

# Changing the Archetype of Information Dissemination Using Open Source Digital Library Technology

*Shibu K M*

Department of Library and Information Science, Aligarh Muslim  
University, Aligarh, India  
Email: shibukm123@gmail.com

## Abstract

The world of Information and Communications Technology (ICT) is changing rapidly. New technologies and new opportunities come and go at an ever-increasing speed. The Free and Open Source Software (FOSS) movement is one such development that is drawing great attention among libraries and library professionals. It offers many opportunities for government organizations, private sector, and educational institutions. Organizations in developing nations that take advantage of free and open source software by implementing them appropriately stand to gain much, while those that fail to take the advantage of this opportunity may find their Information and Communication Technology development lagging behind of comparable organizations.

**Keywords:** Open source, Open Access, Institutional Repository, ICT, Library

**Introduction:** Open source software is the software in which the source code is freely available for the further modification by the user. Open source software is immensely used in creation of digital libraries in India. Greenstone, Dspace and Eprint are the commonly used open source digital library software in India. Briefly, open source

software programs are the programs whose licenses give users the freedom to run the program for any purpose, to study and modify the program, and to redistribute copies of either the original or modified program. Free and open source software has become an international phenomenon, moving from relative obscurity to being the latest buzzword in recent years. However,

there is still a lack of understanding about what really constitutes free and open source software and the ramifications of this new concept (Coyle, 2002)<sup>1</sup>

India is emerging in the forefront of the developing world as well as in South Asian region, both in terms of economic growth and scientific productivity. Research and Development (R&D) institutions and higher learning institutions in India are engaged in advanced studies, leading to the development of new applications, new technologies, new products etc. These R&D and higher learning institutions are producing a large volume of information in the form of articles, research reports, dissertations, theses, etc. which have to be preserved in most appropriate way. Now many of these libraries in India are engaged in the digital library projects to preserve the national and cultural heritage so as to provide global access to its intellectual contents to all.

## ***2. Open Source Software***

Open source means practices in production and development that promote access to the end product's sources. Open source software began as a marketing campaign for free software. Open source does not mean to the

access to the source code. The distribution terms of open source software must comply the criteria like free distribution, availability of source code, modification of software, integrity of author's source code, no discrimination against persons, group, fields, etc. Open source software is software, which has freely available source code, which lets anybody to create new version of the software. Such access to the source code allows anybody to build a package of the software and distribute it. Such software has been known as open source software. Open source software is where the source code of programs is made available for anyone to change and distribute providing the accompanying license (Feller and Fitzgerald, 2000)<sup>2</sup>

## ***3. Review of Literature***

Morgan (2002)<sup>3</sup> discusses about the definition and basic features of open source. According to him, open source is both a philosophy and a process. It is a philosophy describing the intended use of software and methods of distribution. Open source is often equated with GNU software and described as free software, but the term "free" should be more equated with the Latin word *liberat*, and not necessarily

*gratis*. The article also discusses about the various problems of open source software.

Muir (2005)<sup>4</sup> in his article describes basic concepts of free and open source software. Open source originates from *Free Software*. Free does not mean that the software is without cost while open source software basically implies the availability of the source code. The most significant difference between open source and free software are the freedom or liberty in using the source code in free software while open source is concerned with the availability of source code with no cost.

*“Open Access and Institutional Repositories: A Developing Country Perspective”* by Ghosh and Das (2006)<sup>5</sup> describe the current scenario of open source movement in India. Most of the libraries in India are moving towards the digitization of their materials by using open source software in order to provide the global access. Therefore, there are two bands of institutional repositories such as subject specific repositories and document specific repositories. In this area an initiative has been taken with the establishment of Open Source Software Resource Centre (OSSRC) in India. This is established with a joint agreement of IBM India, CDAC and Indian

Institute of Technology, Delhi. Articles also provide detailed description about the institutional repositories using the open source software in India.

*‘Checklist for Evaluating Digital Library Software* by Goh (2000)<sup>6</sup> describes how to select open source digital library software. Many open source software packages are available for organizations and individuals to create digital libraries. However, a simple to use instrument to evaluate these digital library software packages does not exist. The objective of the article was to develop a checklist for digital library evaluation and use this checklist on digital library software packages.

