GlobalJournalofOperatingSystem andTechniques

January - April 2025 Vol – 10 Issue – 1

ENRICHED PUBLICATIONS

JE - 18,Gupta Colony, Khirki Extn,
Malviya Nagar, New Delhi - 110017.
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GlobalJournalofOperatingSystem andTechniques

Aims and Scope

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Focus and Scope Cover

- Implementation of multi programmed OS
- Architecture of OS
- Multiprocessor, multimedia and real time OS
- Models of thread implementations
- Tradition and real - time signals
- Clocks, timers and callouts
- Inter process/ interthread synchronization and communication
- File organization, file system interface and virtual file systems
- Graphical user interface (GUI)
- Linear block addressing (LBA)

GlobalJournalofOperatingSystem andTechniques

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January - April 2025 Vol–10 Issue-1

ACOMPARATIVESTUDYONTOTALQUALITY MANAGEMENTOFLIBRARYSERVICESINTAMILNADU UNIVERSITYLIBRARIES

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Abstract

The Total Quality Management mainly rely on recognizing library user's and discovery of their needs, setting standards that an consistent with library users requirements, empowerment of people at all levels in the organization to act for quality improvement. Quality services means resources and services, which satisfy user's expectations and perceptions. It is very clear that librarians must use management tools to run the library Services. The tools such as TQM, SERQUAL, SERVPERF, LibQUAL help them to assess services, to make decisions, to improve services and to achieve a better quality. The main idea of the present study describes the commitment to quality and meeting the library user's requirements, communication of the quality message and recognition of the need to create total quality.

Keywords: Information Services, Library Services, Total Quality Management, University Libraries, Users satisfaction.

Introduction

The very existence of libraries are dependent on user's satisfaction in the present digital information era, the librarians are more than a custodians to provide the right documents, information and the services to its users. The main objective of this paper is to describe and identify the issues of meritorious attention by the library professionals to gear up the library product and services, so that the user communities to get satisfied for coming to library. **Total Quality Management** (**TQM)** is an integrative philosophy of

management for continuously improving the quality of products and processes. The quality of products and processes is the responsibility of everyone involved with the creation or consumption of the products or services offered by an organization. In other words, TQM capitalizes on the involvement of management, workforce, suppliers, and even customers, in order to meet or exceed customer expectations. Cua, McKone, and Schroeder (2001) identified the nine common TQM practices as cross-functional product design, process management, supplier quality management, customer involvement, information and feedback, committed leadership, strategic planning, cross-functional training, and employee involvement.

Quality Management in University Libraries

The emergence of knowledge society has necessitated exploring more innovative and insightful measures of modernization. The Present study makes an effort to study, assess and evaluate the quality management in the university libraries in TamilNadu. Three main components of Quality Management are:

a) Quality Control,
b) Quality Assurance, and
c) Quality Improvement and Enhancement

Significance of the Study

1. To analyze the demographic characteristics of library users gender wise and status.
2. To analyze the time spent by students and academic users in university libraries.
3. To analyze the different methods adopted for providing quality library services by the university library.
4. To analyze the availability of study materials for teaching and research.
5. To evaluate the modernization inputs and to work out the growth rate trend in key variables in libraries of higher education.
6. To examine the views and opinions of users and staff and to apply a simple SWOT model to assess the quality management in university library services and facilities available.
7. To assess the problems faced by all those concerned with library quality and standards.
8. To offer suggestions for better performance of university libraries.

A Structured Questionnaire was designed after completing the pilot

survey. Different university library records were referred for secondary data and were collected using suitable schedules. Appropriate statistical tools were employed considering their utility and plausibility in this research study. A simple SWOT model was used. This survey covered all the profiles of 15 university Libraries in Tamil Nadu with a randomly selected a samples of 500. Materials, facilities, services offered and the staff and users were considered for the study.

Findings of the Study

The following are the major findings of the present study:

Particulars		No.of Respondents	Percentage
Gender	Male	256	51.2
	Female	244	48.8
Total		**500**	**100**

Table 1: Demographic characteristics of Library users – Gender

Table 1 showed the Demographic characteristics of Library users that 51.2% of the respondents belong to the male category whereas 48.8% of the respondents belong to the female category.

Status	Faculty Member	28	5.6
	M.Phil Scholar	93	18.6
	Ph.D Scholar	70	14.0
	First year Students	147	29.4
	Second year Students	162	32.4
Total		**500**	**100**

Table 2: Demographic characteristics of Library users – Status
Source: Primary data

Table 2 showed that among the overall 500 library users, twenty-eight respondents (5.6%) are faculty members, 18.6% are M.Phil research scholars, 14% of the respondents are Ph.D research scholars, 29.4% are first-year PG students and 32.4% are second year PG students respectively.

Hence more than three-fifths of the respondents belong to the category of PG Students who use the university library services.

Table 3: Status of users and frequency of visits to the library

S. No.	Status of the users	Frequency of visit the library						Total
		Every day	Once in two days	Once in three days	Weekly	Monthly	Occasionally	
1.	Faculty Members	13 (46.43%)	- .	6 (21.43%)	- .	6 (21.43%)	3 (10.71%)	28
2.	M. Phil Research Scholars	57 (61.9%)	9 (9.68%)	2 (2.15%)	14 (15.05%)	7 (7.53%)	4 (4.30%)	93
3.	Ph. D Research Scholars	25 (35.71%)	14 (20%)	4 (5.71%)	21 (30%)	4 (5.71%)	2 (2.86%)	70
4.	P.G. First year Students	78 (53.06%)	5 (3.40%)	12 (8.18%)	40 (27.22%)	6 (4.08%)	6 (4.08%)	147
5	P.G. Second year Students	80 (49.38%)	13 (8.02%)	19 (11.73%)	32 (19.75%)	8 (4.94%)	10 (6.17%)	162
	Total	**253**	**41**	**43**	**107**	**31**	**25**	**500**

Table 3 showed the status of the library users and their frequency of visiting the library. Among the faculty members, 46.43% visit the library every day, 21.43% visit once in three days and 21.43% visit monthly. Hence nearly half of the faculty members visit the university library daily. Among the M.Phil research scholars, 61.29% visit every day, 9.68% visit once in two days, 2.15% visit once in three days, 15.05% visit weekly, 7.53% visit monthly and 4.30% visit occasionally. Therefore three-fourths of the M.Phil research scholars visit the university library daily. Among the Ph.D research scholars, 35.71% visit every day, 20% visit once in two days, 5.71% visit once in three days, 30% visit weekly, 5.71% monthly and 2.86% visit occasionally. Hence more than one-third of the Ph.D research scholars visit the university library daily. Among the Post-graduate first-year students, 53.06% visit every day, 3.40% visit once in two days, 8.18% visit once in three days, 27.22% visit weekly, 4.08% visit monthly and 4.08% visit occasionally. Hence more than half of the Post-Graduate first-year students visit the university library daily. Among the Post-graduate second-year students, 49.38% visit every day, 8.08% visit once in two days, 11.73%

visit once in three days, 19.75% visit weekly, 4.94% visit monthly and 6.17% visit occasionally. Hence nearly half of the post-graduate second year students' visit the university library daily.

S.No.	Purpose	No. of Respondents	Percentage
1.	To know the latest arrivals in the library in your subject	146	29.2
2.	Academic improvement	188	37.6
3.	Reading newspaper	162	32.4
4.	Prepare competitive Examination	154	30.8
5.	To gain current and general information	156	31.2
6.	Reading Journals and magazines	148	29.6
7.	For leisure reading	100	20.0
8.	Preparation of class notes/ assignments/seminar papers	114	22.8
9.	Employment news	8	1.6
Total N=500			

Table 4: Purpose of Visit to the Library by the users Source: Primary data

S.No.	Type of materials	No.of Respondents	Percentage
1.	Reference Books	236	47.2
2.	Newspapers	208	41.6
3.	Employment newspaper	75	15.0
4.	Journals/ Magazines	135	27.0
5.	Text Books	179	35.8
6.	Theses and Dissertations	104	20.8
7.	E-Resources	55	11.0
Total **N=500**			

Table 5: Library users' preference of seeking information sources
Source: Primary Data

Table 5 discussed that 47.2% of the respondents preferred to seek reference books, whereas 41.6% of the respondents newspapers. This is followed by, 35.8% seek text books, 27% of the respondents seek Journals/ Magazines, 20.8% seek theses and dissertations, 15% of the respondents preferred to seek the employment news, and 11% of the respondents seek e-resources. Hence most of the library users preferred to seek the

information from reference books and newspapers.

Sl. No	Opinions on	Very Good	%	Good		Less satisfied/ Satisfactory	%	Not satisfied/ Dis-satisfied	%	Total	%
1	Seeking Infmn. thro' Books	116	23.2	330	66.0	40	8.0	14	2.8	500	100
2.	Seeking Infmn. thro' Jls / magazines	109	21.8	341	68.2	34	6.8	16	3.2	500	100
3.	furnishing of Reading Room	176	35.2	180	36.0	124	24.8	20	4.0	500	100
4.	Cleanliness and working space of Library	158	31.6	214	42.8	103	20.6	25	5.0	500	100
5.	Ventilation and lighting of reading and stack rooms	111	22.2	215	43.0	157	31.6	16	3.2	500	100

Table 6: Opinions on the level of satisfaction on book collection, journals and magazines and about furnishing of reading room, cleanliness and ventilation and lighting of the Library Source: Primary data

satisfactory level was Very Good for seeking Information through books , 66% report as Good, 8% report as satisfactory and 2.8% report that Not satisfactory respectively. Hence 89.2% of the respondents are satisfied as Good in seeking information through books.

6.2 Users seeking information through Journal / Magazine/ Periodicals: Table 6 showed that 21.8% of the respondents reported the Level of satisfaction of seeking Information through Journal/ Magazine /Periodicals are Very Good, 68.2% as Good, 6.8% as satisfactory and 3.2% are Not satisfactory respectively. Hence 90% of the respondents are satisfied with the level of satisfaction of seeking information through Journal/Magazine/Periodicals as Good.

6.3 users' opinion on the Furnishing of Reading Room: Table 6 showed that 35.2% of the respondents report that furnishing of Reading Room is very

6.1 Users seeking information through books Table 6 showed that 23.2% of the respondents report that

good, 36% of the respondents report that good, 24.8% of the respondents report that satisfactory and 4% of the respondents report that not satisfactory respectively. Hence most of the respondents are satisfied Good with the Furnishing of Reading Room at the university library.

