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Role of Information Technology in Academic Libraries: Personal Computer to Cloud Computing

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Abstract The information environment is greatly changing throughout the world. The rapid development in Communication and Information Technology and recent innovation in technology have witnessed as challenges and changing emphasis in the role of information and its management. This century has witnessed the every information contents changing into digital format. This paper made an attempt to analysis the changing of the academic libraries and skill required by the library professionals.
Keywords *Paradigm Shift; Nomenclature of Libraries; Cloud Computing*

1. Introduction

The users are expecting more from the information centre in the competitive world as quick as services from unseen information to known information. The Information and Communication Technology has been changed many activities of the academic libraries from the digital contents providers than hard copies. Naturally, technology helped the information professionals changed contents in the digital mode and made it available through networked environment. In this networked, cloud computing are more helpful for the easy storage and access in the global. So higher education institutions are started developing the digital library in the locally or globally.

- The current ICT environment required the libraries to focus on the technological changes, new innovations, technical expertise, social and legal issues, cost, risk and also skills of the staff and technology.
- Libraries are facing the transition of technology every movement.
- Therefore, the library and information professionals have to support the changes taking place in their service to users.
- Professionals working the libraries are acquired new technologies and skills to improve the services of the information centre.

The libraries around the world are making all the efforts to provide quality library and information services. In the process, technological utilizations are more in the converting the resources to digital form. The library resources have to meet the users need without any hurdles. The work done with these raw materials, and fledgling efforts, to assess the impact that library collections and services have on users are gone in the digital environment. The absence of reliable information that documents and explains shining patterns in library operations and use is adversely.

Library professionals in the current generation have to act as specialist in the information handling, managing and organizing the library in the digital environment. And handling the specialized tasks of massive digitization, storage, access, digital knowledge about mining, electronic reference services, electronic information services, search co-ordination, and manage the archive and its access. Observing the present situation the computer and communication technologies have drastically and directly affected the human activities including library and information science practices. Currently, the concept of librarianship has drastically changed for its practices especially in the services to the end users. The library services are changing to suit the new technologies and modernize the operations. The advanced information processing, storage and retrieval are made simple using the cloud computing technology. The librarian acts as guardian of the information superhighway/the universal digital library or the global library [1, 3]. This paper made an attempt to highlights the changes taking place in the library and information centre and the skills required for the library professionals.

2. Global Changes and Challenges

The information resources are changing its form; size and access differ from printed to electronic. These are unprecedented growth in the information resources. So the libraries and librarian have to face the lot of challenges due to the technological development. These changes are also reflected in the teaching and learning process. Accordingly, information professionals change resources into the digital form that will be useful for the easy teaching and learning of students and staff. It gives way to the personalized services to every individual. There are many challenges taken place in the libraries are listed below:

- Expending Electronic Information Environment;
- Development of Information Infrastructure;
- Need for Web based Services;
- Resource Generation;
- Explosive growth of Information;
- Resource Sharing and Collaboration;
- Industrial Interaction;
- Need for Quality based Services;
- Marketing of Library & Information Products;
- E-Collections Building;
- Digital Rights Management;
- Digital Preservation.

Change is always permanent, the technology changes in each and every movement, so the library is not exception to this. The library activities are made changes due to the technological advancement in each and every process. Digital conversion is the major changing trends in the library contents and made easy to put in the world of circuits and connectivity. The concept of library is the place where the information resources are kept for use and read, after the technological change, information resources are kept everywhere or virtually and access them through networked through computers anywhere in the world. So the expected the changes in the future, the academic library professionals to make necessary transformation from print to digital form to meet the end users.

- Creativeness must be required for the future academic library professionals;
- Global based network library services must be provided;
- Web enabled information services to users irrespective of their locality;
- The pathways are very high to suit the technological development;
- The electronic information should be in the qualitative in nature;
- The library professionals' roles must be pro-active.

3. Changes in Academic Libraries

3.1. Budget Challenges

Libraries are facing in the reduction of operating and materials budgets every year that leads to the economical pressure for allotting the budget for the new challenges.

3.2. Changes in Higher Education

Due to the technological advancement in the information handling, the library professionals are forced to get training in the advancement technological changes in the profession, so additional refresher courses and workshops must be attended by the library professionals to acquire technology.

3.3. Demands for Accountability and Assessment

The end users and stock holders are expecting the institutions must show the value of higher education by way getting good placement after the education. It is accredited by getting employability through the higher education.

3.4. Digitization of Unique Library Resources

Digitization of printed and unpublished documents made available to the researchers as well as worldwide through digital library projects. As Clifford Lynch (Coalition for Networked Information) has said, "special collections are a nexus where technology and content are meeting to advance scholarship in extraordinary new ways". Therefore, the digitization is the challenging task for the library professionals.

3.5. Growth of Mobile Devices and Applications

Information Technology brings everything in the mobile phone. The mobile applications are increasing day by day in all the fields, so the library is also using them by way of giving information in text messaging through SMS to the end user mobile phone as in the services of OPAC, circulation updation such as renewing documents, etc.

3.6. Library will Expand the Role to Institutions

Information literacy instructions are to be integrated with the curriculum in the main stream of the education. Librarians do provide services to the scholars on virtual research environment and digital repositories. Online tutorials must be developed for user-friendly interfaces to the local digital collections. Using open access software, digital collections are to be developed and shared through web with general public.

3.7. To Develop Scholarly Communication and Intellectual Property Services

Every institute must develop their thought contents locally as Institutional Repositories, so that it focuses others to gain importance to publishing scholarly communications. Institutional Repositories are projecting the institute fame to others. The potential of intellectuals are highly appreciated through IRs.

3.8. Innovation Take Continue to Change Services and Required Skills

The academic libraries are facing many technological changes to provide information services. The new technological tools such as social networking tools, open access mode, cloud computing are few of them for providing library services to the end users. Many times, the library professionals do not know how to use and how many tools use for these purpose, the same information has to be served in a different tools and mode with standard format. So all these advanced tools must be integrated for providing services to users.

3.9. Library will Change as Physical Space is Repurposed and Virtual Space Expands

Now-a-days, the academic libraries are providing information services to users than ever before. The number of hard copies is decreasing naturally. The subscriptions of hard copies of journals are withdrawn in many libraries and go for online journals. To access these, the libraries are providing computer facilities to the users instead of hard copies.

4. Changes in Libraries: A Paradigm Shift

To become information scientist and to provide information services through online, must be acquired new skills such as advanced technological training for accessing, storing, retrieving information from networked environment. So the vision of the future academic library professional must be to create a World Class Networked Global Library and Information Centre to provide timely technology induced quality information service to the user in time in the digital environment. The 21st century changed the traditional library professionals into modern and technological library professionals by way of using information technology in the library. Library professional must undergo lot of changes in the activities for information processing and handling them. The technological advancement forced to change and enhance their knowledge and acquire new competencies, skills. Thus, the transitions of activities of library from traditional way to ICT way are given below:

Table 1: *Paradigm Shift*

Sl. No.	Libraries	Networks
1	Custodian of Books	Service oriented Information Providers
2	Print	Digital
3	Ownership	Access
4	Order in Libraries	chaos on the web
5	One Medium	Multimedia
6	Media	Hypermedia
7	Copyright	copy left
8	Own Collection	Library without walls

9	Homogeneity	Diversity (heterogeneity)
10	In Good time	Just in Time
11	Top Down System	Bottom down system
12	Real	Virtual
13	Tangible	Intangible
14	Monopoly	Equity
15	Library	Web Library
16	Intra-action	Inter-action
17	Teaching	Learning
18	Local reach	Global each
19	We go to the Library	Library comes to you
20	Book preservation	Bit preservation

5. Changes in Physical Forms Catalogue

The library of the future will be more a portal through which students and faculty will access the vast information resources of the world and a less place where information is kept. Thus, in this circumstance the evolution of cataloguing physical forms has changed.