Sivasubramanian and Nikham (2006)<sup>7</sup> in their article describes about the technical and economic aspect about the digitization of the electronic theses in Indian Institute of Technology, Bombay. The paper included required infrastructure, technical issues, online submission, retrieval, conservation and preservation, storage devices and formats used, future etc. They want to share their experience with other institutions and find out about others’ experience.

Gullik (2002)<sup>8</sup> explains that over the last few years, Free and Open Source Software

(FOSS) has established itself as a viable alternative to proprietary software in many areas of Information and Communications Technology (ICT) deployment. The availability of free and open source software without license fees and its inherent characteristic of being open to modification and adaptation make it an attractive proposition to developing communities. As a result, many projects that make use of free and open source software to empower and help the people have been initiated all over the world especially in poor and developing regions. He also explains some barriers in the field of open source software by mentioning some case studies.

#### ***4. Scope of the Study***

It has been observed that the best input in this regard could have been available from those libraries, which have developed their own digital libraries and made their resources accessible online either on Internet or Intranet. Hundreds of libraries in India have developed digital libraries using open source software, some of them are available online and rest is available in campus Intranet. Therefore, 43 libraries, which are accessible online either through Internet or Intranet, have been randomly selected for the present study on the basis of the

preliminary survey made to find which libraries are actually involved in digitization of material using open source software. The target population of the present study is librarians of the respective library of the digital library who maintain the system.

#### ***5. Objectives of the Study***

Objectives of this study were:

1. To analyze which open source software are used by majority of the libraries covered under the study.
2. To understand what kind of initiatives are being taken by various types of organization for the development of open source movement.
3. To identify the major obstacles in use of open source software for the development of digital library.
4. To suggest possible ways to initiate and promote open source software in India.

#### ***6. Methodology***

For the present study, data has been collected using different methods. Literature survey was conducted in two stages. In the first stage, literature was scanned to have clear understanding of the topic and various

aspects to be covered for open source, digital library software etc. Clear understanding about what has to be done was evolved. In the second stage, an extensive literature search on selected aspects was carried out. The sources used for scanning and study of literature include primary source of information, such as periodicals and secondary sources such as indexes, abstracts etc.

The purpose of the questionnaire is to get accurate and reliable information for the topic under study. Therefore, questionnaire was used to obtain free, frank and unbiased opinion of the professionals and administrators, etc. involved in the creation of the digital libraries using open source software. Questionnaire has been used as a tool to gather data on various aspects on the use of open source software. Therefore, a comprehensive questionnaire was prepared to find out the problems of digitization using open source software and other basic data relevant for the present study. While preparing the questionnaire, objectives were

kept in mind so as to collect the data relating to the objectives of this study. Interview was also conducted with librarians to supplement the incomplete information left while returning the questionnaire.

## ***7. Data Analysis and Interpretation***

Data collected for this study by different methods are analyzed and interpreted here. Tables and figures are used to present the data in the following section.

### ***7.1 Open Source Software Used***

An effort has been made to find out which software is being used for digital library creation in India. Question was asked about the open source software that is being used in digital library where the librarian was supposed to choose from four given options (*Greenstone, Dspace, Eprint* and *CDSWARE*) in the questionnaire. The component of flexibility to go beyond four given options was added as '*Others*'. The analysis has been given below in Table 5.2.

*Table II Analysis of Software Used*

Software	No. of Libraries	Responses (%)
Greenstone	8	24
Dspace	17	52
Eprint	6	18
CDSWARE	2	6
Others	0	0
Total	33	100