6.4 users' opinion on the cleanliness and working space of the Library:
Table 6 showed that. 31.6% of the respondents report that Cleanliness and working space of the Library is very good, 42.8% of the respondents report that good, 20.6% of the respondents report that satisfactory and 5% of the respondents report that not satisfactory respectively. Hence most of the respondents are satisfied with the cleanliness and working space of the Library. In this study, five per cent of the library users are not satisfied with cleanliness and working space of the library and the university library should engage some menial worker to keep the library Clean and also provide sufficient working space of the Library in order to encourage users for spending more hours and utilizing the library.

6.5 users' opinion on Ventilation and lighting of Reading and Stack Rooms:
Table 6 showed that 43% of the respondents report that Good, 31.6% of the respondents report that satisfactory,22.2% of the respondents report that Ventilation and lighting in the Reading and Stack Rooms is very good, and 3.2% of the respondents report that not satisfactory respectively. Hence most of the users are satisfied with the ventilation and lighting in the Reading and Stack Rooms.

S.No.	Options	No.of Respondents	4
1.	Very Good	81	16.2
2.	Good	186	37.2
3.	Satisfactory	128	25.6
4.	Not Satisfactory	23	4.6
5.	No Comments	82	16.4
Total		500	100

Table 7: User Friendliness of OPAC Source: Primary data

Table 7 showed that 16.2% of the respondents report that User Friendliness of OPAC was very good, 37.2% reported it as good, 25.6% reported it as satisfactory and 4.6% reported it as not satisfactory, respectively. In this study, 16.4% of the respondents did not express any comments. Hence 79% of the users were satisfied with the User Friendliness of OPAC.

Conclusion

TQM is managing the concept of quality with the objective to meet and exceed the customer's expectation by developing leadership-driven forces for providing a product or service with built-in quality. The total quality should aim at the needs of the library users of present and future. The main requirements may include availability, delivery, reliability, maintainability and cost effectiveness, among many other features. Now-a-days the concept of quality has changed from the provider-oriented into customer oriented. Quality is the driving force of the entire activity cycle from the beginning to the end. TQM in any organization are the organizational vision, customer -focused, management by fact, total involvement and system support.

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ASTUDYONDETERMININGTHEUSERAWARENESS TOEVALUATETHEEFFECTIVENESSOFDIGITAL REFERENCESERVICESPROVIDEDBYACADEMIC LIBRARYOFENGINEERINGANDTECHNOLOGY INSTITUTIONSINTAMILNADU

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Abstract

Digital Reference Service is a very essential component of every Academic Digital Libraries. It is an advanced version of the traditional reference services that is need of the hour to meet the user's information requirements in this dynamic and changing environment. This study is to measure the effectiveness of Digital Reference Services (DRS) being provided by the Academic libraries of Engineering and Technology institutions in Tamilnadu based on user's awareness and perception. It focuses on the user awareness of DRS provided by academic libraries of various categories of Engineering and Technology institutions. The research methodology employed was a case study approach that combined two data collection methods: questionnaires, and content analysis. This paper discusses the strength and weakness of existing digital reference services being provided by the academic libraries under study, and also concludes with some specific suggestions for improvement of digital reference services in Academic Libraries under study.

Keywords: Reference services, Digital Reference Services, academic libraries

Introduction

Historically, libraries have been a part of social milieu. Most of the human activities like education and training, research and development, socio-economic growth, industry and business, trade and commerce, politics and international relations, arts and culture, government administration, need active support of libraries. Academic Libraries support learning, teaching, research and other educational functions appropriate to the parent institutions. These libraries play at different levels of educational process. Libraries are considered only as the storehouses of knowledge, have got a new outlook in the modern Information Communication Technology (ICT) era. The activities like reference services, which were carried manually in libraries with so much of pain and strain are being carried out smoothly with the help of ICT with greater effectiveness. The impact of ICT on traditional libraries evolves digital libraries, which is consisting of digital materials and services. In current trends Digital libraries are a key connector to the information resources.

Literature Review

Literature review is done based on the Indian experience on ICT in academic libraries. Salma Khan and J. Dominic (2009) analyze the patterns of internet use, the internet skills of professionals, the perceived impact of the internet on their academic efficiency and problems faced by them in using the Internet among Engineering colleges of Moradabad, Uttar Pradesh. The study reveals that the use of conventional document is decreasing and dependency on internet is increasing. It expedite the research process and also improve the professional competency.

Sampath Kumar and Biradar (2010) observe the use of information communication technology in 31 college libraries in Karnataka, India by analyzing the ICT infrastructure, status of library automation, barriers to implementation of library automation and librarians' attitudes towards the use of ICT. The survey shows that lack of budget, lack of manpower, lack of skilled staff and lack of training are the main constraints for not automating library activities.

Mohamed Haneefa and Shukoor (2010) observe the Information and Communication Technology (ICT) literacy among the library professionals of Calicut University. The study reveals that the use of digital library and institutional repository software is very low among the library professionals. Majority of the

professionals had confidence in routine ICT and Internet tasks, and need training or orientation in library automation, digital library and institutional repository software.
Dhanavandan, Esmail and Nagarajan (2011) analyse the ICT infrastructure facilities with reference to self-financing engineering college libraries in Tamil Nadu. The study traces out the status of electronic resources in terms of topology of library network, electronic access points, electronic database, e-journals, and electronic resources in the libraries. The study reveals that most of the engineering colleges in Tamil Nadu use the library application software in their libraries. The establishment of ICT infrastructure facilities in the self financing college libraries in Tamil Nadu can improve the efficiency of information support, the information retrieval and quality of education also. It is clear that technological change clearly affects library staff and there is a need to develop guidelines and policies to train the professionals in providing frontline services in academic libraries of India.
Kalra, Harinder Pal Singh. (2011) concluded that the Digital reference services constitute a rapidly growing extension of the traditional reference service offered to library users. The study highlighted real-time architecture is the latest technological supports that enable the libraries to provide reference services beyond traditional walk-ins, appointments, and telephone reference. For years, libraries have responded to questions via e-mail, however, e-mail can only answer unambiguous where step-by-step instructions are not required. It fails to work when the user and the librarian have to follow a series of steps to explain the scope and nature of the question.
M.Magamma (2013) highlighted the present status of Digital reference service in the engineering college libraries of Visakhapatnam, as well as discusses the strength and weakness of existing reference service being provided in engineering college libraries under study. The study revealed that all the ten selected engineering college libraries are providing online /digital services including Library Websites, Web-OPAC, Subject Portals, Web-Database, Collaboration with National International Network and Links to e-resources.
Archana Saxena and Dr. T. N. Dubey (2014) discussed the impact of digital technology and role of libraries in the age of knowledge and information societies. This paper also highlights the problems faced by the academic libraries in India in implementation of

digital technology.

Based on the literature in today's academic library environment the role of reference librarians is totally transformed and need to be more teaching centred rather than stereotyped service centred. Now a days in academic libraries educating and guiding students in terms of accessing information through digital communication is the primary responsibility of reference librarians. The librarians would not be able to perform their duties well if they do not have sufficient knowledge on ICT and training on appropriate and up to date methods of library instruction and practices.

Statement of the Problem

The total number of Engineering and Technology Institutions are around 573 in Tamilnadu state in the year 2015, including Anna University Constituent Engineering Colleges, Government Engineering Colleges, Government Aided Institutions, Self - financing Institutions. The 28 institutions out of 573 are autonomous and are affiliated to Anna University Chennai, Tamilnadu. And also most of the deemed universities out of 30 deemed universities in Tamilnadu are offering Engineering and Technology programmes. Every year more than 200000 students are joining undergraduate and post graduate engineering and technology programmes in these institutions in Tamilnadu. For the past few years Government of Tamilnadu is issuing free laptops for all higher secondary school students. Most of the students of engineering and technology institutions are having their own individual laptops.

According to World Internet Usage Statistics News and World Population Statistics which were updated in June 2014, there are about 3.035 billion users on the Internet. . The total number of Internet users in Tamilnadu is 20,416,458, as on 11.08.2014 (Source: Lok Sabha Unstarred Question No. 4636, dated 11.08.2014).

According to IAMAI-IMRB report, usage of social media in rural India has grown by 100 percent during the last one year with 25 million users residing in that belt. However, urban India registered a relatively lower growth of 35 percent with the total number of users at 118 million as on April 2015, says the 'Social Media in India 2014' report by the Internet and Mobile Association of India (IAMAI) and Indian Market Research Bureau (IMRB) International. There are 143 million social media users in India as on April 2015. The report stated that the top four metros continue to

account for almost half of the social media users in urban India. The report said the largest segment accessing social media consists of the college going students with 34 percent followed by young men at 27 percent. School-going children constitute 12 percent of the social media users. College-going students and young men still form the 60 percent of the social media users in urban India. The report further stated that 61 percent of these users access social media on their mobile device. The report highlights that "The fact that almost two-thirds of the users are already accessing social media through their mobile is a promising sign. With the expected increase in mobile traffic the number of users accessing social media on mobile is only bound to increase". The number for rural India stood at 25 million, up from close 12 million last year, showing a growth of 100 percent.

The ability that is necessary for the growth of research to disseminate and promote one's work and research is an important component of managing and communicating information. Digital Reference Service is an advancement of the traditional reference services that is emerging as natural solution to meet the user's information needs in the changing environment The Digital libraries and the Web have brought enormously powerful search mechanisms to the desktops or laptops of many researchers to do vast research, Magamma (2013). There is a huge requirement from the students, research scholars and faculty members to search for references such as articles, e-books, journals, magazines, etc., after the office hours of the institutions academic libraries. This study is the need of the hour to measure the effectiveness of Digital Reference Services provided by the academic libraries under study based on the feedback and perception of their users. And also this study is to find the research gap and to provide suggestions for improvement of Digital Reference Services in the Academic Libraries under study.

Scope of the Study

This study categorised various modes of Digital Reference Services such as e-mail, web-form, AskA Librarian, online or instant chat, teleconferencing and video conferencing, and collaborative digital reference, digital robots, remote login over 24/7, social media into five categories namely E-mail based Reference Services, Real-time reference services, Web-based reference services, Collaborative reference services, and Social network based reference services. The scope of

this study is to describe Digital reference service with its new features and various forms like VoIP Service, Collaborative reference service, and Social network based services. The study will include the comparison of digital reference service is being provided by Academic Libraries of Engineering and Technology Institutions in Tamilnadu. In this study, institutions under study are classified into four categories namely Universities, Deemed to be universities, Autonomous affiliated institutions, and non-autonomous affiliated institutions. The questionnaire set 1000 copies are sent to users of academic libraries of all engineering and technology institutions in Tamilnadu. This study is based on the sample that is based on responses received from users, since till the responses are being received from users.

