LIBRARY AUTOMATION IN INDIA: A SURVEY OF INFORMATION RETRIEVAL SYSTEM OF CENTRAL LIBRARIES OF IIT DELHI, IIT KANPUR AND KASHMIR UNIVERSITY

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Abstract

The primary purpose of this study is to assess the current status of information retrieval system of two leading institutes of national importance and one of the first ISO certified university library in India to help other libraries also to enhance their information retrieval system. The study was undertaken with the focus to determine the satisfaction of users with the existing retrieval system. The study also highlights the features of different software packages used by the select libraries i.e. Central Library, Indian Institute of Technology (IIT) Delhi; P. K. Kelkar Library, IIT Kanpur and Allama Iqbal Library, Kashmir University. Being technologically advanced, the author was of the notion that the information retrieval system of the select IIT libraries may be comparatively more developed. However, it is observed that the retrieval system of Allama Iqbal Library is rather more advanced. Nevertheless, even after using the leading international software and installing a complete automated retrieval system, some users in Kashmir University still rate the overall status of retrieval system behind the retrieval system of the select IIT libraries. On contrary, a significant percentage of users in the select IIT libraries are satisfied with the overall status of retrieval system. Nonetheless, it is notable to point out that there is further improvement required on part of librarians' to take appropriate steps to enhance their information retrieval system for its effective and efficient use.

Keywords– Library automation; Library software packages; Information Retrieval System; LibSys; Virtua; IIT Delhi; IIT Kanpur; Allama Iqbal Library

1. INTRODUCTION

Libraries have been seeking technological aids to facilitate and enhance their operations and services since very long. The introduction of typewriters in 1800s and innovations ranging from printing press to microcomputers have affected a wide spectrum of library operations (Reynolds, 1985). It is believed that library automation has taken off as early as 1930s, with the use of punched card equipment (invented by 'Herman Hollerith' of US Census Bureau) in library circulation and acquisitions. Quickly after this major breakthrough, other technology related applications were introduced to library procedures. However, the progress was very sluggish and the most practical data processing applications were restricted to library circulation (Riggs, 1992). However, the wide availability of general purpose computers in 1960s changed all and made possible a second era of library automation systems. Punched

cards were not completely abandoned, but their role slowly and gradually declined (Salmon, 1975). In the era of computerization, the landmark initiatives were taken by USA, UK and later in Continental Europe due to availability of best infrastructure in telecommunication and computing technology. It is said that the genesis of library automation is viewed in three different phases: the first, during 1954-70; the second, during 1970-90; and the present from 1990 onwards. The hardware and software available at those times have influenced each of these phases (Haravu, 2004).

In comparison to developed world, the application of computers for library work in India took off quite late. The first effort in this direction was possibly taken by Indian National Scientific and Documentation Center (INSDOC) in 1965, when it computerized the author and subject indexes of 'Indian Science Abstract'. Soon after two years, INSDOC (now NISCAIR) National Institute of Science Communication and Information Resources brought out 'Roster of Indian Scientific and Technical Translators' with the help of computers (Sharma, 1993). However, the progress towards computerization was very slow. Owing to the financial constraints, the significant movement towards automation in Indian libraries picked up the momentum with the falling hardware prices, wide availability of different software packages and ever-increasing curiosity towards automation among library professionals. Against this background, a number of Indian libraries associated with Research and Development agencies brought out many library software packages. Of them, LibSys; Granthalaya; Maitreyi**;** Sanjay; SOUL; Suchika; DELMS; DELDOS; TLMS; LIBMAN; OASIS; Delsis; Libman; Librarian; Libris; Library Manager; Library Management; Loan Soft; Salim; Slim 1.1; Trishna; Tulib; Ulysis; Wilisys, etc. are notable Indian softwares (Saxena & Srivastava, 1998**)**. However, SOUL and LibSys due to their nonstop development for upgraded versions are widely used in Indian libraries. Furthermore, these software's also fulfill many international standards. It is worthy to point out here that many academic and special libraries in India are currently using some foreign software's such as Alice for Windows, Virtua, Techlib Plus, etc. to enhance the standard of their library operations and services. Significantly, the move towards using international software's especially Virtua software of VTLS (Virginia Technology Library Solutions) Company is growing at a fast speed among Indian libraries.

