; Research on integration of digital library information resources [J], Modern Information, **(11)**, 54-57 **(2012)**.

[5] Shen Lifeng; Research on integration of digital library network information resources [D], Chinese Academy of Agricultural Sciences, **(2005)**.

[6] Wang Yuhong, Ma Shengli, Zhang Qian; Research on integration of university library information resource based on portal [J], Library Work and Study, **(12)**, 29-31 **(2010)**.

[7] Qiu Chunlan, Yang Guirong; Research on integration of hybrid library information resources [J], Chinese Market, **(09)**, 108-109 **(2008)**.

[8] Ling Zhengqiang; Research on integration of library information resources in higher vocational colleges [J], Study of Library Science, **(03)**, 66-69+83 **(2007)**.