Objectives of the Study

The main objective of this study is to explore and to measure the effectiveness of Digital Reference Services in the Academic libraries of Engineering and Technology institutions in Tamilnadu based on users perception. The objectives of the study can be summarized as follows:

a) To identify the status of user awareness about digital reference services being provided by academic libraries of engineering and technology institutions under study.

b To determine how demographic variables are related to awareness, usage, and the perceived needs of digital reference services. Demographic variables in this context refer to category of institution, gender, age, user education level, stay.

c) Comparative analysis of Digital reference service being provided by the academic libraries of various categories of institutions under study

d) To recommend solutions pertaining to digital reference services in academic libraries.

Methodology

Case study is a valuable method of research, with distinctive characteristics that make it ideal for many types of investigations. Eisenhardt (1999) noted that case studies typically combine data collection methods such as questionnaires, interviews, observation, and archives. The case study is a specific field or qualitative research method and thus is an investigation "of phenomena as they occur without any significant intervention of the investigators". In this study questionnaire method is used. Questionnaire is designed

according to the information required for this study and data analysis. Around 1500 questionnaire are distributed to selected engineering and technology institutions in Tamilnadu, In this study, engineering and technology institutions in Tamilnadu are categorized in to four categories and about 1500 questionnaire were distributed to each categories of institution as follows - Universities (300) / Deemed to be University (300) / Autonomous Affiliated Institutions (300) / Non-autonomous Affiliated Institutions (600). The reason for more number of questionnaire were distributed to Non-autonomous affiliated institutions is the number of institutions in this category is high that is 545, where as other categories only around 30.

The relevant and required data are collected by fixing an evaluation criterion such as availability of Dedicated web-site for library, Online Public Access Catalogue, E-mail, Chat, Video Conferencing, Instant Messaging, DSpace Repository, Remote login, Social networking, collaborating networking etc., from the users of libraries under study. The data thus obtained were categorized, analyzed, tabulated and interpreted for comparing digital reference services provided by selected academic libraries. Modes of digital reference service and Online Service criteria are selected for systematic evaluation of digital reference service in the libraries included in the study. The purposive sampling method is used in this for data collection. Sekaran (2000) stressed that purposive sampling is confined to specific types of people who can provide the desired information either because they are the only ones who possess it or they conform to some criteria set by the researcher. According to Sekaran's (2000) statement, it is justified that the purposive sampling approach is suitable for this study. The users in this context include teaching staff, research scholars, undergraduate and postgraduate students of the departments of Computer Science & Engineering and Information Technology in the institutions under study were chosen. The departments also have a similar structure in terms of staffing and resources, as well as physical facilities as per the general guidelines of regulatory bodies like All India Council for Technical Education (AICTE) and University Grants Commission (UGC). The data collected were analyzed using SPSS version 22.0 for Windows.

Data Analysis and Findings

The data collected from the users' of academic libraries of approximately 600 engineering and technology institutions (including deemed universities and colleges) in Tamilnadu has been prepared in the form of Tables and analysed using statistical software. The comparative analysis on Digital Reference Services provided by the institutions under study is made on the basis of various categories of institutions. Following tables and graphs shows the comparison between academic libraries of different categories of institutions under study according to the online services and various modes of digital reference services.

Demographic Data of Users

The summary of the Demographic Data of users as follows; Demographic variables are category of institution, user education level, users' gender, users' age, and stay. Users include teaching staff, research scholars, post-graduate students and under-graduate students. Engineering and Technology institutions in Tamilnadu are categorized into four namely Universities, Deemed to be universities, autonomous affiliated institutions, non-autonomous

Institutions	Questionnaire Distributed (QD)	No. of responses received (RR)
University	300	113
Deemed to be university	300	187
Autonomous and affiliated Institutions	300	141
Non-autonomous and affiliated institutions	600	307
	1500	748

Table 1 : Number of Responses for Questionnaire - Institution wise

	Total	Teaching staff, Scholars	PG Students	UG Students	Male	Female
Institutions	RR*	RR*	RR*	RR*	RR*	RR*
University	113	15	29	69	46	67
Deemed to be university	187	21	55	111	106	81
Autonomous and affiliated Institutions	141	12	32	97	65	76
Non-autonomous and affiliated institutions	307	39	69	199	134	173
	748	87	185	476	351	397

Table 2: Number of Responses for Questionnaire - User level and Gender wise
*RR - Number of Responses Received

affiliated institutions.
Table 2 shows the details of number of respondents that is user level wise and gender wise. In user level, 87(11.63%) were teaching staff and research scholars, 185(24.73%) were post-graduate students, 476(63.64%) the majority were under-graduate students. The number of female respondents 397(53.07%) are more than the number of male respondents 351(46.93%).

	Total	Age < 21	21 - 24	Age > 24	Hostel	Outside the campus
Institutions	RR*	RR*	RR*	RR*	RR*	RR*
University	113	66	31	16	61	52
Deemed to be university	187	101	57	29	82	105
Autonomous and affiliated Institutions	141	89	30	22	53	88
Non-autonomous and affiliated institutions	307	188	72	47	92	215
	748	444	190	114	288	460

Table 3 : Number of Responses for Questionnaire - Users' Age and Stay wise
*RR - Number of responses received

Table 3 shows that most of the respondents that is 444 (59.36%) were age below 21 years, followed by 190 (25.4%) were 21 to 24 years, followed by 114 (15.24%) were more than 24 years. And also it shows that most of the students 460 (61.5%) were staying off-campus and 288 (38.5%) were staying on-campus.

Awareness of DRS

Respondents were asked whether they were aware of their academic library offering DRS. As can be seen in Table 4, totally 339 (45.32%) respondents were aware of their institution academic library offering DRS out of 748 users responded.
The analyses of cross tabulations and Chi-square tests were performed to identify the (a) significance of the awareness of DRS and Users from different categories of Institutions, (b) significance of the awareness of DRS and Users Education Levels, (c) significance of the awareness of DRS and Gender of User, (d) significance of the awareness of DRS and Users' Age, and (e) significance of awareness of DRS and Users' stay. The summary of results and findings from Chi-square tests of demographic variables are shown in Tables 4 - 8.

Users in Universities are well aware of DRS that is 92(81.42%) users are aware of DRS and 21(18.58%) of users are unaware of the DRS, whereas in Deemed to be universities and autonomous affiliated institutions user awareness of DRS are 55.08% and 57.45% respectively. In case of Non-autonomous affiliated institutions, very few that is 20.52% of users are aware of DRS provided by their institutions' academic library. The reason is most of the Non-autonomous affiliated Engineering and Technology

Type of Institution Vs Awareness					
Type of Institution	YES* - Frequency	YES - %	NO* - Frequency	NO - %	***Row Totals***
Universities	92 (51.21) [32.48]	81.42	21 (61.79) [26.92]	18.58	113
Deemed to be universities	103 (84.75) [3.93]	55.08	84 (102.25) [3.26]	44.92	187
Autonomous affiliated institutions	81 (63.90) [4.57]	57.45	60 (77.10) [3.79]	42.55	141
Non-autonomous affiliated institutions	63 (139.14) [41.66]	20.52	244 (167.86) [34.53]	79.48	307
Column Totals	339	45.32	409	54.68	**748 (Grand Total)**
The chi-square statistic is 151.1551. The P-Value is < 0.00001. The result is significant at p < 0.05.					
*Observed cell totals, (the expected cell totals) and [the chi-square statistic for each cell].					

Table 4: Type of Institutions Vs Awareness

institutions in Tamilnadu are not providing DRS (K.Chandraprabha, 2015).

The Chi-square value is calculated on the data collected from the questionnaire about the awareness of Digital Reference Services provided by the academic libraries using SPSS 22.0 software. The Chi-square value is 151.155, Probability value is less than 0.00001. Hence the Type of Institution and the Awareness of DRS is significant at $p < 0.05$.

Users' level Vs Awareness					
	YES* - Frequency	YES - %	NO* - Frequency	NO - %	***Row Totals***
Teaching staff and Research Scholar	73 (39.43) [28.58]	83.91	14 (47.57) [23.69]	16.09	87
Post-graduate students	124 (83.84) [19.23]	67.03	61 (101.16) [15.94]	32.97	185

Under-graduate students	142 (215.73) [25.20]	29.83	334 (260.27) [20.88]	70.17	476
Column Totals	339	45.32	409	54.68	**748 (Grand Total)**
The chi-square statistic is 133.5295. The P-Value is < 0.00001. The result is significant at p < 0.05.					
*Observed cell totals, (the expected cell totals) and [the chi-square statistic for each cell].					

Table 5: Users' level Vs Awareness

Table 5 shows the significant relationship between the Users' education level and the awareness. It is found that in the above three categories of users' education level, Teaching staff and Research Scholar category is well aware of DRS that is 83.91%, when comparing with other categories post-graduate students and under-graduate students the awareness percent is 67.03%, 29.83% respectively.

Gender Vs Awareness					
	*Yes - Frequency	Yes - %	No - Frequency	No - %	***Row Totals***
Male	158 (159.08) [0.01]	45.01	193 (191.92) [0.01]	54.99	351
Female	181 (179.92) [0.01]	45.59	216 (217.08) [0.01]	54.41	397
Column Totals	339	45.32	409	54.68	**748 (Grand Total)**
The chi-square statistic is 0.0251. The P-Value is 0.874147. The result is *not* significant at p < 0.05.					
*Observed cell totals, (the expected cell totals) and [the chi-square statistic for each cell].					

Table 6: Users' Gender Vs Awareness of DRS

Table 6 shows that there is no significant relationship between users' gender and awareness of DRS. The Chi-square test result shows p-value 0.874 which is greater than 0.05.

Users' Age Vs Awareness					
	*Yes - Frequency	Yes - %	*No – Frequency	No - %	***Row Totals***
Less than 21 years	125 (201.22) [28.87]	28.15	319 (242.78) [23.93]	71.85	444
21 to 24 years	117 (86.11) [11.08]	61.58	73 (103.89) [9.18]	38.42	190
More than 24 years	97 (51.67) [39.78]	85.09	17 (62.33) [32.97]	14.91	114
Column Totals	339	45.32	409	54.68	**748 (Grand Total)**
The chi-square statistic is 145.8219. The P-Value is < 0.00001. The result is significant at p < 0.05.					
*Observed cell totals, (the expected cell totals) and [the chi-square statistic for each cell].					