*Figure I Analysis of Software Used*

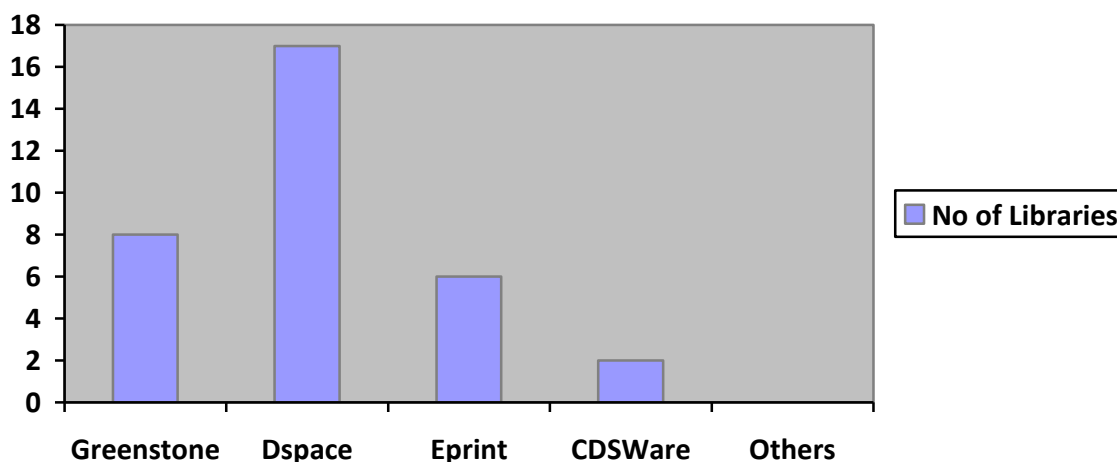


Table II and Figure I reveals that majority of the libraries (17 i.e. 52%) are using *Dspace* open source digital library software for the digitization of their material in India, whereas 24% of the libraries are using *Greenstone* for the digital library. *EPrint* is

being used by 18% of libraries and 6% of libraries are using *CDSWARE*. However, many of the libraries are using two or three above listed software for their different databases at the same time.

### **7.2 Technical Problems**

Librarians were asked to express technical problems that they are facing while developing and maintaining the digital library using open source software. Four options were given for this purpose which included *installation problem, maintenance problem, software up gradation problem* and

*database management problem* to be chosen as the one to reveal the problems they are facing. Flexibility to provide other technical problems if not covered under the above mentioned options under '*Others*' was given. Analysis of the responses is given in Table III.

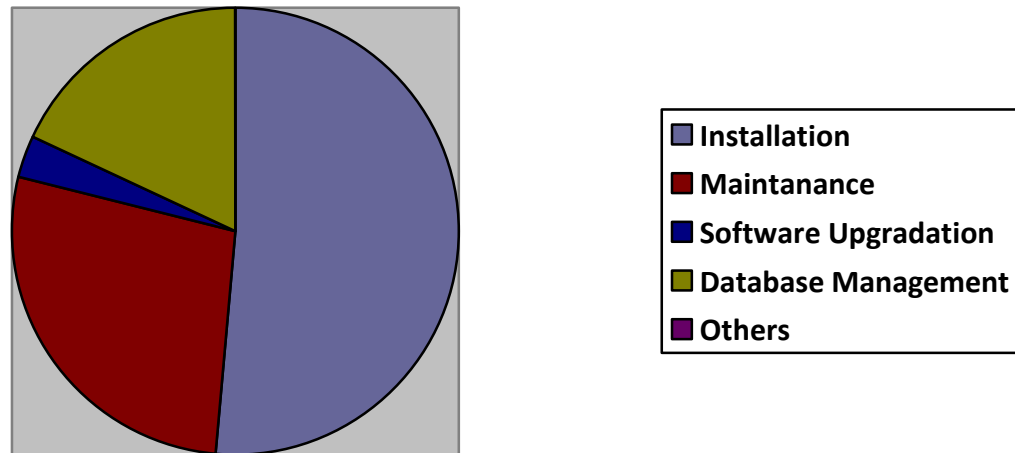
**Table III Technical Problems of Open Source Software**

Serial No.	Technical problems	No. of Libraries	Response (%)
1	Installation problem	17	52
2	Maintenance problem	9	27
3	Software Up-gradation problem	1	3
4	Database management problem	6	18
5	Others	0	0
Total		33	100

Table III shows that common technical problem in using open source digital library software is *Installation Problem* i.e. 52% of libraries faced difficulty in *installation* of the software, followed by *Maintenance Problem* (27%). *Database Management Problems* and *Software Up-gradation Problems* fall between 18% and 3%. No library mentioned any other *Technical Problem* even though they were given the

option as '*Others*' to mention any other difficulties. While interacting personally with the librarians, they expressed that the major problem with the software is in *Installation*. Delhi College of Engineering, One World South Asia Open Archives Initiatives and Delhi University Library System etc. confirmed it during interaction. The following figure clearly depicts the above analysis.

*Figure II Technical Problems of Open Source Software*



### 7.3 Financial Problems

Although open source software are available free of cost but the fund is required for accessories of digital library like Internet connectivity, computers, scanners, LAN

network etc. therefore, a question was asked whether libraries are facing any financial problem in managing digital library. The analysis has been given in Table IV.