In any library automation venture, the information retrieval system is the most vital subsystem of the entire project. It has a direct bearing with the users of a library. In fact, the success of whole automated library system of a particular library rests on the effectiveness and efficiency of its retrieval system. The overall status of information retrieval system of surveyed libraries is discussed in detail in table-3.

2. RELATED LITERATURE

A number of studies have shown that even though many libraries have installed fully automated retrieval system, but their users are not still satisfied with their information retrieval system. In this direction, the study by (Saffady, 1989) revealed that a number of libraries purchased machine-readable bibliographic and non-bibliographic databases for

custom developed information retrieval software. However, most of these libraries lacked access to the hardware and software resources required to implement such systems. The study of (Choudhary & Sudatta, 1994) also revealed that automated text retrieval and library management system has not yet yielded a desired shape in Indian Libraries. Another study of (Gudivada, Raghavan, Grosky & Kasanagottu, 1997) also studied the effective search and retrieval for achieving the full potential of World Wide Web. The authors also suggested some of the recommendations and methods for enhancing retrieval effectiveness. Yet another study by (Sridhar, 2004) identified some of the reasonably new features like adjunct thesaurus help, limiting device with filtering effect, along with relevance feedback and ranking of retrieval references to lessen searching breakdowns. One more study carried out by (Mehtab & Amita, 2008) revealed the awareness and use of OPACs for information retrieval in Indian libraries. The study revealed that many users are yet unaware of advance searching and face number of issue of recall and precision, nevertheless in some searches; the users are unable to get their desired documents. They pointed out that necessary training should be rendered to users for using such automated retrieval systems in an efficient way. In their study (Tseng & Kuo, 2009) discussed the automated library equipped with RFID and Self-checkout system. Authors pointed out unfamiliarity of users as the major problem in operating automated Circulation system. This study revealed that Ximen Open Book Intelligent Library circulates and helps in Self-check out without any human intervention. However, this study is confined to Self-checkout and Circulation sections of few public libraries of Taipei Taiwan. It is hoped that this study will fill the gap in the literature available on information retrieval system particularly at Indian level.

3. SCOPE

At present, a large number of indigenous and foreign library software packages are available in India. Among the indigenous softwares as discussed in above paragraphs, LibSys and SOUL are widely used in Indian libraries. These softwares were largely developed by Research and Development (R&D) institutes. On the other hand, a number of large Indian libraries are using foreign softwares such as Alice for Windows; Virtua; Techlib Plus; etc.

Being a big country and having hundreds of universities and thousands of colleges, it was difficult for the investigator to cover all the software packages used by the Indian libraries. Nevertheless, the investigator had selected one popular indigenous software i.e. LibSys and one popular foreign software i.e. Virtua for the present study. Both LibSys and Virtua are integrated library management systems and comprise a number of modules as depicted in table-2. Furthermore, the coverage of present study is restricted to the central libraries of two institutes of national importance i.e. IIT Delhi and IIT Kanpur and one of the first ISO Certified University Library in India i.e. Allama Iqbal Library, Kashmir University.

4. METHODOLOGY ADOPTED

Since the study undertaken is descriptive in nature and has a direct bearing with the users of select institutes to determine the overall status of retrieval system, therefore, survey research

method was used for the present research effort. In survey research, there are three popularly used methods for collecting the data; the Questionnaire method, the Interview method and the Observational method. Based up on the fact, that questionnaires are acknowledged as the single most popular data collection tools in any research involving human subjects. Therefore, questionnaire was the chief tool used for collecting the necessary data. However, in order to avoid the limitations of questionnaire method, the investigator also adopted interview and observation method wherever the need was felt. The investigator personally visited all the select libraries and directly approached to the users of surveyed libraries to collect the necessary data. Notably, a pilot study was undertaken to left out the ambiguities and to check the validity and objectivity of the prepared questionnaires. Consequently, questionnaires were administered for data collection. The administration of questionnaires is shown below in table-1.