Table 7: Users' Age Vs Awareness of DRS

Table 7 shows the relationship between users' age and awareness of DRS. The chi-square statistic value is 145.82 and the p-value is less than 0.00001. Thus there is significant relationship between users' age and awareness of DRS at $p < 0.05$. It is found that in table 7, users with more than 24 years old are well aware of DRS that is 85.09%, where as in the other two categories that is less than 21 years and 21 to 24 years the percentage of awareness is 28.15% and 61.58% respectively. The reason is most of the teaching staff and research scholars are older than 24 years.

Stay Vs Awareness					
	*Yes - Frequency	Yes - %	*No - Frequency	No - %	***Row Totals***
In-campus	192 (130.52) [28.95]	66.67	96 (157.48) [24.00]	33.33	288
Off-campus	147 (208.48) [18.13]	31.96	313 (251.52) [15.03]	68.04	460
Column Totals	339	45.32	409	54.68	**748 (Grand Total)**
The chi-square statistic is 86.1077. The P-Value is < 0.00001. The result is significant at p < 0.05.					
*Observed cell totals, (the expected cell totals) and [the chi-square statistic for each cell].					

Table 8: Users' Stay Vs Awareness of DRS

Table 8 shows cross tabulation of users' stay and awareness of DRS. Users staying in campus are well aware of DRS when comparing with the off-campus days-scholars. There is a need for providing and educating users to access and avail the digital reference services in the academic libraries of the institutions under study.

Conclusion and Suggestions

The results indicated that there is significant relationship between awareness of DRS and institutions type, users' education level, users' age, stay. The results also show that there is no significant relationship between awareness of DRS and gender. Only Institutions type, Users' education level, Users' age and Users' stay were found to be significant in determining the awareness of DRS. The finding of this study are (i) The awareness of DRS among users of non-autonomous affiliated institutions is very low, (ii) Users under 21 years old are not well aware of DRS, (iii) users staying off-campus are also not well aware of DRS in numbers. It is found that most of the engineering and technology colleges are not providing dedicated website for

libraries, remote login to users. The suggestion for improvement is, it would be efficient DRS if the academic libraries of all engineering and technology colleges provide dedicated website and remote login to every members. There is a good expectation from the users to avail the digital reference services from their academic libraries beyond the office hours through the use of remote login facility to access the digital library to avail the digital services. Anna University is proving affiliation to all the engineering and technology colleges in Tamilnadu. Anna University can insist all its affiliated institutions to provide digital reference services through dedicated website for their libraries and remote login facilities.

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ACCESSINGKNOWLEDGETHROUGHTHEATTRIBUTES ANDPOPULARITYOFSEARCHENGINES

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Abstract

This paper present a review of recent litereature related to Web search and search engine and nature of search. The major factors that influence user evaluation, quality of search results are discussed. The usefulness of search engines for accessing knowledge is outlined by contrasting search engines against meta-search engines with evaluation and comparative study of the effect of web searching on online public access catalogue (OPAC) users. A technique for assessing search results retrieved from different sources is described. It is also demonstrated how personalization helps in finding the right information in the shortest time with the least effort. Intensive training for students and faculty members in order for them to acquire the essential search strategies for effective information retrieval was made is recommended so that Indian academics can use these searching strategies for retrieving information. The impact of search engines can be enhanced by for designing a user friendly OPAC that entails simplistic search strategies for university libraries of India and other developing countries were made. Recommendation is made as to which aspects to be considered when evaluating web search engines' accessibility for people with disabilities. Need for intensive training for students and faculty members in order for them to acquire the essential search strategies for effective information retrieval by search engines by the Indian academics can be made.

Keywords: Search Engines, Accessing, Knowledge, Usefulness, Impact.

Introduction

The facts related to Web search and search engine have also showed new perspectives on Web searching research from different perspectives and these need to be integrated into a more cohesive perspective. There have been various aspects of search engines, but emphasis on emerging areas of Web searching and search engine evaluation going beyond traditional methods and is part of this study (Lewandowski, 2012). Rall (2012) reviewed the concept of truth claim. Stating the framework for four research traditions namely science, social science, law, and judgments of excellence. "Truth claim" as connected to traditional research methods was initially presented by Rall himself before in 2002 and 2004. The operational mechanisms of networks and sufficient definitions for how truth claims are built in four established research traditions. There has been idea of most Internet scholars neglecting the philosophy of research methodologies. This was the reason for Rall to review the "truth claim' concept. The literature shows the focus on r research work on information seekers as well as on the politics of search engines and the computational problems in search engine results. There has been following aspects to consider the nature of search:

I. Aesthetic theory of indexing,
ii. Study perceives search from the psychology of learning, and
iii. Examination of the relationship between performance and recent economic models of how data accumulates in today's world.

The previous studies help library and information science (LIS) scholars to reframe Web search that permit linkages to the established research traditions. The insights into the development and use of alternative search engine interfaces their search outcomes in terms of retrieving high-quality, credible information supports the progress (Kammerer and Gerjets, (2012). The effects of alternative Search Engine Result Pages or popularly called SERP- layouts on searchers' information quality or credibility assessments of search results has been of great help to researchers, search engine developers, educators, and students. The alternative search engine interfaces might affect Web users' search and evaluation strategies in Web searching. Markus and Christain (2012) defined social search, different from other interpretations of the social search concept, by unifying some existing definitions with view to ambiguity and vagueness of the term social search. Classification of the

heterogeneous landscape of social search implementations on the WWW leads towards extensive literature review to unify and enhance existing ideas and concepts was performed. The existing social search engines by their specific features and social aspects present the illustration of social search the discussion of social search as well as a comparison of existing social search engines. The in-depth information provides many ways people can search the web together. There has always been a need to make an assessment of future developments in this area. The evaluation of search engines by developing a conceptual model has presented a path to follow (Palanisamy, 2013). This effort pursues and presents following facets:

I. The attributes that determine a good search engine and why users repeatedly visit their favorite search engines.
ii. The reasons why users change search engines.
iii. Identification of key factors that influence user evaluation of search engines, effective and efficient criteria for evaluation by considering user satisfaction and usage as the search engine success variables.

The research issues, evolved out of the conceptual model play a great role to identify the implications that are useful for searchers and search engine providers are given. The factors which matter for search engine popularity are given as following:

I. Key design issues to access through search engine.
ii. Attributes including aesthetics

These aspects determine and shape the popularity of a good search engine. The users repeatedly visit their favorite search engines due to certain features. The reasons as users change search engines also exist. These key factors that influence user evaluation of search engines must meet effective and efficient criteria by:

I. Considering user satisfaction and usage as the search engine success variables.
ii. Indexing as well as perceiving search from the psychology of learning.
iii. Examination of the relationship between performance and recent economic models of how data accumulates in today's world.

Suggestions by researchers are that LIS scholars must cater to reframe Web search that permit linkages to the established research traditions. The developers also have to play their role by design alternative search engine interfaces as these alternative search

engine interfaces might affect Web users' search and evaluation strategies in Web searching. Definition of social search and the comparison of social search engines summarize the many ways people can search the web together.

Usefulness of Search Engines for Accessing Knowledge

The usefulness of search engines for accessing knowledge can be enhanced by including the modern features of present search engines to improve practices of OPACs. Shiv (2011) identified the comparison of the effect of web searching on online public access catalogue (OPAC) users in the libraries of the three universities in the Union Territory of Chandigarh and Punjab state in India was carried out. Unawareness of users regarding the difference between internal–search methodology of OPAC and common search engines such as Google was observed**.** This effort makes following recommendations:

I. University libraries should share user expectations with OPAC designers and Library community.
ii. Collaboration with OPAC designers must be put in place so as to develop a user-friendly OPAC system.

The expectations of library users while searching OPAC are high. As well as, ready access to information through search engines became considerably straightforward. Also, like popular search engines, that majority of searches were performed on OPAC therefore Web searching influenced their OPAC searching process greatly. The Comparison of search engines against meta-search engines was made. This effort which used the physics field as information retrieval domain demonstrated that measured the overlapping degree of retrieved information from search engines against meta-search engines. Six search engines and six public meta-search engines from the "searchenginewatch.com" website were used for the experiment (Esmaeil and Kiaie, 2011). The following measurements were used:

I. Averages, percentages and other statistical measures such as, frequency distribution
ii. MS Excel for drawing tables and graphs.

The major findings are as follows:

I. "Yahoo" retrieved 40% whereas "CurryGuide" retrieved maximum 77.1%, of physics documents in search engine category.
ii. The maximum overlapping degree with various other search engines i.e. 39% was found with "AOL" search engine had search engines.

The geographic information community often discusses about the use of digital libraries of search engines for the discovery of geographic information resources (**Fransico...[et.al.] 2011).** This research measured and compared the performance of major search engines in the discovery of geographic web services. The performances of Bing previously known as Microsoft Live Search, Google and Yahoo! in searching standardized XML documents that describe, identify and locate geographic web services were compared. Automated evaluation of three search engines using their API (application programming interfaces)-library functions. The queries submitted for XML documents contained geographic web services, and documents containing links to those documents. Relevant XML documents linked from the documents found in the search results were also included in the evaluation results. The results suggested the following specifics:

I. Search engines are a feasible alternative for searching geographic web services.
ii. Resource- oriented search should combine simple queries with the exploration of the pages linked from the search results of the search engines.

In addition, the findings show that:

I. The discovery of geographic web services in search engines does not require the use of advanced search operators. Research also disclosed that some technical advances in search engines could harm resource-orientation.
ii. No significant difference was observed in the precision for Google and three NL search engines whilst retrieving the exact answer documents for NL queries.
iii. The performance of natural language (NL) search engines in retrieving exact answers to the natural language (NL) queries differs from that of keyword searching search engines.

In terms of the precision of exact answer and relevant documents showed that Ask.com retrieved exact answer document descriptions at the top of the results list in 60 percent of searches better than the other search engines. The mean value of the number of exact answer top list documents for three NL search engines (20.67) was a little less than Google's (21) (Hariri, 2013). The research was carried out to determine the implications of gender in awareness and use of search engines by private south Nigerian university lecturers. Anyira (2013) investigated

the gender in awareness and use of search engines. This investigation was related to the university library usage by Lecturers in private universities. The T-test results indicated following observations:

(I) The awareness-level of search-engines between male and female lecturers' 3.69 is significantly different with t (df.73) =at 0.001.

(ii) Utilization-extent of Google search engine 4.80 is also significantly different with t (df.73) at .0000.