- Printed Book Catalogue
- Printed “Pasted Slip” Catalogue
- Sheaf Catalogue
- Visible Index
- Card Catalogue
- Microform – [COM]
- Machine Readable Catalogue
- OPAC
- Web OPAC

6. Changes in Metamorphosis of Libraries

6.1. Traditional Library

- Holding in hard copy form
- No Computerisation

6.2. Automated Library

- Automation of library functions
- Computerized catalogue
- Circulation, acquisition etc. Holding mostly in Print form
- A few electronic resources

6.3. Electronic Library

- Fully automated functions
- CD-ROM networking Resource in electronic and conventional form

6.4. Digital Library

- Fully automated
- All resources in digital form
- High speed optical fiber LAN and access over WAN

6.5. Virtual Library

- Library without walls
- Provide access to resources
- Library without resources

7. Changes in Nomenclature of Libraries

Table 2: *Changes in Nomenclature of Libraries*

Sl. No.	Libraries	Librarian
1	Library	Librarian
2	Information Centre	Information Officer
3	Documentation Centre	Documentation Officer
4	Electronic Library	Information Scientist
5	Hitech Library	Manager (Information)
6	Open Library	
7	Virtual Library	Director (Information)
8	Digital Library	Digital Librarian
9	Cyberlibrary, Cybrary	Cybrarian
10	Elibrary	E-Librarian
11	Hybrid library	Director (Library)

8. Changes in Electronic Libraries

Due to the Information technology advancement and realized the importance of electronic libraries, some of the factors is to be considered and listed below:

- Provide interactive access to the collections;
- Instant access to multimedia based information;
- Fully automated indexing & intelligent retrieval;
- Users are more eager to do R&D remotely;
- Storage of large volume of data;
- Access @anytime @anyplace by anyone;
- Faster addition & gap reduction;
- Effective tool for bridging the information gap;
- Distributed learning environment;
- Promote paperless office environment;
- Promotes e-learning.

9. Changes in Library Services

9.1. Collection

Online access to subscribed databases, including bibliographic records, full- text articles, e-books and so on; library web sites leading to selective online documents and resources

9.2. Catalogue

Online catalog with web-interface and remote accessibility.

9.3. Circulation

Online access to e-books; online renewal of checked-out materials.

9.4. Reserve

Online accessible electronic reserve.

9.5. Instruction

Online instruction; in-person instruction with online components.

9.6. Interlibrary Loan & Document Delivery

Online ILL request and articles delivery via e-mail in addition to traditional delivery.

9.7. Reference

Online reference including simple e-mail reference and real-time virtual reference.

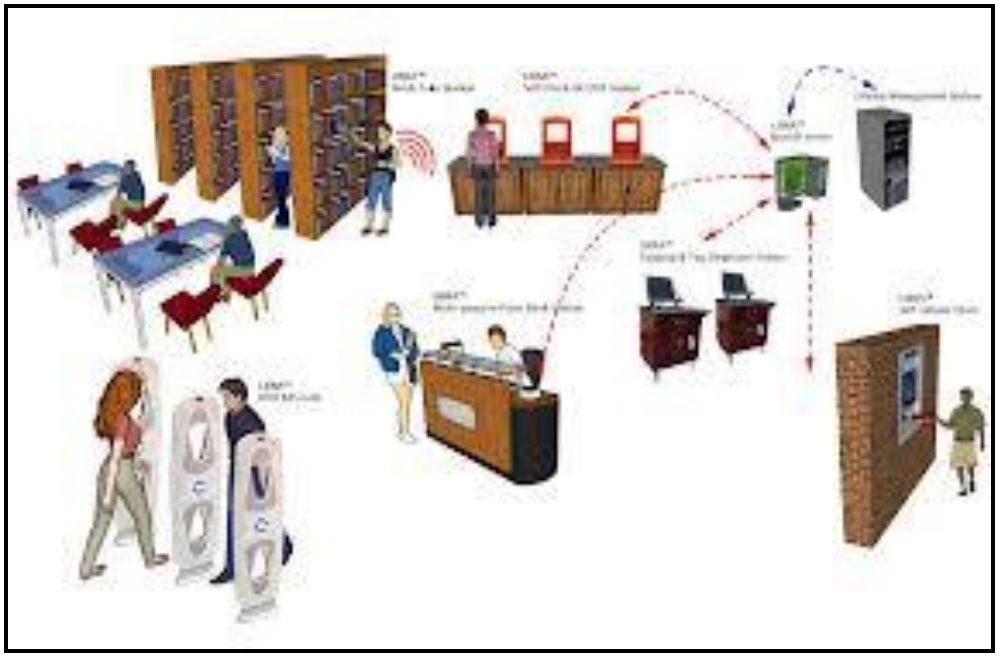

Figure 1: *Changes of Library to Modern Library*

10. Characteristics of E-Libraries or Digital Libraries

Both combination traditional and median collection and digital technologies required for digital library and it include for both electronic and paper material. Further it consists of mostly electronic material for reference type

(i). Digital object that includes video, audio and multimedia numeric components are in the digital library;
(ii). From the users' desk place digital library can be accessed;
(iii). Informal and Formal learning procedures supported by digital library;
(iv). Remote to rare and expensive material provided digital library.

Digital Library requires well tested and prevent information technologies including the multimedia kit [2].

11. The Skill of Library Staff

In order to manage the changing library environment, the library staff will need to be trained in the application of necessary tools in their work environment. The modern storage media like, CD-ROM, microfilms, micro-text, optical laser disc, floppy discs, magnetic tapes and discs etc., play a vital role in the ever-growing information world-daily routines and functions of the library have been impacted and influenced very much by the modern communication medias like e-mail, e-journal, fax, telex, satellite communication, telecommunications, online network communication etc. So it is very essential to provide approximate training to the library personnel. To handle and utilize the modern facilities librarian must have the knowledge and skills about the technologies and communication channels and should provide proper training to the staff.

The librarian ship concept of has changed by change of time. In earlier stages, the librarian as a custodian and caretaker of books. But today's librarians are having new technologies handling skills like physical form of books and journals is replaced by Electronic media such as CD-ROMs, DVD, and Floppy Disc etc. So, the librarians and library professionals are automatically undergoing a change due to the necessity of information literacy. The library professional are need balance combination knowledge, skills to maintain electronic environment.

The new trends using the Free Open Source Software are for developing digital library and institutional repositories locally. Freely available many tools are over the Internet. The library professionals are updating their knowledge technically and technologically by the way of workshops, tutorials and seminars organized the subject experts.

Table 3: *Traditional Environment Vs Electronic Environment*

Sl. No.	Traditional Environment	Electronic Environment
1.	Reading	Browsing
2.	Ordering, Billing, Invoicing	E-Commerce
3.	Writing	Web Publishing
4.	Document Delivery	E-Prints, Attachment, Scanned Images
5	Inter Library Loan	Consortia
6.	Literature Search	CD-ROM and Internet Search
7.	Resource Sharing	Networking
8.	Classification	Subject Directories, Subject Gateways
9.	Indexing System	Search Strategies

12. Personal Computing To Cloud Computing

At the end of the 20th century, the computer technology established its legs into all the fields in the world. Its usage starts with small business organization to big research and production organization. The personal computer with capacity of pc xt, pc at, etc. has been increased their speed, configurations slowly and now it has reached up to the networking computing to cloud computing without computer storage capacity network one can have network in cloud computing.

The new technology is used the internet and central remote servers to maintain data and applications. Cloud is a virtualized pool of computing resources. Cloud computing allows consumers like library, businesses, consumers to use data and applications without installation and access their personal files at any computer with internet access. It helps the centralizing storage, memory, processing and bandwidth. In cloud computing services provide common business applications online that can be accessed using a web browser while storing software and data on the servers.

Network Computing Technology	Cloud Computing Technology
Client Server and other paradigms	Service Paradigms (e.g. Platform as a Service)
Remote Procedure Call	Processor Virtualization
Overview on Java RMI, CORBA and other infrastructures	Virtual Network Interfaces and Virtual Networks
Emerging Web Technologies	Virtualized and Network Storage
Web Services and Service-oriented Computing	Web Service Interface Authorization and Security

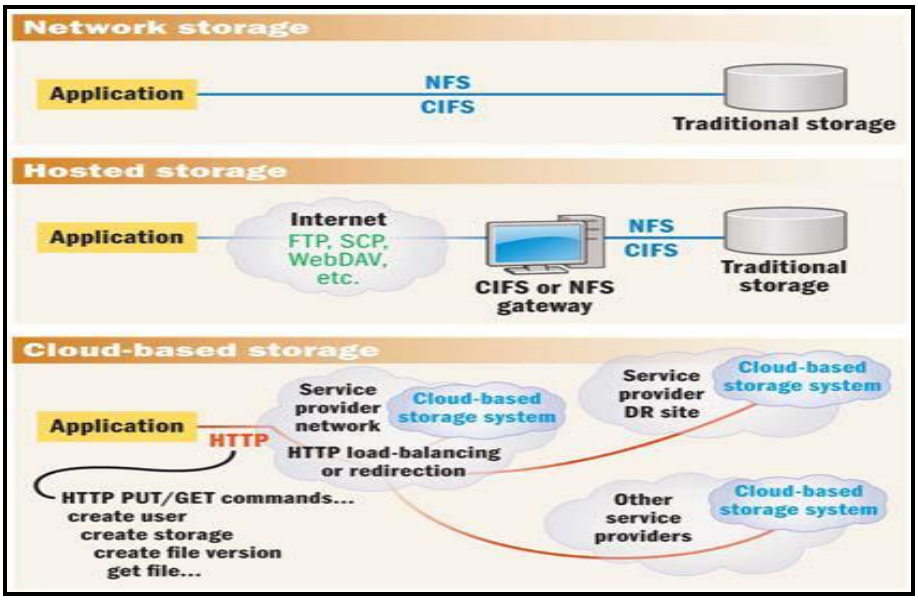

Figure 2: *Evolution of Cloud Storage* [4]

12.1. Cloud Computing and Library

Digital library is emerging now-a-days for more in libraries. Every library is developing digital contents and it can be put into their local storage with different applications. Once the storage can be put in the cloud computing storage with help interoperable or Z39.50 used to access the data. The cloud computing may gradually implement more comprehensive services of the digital library. It can be applied for the Institutional Repositories, digital library and other information e-resources store as data in cloud computing. The following areas can be applied cloud computing technology [5].