*Table IV Financial Problems of Management*

Financial Problems	No. of Libraries	Response (%)
Yes	12	46
No	14	54
Total	26	100

The data in Table IV reveals that majority of the libraries (14 i.e. 54%) are self sufficient. They have expressed that they are not facing any financial problem in managing their libraries whereas, 46% libraries are facing financial crisis in maintaining their digital libraries. Department of Information Technology, Government of India, CSIR, University Grants Commission etc. are providing financial aid for the development of digital libraries in India.

#### **7.4 Open Source Software Vs Proprietary Software**

Twenty six libraries agreed upon that open source digital library software is better than Proprietary software because of its Flexibility, Quality and Free Availability. Librarians were given four common characteristics (*Flexibility, Free availability, Quality, User friendly*) of open source software in order to explore the reason for selecting open source software, if it is considered to be better than *Proprietary Software*. Analysis of response is given in Table V.

**Table V Open Source Software Vs Proprietary Software**

Software	Better	
	Yes	Response (%)
Open source software	24	73
Proprietary Software	2	6
No opinion	7	21
Total	33	100

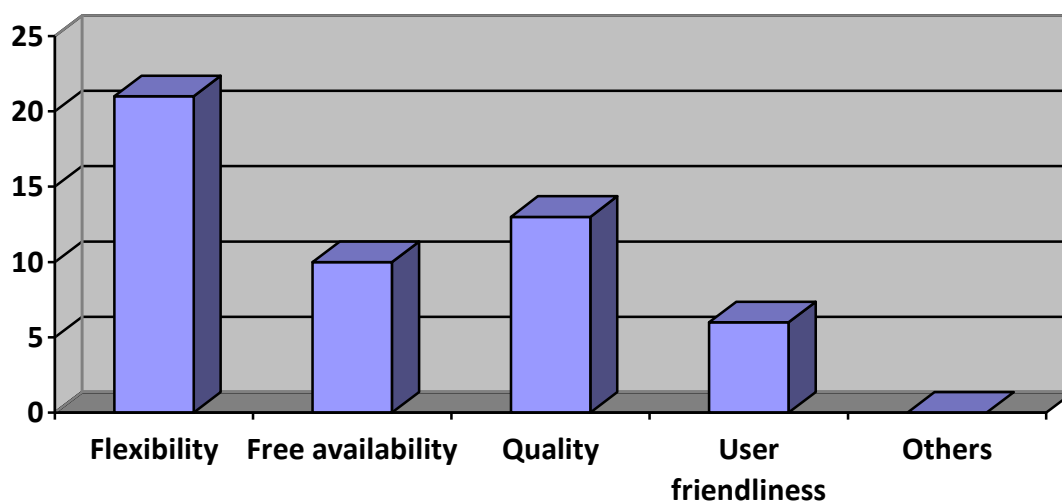
Percentage on Table V shows that out of 33 libraries under the study, 24 librarians (73%) expressed that at present, open source software is better than any other proprietary software available in the market for the digitization of the library collection. Reason for selecting open source software over proprietary software has been analyzed on

the basis of four multiple choice options i.e. *Flexibility, Free Availability, Quality, and User Friendly* given for this purpose. Librarians were given flexibility to express other reason, if any, under '*Others*'. Analysis has been presented in Figure VI.

*Table VI Reasons for Selecting Open Source Software*

Serial No.	Reasons	No. of Libraries	Response (%)
1	Flexibility	21	42
2	Free availability	10	20
3	Quality	13	26
4	User friendly	6	12
5	Others	0	0
	Total	50	100

*Figure III Reasons for Selecting Open Source Software*



Analysis in Table IV and Figure III reveals that 42% of librarians feel that *Flexibility* is the main reason which ranks open source software better than proprietary software followed by other reasons i.e. *Quality* (26%) of open source software, *Free Availability* (20%) and *User Friendliness* (12%) that rates the open source software better than proprietary one.

### ***7.5 Role of Professional, Academic and Government Organizations***

Professional, academic and government organizations can initiate a number of

activities to create awareness as well as to promote open source movement in India. It may include seminars, conferences, workshops, training programs, curriculum development on various aspects of open source. This part of the questionnaire deals with the role of professional, academic and government organizations in creating awareness and promoting open source software in India. Multiple choice was permitted in this question.