(iii) Utilization-extent of Yahoo search engine is 1.16 and this did not indicate a significant difference between male and female lecturers with t (df: 73) at 0.0500.

The recommendations made on the basis of the above observations that university libraries should put up an ICT policy document that promotes gender impartiality in the delivery of library and information services to users. The studies focus on the finding the factors:

I. Contrasting differences between search engines against meta-search engines were observed which effect overlapping degree of retrieved information from search engines against meta-search engines.

ii. Answers to the natural language (NL) queries differ from that resource of keyword searching search engines.

The research effort helped in outlining the steps needed for increasing the usefulness of search engines for accessing knowledge:

I. An ICT policy document is a must for university libraries.

ii. Gender impartiality must be a key clause in the ICT policy document that promotes in the delivery of library and information services to users.

iii. University libraries should share user expectations with OPAC designers and Library community.

iv. Use of digital libraries of search engines for the discovery of geographic information resources.

Another only drawback visible was that certain technical advances in search engines could influence

Most Popular Search Engines for Scholarly Communication

Two new automatic methods for the performance evaluation of Ask.com, Bing and Google search engines were used. , This performance evaluation can help users to select a truly effective search engine. The results of the evaluation are of great assistance to vendors of web search engines for improving their technology. Experimentally the search engines performance is assessed based on the

2002 TREC web track's 50 topics. To compute the similarity degree between the lists two measures called the “tendency degree” and “coverage degree” is introduced. The “tendency degree” assessed a search engine in terms of results presentation and the “coverage degree” evaluated it in terms of retrieval effectiveness (Sadeghi, 2011). Investigation's findings show that Google outperformed the others, followed by Bing and Ask.com. In addition, significant degrees of consistency about 92.87 percent for automatic approach and 91.93 percent for human-based approaches were found For verification of searching and for developing an evaluation criteria system for search engines using the Delphi method, Chinese search engines were taken up (Zhu, Du, Meng and Sun (2011). The evaluation criteria system also helped in establishing the analytic hierarchy process. Systematically comparison the major search engines was done by Major web search engines are tested on their performance on navigational queries, i.e. Searches for homepages. The comparisons are performed on navigational queries. Six search engines namely, Google, Yahoo!, MSN, Ask, Seekport, and Exalead were submitted with 100 user queries. Users described the desired pages, and the results position of these was recorded (Lewandowski, 2011). The performance of the major search engines Google, Yahoo!, and MSN was found to be the best and around 90 per cent of queries were answered correctly. But the Ask and Exalead were worst performers but received good scores as well. And the findings suggested the following:

(I) Care should be taken on the performance on navigational queries while designing a search engine so that designed search engine may compete with the major search engines.

(ii) Users can be influenced easily in their quality ratings of search engines based on this performance.

The results are limited by the fact that only German-language interfaces of all the search engines were used and all the queries were in German. Therefore, the results are only valid for German queries. The search engine performance and characteristics of different search engines were compared. This comparison was done on parameters such as, *quality, accuracy, appearance and significance of the search results* that are produced upon searching. Many a information retrieval systems (IRS) were evaluated. Librarians' behavior in the application of search engines is

analyzed. The detailed view on international and Greek search engines as an information retrieval tool and their utilization is presented (Garoufallou, 2012). The factors that results gratified the librarians were identified as:

(I) Search results' significance i.e. Precision and hence the quality and value of result

(ii) Presentation and the visualization, Librarians favored using international search engines rather than Greek ones. A pioneering analysis of search engine queries used to locate the ETDs collection with the purpose to find out the search engine queries and variation in different locations. To answer these questions, search engine queries used to locate the AUETDs collection were obtained from Google Analytics and were separated into groups based on user location. Implications indicated following trends:

I. Most local users' queries contained person names, variation for thesis or dissertation, and variants.

ii. The definiteness of their queries indicates that full-text indexing will be more helpful to users than metadata indexing alone.

iii. Queries from users located within the state but outside of the local area were intermediate between these groups. Nearly all out-of-state users' queries contained title and subject keywords and appeared to be seeking specific research studies.

iv. Repository content must be indexed by search engines such as Google as this is an important factor to be considered while designing. (Coates, 2014)

The researchers have concluded users can be influenced easily in their quality ratings of search engines based on this performance. The popularity-comparison of the search engines for scholarly communication can be performed by new automatic methods performance evaluation methods. Specifically web-based Delphi method was quite responsive in popularity-comparison Implications of these performance comparison shows:

(a) Out of available popular search engines Ask.com, Bing and Google gave the best performance. The results of the researches showed that Google outperformed the others, followed by Bing and Ask.com. Performance of the major search engines Google, Yahoo!, and MSN was found to be the best and around 90 per cent of queries were answered correctly.

(b) The parameters “tendency degree” assessed a search engine in terms of results presentation and the “coverage degree” evaluated it in terms of retrieval effectiveness.
© Care should be taken on the performance on navigational queries while designing a search engine so that designed search engine may compete with the major search engines.
The effort of studies suggests that most local users' queries contained person names, variation for thesis or dissertation, and variants for Auburn University. Nearly all out-of-state users' queries contained title and subject keywords and appeared to be seeking specific research studies.

Effective Searching Methods And Technology Make Search Engines As Effective Information

Retrieval Tool

By drawing upon the patterns of web search behavior effective searching methods can be formulated. The use of social search taxonomy and a user-centered social search method was tested by MacDonnell and Shiri (2011). There is the value and power of “collective intelligence” in web search. Analysis of the notion of social search and proposed taxonomy of social search by using socially enhanced web-based tools such as, social bookmarking systems, social tagging services and social media sites improved general web searches. A dual set phase methodology was used for comparing and evaluating search results from different sources was formulated. Ian and Levene (2011) developed this methodology. Analysis of important similarities and differences disclosed several disparities in social search approaches. A practical method was proposed that allows users to directly leverage social search without special features built into search engines. Results showed that local Google interface, was preferred by a group of users i. e. Google succeeded in the country specific customization of search results.. Live search was much less successful in this aspect. Recommendations are for preferring country specific customization design of search engines, digital libraries and the browser add-ons. The research on general search engines such as Google and Yahoo!, was first of its kind, in dynamic online information environments, provided useful insights for search engine designers by examining the indexing quality and ranking of XML (Dublin Core and MARC 21 metadata elements) based content objects. Results showed that the XML-based Dublin Core Metadata

Initiative and MARC 21 both do not demonstrate any preference regarding access. Google made full retrieval of all the content objects via its Dublin Core and MARC 21 metadata elements and surprisingly. Yahoo! search engine did not respond at all. All Dublin Core and MARC 21 metadata elements were indexed by Google search engine Farajpahlou and Tabatabai (2011) Li, Wang and Yu (2012) presented search engine evaluation models that can be personalized. This personalization is achieved by enabling a particular Web searcher choose an appropriate search engine for his/her informational requirements and hence finding the right information in the shortest time with the least effort. This customizable evaluation model for comparing search engines was designed as a hierarchy of weighted parameters thus enabling customization by simply changing the weights and modifying the features considered. This customization is not possible in other evaluation models. As the other models are user oriented and focus on relevance issues. Identifiable statistical patterns are found in performance measures of search engines. Search engine features and performance measures were given quantitative and qualitative ratings by an individual user. The results show:

I. The precision and recall are the fundamental measures used in many search engine evaluations due to their simplicity, evenhandedness and reliability.
ii. Histograms based on three metrics enable user to perceive the characteristics of a search engine quickly using the quantitative measure of histogram patterns that represent the search performance metrics introduced.

Further refinement of specific parameters used in the evaluation model can be done. A larger scale search engine evaluation is required to confirm the validity and usefulness of the model. The three performance measures presented give a reasonably informative overview of the characteristics of a search engine. Other performance parameters and their resulting statistical patterns would make the methodology more valuable to the users. For the purpose of using search engines, a detailed observation was made on the usage of various search engines. This was done for Meta search engines by Indian academics for retrieving information on the web as well . The observation also looked into the learning mechanisms of various search strategies by Indian academics (Sampath and G. T., 2013). The results

show:

I. Google usage was 91.93 percent and Yahoo usage came 43.85 percent while Dogpile and Ixquick came 35.78 percent each.
ii. 65.26 percent of respondents used the search strategy for retrieving information. A significant relationship was inferred between the respondent's profession and use of search engines (p=0.018) as well use search strategies o search engine (p=0.028).
iii. Method of learning the search strategies of search engines is also associated with the respondent's profession (p=0.008).

These implications are clearly for information literacy instruction in the context of search engines. Need for intensive training for students and faculty members in order for them to acquire the essential search strategies for effective information retrieval was felt. The findings can assist to concerned authorities to enhance the effective and efficient use of search engines by the Indian academics.
Factors affecting the analyzing patterns of web search behavior.
There several effective searching methods and technology that make search engines useful as effective information retrieval tool .There are patterns of web search behavior. The value and power of “collective intelligence” in web searching.
Analysis of the notion of social search and proposed taxonomy of social search by using socially enhanced web-based tools such as social bookmarking systems, Social tagging services and media sites improved general web searchers. There are group of users who prefer specific customization of search results. Live Search was much less successful in this aspect. The XML-based Dublin Core Metadata Initiative and MARC 21 both do not demonstrate any preference regarding access. Google made full retrieval of all the content objects via its Dublin Core and MARC 21 metadata elements and surprisingly. Yahoo! search engine did not respond at all. The fundamental measures used in many search engine evaluations are precision and recall due to their simplicity, evenhandedness and reliability.

Impact of Search Engines For Knowledge Accessing

The influence of user's demographic characteristics on the impact of web searching is noticeable. This impact is seen with regard to OPAC in the context of an Indian university setting **(**Shiv 2012). There are certain characteristics which definitively impact the web searching in some limited activities.
Following significant relationships

were observed:

(1) Relationship between male and female users regarding their perception of unsuccessful searches.
(2) There were **s**ignificant differences between OPAC usage patterns and demographic characteristics of user categories and age groups.
(3) Significant variations were noticed in awareness among user age groups about the differences between web search engines.

In addition, certain variations were also observed among academic majors with regard to perceptions of users after failed searches. Impact assessment of web searching on OPAC users of the Punjabi university library Punjab Patiyala (India) was carried out. Shiv Kumar, (2012) made following conclusions :

(1) Search engines not only affected OPAC users in developed countries but also less developed countries like India.
(2) OPAC and web search engines compete for survival and sustainability.
(3) The information searching behavior of academicians was changing significantly in the web environment.
(4) A large number of users explored the web to garner relevant information for academic purposes.