- Library systems (e.g., catalogs, discovery systems, request management systems)
- Educational initiatives (e.g., outreach to students, instructional support)
- Scholarly communications (e.g., digital repositories)
- Public services (e.g., enhancing online conversations with patrons)

Now a days public cloud for serving to the users to using cloud computing capable by updating as the related equipment like personal computer, mobile phones. To avoid the capital cost of software and hardware the universities and colleges can subscribe or purchase their resources and as need basis.

13. Conclusion

The librarians and information professional are requires reorientation of traditional skill of librarianship must acquire the new skills using the new technology as, on line searching of electronic database, networking and web based technologies and CD-ROM Products e-journals etc. in the field of information in academic libraries due to the development of information communication technology. The present generation of library professionals requires especially academic librarians who has to manage and organize the library would be appropriate for the current environment. And also to need handling techniques on various tasks of electronic information services, electronic reference services, massive digitization, storage, access, digital knowledge about mining, search co-ordination, and manage the archive and its access.

Cloud Computing is a low-cost super computing services to provide the maximum possibility. A large number of manufactures are running the cloud computing for the benefit of Internet users. The cloud computing has safety and security by the third party and need not worry about the data loss or software corruption. The future of cloud computing is very much bright life. And at the same time on many issues arises that has to be solved by experience. In Simple word, one can have number of storage space need not be in his computer the same way applications. One can know, the technology, pay the subscription to the cloud computing storage and applications you do the wonder need not be worried about the crash, Security of cloud platform and data in transmission and Interoperation and standardization, etc. Cloud based library services could bring the power of library cooperation to core library management.

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Lung Cancer Research in G7 and BRIC Countries: A Comparative Analysis by Scientometric Method

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Abstract This paper examines the research output of lung cancer in the G7 and the BRIC countries by scientometric method. Data has been downloaded from Scopus database for the period of 10 years (2003–2012). This study compares the growth rate (CAGR), Collaboration Coefficient (CC) and Publication Activity (TAI) of the countries of both the groups. Two relative indicators– Absolute Citation Impact (ACI) and Relative Citation Impact (RCI) have been adopted to compare the quality and impact of the lung cancer research. We found that the BRIC countries had a significant growth in both in the number of articles and their share in the recent years when compared with the G7 countries.

Keywords *Lung Cancer; WHO; Scopus; G7 and BRIC Countries; Citation*

1. Introduction

The growth of abnormal cells in the lungs is termed as lung cancer. They spoil the development of healthy lung tissue. As they grow, the abnormal cells can form tumors and interfere with the functioning of the lung, which provides oxygen to the body via the blood [1]. There are two types of lung cancer namely primary lung cancer and secondary lung cancer. The origin of the primary lung cancer is developed within the lungs, whereas in the case of secondary lung cancer the growth is developed somewhere in the body and reaches the lungs. It is certainly no surprise that smoking is the leading cause for lung cancer; about 80% of individuals are current (20%) and former (60%) smokers. Smoking increases a person's lifetime risk of lung cancer by a factor of 20 times. Other causes are radon, second– hand smoke (passive smoker). Around 7.6 million deaths worldwide in each year are caused by cancer. About 13% of the deaths are caused by cancer in which lung cancer is regarded according to the report of World Health Organization (WHO).

It is estimated that 228, 190 men and women (118,080 men and 110,110 women) will be diagnosed with cancer and 159,480 men and women will die of cancer of the lung and bronchus in 2013 [3]. The financial ministers of the following seven countries namely USA, UK, France, Germany, Italy, Canada

and Japan are known as the group of G7. According to their global net wealth, they are regarded as the wealthiest nations on the world. About 50.4% of the global nominal GDP and 39.3% of the global GDP are comprised by the G7 countries. They discuss about economic policies in their meeting which is conducted every year.

The group acronym BRIC (refers to Brazil, Russia, India and China), coined by O'Neill [5] in 2001 in a report named "Building better global economic BRICs". He identified BRIC as four rapidly growing "developing countries" likely to challenge the G7 countries. His judgment has been vindicated over the past decade. Therefore, the G7 and BRIC countries can be used to study two kinds of countries in lung cancer research.

2. Review of Literature

The review regarding to the present study has been analyzed.

The research performance between BRIC and N-11 countries has been compared by Rons (2011). Who found that the economic profile of the country has been enhanced by the indicators which were related to research performance. .

(Yang et al., 2012) [7] compared the disciplinary structure of the G7 countries and BRICs countries and found that the disciplinary structure of the G7 countries was more balanced than that of the BRICs countries, but in recent years the disciplinary structure of the BRICs countries has become more and more similar to that of the G7 countries.

By using Scientometric indicators, (Yi et al., 2013) answered the question "Are CIVETS the next BRIC at the country group level and found out the significant difference between CIVETS and BRICs in knowledge– based economy performance, scientific research quality and scientific research structure.

The tribology research output in BRIC countries their document type, authorship and publication pattern were analyzed by (Elango et al., 2013). The majority of the world articles are published by G7 countries and their share was replaced by other countries in BRIC according to the study conducted by (Yang et al., 2013) on global trends of solid waste research.

3. Objectives of the Study

The main objective of the study is to identify/analyze the following.

- Research output of lung cancer research between the G7 and the BRIC countries during 2003 to 2012.
- Collaboration pattern of authors and activity profile of lung cancer research.
- Citation profile and Relative Citation Index of lung cancer research.

4. Methodology

The data in this study has been retrieved from Scopus (www.scopus.com). Scopus is the world's largest abstract and citation database of peer-reviewed literature. All document types from 2003 to 2012 which had the following keywords were downloaded: "lung cancer", "lung carcinoma", "lung metastasis", "lung malignancy" and "adenocarcinoma of lung". The following search strategy has been used for the G7 countries.

TITLE-ABS-KEY ("lung cancer" OR "lung malignancy" OR "lung metastasis" OR "lung carcinoma" OR "adenocarcinoma of lung") AND PUBYEAR > 2002 AND PUBYEAR < 2013 AND (LIMIT-TO (AFFILCOUNTRY, "United States") OR LIMIT-TO(AFFILCOUNTRY, "Japan") OR LIMIT-TO (AFFILCOUNTRY, "United Kingdom") OR LIMIT-TO(AFFILCOUNTRY, "Germany") OR LIMIT-TO (AFFILCOUNTRY, "Italy") OR LIMIT-TO (AFFILCOUNTRY, "France") OR LIMIT-TO (AFFILCOUNTRY, "Canada"))

The following search strategy has been used for the BRIC countries.

TITLE-ABS-KEY ("lung cancer" OR "lung malignancy" OR "lung metastasis" OR "lung carcinoma" OR "adenocarcinoma of lung") AND PUBYEAR > 2002 AND PUBYEAR < 2013 AND (LIMIT-TO (AFFILCOUNTRY, "China") OR LIMIT-TO (AFFILCOUNTRY, "India") OR LIMIT-TO (AFFILCOUNTRY, "Brazil") OR LIMIT-TO (AFFILCOUNTRY, "Russian Federation"))

Bibliographic details like author, title, affiliations, document type, language, year, and number of citations were exported to Microsoft Excel.

5. Analysis and Discussion

All types of documents related to the research of lung cancer from 2003 to 2012 for the G7 and the BRIC countries have been processed. There were 73,788 papers for the countries of both the groups.