***Table-1* Sample Distribution**

Categories	Number of Respondents											
	IIT Delhi				IIT Kanpur				Kashmir University			
	♣STU	♣RS	♣ FM	Total	STU	RS	FM	Total	STU	RS	FM	Total
Administered Questionnaires	390	95	42	527	203	76	36	315	475	40	40	555
QuestionnairesReceived	355 (91.02)	89 (93.68)	29 (69.04)	473 (89.75)	192 (94.58)	73 (96.05)	26 (72.22)	291 (92.38)	435 (91.57)	40 (100)	28 (70)	503 (90.63)
QuestionnairesAnalyzed	330 (79.71)	84 (20.28)	27 (6.12)	441 (83.68)	184 (65.48)	72 (25.99)	25 (9.02)	281 (89.20)	416 (86.30)	40 (8.29)	26 (5.39)	482 (86.84)

♣ STU = Students (comprising Graduate and Post graduates),
♣RS= Research Scholars, and
♣FM= Faculty Members.
(Figures within the parenthesis represent %age)

4.1 Administration of Questionnaires

After getting the permission, the investigator personally disseminated the questionnaires among the users of the select institutes. Significantly, care has been taken to have a representative sample of total population of users, though the random sampling technique was adopted. The investigator administered a total of 527 questionnaires for a population of 5269 users, comprising 3900 graduate and post graduate students, 948 Research Scholars and 421 Faculty members in the month of February 2013 among the users of Central Library, IIT Delhi. Similarly, in the month of March 2013, 315 questionnaires were administered in P. K. Kelkar Library, IIT Kanpur for a population of 3143 users, comprising 2028 graduate and post graduate students, 758 Research Scholars and 357 Faculty members. In case of Kashmir University, though there are 6000 students registered with it; however, it is observed that 850 students are enrolled in different colleges which are affiliated with Kashmir University.

Therefore, the investigator selected only those users who are enrolled in the main campus. Consequently, a total of 555 questionnaires were administered in the month of April 2013 for a population of 5550 users comprising 4750 graduate and post graduate students, 400 Research Scholars and 400 faculty members. The whole course of data collection took three months to complete. The ultimate response rate (given in table-1) obtained from the users of select institutes is found to be 89.75%, 92.38% and 90.63% respectively.

The investigator used a self designed coding sheet and statistical counting was accordingly done for each response. The responses obtained through questionnaires have been cross checked by the responses obtained through interview and observation. Finally, the data have been organized; analyzed; compared; consolidated; tabulated and interpreted by using tables, percentages and statistical techniques. The software package MS-Excel has been used to tabulate, co-relate, and verify the validity of results. The charts depicting the different variables have also been drawn by using MS-Excel package. In the light of above data, useful findings, recommendations and conclusion have been derived.

5. OBJECTIVES

The principle objective of the this study was to assess the status of information retrieval system of the select libraries with special focus on following core objectives

- To underline the features of software packages used by the select libraries.
- Compare the information retrieval systems of the select libraries on the basis of easiness of use from the users' point of view.
- To examine the satisfaction of users with the existing information retrieval systems of the select libraries.

6. SOFTWARE PACKAGE USED FOR AUTOMATION

The Central Library, IIT Delhi and P. K. Kelkar Library, IIT Kanpur are using LibSys software. However, the Central Library, IIT Delhi started with LibSys4 version of LibSys in 1999; and in 2007, it shifted from LibSys4 to LSPremia version to enhance its functions and services (IIT Delhi, 2009). In order to overcome the shortcoming of RFID compatibility in LSPremia, the library recently switched over to LibSys7 version which is compatible with RFID technology and comprises some advanced features. In comparison, P. K. Kelkar Library, IIT Kanpur began with an in-house developed Kanpur Library Automation Software (iit-KLAS) in 1988. The software was used for nearly two decades. However, due to the shortcomings of upgraded versions, the software could not satisfy the emerging techno-oriented needs of the library. Therefore, the library in 2007 migrated over to presently using LSPremia version of LibSys (IIT Kanpur, 2006-07). On the other hand, Allama Iqbal Library took off with CDS/ISIS in 1997; however, in 2003, the library migrated to SOUL (Software for University Libraries) developed by Information and Library Network (INFLIBNET), Ahmadabad. Due to the shortcomings of UNICODE feature to deal with the large collection of multi-lingual resources of the library and lack of RFID compatibility in SOUL, the library