The majority of researchers were influenced by search engines because they also used O PAC. Recommendations for designing a user friendly OPAC that entails simplistic search strategies for university libraries of India and other developing countries were made. Relation of 'Rank-correlation' to the documentation on search engine evaluation was performed by Melucci (2012). This presentation is done in a practical way for the researcher's active in the different domains of search engines. A model for the application of rank correlation within scientific experimentation or item/service recommendation has inferred that Rank correlation analyses impact on the success or failure of a search engine in performing the tasks for which it has been designed and hence on the people's daily life activities. Rank correlation analyses has impact on the success or failure of a search engine in performing the tasks for which it has been designed and hence on the people's daily life activities. There are significant differences observed between OPAC usage patterns and demographic characteristics of user categories and age groups.

Recommendations for Improvement In Search Engines

Several improvements are suggested in the search engines. Real barriers of web search engines and criteria of satisfaction for people with disabilities do not exist as of yet. Insights are provided into the principles of disability studies and the idea of inclusion is described. The W3C Web Accessibility Initiative's (WAI) evaluation model is helpful in evaluating accessibility features of search engines. Kerkmann, and Lewandowski (2012) suggested WAI Methodology for accessibility review of search engines in a comprehensive manner. The WAI methodology consists of three-steps:

I. Preliminary review to quickly identify potential accessibility problems;
ii. Conformance evaluation to determine whether a website meets established accessibility standards;
iii. User testing to include real people with disabilities in a practical use.

There are various aspects to be considered when evaluating web search engines' accessibility for people with disabilities. A theoretical framework outline for a comprehensive accessibility review of web search engines does also have practical implications for web search engine developers to improve accessibility of their product. Various measurements of several accessibility aspects and as well impertinence of accessibility of web search engines for people with disabilities and for the elderly or temporarily handicapped people are mentioned. The paper is of great help for the researches, search engine developers and educators in practice, with reference to the aspects of disability studies. Research is limited as it describes a theoretical concept and also that the model is not tested so far. A variety of diversification approaches are available. Web provides a rich source of a variety of information mainly in unstructured textual form. New challenges to make the user aware of the diversification of content i.e. variety of content available. It is also hard to satisfy users best with such manifold content (Denecke, 2012). Diversification issue from two angles:

I. Diversity is introduced with its notions and dimensions. This diversity is a SERPs/ result set's coverage of multiple interpretations of a query. and
ii. The organization and classification of content within diversification become increasingly important.

Objective of the web search is diversity. As the diversification of content increases ranking, methods to assess diversity within web search are presented. Approaches for diversification are extremely

important. Web search tries to address this problem from different perspectives. For the future, following recommendations are made:

I. Combination of text search with image search result is important in achieving diversification.
ii. Benchmarks and standard data sets for evaluations need to be established to ensure comparability of results from various approaches.

The general computer searching behaviors demonstrated that digital natives are different from older age groups (Zimerman, 2012). Digital natives were different in Bing. More emphasis needs to be placed on the digital natives' search habits to find out how best to serve. More emphasis needs to be placed on the digital natives' search habits to find out how best to serve this population and that it will be a great disservice to digital natives. Research efforts on the computer searching behaviors suggested about disservice to digital natives unless they are taught how to search academic databases. Several ways are provided to reach out to the users by exploiting present day mighty web search engines. Vinit (2012) identified problems related to unfriendliness of library OPACs and the reasons behind these problems. The author recommended:

I. Use of sitemaps to expose the bibliographic records to search engines.
ii. Creation, upload, and submission of sitemaps options to search engines.

It is also established that Web OPACs architecture does not help search engine robots or crawlers to index the huge library data. Therefore by exploiting some of the best practices of information architects and webmasters, libraries can also open their huge data to the search engines. This will greatly help in getting listed in the top results by getting more visibility. Adoption of empirical approach was made for the examination of characteristics of relevant libraries' website. This approach helped in two ways:

I. Determining the visibility performance of search engine result pages (SERPs).
ii. Proved the advantage of using search engine optimization (SEO) phenomenon asfor improving libraries' digital content search-ability on the web.

Libraries' application of SEO is very important factor for scholarly academic research. In addition, several website characteristics are identified that can be optimized for higher SERP rankings. There is an impact of following factors on higher SERP rankings

I. External links
ii. The number of indexed web pages by search engines on
iii. Application of web analytical tools, such as Alexa.com

The concepts from the Integrated IS&R Research Framework are applied to analyze SEO as an element within the Framework. The findings confirmed the following:

I. Effect of certain characteristics of websites on ranking of libraries' websites) by search engines.
ii. Reputation of a library's website and the number of its search engine indexed web pages also increased its ranking on SERPs

These findings can help in the search-ability of libraries' digital content. Herbert and Mellius (2013) recommended designing content oriented website with high quality, well-written content. These three biggest search engines interpret keyword stuffing has been considered as a negative design element. Although keyword stuffing is likely to lead to search engine rankings increase, it could deter human visitors and reduce website value. Spam-dexing, characterized by different keyword density measurements in the body text of a webpage play a role too. Upon monitoring of three major search engines, namely Google, Bing and Yahoo!, the claims of high keyword densities leading to blacklisting by search engines have been disproved (Taheri, Hariri and Fattahi (2014). The research has helped and some patterns are identified to the metadata creators and the end users for better indexing and retrieval. With the help of data island method for creating the metadata records, it is suggested that metadata records based on DCXML, MARCXML, and MODS are effective for better indexing and increased visibility of the metadata element tag names. Following implications are derived:

I. All the tag names of the metadata records created based on the data island method relating to the experimental group indexed by Google and Bing were visible in the search results. But the tag names in the control group's metadata records were not indexed by the search engines.
ii. It is possible to index and retrieve the metadata records by their tag name in the search engines. Whereas, the records of the control group are accessible by the element values only.

For increasing search engine visibility of websites / portals the website must be content oriented with high quality well-written content. The WAI

methodology includes real people with disabilities, helps in describing the aspects to be considered when evaluating web search engines' accessibility. To be successfully qualified the WAI testing, two aspects are very important:

I. The organization and classification of the website content,
ii. Diversification of the content,

Approaches for diversification are extremely important. Several website characteristics were identified that can be optimized for higher SERP rankings:

I. The search-ability of digital content of library's website
ii. Reputation of a library's website.
iii. The number of library's website search engine indexed web pages.
iv. The tag names of the metadata records created based on the data island method.

Conclusion

The conclusions derived from the review on knowledge-access through search engines are overwhelming. Many factors are responsible users repeatedly visit their favorite search engines and also there are reasons why users change search engines. Aesthetic theory of indexing must be considered as the attributes including aesthetics that determine a good search engine. Due importance to the satisfaction and usage must be given. As the satisfaction and usage variables determine search engine success. The alternative search engine interfaces might affect Web users' search and evaluation strategies in Web searching. Users can be influenced easily in their quality ratings of search engines based on this performance. The definiteness of full-text indexing will be more helpful to users than metadata indexing alone. Socially enhanced web-based tools such as social bookmarking systems, social tagging services and social media sites must be used while designing as consideration to this result in improved general web searches.

Suggestions

I. The design of search engines, digital libraries and the browser add-ons must be done keeping in consideration the web search behavior patterns.
ii. Local interface must be made available to academic researchers, as Google succeeded in its country-specific customization of search results. That's why country-specific customization of search engines is preferred.
iii. Fundamental parameters of search engines must be evaluated along with, precision and recall due to their simplicity, evenhandedness and reliability, as

Google also made full retrieval of all the content objects via its Dublin Core and MARC 21 metadata elements, these elements can be useful for designers.

iv. OPAC usage patterns and demographic characteristics of user categories and age groups are important while designing search engines.

v. There is need for intensive training for students and faculty members in order for them to acquire the essential search strategies. This is necessary for the effective information retrieval by the Indian academics. A user friendly OPAC must be designed that entails simplistic search strategies for university libraries of India and other developing countries were made.

vi. Diversification makes the ranking in a way that the top results are diverse. Methods to assess diversity within web search must be exploited by information architects and webmasters,

vii. Libraries can also open their huge data to the search engines and can get listed in the top results to get more visibility.

viii. It is also recommended designing content oriented website with high quality, well-written content.

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DIGITISATIONOFLIBRARYMATERIALINACADEMIC LIBRARY:CHALLENGESANDISSUES

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Abstract

Digitization as a method of preservation is now a global phenomenon as well as the new trend in managing a library collection especially precious ones among academic libraries. Digitization of library collection has become a common activity among libraries. Libraries, are realizing the need to make available their local collection in digital forms to their users apart from subscribing to digitized resources in terms of online databases and e-books. This paper discusses the reasons for digitization and also explains the processes and methodology of digitization. Issues and challenges involved in the process of digitization are also highlighted.

Keywords: digitization, academic libraries, information, technology.

Introduction

Digitization of information materials is the process of converting analogue information to a digital format. It is one of the newest methods of managing information resources in the new information age, whereby information technology has assisted in making information accessible to people even in their homes. Traditional library materials in the form of books, papers, manuscripts, documents, etc. are converted into electronic formats. Images (such as photographs or maps) are converted into digital representations using some type of scanning device (or digitizer) so that they can be displayed and manipulated on a screen. Digital institutional resources such as theses, manuscripts, special monographs, research papers, or images are of very high value to academic institutions. Cooperation,

automation and building of the digital library — all for the enhancement of service delivery in support of teaching and research — are the principal drivers that will shape the collective future of libraries as suppliers of information to the scholarly world

Digitisation

Digitization of library collection has become a common activity among academic libraries. Libraries, more particularly academic libraries are realizing the need to make available their local collection in digital forms to their users apart from subscribing to digitized resourcs in terms of online databases and e-books,. Academic libraries have always been the depositories of intellectual contents such as theses, dissertations, research reports, students' projects and various published and unpublished works of the faculty members, staff and students. In this context digitization has become bare necessities for academic libraries in digital environment.

Witten and David (2003) defined Digitization as the process of taking traditional library materials that are in form of books and papers and converting them to the electronic form where they can be stored and manipulated by a computer.

Ding, Choo Ming (2000) has elaborated the works of Getz (1997), Line (1996) and Mckinley (1997) on the advantages of digitization. They maintained that: Digitization is the creation of digital objects from physical, analogue originals by means of a scanner, camera or other electronic device. It is undertaken as part of a process that includes:

Selection

Assessment, including of needs

Prioritization preparation of originals for digitization metadata collection and creation digitization and creation of data collections submission of digital resources to delivery systems and repositories.

Digitisation of Library Material in Academic Library: Challenges and Issues.