5.1. Year Wise Output and Growth Rate of the G7 and the BRIC Countries

The research output and growth rate of the G7 and the BRIC countries were shown in Table 1 and Table 2 respectively. It was also revealed from the table that 61407 articles were published by the G7 countries from 2003 to 2012. Among the G7 countries, US topped with 27375 (44.58%) papers, followed by Japan with 10666 (17.37%).

Table 1: *Year Wise Output and Growth Rate of the G7 Countries*

Country / Year	US	UK	France	Germany	Italy	Canada	Japan	Total
2003	1893	381	295	357	359	154	838	4277
2004	2125	432	381	485	413	216	844	4896
2005	2327	442	347	467	392	244	929	5148
2006	2459	496	398	514	478	246	1000	5591
2007	2613	520	410	523	480	291	969	5806
2008	2785	546	407	525	500	329	903	5995
2009	2908	599	469	596	549	354	1184	6659
2010	3144	624	485	641	565	377	1261	7097
2011	3380	686	552	601	634	415	1295	7563
2012	3741	733	588	704	716	450	1443	8375
Total	27375	5459	4332	5413	5086	3076	10666	61407
%	44.58	8.89	7.05	8.81	8.28	5.01	17.37	100.00
CAGR	**7.86**	**7.54**	**7.97**	**7.84**	**7.97**	**12.65**	**6.22**	

Table 2: *Year Wise Output and Growth Rate of the BRIC Countries*

Country / Year	Brazil	Russia	India	China	Total
2003	43	48	54	261	406
2004	43	54	70	295	462
2005	36	40	77	481	634
2006	55	39	86	563	743
2007	60	42	97	733	932
2008	65	36	120	988	1209
2009	70	30	153	1300	1553
2010	70	45	211	1391	1717
2011	86	56	298	1634	2074
2012	111	74	353	2113	2651
Total	639	464	1519	9759	12381
%	5.16	3.75	12.27	78.82	100.00
CAGR	11.11	4.93	23.20	26.16	

The growth rate was measured with Compound Annual Growth Rate (CAGR) [11]. The mathematical formula of CAGR is

$$\text{CAGR} = \left(\frac{\textit{Ending Value}}{\textit{Begining Value}} \right)^{\frac{1}{n-1}} - 1$$

China had the highest growth rate of 12.65. Except Japan, other countries (US, UK, France, Germany and Italy) have shown similar growth rate.

Among the BRIC countries, China topped with 9759 (78.82%) papers, followed by India with 1519 (12.27%) papers. China had the highest growth rate of 26.16 followed by India (23.20), Brazil (11.11) and finally Russia (4.93). When the G7 countries were compared with the BRIC countries, one of the BRIC country i.e. China had the highest growth rate (26.16).

The pattern of output and rank during the period 2003 to 2012 in two blocks for 5 years is depicted in Table 3. US, one of the G7 countries holds the first rank during the period 2003-2007 and 2008-2012. One of the G7 countries, Japan holds the second rank during the year 2003–2007, but during the year 2008–2012, one the BRIC countries, China holds the second rank.

Table 3: *Rank of the G7 and the BRIC Countries*

	Country	2003-2007	Rank	2008-2012	Rank	2003-2012
BRICS	Brazil	237	10	402	10	639
	Russia	223	11	241	11	464
	India	384	9	1135	9	1519
	China	2333	4	7426	2	9759
G7	US	11417	1	15958	1	27375
	UK	2271	5	3188	4	5459
	France	1831	7	2501	7	4332
	Germany	2346	3	3067	5	5413
	Italy	2122	6	2964	6	5086
	Canada	1151	8	1925	8	3076
	Japan	4580	2	6086	3	10666

Comparison between the G7 and the BRIC countries is demonstrated in Figure 1. Although the G7 countries played a predominant role in lung cancer research and the articles from these countries kept increasing in quantity, their article share was decreasing in the last 5 years. On contrary, BRIC countries had a significant growth in both in the number of articles and their share.

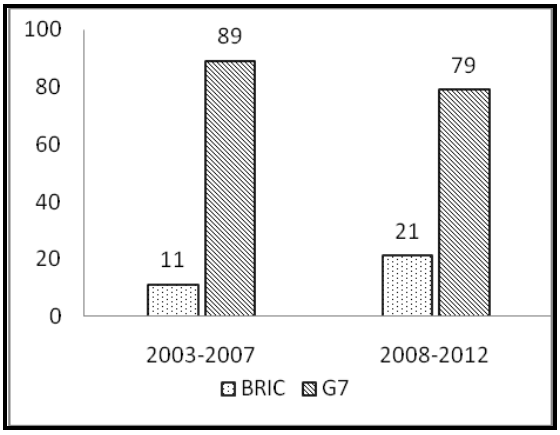

Figure 1: *Comparison between G7 and BRIC on the Percentage of the Articles*

5.2. Measure of Collaboration

Collaboration Coefficient (CC) can be defined as (Ajiferuke, 1988) [12],

$$CC = \frac{\sum_{j=1}^{A}\left(\frac{1}{j}\right)f_j}{N}$$

CC always lies between 0 and 1. As the number of single authors dominate CC 0. CC distinguishes between single authors and multiple authors. However, CC fails to yield 1 for maximal collaboration, except when number of authors is infinite. From Table 4, it can be observed that Japan (one of the G7 country) and Russia (one of the BRIC country) have highest collaboration rate of 0.80 followed by China (0.79) and Italy (0.78). Except US and UK, all the countries have collaboration rate ≥ 70.

Table 4: *Collaboration Rate of the G7 and the BRIC Countries*

	Country	Number of Authors					Total	CC
		1	2	3	4	> 4		
BRIC	Brazil	21	55	62	85	416	639	0.77
	Russia	10	34	39	52	329	464	0.80
	India	65	260	266	309	619	1519	0.70
	China	123	599	1144	1264	6629	9759	0.79
G7	US	3083	4181	3288	2865	13958	27375	0.68
	UK	644	823	764	664	2564	5459	0.67
	France	446	400	376	387	2723	4332	0.72
	Germany	559	639	536	572	3107	5413	0.70
	Italy	236	337	423	455	3635	5086	0.78
	Canada	219	356	342	381	1778	3076	0.73
	Japan	487	430	579	810	8360	10666	0.80

5.3. Co–Authorship Pattern

Based on the suggestions made by Garg and Padhi, the Co-Authorship pattern and Co-Authorship Index (CAI) has been calculated by using the following formula.

$$CAI = \frac{N_{ij}/N_{io}}{N_{oj}/N_{oo}} X\ 100$$

Where, N_{ij} = Number of publications for the particular authorship pattern for a particular country

N_{io} = Total output for the particular authorship pattern
N_{oj} = Total output of the particular country
N_{oo} = Total output of all the countries

Table 5: *Co–Authorship Pattern of the G7 and the BRIC Countries*

	Country	Single Author	CAI	Two Author	CAI	Three Authors	CAI	> Three Authors	CAI	Total
BRICS	Brazil	21	41	55	78	62	92	501	111	639
	Russia	10	27	34	67	39	79	381	117	464
	India	65	54	260	156	266	165	928	87	1519
	China	123	16	599	56	1144	111	7893	115	9759
G7	US	3083	141	4181	139	3288	113	16823	87	27375
	UK	644	148	823	137	764	132	3228	84	5459
	France	446	129	400	84	376	82	3110	102	4332
	Germany	559	129	639	107	536	93	3679	97	5413
	Italy	236	58	337	60	423	78	4090	114	5086
	Canada	219	89	356	105	342	105	2159	100	3076
	Japan	487	57	430	37	579	51	9170	122	10666
	Total	5893		8114		7819		51962		73788

It is observed from Table 5 that except India, for the rest of the BRIC countries the value of CAI was more than 100 which shows that they preferred to work in small and big teams. The value of CAI for India for two and three authored publications were higher than the average, it seems that they were more preferred to work in small teams. For single authored publications in some of the G7 countries like US, UK, France and Germany, the CAI value stands higher than the average value which indicates that these countries preferring to work independently. In the case of multi authored paper the CAI value for Japan and Italy are higher than the average value which represents that these two countries prefer working as a team.

5.4. Publication Activity

In order to study the change in output of lung cancer articles among the countries, use of Transformative Activity Index (TAI) suggested by Guan and Ma [14] has been made. Mathematically,

$$TAI = \frac{C_i/C_o}{W_i/W_o} X\ 100$$

C_i – Number of publications of the specific country in the i^{th} block;
C_0 - Total number of publication of the specific country during the period of study;

W_i – Number of publications all the countries in the i^{th} block;
W_0 - Total number of publication of all the counties during the period of study.