in 2008 switched over to Virtua software of VTLS Company to overcome these drawbacks (Kashmir University, 2009). The description of both these softwares' is given hereunder:

6.1 Description of Softwares

LibSys software is an integrated multi-user library management system designed to run on different hardware/software platforms in Client-Server architecture. The software is developed by Info Consultants (now LIBSYS, Ltd) with its Headquarters in Gurgaon (Haryana) India. It is easy to operate and requires less programming/computer skills. With the pre-requisite of nominal data entry, maximum possible integration of operations and powerful search and query facilities, LibSys produces high productivity. The software is built around its centralized bibliographic database based on Z39.50 format. LibSys undertakes almost all tasks related to acquisition; cataloguing; circulation; and serials. Besides this, it has a powerful and user-friendly OPAC. As stated earlier, LibSys is popularly used software across the nation having more than 1000 libraries as its clients. It is also used in some adjacent countries like Nepal, Sri Lanka and overseas country like Costa Rica, etc. The nonstop development of LibSys popularized it as a standard library management package for Indian libraries. With constant advancement, LibSys has produced a LibSys suite comprising various products such as LSEase; LibSys7; LSPremia; LibSysX and LSDigital for different types of libraries (LibSys, 2011).

On the other hand, Virtua software used by Allama Iqbal Library is a fully integrated library management package accepted globally to deal with the wide range of library functions. The software is developed by VTLS Inc; the leading library automation vendor at Blacksburg, USA. Virtua provides web OPAC and Chameleon iportal that facilitate the patrons to interact with the library by letting them to share on social network sites such as Facebook and twitter, etc. Virtua is having a significant distinction of being first library management package to fully support FRBR (Functional requirement for bibliographic records) and RDA (Resource Description and Access) standards. The software is based on six technologies such as Relational Database Management System (RDBMS); Rapid development tools; three tier Client-server architecture; database ware housing; UNICODE support and ATM network optimized applications. These technologies help in database management handling, software development and network delivery (VTLS, 2011). Virtua is worldwide acknowledged software with over 1800 libraries across 42 countries presently its clients. In India alone, about 40 libraries including National Library; Jawaharlal Nehru University; Central Institute of Indian Languages; University of Hyderabad; Allama Iqbal Library; IIT Madras; Indian Institute of Management (IIM), Indore; Indian institute of Science Education & Research (IISER), Kolkata; Indian Institute of Management (IIM), Ranchi; Indian Institute of Management (IIM), Bangalore; Indian Institute of Technology (IIT), Bhubaneswar; etc. are presently using Virtua software. It is observed that the number of libraries using Virtua is speedily increasing in India (Chachra, 2012). The features of LibSys and Virtua softwares are discussed in table-2 as below:

Table-2 Features of LibSys and Virtua

S.No	Features	LibSys	Virtua
1	Organization responsible for development of the software with year of establishment	Info Consultants (LibSys Corporation, now LIBSYS Ltd), Gurgaon, India. 1992	Virginia Technology Library Solutions (VTLS) Inc, USA. 2001
2	Nature of the Software	Proprietary and Fully Integrated library management system	Proprietary and Fully Integrated library management system
3	Design/Architecture	Client-server	Client-server
4	Operating system (Client Platform)	Windows 95/98/NT/2000, UNIX, Linux and NOVELL	95/98/2000/NT/XP/Vista, Linux
5	Operating system (Server options)	SCO Unix, Windows NT/Unixware/ Novell, UNIX, LINUX Sun Sparc (SOLARIS)	UNIX, LINUX, SOLARIS, SUSE LINUX, IBM(AIX), SUN(SOLARIS)
6	RDBMS	ORACLE, SQL, MySQL	ORACLE
7	Standards	ANSI Z39.50, USMARC, UKMARC, UNIMARC, MARC21, CCF	ANSI/ISO Z39.50, MARC21, ISO-23950, ISO-10161
8	ISO Certified	No	Yes (VTLS received ISO certification in 1997)
9	Profiler	Windows GUI	Windows GUI
10	Supports Multi lingual scripts	Yes through UNICODE	Yes through UNICODE
11	User facility	Multi user tasking	Multi user tasking
12	Protocol compatibility	TCP/IP communication protocol	TCP/IP communication protocol
13	Mode of searching	OPAC	OPAC
14	Modules supported	Acquisition, Cataloguing, Circulation, Serials Control, OPAC and Article indexing	Acquisition and Fund Accounting, Cataloguing, Circulation, Serials control, OPAC, Statistics and Reporting, Chameleon Gateway
15	Reports	Customization restricted	Customization certified
16	Installation Base	Over 1000 Libraries in India and some about 5-10 libraries in adjacent countries namely Sri Lanka, Nepal, etc.	Over 1800 Libraries across 42 Countries and about 25 libraries in India with number speedily increasing.

7. ANALYSIS, INTERPRETATION AND FINDINGS

To assess the status of information retrieval system, the investigator personally visited all the select libraries and collected the necessary data in this regard from the users. The responses received through questionnaires were consequently correlated with the responses received through interviews. The finalised data have been have been analysed, interpreted and discussed in table-3 as under:

Table-3 Overall Status of Retrieval System

Rating	IIT Delhi				IIT Kanpur				Kashmir University			
	♣STU N=330	♣RS N=84	♣FM N=27	Total N=441	STU N=184	RS N=72	FM N=25	Total N=281	STU N=416	RS N=40	FM N=26	Total N=482
Excellent	48 (14.54)	16 (19.04)	4 (14.81)	68 (15.41)	25 (13.58)	13 (18.05)	3 (12)	41 (14.59)	111 (26.68)	14 (35)	7 (26.92)	132 (27.38)
Very good	147 (44.54)	35 (41.66)	10 (37.03)	192 (43.53)	85 (46.19)	26 (36.11)	9 (36)	120 (42.70)	168 (40.38)	17 (42.5)	13 (50)	174 (36.09)
Good	90 (27.27)	20 (23.80)	9 (33.33)	119 (26.98)	44 (23.91)	20 (27.77)	9 (36)	73 (25.97)	99 (23.79)	7 (17.5)	5 (19.23)	135 (28)
Average	34 (10.30)	12 (14.28)	4 (14.81)	50 (11.33)	23 (12.5)	11 (15.27)	4 (16)	38 (13.52)	30 (7.21)	2 (5)	1 (3.84)	33 (6.84)
Poor	11 (3.33)	1 (1.19)	0 (0)	12 (2.72)	7 (3.80)	2 (2.77)	0 (0)	9 (3.20)	8 (1.92)	0 (0)	0 (0)	8 (1.65)

♣STU= Students (comprising Graduate and Post Graduate), ♣RS=Research Scholars and

♣FM=Faculty Members

(Figures within parenthesis represent %age)

As stated earlier, the information retrieval system is the most important subsystem of the entire library automation system. It may be noted that the success of implementing automated library system lies in the effectiveness and efficiency of its information retrieval system. In this backdrop, the collected data in table-3 reveals that a small percentage of 14.54% students, 19.04% research scholars and 14.81% faculty members in IIT Delhi rated that the overall status of retrieval system of their library as excellent. There is not much difference observed in this direction in IIT Kanpur, where 13.58% students, 18.05% research scholars and 8% faculty members replied that the retrieval system of their library is excellent. In comparison, this category of users who reported the retrieval system of Allama Iqbal Library as excellent is 26.68% students, 35% research scholars and 26.92% faculty members.