This process is accompanied along the way by management, including intellectual property rights management and quality control, and evaluation at the end. These steps are essential to ensure that the digital object remains accessible in the long-term.

Need of Digitization

Library materials especially old manuscripts, photo images, theses, and musical recordings etc that are in danger of being lost in the future and which are mostly historical and valuable needs to be preserved for future use. But the main problems for academic libraries are to select which

materials to be digitized and how to get these materials digitized. In this context **De Stefano (2001)** noted that there were different purposes for digitization. She highlighted the types of materials selected must meet the purpose, selection to enhance access, selection based on content and selection for preservation. Similarly **Gertz (2000)** outlined that when considering materials for digitization, first criteria will be physical condition of the materials, followed by access, value of content, the demand for the materials, the intellectual property rights, the required infrastructure, cost and sources of funding.
Academic libraries are digitizing materials because they know the continuing value of library resources for learning, teaching, research, scholarship, documentation, and public accountability. Another reason of digitization is to make access facilities to these resources. The needs of digitization of library materials are:
To preserve the age old materials for long use which are important and valuable for future? To facilitate new forms of access and use.
Better and enhanced access to a defined stock of research material.
Creation of a single point of access to documentation from different institutions concerning a special subject.
Support for democratic considerations by making public records more widely accessible Better search and retrieval facilities for library types of materials.
To give the institution opportunities for the development of its technical infrastructure and staff skill capacity.

Process of Digitization

The basic process of digitization is fairly simple, though a wide range of sophisticated techniques and tools may be used. Some important processes of digitization are discussed as below.

Scanning: Scanning means capturing a digital image. Image resolution is an important part of scanning process. The number of pixels of a row and columns determine the quality of the scanning. Generally scanning done through digital camera and scanners. Both have photo sensor, which consist of a charged coupled device or CCD arrays. The CCD arrays convert the light into electronic signals. Various types of scanners are available such as flat bed scanner, overhead scanner, and drum scanner etc. Scanning is the most cost effective way to create a digital file. The alternative to scanning is to photograph a document using a digital camera. It may be hand held or fixed. Hand held digital cameras are not suitable for archival scanning, but the high hand digital camera has no scanning limitations. The size and

shape of materials are also responsible for high speed of scanning. Overhead fixed digital camera present great potential for scanning oversize materials, media in all format.

File format: File formats are meant for storing image data. Some most commonly used file formats are:
GIF (Graphic Interchange Format) – 8 bits JPEG (Joint Photographic Expert Group) – 24bits TIFF - 24bits PDF (Portable Document Format) – 32bits

Optical Character Recognition (OCR): Another technology involved in digitization is Optical Character Recognition (OCR). When a page is stored as an image, manipulation of the text is not possible as the image file contains only a digital representation of a printed page. Thus editing, cut and paste, correction, retrieval is not possible. The usual process by which an image page is transformed into a text file is optical character recognition. The purpose of the whole OCR process is to recognize the letters, words and symbols printed on a page. It also uses spell checkers or other lexical analyzers that make use of context information to correct recognition errors and resolve ambiguities in the generated text.

Mark up: An electronic document has no inherent structure other than that of linear character or bite string. Therefore if part of the document has to be made identifiable, convention must be established. So, different identifier/ tag found in an electronic document are collectively referred as mark up. The three commonly known markup languages are:
Standard Generalized Markup Language (SGML) Hypertext Markup Language (HTML)
Extensible Markup Language (XML)

Metadata: The type of information in describing an electronic product is a great task. The metadata are used for describing information about the technical characteristic of digital file, their location, and a summary of their contents. These are located in the header of a tagged document. The function is to provide users with a standardized means for intellectual access to digitized materials.

PDF (Portable Document Format): PDF is the open de facto standard for distribution of electronic documents worldwide. Adobe PDF is a universal file format that preserves all the fonts, formatting colors and graphics of any source document regardless of the application and platform used to create it. It is compact and can be shared, viewed, navigated and printed exactly.

Issues and Challenges

Although Digitization of library materials seems to be simple, it is a

complex process, which carries a lot of issues and challenges .It includes managing budget, staffing, workflow, determining metadata, technical specification etc to make the digitization project a success. The major issues and challenges of digitization are as discussed below.

Policy formulation: Many issues related to Digital technology are unresolved since these technologies are undergoing rapid and continuing development .It gives rise to "wait and see" approach. The technology changes very often and therefore the management decision regarding digitization get delayed. The academic library authority/management need to consider that whether the cost and time involved would be commensurate with the benefits before taking any policy decision regarding digitization.

The policy of a library for digitization includes the standards and guidelines for digitization of materials of a library. It differs from project to project and library to library. In most cases libraries adopts their own standards and guidelines. However some widely accepted standards such as standard prescribed by Digital Library Federation are commonly referred at the planning stage. Similarly common metadata standards used for this are Dublin Core, RDF, TEL, MARC etc. Normally the standards fall into three major areas i.e. material description, user access and system architecture. Hence at the planning stage of the digitization project ,a good policy regarding standards, formats and protocols should be formulated .Framing of a policy for material to be digitized is a tricky matter. One person cannot judge historical value, utility value, content value and quality value. Therefore a group of experts should discuss on this matter and an overall policy has to be framed very carefully.

Legal issues: The academic libraries which are interested to undertake a digitization project need to be aware of the legal issues related to this. They must investigate the copyright laws involved for each item they intend to digitize and also the legal issues affecting its access by users. Thus three issues such as copyright, authencity and Intellectual Property Management must be properly addressed by the libraries.

Cost: Digitization is an expensive and resource intensive process. In includes cost relating to design, implementation and maintenance. Therefore financial issues related to training of staff, integration of new work process, procurement of machines and equipments, provision of a suitable workspace and the establishment of new systems for digital storage to ensure the preservation of digital heritage must

be taken into consideration at the time of planning the digitization programme.

However the high cost involved in digitization suggest the need for cost recovery by the library as a small compensation in a way similar to a photocopy service. A digital collection normally includes surrogate copies of all types of library materials, which may be of high interest to a range of potential markets. Since libraries seldom retain copyright for the original works, the permission to access may be given basing upon licensing the use of images in protection of intellectual property of digital assets held by the libraries.

Technology Obsolescence: The greatest challenge lies in technology preservation, which entails not only the migration of the data itself, but also the migration and emulation of the technology platform, including devices and the data formats in which the information are created to ensure that it will continue to be accessible on emerging new platforms. File formats are also changing rapidly. The age-old preservation techniques are changing into new techniques. Some strategies to meet these new challenges of technology obsolescence are:

Application of International standards and best practices

Policy development for use of latest technology available at the time of initiation of digitization project

Selection of hardware, software and other equipments which will be compatible with the future change.

Development of skilled manpower to use the available technology.

Sufficient financial provisions for procurement and maintenance of new technologies.

Skilled Manpower: Although there are many problems associated with process of digitization, most libraries feel manpower as the main problem. Since the library and information science processionals are not educated or trained for digitization process, there is need for more training and education for library & information science professionals. Training is the most essential part in digitization process. Handsome training need to be provided regularly to the library staff, particularly those who are engaged in digitization project of the library.

Conclusion

It is a challenge for Library & Information science professionals to cope with the change and to adopt the new tools and techniques to make the digitization process fruitful. The process and methodology used in the digitization is a great task. Above all the copyright issue, cost, skilled manpower, technological obsolescence, file format, correction,

etc. are various issue related to digitization that must be addressed properly.

Digitization has opened up new audiences and services for libraries, and it needs to be integrated into the plans and policies of any institution to maximize its effectiveness.

Digitization is a complex process with many crucial dependencies between different stages over time. Utilizing a holistic life-cycle approach for digitization initiatives will help develop sustainable and successful project.

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DSPACE:ADAISFORDIGITALRESOURCES

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Abstract

DSpace is an open source institutional repository software developed jointly by MIT libraries and HP labs that is freely available and can be downloaded and installed without any restricted. The code is currently licensed under the BSD open source license. To capture and preserve the digital materials, the DSpace is an excellent dais. This paper deals with the development, features, limitations, architecture and construction of DSpace. In addition it highlight that DSpace is an open archival information system that allows users to use the system and submit their digital content, even the administrator organize and configure the system. In order to be more usable to different types of users, the software provides a configurable submission and workflow process that can be useful for any institution's information needs.

Keywords: DSpace, IR, Construction, Archicture

Introduction

Repositories now represent potentially rich sources of information, data, images and valuable research results. The Repositories are powerful systems that allow organizations to store and maintain their digital documents and allow for interaction and collaboration among users in the organizations. There are a number of digital library software available as “Open Source” as well as in “Proprietary format”. Open source software helps libraries

mainly in lowering initial and ongoing costs, eliminating vendor lock-in and allowing for greater flexibility. The main advantage of open source software is that it is generally available in free.[1]

When we talk about the 'institutional repository', we use 'institution' to refer the educational or research establishment which is the library's parent body. Institutional repositories have emerged from universities, but are spreading into other types of educational institutions too, such as colleges and research institutes. The concept of institutionally is an increasingly fragile one when we consider digital content and digital libraries, and therefore we must ask whether we should be developing institutional repositories at all. [2]

Dspace is a Digital Institutional Repository System that captures items in different formats and stores in audio, video, data and text. It redistributes it over the web an organization's research material. It indexes the digital resources, so user can search and retrieve that. Research organizations are using the DSpace worldwide for a variety of digital archiving needs from institutional repositories (IRs) to learning object repositories or electronic records management. It preserves digital content for long duration. DSpace is freely available as open source software which can customize and extend.

Objectives

To study the DSpace development and find suitability for use. To study the architecture and construction of Dspace.

To study the creation of DSpace IR and workflow. To study hurdles of Dspace.

Historical Development of Dspace

The first public version of DSpace was released in November 2002, as a joint effort between developers from MIT and HP Labs. Following the first user group meeting in March 2004, a group of interested institutions formed the DSpace Federation, which determined the governance of future software development by adopting the Apache foundation's community development model as well establishing the DSpace Committer Group. In July 2007 as the DSpace user community grew larger, HP and MIT jointly formed the DSpace foundation, a not-for-profit organization that provided leadership and support. In May 2009 collaboration on related projects and growing synergies

between the DSpace Foundation and the Fedora Commons organization led to the joining of the two organizations to pursue their common mission in a not-for-profit called DuraSpace.