Table 6: *TAI of the G7 and the BRIC Countries*

	Country	2003-2007	TAI	2008-2012	TAI	2003-2012	Change in TAI
BRICS	Brazil	237	95	402	103	639	+9
	Russia	223	123	241	85	464	-37
	India	384	65	1135	123	1519	+58
	China	2333	61	7426	125	9759	+64
G7	US	11417	107	15958	96	27375	-11
	UK	2271	106	3188	96	5459	-10
	France	1831	108	2501	95	4332	-13
	Germany	2346	111	3067	93	5413	-18
	Italy	2122	107	2964	96	5086	-11
	Canada	1151	96	1925	103	3076	+7
	Japan	4580	110	6086	94	10666	-16
		28895		44893		73788	

Table 6 shows the publication output of lung cancer research of the G7 and the BRIC countries during the two blocks i.e. 2003–2007 and 2008–2012. The TAI has been calculated for the two blocks.

It is clear from the Figure 2 that the publication activities in Russia, US, UK, France, Italy, Germany and Japan have been decreasing considerably. The remaining countries show an increasing trend in their publication activity as shown by the values of TAI. When the G7 countries were compared with the BRIC countries, the publication activity has increased considerably for the BRIC countries such as China, India and Brazil.

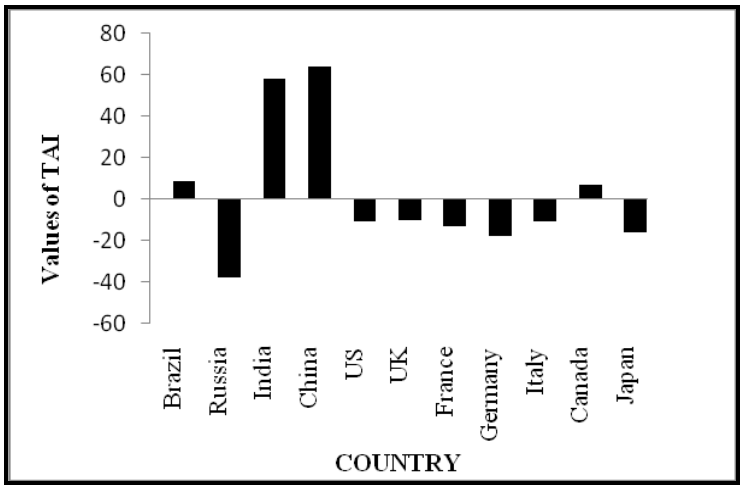

Figure 2: *Change in the Values of the TAI for the G7 and the BRIC Countries*

5.5. Citation Profile of Lung Cancer Research for the G7 and the BRIC Countries

The impact of publication is assessed in terms of number of citations that it has received. Out of 61407 publications in lung cancer research in the G7 countries, 11024 (18%) articles did not receive any citations. Remaining 50383 papers received 1404375 citations during 2003 to 2012. Average citation rate is 22.9 for all publications and US, UK and Canada received citations more than average

which was showed in Table 7. It was interesting to note that one of the article published by France during 2005 received 9936 citations.

In BRIC countries, out of 12381 papers, 5049 (41%) papers did not receive any citations; remaining 7332 papers received 94292 citations during 2003 to 2012. Average citation rate is 7.6 for all publications and Brazil, Russia and India received citations more than average which was showed in Table 8. Among the BRIC countries, one of the article published by Brazil during 2005 received 2881 citations.

Table 7: *Citation Profile of the G7 Countries*

Citations Range	US	UK	France	Germany	Italy	Japan	Canada	Total
0	3676	927	953	1099	908	3040	421	11024
1	2109	498	456	467	455	1025	226	5236
2	1620	357	299	396	354	704	197	3927
3	1369	293	252	277	276	546	168	3181
4	1226	245	163	263	195	442	120	2654
5	1058	173	163	189	211	384	122	2300
6 – 10	3800	727	528	707	758	1382	444	8346
11 -100	11256	1997	1396	1845	1785	2968	1244	22491
101 - 1000	1223	236	113	167	136	167	131	2173
> 1000	38	6	9	3	8	8	3	75
Total	**27375**	**5459**	**4332**	**5413**	**5086**	**10666**	**3076**	**61407**
Total Citation	**740180**	**128982**	**98564**	**105467**	**101770**	**151063**	**78349**	**1404375**
Average citations	**27.0**	**23.6**	**22.8**	**19.5**	**20.0**	**14.2**	**25.5**	**22.9**

Table 8: *Citation Profile of the BRIC Countries*

Citations Range	Brazil	Russia	India	China	Total
0	127	156	541	4225	5049
1	102	60	198	1350	1710
2	49	32	129	681	891
3	48	19	111	505	683
4	38	17	77	396	528
5	30	20	48	279	377
6 - 10	95	33	153	864	1145
11 -100	140	111	252	1419	1922
101 - 1000	8	15	9	38	70
> 1000	2	1	1	2	6
Total	639	464	1519	9759	12381
Total Citation	**11387**	**9005**	**11714**	**62186**	**94292**
Average citation	**17.8**	**19.4**	**7.7**	**6.4**	**7.6**

The impact of scientific publications was compared by two relative indicators namely Absolute Citation Impact and RCI. The Absolute Citation Impact is also called as CPP which is calculated by the average number of citations per publication. This is the most common and frequently used indicator which normalizes the large disparity in volumes of literature published among prolific publishing G7 countries and BRIC countries to compare the quality of the research. On the other hand, Thomson reuters developed RCI to calculate science and Engineering Indicators.Lalitha Kumari studied the field of synthetic organic research to analyze the impact of different countries.

$$RCI = \frac{A\ country's\ share\ of\ total\ citations}{A\ country's\ share\ of\ total\ publicatoins}$$

RCI = 1 indicates denotes a country's citation rate equal to world citation rate.
RCI < 1 indicates a country's citation rate less than world citation rate and also implies that the research efforts are higher than its impact.
RCI > 1 indicates a country's citation rate higher than world citation rate and also imply high impact research in that country.

Table 9: *RCI of the G7 and the BRIC Countries*

	Country	TP	TC	ACI	RCI
BRIC	Brazil	639	11387	17.8	0.88
	Russia	464	9005	19.4	0.96
	India	1519	11714	7.7	0.38
	China	9759	62186	6.4	0.31
G7	US	27375	740180	27.0	1.33
	UK	5459	128982	23.6	1.16
	France	4332	98564	22.8	1.12
	Germany	5413	105467	19.5	0.96
	Italy	5086	101770	20.0	0.99
	Canada	3076	78349	25.5	1.25
	Japan	10666	151063	14.2	0.70
		73788	1498667		

Table 9 presents the value of ACI and RCI for the G7 and the BRIC countries. For US, UK, France and Canada, RCI is more than 1, indicating higher citation impact that the world rate. Italy, Germany and Russia with RCI = 0.96 to 0.99 have almost equal to world citation rate. Brazil, India, China and Japan have RCI value less than 1 indicates that the research efforts are higher than visibility and impact.

6. Conclusion

Based on the above study, comparing the G7 and the BRIC countries in the lung cancer research, we conclude that although the G7 countries played a predominant role in lung cancer research and the articles from these countries kept increasing in quantity, their article share was decreasing in the last 5 years. On contrary, BRIC countries had a significant growth in both in the number of articles and their share. Detailed research work in the topic has revealed that further more scientomentric studies have been done and the results were similar– stating that the "Output from the BRICs shifted steadily to more closely resemble that of the G7" [17]. The publication activity has increased considerably for the BRIC countries such as China, India and Brazil than the G7 countries.

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Research Article | Open Access

Collaboration in the Cloud Computing among Students of Library and Information Science Department of Dr. Babasaheb Ambedkar Marathwada University, Aurangabad

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Abstract The Study examines how students of library science of Dr. Babasaheb Ambedkar Marathwada University, Aurangabad, collaborate in the cloud computing. A well structured questionnaire was distributed among the 60 students under study, only 42 retrieved. Findings of this study show that all the respondents were Aware of using the Internet, and collaboration in the cloud computing is being heavily used web mail and Social media, and also the study highlight the majority purpose of respondents are Sharing documents, Send a short message to another user outside of e-mail and having a text-based real-time chat. The study also discovered that respondents have ability to use Google applications and its services. Eventually, the study discusses the problems that are preventing while collaborate and use of the internet.
Keywords *Collaboration; Cloud Computing; Students; Library Science*

1. Introduction

Now a day's libraries are adopting computing resources and services that do not own to provide new and innovative services. In the opening remarks to their book on information technology in librarianship, (Buschman and Leckie, 2009) indicate that librarians need to be critical in their use of technology. Cloud computing and Web collaboration are two major concepts that underlie new and innovative developments in library automation (Sosinsky, 2011). The term cloud computing describes the abstraction of web based computers, resources, and services that developers can employ web based systems. The concept of cloud collaboration brings together new advances in cloud computing and collaboration that are becoming more and more necessary in firms operating in an increasingly globalised world.