The collected data further reveals that a large percentage of users in IIT Delhi with 44.54% students, 41.66% research scholars and 37.03% faculty members rate the retrieval system of their library as very good. This number of users is more or less same in IIT Kanpur, where 46.19% students, 36.11% research scholars and 36% faculty members are of the same opinion. No big difference is observed between the both IIT libraries and Allama Iqbal Library, as a large population with 40.38% students, 42.5% research scholars and 50% faculty members in Kashmir University are of the opinion that the overall retrieval system of their library is very good.

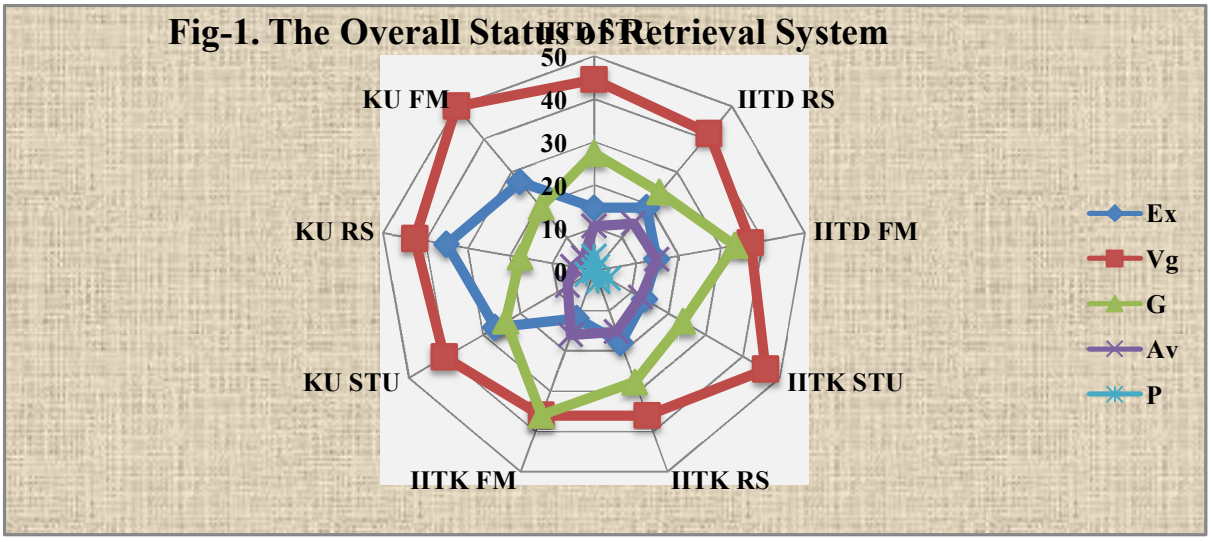
Furthermore, the data reflects that a considerable percentage of 27.27% students, 23.80% research scholars and 33.33% faculty members in IIT Delhi; while 23.91% students, 27.77% research scholars and 36% faculty members in IIT Kanpur rate the retrieval system of their library under good category. The situation in this regard is not much different in Kashmir University, where 23.79% students, 17.5% research scholars and 19.23% faculty members also rate the retrieval system of their library under good category.

It is, however, disappointing that 10.30% students, 14.28% research scholars and 14.81% faculty members in IIT Delhi find the retrieval system of their library as average. Likewise, 12.5% students, 15.27% research scholars and 16% faculty members in IIT Kanpur rate their library's retrieval system as average. On contrary, a small percentage of users in Kashmir University with 7.5% students, 5% research scholars and 3.84% faculty members are of the view that their library's retrieval system is average.

Further, a thin percentage of users with 3.33% students and 1.19% research scholars in IIT Delhi; while 3.80% students and 2.77% research scholars in IIT Kanpur find the retrieval system of their library as poor. However, none of the faculty members in both the IITs are of this opinion. On contrary, this number is even thinner in Kashmir University, where a meagre 1.92% students view the retrieval system of their library as poor.