Currently the DSpace software and user community receives leadership and guidance from DuraSpace. The different versions of DSpace with release dates are:

2002	DSpace 1.0.1
2003	DSpace 1.1.1
2005	DSpace 1.2.2 and DSpace 1.3.2
2007	DSpace 1.4.2
2009	DSpace 1.5.2
2010	DSpace 1.6.2
2013	DSpace 1.7.3 and 1.8.3
2015	DSpace 3.4, 4.3, 5.2 and 6.x (unreleased)

Why Dsapce Should Be Choosed?

Largest community of users and developers worldwide: DSpace has over 1000 organizations that are currently using the DSpace software in a production or project environment. The most common use is by research libraries as an institutional repository; however there are many organizations using the software to host and manage subject based repositories, dataset repositories or media based repositories.

Free open source software: The DSpace open source platform is available for free to anyone and can be downloaded from the source forge open source software repository. The code is currently licensed under the BSD open source license. This means that any organization can use, modify, and even integrate the code into their commercial application without paying any licensing fees. Today there are more than 100 contributors around the world contributing code, bug fixes, etc. DSpace software is managed by a smaller group of volunteer developers (called

committers) that work together to plan releases and integrate new features and bug fixes submitted by the community.

- **Completely customizable to fit organization's needs:** DSpace can be customized in the following key ways to suit different needs:
- ***Customize or theme the user interface*** - The users can fully customize the look and feel of their DSpace website so it will integrate seamlessly with the institution's website and can be more intuitive for the users. DSpace provides two main user interface options: JSPUI and XMLUI.
- ***Customize the metadata*** - Dublin Core is the default metadata format within the DSpace application. However users can add or change any field to customize it for the application. DSpace currently supports any non hierarchical, flat name space, although it is possible to ingest other hierarchical metadata schemas into DSpace such as MARC and MODS. This requires using tools such as crosswalk and having some technical capability to map the transfer of data.
- ***Configure Browse and Search*** - Users can decide what fields they would like to display for browsing, such as author, title, date etc. on DSpace website. Users can also select any metadata fields they would like included in the search interface. All of the text within a given item and metadata associated with the item, are indexed for full text search if desired.
- ***Local authentication mechanisms*** - DSpace comes with plugins for most university authentication methods, including: LDAP (and hierarchical LDAP), Shibboleth, X.509, IP-based. In addition, DSpace comes with its own internal authentication method, or can be configured to use multiple authentication methods at once. User can also build their own authentication plugin if he use a custom authentication mechanism.
- ***Standards compatibility*** - DSpace complies with many standard protocols for access, ingest, and export. The standards DSpace supports include: OAI-PMH, OAI-ORE, SWORD, WebDAV, OpenSearch, OpenURL, RSS, and ATOM.
- ***Configurable database*** - Either PostgreSQL or Oracle can be choose for the database where DSpace manages its metadata.
- ***Default language*** -The DSpace web application is multilingual and available in over twenty languages. So,

the user can customize the preferred language which DSpace uses. DSpace can be configured to support multiple languages, so that the language of user sees is the 'preferred language' set in their web browser.

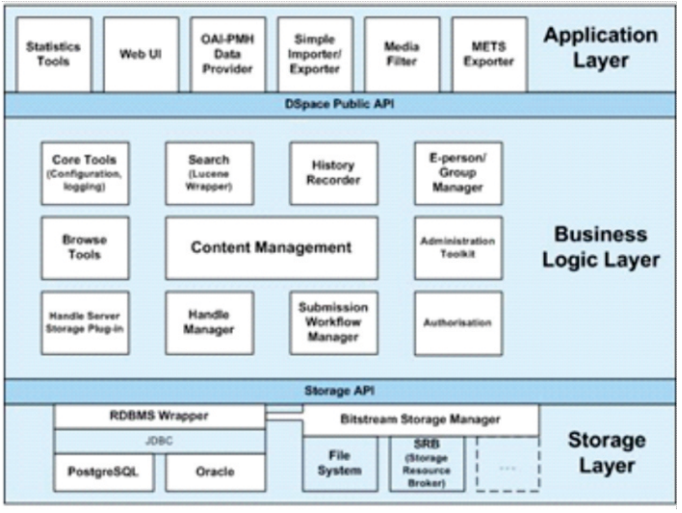
Used by Educational, Government, Private and Commercial Institutions: The DSpace platform is used by higher education institutions for which the platform was initially developed, while also showing a much broader appeal. The software has been used by museums, state archives, museums, state and National Libraries, journal repositories, consortiums, and commercial companies to manage their digital assets.

Can be installed out of the box: DSpace comes with an easily configurable web based interface, which any system administrator can install on a single Linux, Mac OSX or Windows box to get started.

Can manage and preserve all types of digital content: The DSpace application can recognize and manage a large number of file format and mime types. Some of the most common formats currently managed within the DSpace environment are PDF, Word, JPEG, MPEG, TIFF files. DSpace also provides a simple file format registry where any unrecognized format can be registered, so that it can be identified in the future.

Architecture of DSPACE

The DSpace system is organized into three layers, each of which consists of a number of components.



Dspace System Architecture

The storage layer is responsible for physical storage of metadata and content. The business logic layer deals with managing the content of the archive, users of the archive (e-people), authorization, and workflow. The application layer contains components that communicate with the world outside of the individual DSpace installation, for example the Web user interface and the Open Archives Initiative protocol for metadata harvesting service.
Each layer only invokes the layer below it; the application layer may not used the storage layer directly, for example. Each component in the storage and business logic layers has a defined public API. The union of the APIs of those components are referred to as the Storage API (in the case of the storage layer) and the DSpace Public API (in the case of the business logic layer). These APIs are in-process Java classes, objects and methods.

Each layer is described in a separate section:
Storage Layer

- RDBMS
- Bit stream Store Business Logic Layer
- Core Classes
- Content Management API
- Workflow System
- Administration Toolkit
- E-person/Group Manager
- Authorization
- Handle Manager/Handle Plugin
- Search
- Browse API
- History Recorder
- Checksum Checker Application Layer
- Web User Interface
- OAI-PMH Data Provider
- Item Importer and Exporter
- Transferring Items Between DSpace Instances
- Registration
- METS Tools
- Media Filters
- Sub-Community Management

Work flrow to Create The IR

The DSpace submission workflow system is a critical part of the DSpace architecture that allows submission, processing, and final addition of content to the live repository.
DSpace's underlying model includes E -People, users who have registered with the system and have certain authorizations, roles, rights, and privileges that translate abilities to complete certain tasks within the

DSpace system. A typical submission begins with the system asking the user a couple of questions about digital document to be added in the repository and number of files involved in the submission. Then the system guides the user through the different steps, which are:

Step 1: Create a Top level Community
Log in as Administrator on instance of DSpace at My DSpace. Click on Communities & Collections (just below Browse).
Click on Create Top-Level Community.
Complete the online form describing the Top-Level Community and click on Create. The new Top-Level Community will be displayed (also referred to as the 'Edit Community' page).

Step 2: Create a Sub Community (optional)
To create a Sub-Community, go to the Community home page of the Community that is to be the parent of the new Sub-Community.
Then, click on the Create Sub-community in the Admin Tools box at the top right-hand corner of the page. This will create the new Sub-Community and take us to the home page for that Sub-Community, also referred to as the 'Edit Community' page for that Sub-Community.
Fill out the forms as needed. Name is required. All other fields are optional.
Short Description: Appears on the Community List page below the Community name, and should be one or two sentences of plain text describing the Community.
Introductory Text, Side Bar Text, Copyright Text Fields are displayed on the Community's home page.
Introductory Text and Side Bar Text are both HTML fields, which means we should place text in .
Upload Logo: Relatively small logo sizes look best due to the design of the Collection home page. Click Create or Update when done with changes.

Step 3: Create a Collection
To create a Collection, go to the Community home page of the Community that is to be the parent of the new Collection.
Then, click on the Create Collection in the Admin Tools box at the top right-hand corner of the page. Follow the wizard, and click on Next to move forward each time. [3]

Barriers of DSPACE
1. DSpace software is required high level of technical skills personals to

WORKFLOW	STEP DESCRIPTION
Describe	User enters metadata about the document (s) they are submitting, including but not limited to author, title, keywords, and a description.
	The user selects and uploads the files on their local machine that they like to Upload as part of the submission. Each file's type is identified by the system and the user verifies the file type.
Verify	An overview of all details of the submission is given including a summary of the entered metadata and the files involved in the submission.
License	The user is shown and must agree to the license the system administrator has assigned to submit content for this collection.
Complete	The user's actions in the submission process are complete. Based on the workflow steps set for the collection, the item may immediately be added to the collection or have to be reviewed by system administrators before its addition to the collection.

function it properly.

2. Institutions do not appoint the IT professionals or experts on regular basis for the library. They just hire them on part time basis. In this situation, if any problem causes, it leads to delay in routine work of library due to unavailability of those professionals.
3. Vendors are also not authorized for DSpace software (FOSS) as compared to commercial softwares.
4. Technical terms are written in manuals which are not easily understandable by the normal users.

Conclusions

The different organizations and academic institutions have been effort to started addressing a growing and their needs by DSpace. MIT Libraries has been running DSpace as a live service at MIT for several months, and several other institutions have successfully installed and started to run DSpace. MIT Libraries remain committed to maintaining the DSpace service and software.

The DSpace does not currently address all of the issues of long-term preservation and access of digital material naturally, although it serves as a useful basis for developing and setting up the solutions to those issues. Already, an open source community is forming around DSpace. This exciting development bodes well for the future development and impact of DSpace. Additionally, two further pieces of work are already

under way to boost up the DSpace system. This paper has described that Dspac is one of the free, open source and leading software to build the digital institutional repository. The DSpace is most appropriate software for digital library because of content acquisition, content management and information searching & retrieving methods. It can potentially provide value to a great many institutions, and stands to benefit from a large community of developers and information science professionals.

References

[1] Juli Thakuria, Building An Institutional Repository With D Space, p102-114 https://atmire.com/DSpacelabs/bitstream/handle/123456789/22917/DSpace%20paper.pdf?sequence=1.

[2] https://www.era.lib.ed.ac.uk/bitstream/handle/1842/858/Chapter_1.pdf;jsessionid=A3771D7C2261009F2B227CB49D75D84C?sequence=1, The institutional repository in the digital library.

[3] http://wiki.lib.sun.ac.za/images/3/3e/Manual.pdf.

[4] https://wiki.duraspace.org/display/DSPACE/User+FAQ#UserFAQ-WhatisDSpace?.

[5] http://ir.inflibnet.ac.in/bitstream/1944/1747/1/IR%20Using%20DSpace.pdf.

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