Cloud based meeting and cloud based collaboration tools and its applications services are some of advanced important of the information technology industry's hottest items. In the simple way (Jamsa, 2013) collaboration is a process of two or more people working together to achieve their goals. For years many students use to send and receive short message, content via email. To meet their needs of improving their knowledge and also many students attend conferences and forum via virtual meetings.

2. Scope and Limitations

The scope of the present study is limited to the collaboration in cloud computing among the students of library and information science department of Dr. Babasaheb Ambedkar Marathwada University, Aurangabad, during January 2014.

3. Purpose and Objectives of the Study

The main purpose of the study is to investigate the collaboration in the cloud computing among students of library and information science department of Dr. Babasaheb Ambedkar Marathwada University, Aurangabad. Specifically the study found out:

a) To identify awareness of the Internet by students of library and information science.
b) To determine the frequency of use and locations of access internet by students of library and information science.
c) To ascertain the purpose for which the students of library and information science are collaborating in the clouds.
d) To determine the tools those are using to collaborate in the clouds by students of library and information science.
e) To count clouds computing opening accounts by students of library and information science.
f) To know the ability to access and use some popular collaborations application in the clouds.
g) To know the extent of satisfactions about collaboration in the clouds.
h) To find out the difficulties encountered while collaborating in the clouds.

4. Methodology

Case study method was adopted for data collection, in order to fulfill the specific objectives, researcher-designed questionnaire which was administered among 60 students, only 42 returned usable questionnaire giving a response rate of 70% which formed the basis for the analysis.

5. Data Analysis

Data having been collected through the use of the questionnaire was analyzed using descriptive statistics using the Statistical Package for Social Sciences (SPSS) software. The main purpose of questionnaire was to know how users collaborate in the clouds computing.

Table 1: *Gender of Respondents*

Gender	Frequency	Percentage (%)
Male	24	57.1
Female	18	42.9
Total	42	100

The Table 1 shows the distribution of respondents by sex. It shows 24 (57.1%) of the respondents are male, while the female make up the remaining 18 (42.9%).

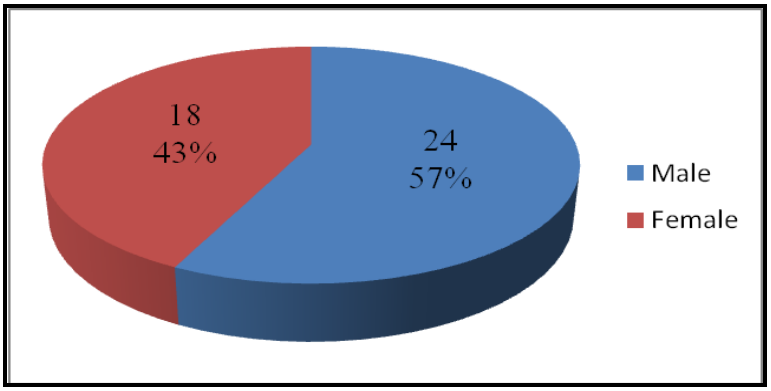


Figure 1: *Distribution of Gender*

Table 2: *Age of Respondents*

Age	Frequency	Percentage (%)
20 to 24	21	50.0
25 to 29	19	45.2
30 to 34	2	4.8
Total	42	100

Data in Table 2 shows that the majority 40 (95.2%) of the respondents between the age of 20 to 29. It means they are young and active to adopt and up to date new advanced technologies. Whereas only 2 (4.8%) between the age of 30 to 34.

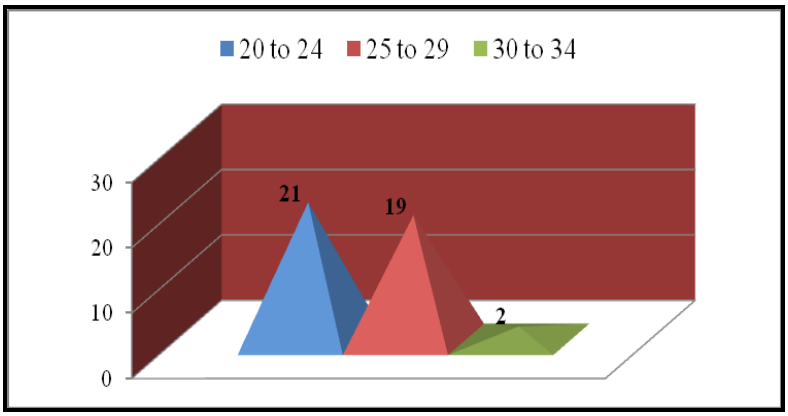


Figure 2: *Age of Respondents*

Table 3: *Awareness of using the Internet*

Awareness of Internet	Frequency	Percentage (%)
Yes	42	100
No	-	-
Total	42	100

The Table 3 shows that all the respondents 42(100%) are aware of using the Internet, this due to including Internet aspects in their syllabus as shown in the Table 12. This result confirmed by the study of (Singh, 1998) who revealed that all the librarians are aware of using Internet.

Table 4: *Experience of using Internet*

Years of Experience	Frequency	Percentage (%)
1 to 2 years	13	31.0
2 to 3 years	8	19.0
3 to 4 years	7	16.7
More than 4 years	14	33.3
Total	42	100

The Table 4 shows that 14 (33.3%) of the respondents had been using the Internet more than 4 years. This result is somehow in line with findings of (Bankole & Oludayo, 2012; Otunla, 2013) who showed that respondents have experience more than four years to deal with Internet. Also this study shows that 13 (31.0%) have experience for 1 to 2 years, followed by 8 (19.0%), 7 (16.7%), have experience for 2 to 3 years and 3 to 4 years, respectively.

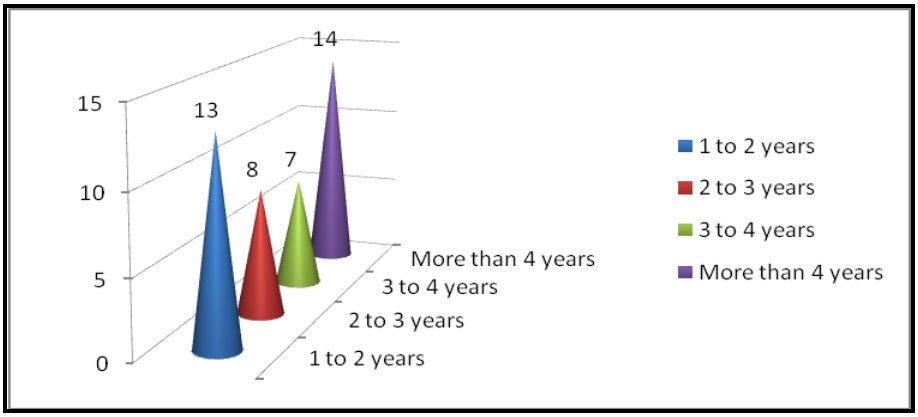


Figure 3: *Experience of using Internet*

Table 5: *Frequency of using the Internet*

Frequency of use	Frequency	Percentage (%)
Daily	31	73.8
2 or three times in week	9	21.4
Once in week	2	4.8
Total	42	100

It has been showed from the Table 5 that a majority 31 (73.8%) of respondents use the internet daily. 9 (21.4%) of respondents use it for two or three times in week, these results are somehow in lines with findings of (Khaparde, 2011) and (Islam, 2013) who showed that the majority of respondents use internet every day and more than two times in week. Also the study found that 2 (4.8%) of respondents are using the Internet once in week, otherwise no one of respondents use the Internet fortnightly, monthly and hardly ever.