The findings suggest that the retrieval system of Allama Iqbal Library has taken a strong lead over the select IIT libraries. Notably, a large percentage of users in Kashmir University rate the retrieval system of their library between excellent and very good. This owes to the fact that Allama Iqbal Library is providing the facility of self check-out and check-in system for issue and return of the library resources. It has also been observed that the users are more enthusiastic in issuing and returning the library resources themselves via self check-out/check-in machines. As mentioned earlier in chapter, this facility is yet to be seen in the libraries of both IITs.

In addition to above, the status of information retrieval system of the select libraries is also shown in graphical presentation below in Fig-1



'IITD'= IIT Delhi, 'IITK'= IIT Kanpur and 'KU'= Kashmir University

'STU'= Students (comprising Graduate and Post Graduate),

'RS'= Research Scholars,

'FM'= Faculty members

'Ex'=Excellent, 'VG'=Very Good, 'G'=Good, 'Av'=Average, 'P'=Poor.

8. CONCLUSION

It is revealed that both LibSys and Virtua softwares' have their potentialities and limitations. LibSys is most popular at Indian level and supports most of the international standards. In comparison, Virtua is globally acclaimed to have robust features that are compatible to all international standards. It is noteworthy to mention that LibSys is possible to be installed on different operating systems i.e. Windows NT, UNIX, Linux and NOVELL as server platform with any version of Windows as a Client. In this direction, Virtua can also run on several operating systems like UNIX, LINUX, SOLARIS, SUSE LINUX, IBM (AIX), SUN (SOLARIS) platform with Windows as a Client. LibSys has the advantage over Virtua that it does not require RDBMS as its back-end. However, the option of SQL server or ORACLE as back-end RDBMS is available. On the other hand, Virtua inevitably requires Oracle RDBMS at its back end. Furthermore, the study revealed that LSPremia version of LibSys presently used by select IIT libraries lacks RFID compatibility. While as Virtua is the first library software that fully supports RFID technology. Appreciably, Allama Iqbal Library has successfully and effectively installed RFID technology. In addition to above, Virtua is the first software in library automation industry that fully supports UNICODE, FRBR and RDA standards. While as apart from partial UNICODE, LibSys does not support these standards. It

is now up to the librarians' technological competence and judgement to select the software that accomplishes most of the library operations and services more efficiently and effectively.

It is encouraging to state that Allama Iqbal Library has taken a lead and has successfully installed RFID technology, self issue, self return and self check-in/check-out features. While these technologies are not yet in place in the libraries of select IITs. In the light of these facts, it can be said that the retrieval system of Allama Iqbal Library is comparatively more advance than the retrieval system of surveyed IIT libraries. Significantly, 63.47% users in Kashmir University rate the retrieval system of its library between excellent and very good. In case of IIT Delhi and IIT Kanpur, 58.94% and 57.29% users respectively are of the view that the retrieval system of their library is between excellent and very good. However, when the investigator wished to know the satisfaction level of users', majority of users in the Central Library, IIT Delhi and P. K. Kelkar Library, IIT Kanpur reported that they are satisfied with the overall retrieval system of their libraries. But strangely, the users of Kashmir University are little less satisfied with the overall retrieval system of Allama Iqbal Library. It may also be noted that a sizeable percentage of 14.05% users in IIT Delhi and 16.72% in IIT Kanpur rate the retrieval system of their libraries between average and poor. In contrast, only 8.49% users in Kashmir University rate the overall retrieval system of their library between average and poor. Although, this percentage of users, who view the retrieval system between average and poor is more in IIT Kanpur and IIT Delhi respectively. However, even after using the leading foreign software and installing a complete automated retrieval system, some percentage of users in Kashmir University still rate the overall retrieval system of Allama Iqbal Library as unsatisfactory. The results of this study clearly point out that there is further improvement needed on part of librarians' to take appropriate steps for making effective and efficient use of their information retrieval system. Besides, the study also reveals that the Allama Iqbal Library needs to take appropriate measures to guide its users for effective and efficient use of fully automated retrieval system.

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