**Table VIII: Role of Various Organizations in Creating Awareness**

Serial No.	Kinds of Organizations	No. of Libraries	Awareness (%)
1	Professional Organizations	20	44
2	Academic Organizations	14	31
3	Government Organizations	9	20
4	No role	2	5
Total		45	100

Percentage analysis in the above Table 5.19 reveals that 44% of the librarians of digital library believe that there a vital role is being played by national level *Professional Bodies* in Library and Information Science to promote open source software, followed by *Academic Bodies* with 31%. 20% of professionals express that *Government Bodies* can do many things in ways of financial aid and other promotional activities to create awareness of open source software in India. There are 5% of people under study who mention that there is *No Role* of these bodies to create awareness of open source software.

## **8. Findings**

### **8.1 Awareness and Use**

Regarding awareness and use of open source digital library software, finding reveals that Dspace software has been given first rank. Majority of librarians/administrators of digital libraries are using Dspace followed by Greenstone software. Awareness and use of Eprint and CDSWARE are poor in India.

### **8.2 Technical Problems**

Majority of the libraries have initially faced the problems in Installation of open source software. Some of them faced Maintenance and Database Management Problems but Up-gradation of the open source software was found very easy and simple.

### **8.3 Financial Problems**

In India, University Grants Commission (UGC), Department of Information Technology (DIT) etc. are providing fund for developing digital library. Therefore, majority of the libraries are not facing any Financial Problems in developing and maintaining digital library.

### **8.4 Open Source vs. Proprietary Software**

Twenty six libraries out of 33 agreed upon that open source digital library software is better than Proprietary software because of its Flexibility, Quality and Free Availability. Findings show that majority of the libraries have selected open source software because of its Flexibility feature.

### **8.5 Role of Professional, Academic & Government Organizations**

Regarding role of various organizations, findings reveal that Professional organizations have major role in making awareness of open source, followed by Academic organizations and Government organizations respectively. During the interaction with librarians/administrators

they have expressed that Professional organizations can create more awareness and promote open source through seminars, conferences etc.

### **9. Conclusion**

In India, there are a number of open source initiatives in many forms, such as open access journals, archives of back volumes of journals, institutional repositories, subject-specific repositories, document-specific repositories, open courseware, etc. Some initiatives have been also taken to make available the cultural heritage literature of India to the whole world. All these initiatives are being taken in open source and access mode only, where cost of creating repositories has reduced drastically. Some studies on institutional repositories show that the India is leader of open source movement in Asian region. There is also a shift in the philosophy of business model software development of owning and selling program to service-oriented supportive philosophy. Therefore, open source digital library software is becoming popular in India.

## References

1. Coyle, Karen (2002) "Open Source and Open Standards", *Information Technologies and Libraries*, Vol.21, No.1, pp.33-36.
2. Feller, J and Fitzgerald B (2000), *Understanding Open Source Software Development*. Addison-Wisley, London.
3. Morgan, Eric Lease (2002), "Possibilities for Open Source Software in Libraries", *Information Technology and Libraries*, Vol.21, No.1, pp. 8-28.
4. Muir, Scott P (2005) "An Introduction to the Open Source Software Issue", *Library Hi-tech*, Vol.23, Issue 4, pp. 15-21.
5. Ghosh, S B and Das, Anup Kumar (2006), "Open Access and Institutional Repositories-a Developing Country Perspective: a Case Study of India". IFLA conference proceedings, Seoul.
6. Goh, Dion Hoe-Lian et al. (2006), "Checklist for Evaluating Digital Library Software", *Online Information Review*, Vol.30, No.4, pp.360-379.
7. Sivasubramanian, V and Nikham, Khaiser (2006), "Open Source Software and Its Role for Indian Economic Growth and Development", in Chatterjee, Amitabha (Ed.), *Open Source Movement- Asian perspective*, XXII National Seminar of IASLIC, Roorkee, Dec, 2006, Kolkata, pp.1-8.
8. Gullik, Robert (2002), "Digital Library in New Era", *Digital libraries* Vol.26 No.2, pp.35-41.

***Manuscript Received: 1<sup>st</sup> Mar. 2011***

***Manuscript Revised: 8<sup>th</sup> May 2011***

***Manuscript Accepted: 25<sup>th</sup> May 2011***