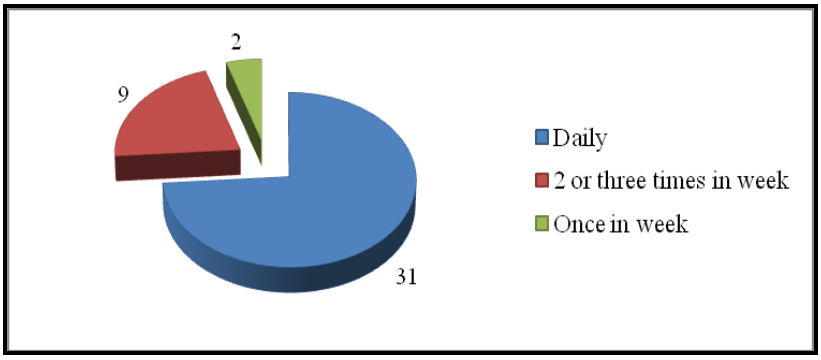


Figure 4: *Frequency of using the Internet*

Table 6: *Location of using the Internet*

Place of use	Frequency	Percentage (%)
Department laboratory	38	90.5
At home	18	42.9
Mobile phone	16	38.1
Internet cafes	15	35.7
Any other	5	11.9

Data in Table 6 shows that 38 (90.5%) of respondents have accessed the Internet from department laboratory. This is because the long time spends by the respondents during schedule study in the department, 18 (42.9%) of respondents access the Internet from the home, these results are somehow in line with findings of (Islam, 2013) who showed that the majority of respondents access the internet from their departments computers, then from the home. The study also revealed that 16 (38.1%) and 15 (35.7%) of respondents access the Internet from mobile phone and Internet Cafes, respectively, these results disagree with the study of (Nwosu and Anyira, 2012) who showed that half of the respondents have mobile access to the Internet. Thus they can access the Internet anywhere on their mobile devices; this was followed by who access the internet via cyber cafes. 5 (11.9%) indicated that they access the net from friends and colleagues' house.

Figure 4: *Location of using the Internet*

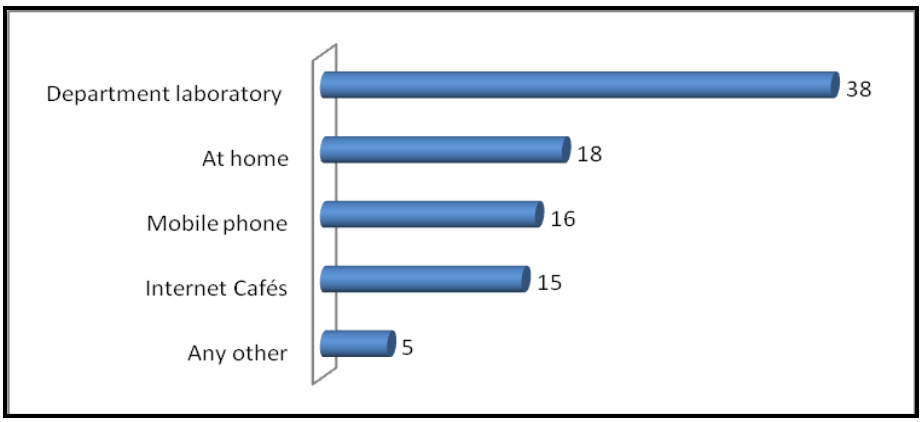


Table 7: *Tools of Collaboration in the Cloud*

Tools	Frequency	Percentage (%)
Web mail	37	88.1
Instant messaging (IM)	12	28.6
Wiki	17	40.5
Blog	4	9.5
Virtual meetings	3	7.1
Skype voice over internet protocol (VOIP)	2	4.8
Shared documents	11	26.2
Microsoft office web applications	12	28.6
Social media	27	64.3
Phone systems	11	26.2
Calendar management	2	4.8

From the Table 7 it is obvious that the majority 37 (88.1%) of respondents are using web mail as a tool to collaborate in the cloud, This finding corroborates many studies such as that of (Ajuwon, 2003; Palesh, Saltzman and Koopman, 2004; Khaparde, 2001; Simsim, 2001; Salaam and Adegbore, 2010; Nwezeh, 2010 and Bankole, 2012) who revealed that the majority of students used the email to communicate with their friends and colleagues. Even in developed countries such as America, (Jones and Madden, 2002) found that the greatest number 62% of students used e-mail, whereas about 29% use instant messaging as Internet communication tools. This findings maybe regarding to the various benefits of email over other communication media include its being an asynchronous, bidirectional, groupware medium, that requires less social presence making it possible for users to have more control over when to read/respond, reply with equal ease to senders, reply to several others simultaneously, and interact with more diverse others than they would do in person (Wellman et al., 1996). The study also found that 27 (64.3%) of respondents use social media to collaborate in the cloud, this followed by 17 (40.5%) of respondents use wiki, whereas the Instant messaging (IM) and Microsoft office web applications have the same rate 12 (28.6%) by respondents, 11 (26.2%) use phone systems, 3 (7.1%) of respondents use Virtual meetings, lower 2 (4.8%) rated to both Skype voice over internet protocol (VOIP) and Calendar management.

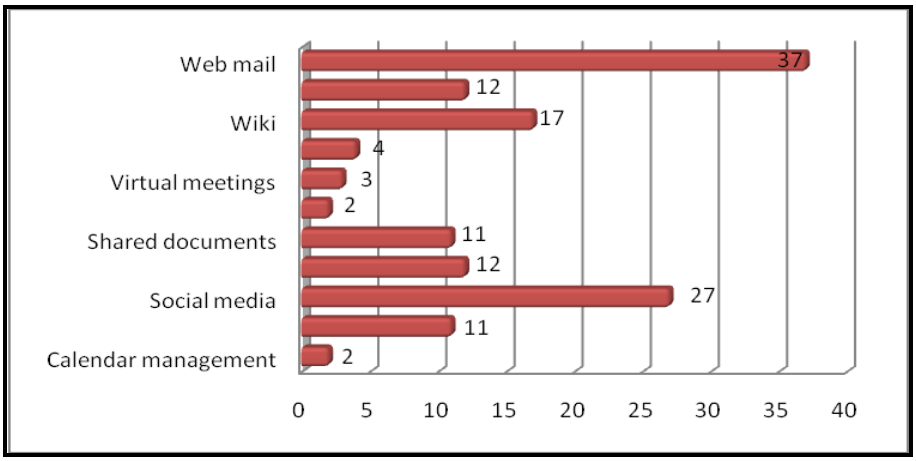


Figure 5: *Tools of Collaboration in the Cloud*

Table 8: *Frequency of Opening Accounts*

Accounts	One	Two	Three	More
Google	25(59.5)	6(14.3)	3(7.14)	11(26.19)
Yahoo	18(38.1)	2(4.8)	-	4(9.5)
Hotmail	1(2.4)	-	1(2.4)	1(2.4)
Rediff Mail	6(14.3)	2(4.8)	-	2(4.8)
Face Book	17(40.5)	2(4.8)	3(7.14)	11(26.19)
You Tube	8(19.1)	-	-	2(4.8)
Twitter	5(11.9)	-	2(4.8)	-
Blog	4(9.52)	1(2.4)	-	-
Skype	3(7.14)	-	-	-
Other	4(9.52)	1(2.4)	-	1(2.4)

From Table 8 it is revealed that 25 (59.5%), 18 (38.1%), 17 (40.5%) of respondents have one account for Google, Yahoo and Facebook, 11 (26.19%) of respondents have more than three accounts in Google and Facebook, 6 (14.3%) of respondents have two accounts, and also 3 (7.14%) of users have three opening accounts in Google and Facebook.

Table 9: *Purpose of Collaboration*

Purpose	Frequency	Percentage (%)
Having a text-based real-time chat	21	50.0
Send a short message to another user outside of e-mail	24	57.1
To talk face to face interaction	9	21.4
Audio-only calls over the internet	8	19.0
Sending and receiving email fax	19	45.2
Sending voice mail and receiving	7	16.7
Add and edit content	5	11.9
Create and access to a word processor, spreadsheet, and presentation	14	33.3
Sharing documents (videos, photos, etc.)	25	59.5
Create and publish content on the web (e.g. blog)	9	21.4
Share calendars to simply appointments and meetings	2	4.8
Other	4	9.5

Internet use has both advantages and disadvantages. It depends upon the purpose of use. If it is positively used, it helps to increase knowledge and keeps oneself abreast of the latest developments (Islam & Hossain, 2012). From table above, the majority purpose of respondents are 25 (59.5%), 24 (57.1%), 21 (50.0%) are Sharing documents, Send a short message to another user outside of e-mail and having a text-based real-time chat, respectively, whereas 19 (45.2%) of respondents sending and receiving email fax, 9 (21.4%) rated for both purpose, to talk face to face interaction and create and publish content on the web, 8 (19.0%), 7 (16.7%) of respondents purpose to audio-only calls over the internet and sending voice mail and receiving, respectively, lower rated to, add and edit content, any other, and share calendars to simply appointments and meetings, (11.9%), 4 (9.5%), 2 (4.8%), respectively.

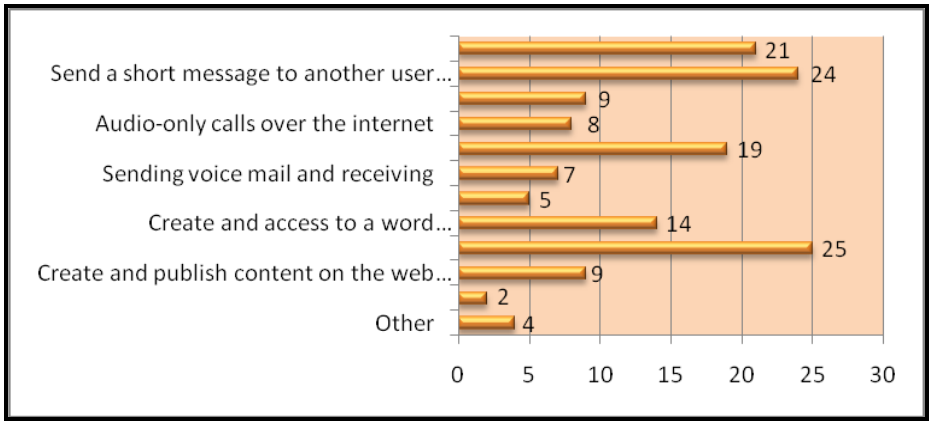


Figure 6: *Purpose of Collaboration*

Table 10: *Use of Popular Collaborations Applications and Services*

Applications and Services	Frequency	Percentage (%)
My fax	6	14.3
Google Gmail	41	97.6
Google voice phone system	7	16.7
Google Docs	12	28.6
Google calendar	7	16.7
Google sites	16	38.1
Google talk	7	16.7
Word press (a leading blog sit)	5	11.9
GoToMeeting	3	7.1
WebEx	1	2.4
Zentation (virtual presentation software)	1	2.4
Salesforce.Com chatter	1	2.4
Office web app	6	14.3
Hulu (streaming content)	1	2.4
Picasa (organize, edit, and share your photo)	10	23.8
Other	2	4.8

The Table 10 shows that the use of Google dominated 41 (97.6%), collaborations applications, followed by 16 (38.1%), 12 (28.6%) of respondents use Google sites and Google documents, respectively. And 10 (23.8%) of respondents use Picasa, also 7 (16.7%) of respondents rated for both Google calendar and Google talk, 6 (14.3%) of respondents have ability to apply Office web app, 5 (11.9%) use Word press (a leading blog sit), 3 (7.1%) have ability to apply Go To Meeting, 2 (4.8%) for any other, lowers rate 1 (2.4%) for all WebEx, Zentation (virtual presentation software), Salesforce.Com chatter and Hulu (streaming content).

Table 11: *Extent of Satisfaction of Collaboration*

Satisfaction	Frequency	Percentage (%)
Satisfied	30	71.4
Fully satisfied	10	23.8
Moderately satisfied	2	4.8
Not satisfied	-	-
Total	42	100

Table 11 shows that 30 (71.4%) are satisfied with collaboration in the cloud computing, this is consistent in an earlier study of Khaparde (2001) who showed that most of research scholars of Dr. Babasaheb Ambedkar Marathwada University, Aurangabad were satisfied about the use of internet. The study shows that 10 (23.8%) are moderately satisfied, 2 (4.8%) respondents are fully satisfied with collaboration in the cloud computing, whereas no one of the respondents are not satisfied with collaboration in the cloud.

Figure 7: *Extent of Satisfaction of Collaboration*

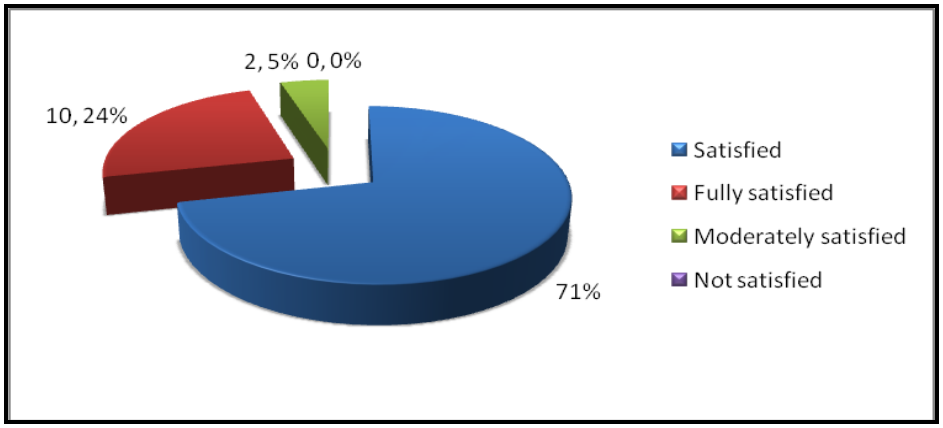


Table 12: *Including in the Syllabus*

Available	Frequency	Percentage (%)
Yes	41	97.6
No	1	2.4
Total	42	100

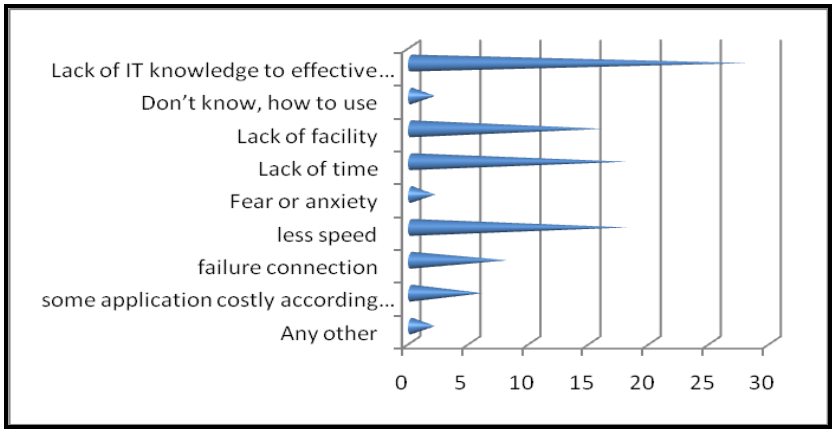
The Table 12 shows that mostly 41 (97.6**%**) of the respondents have been studying clouds computing in their syllabus, whereas only one respondent who said that cloud computing not including in the syllabus.

Table 13: *Difficulties to Collaborate in the Clouds*

Difficulties	Frequency	Percentage (%)
Lack of IT knowledge to effective utilization of the collaborating tools and services	28	66.7
Don't know, how to use	2	4.8
Lack of facility	16	38.1
Lack of time	18	42.9
Fear or anxiety	2	4.8
less speed	18	42.9
failure connection	8	19.0
some application costly according to my financial	6	14.3
Other	2	4.8

From the Table 13 it is seen that 28 (66.7%) respondents have difficulties of lack of IT knowledge to effective utilization of the collaborating tools and services. Lack of time and less speed have the same rate 18 (42.9%), and 16 (38.1%) have barriers of lack of facility, 8 (19.0%) of respondents have problem of failure connection, and lower rate 2 (4.8%) given to: those who don't know how to use, fear or anxiety and any other, whereas 2 (4.8%) respondents indicated that no difficulties at all to use the Internet and collaborate in the clouds.

Figure 8: *Difficulties to Collaborate in the Clouds*



6. Conclusion

Cloud computing is a vast ocean of new advanced technology in library and information science. The present study revealed that a majority of respondents used web mail and Social media as a tool to collaborate in the clouds computing. Also respondents have used Google Gmail as popular collaborations applications and services. The study also indicates that most users are satisfied to collaborate in the clouds computing because of including clouds aspects in their syllabus. This study has a vital significance in redesigning the policy framework to suit to the modern era with more emphasize on new advanced technology and providing access to information more and more. The survey also helps us in great deal to indentify the areas, which has to be looked in and give more importance to provide better facilities and services to the students of library science.

7. Suggestion

Necessary IT training facilities and more practical to be provided to the library students to apply and make effectively use of collaboration tools available on the Internet. Internet connectivity should be speedily available to all laboratories of the library department.

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Research Article **Open Access**

College Libraries of Srinagar: A Study to Evaluate Collection, Facilities and Services

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Abstract The study is an attempt to evaluate library collections, facilities and services of degree colleges of Srinagar, Kashmir. A questionnaire is used to collect primary data from users to know the different dimensions of the study. The results reveal that the Frequency of daily visitors to libraries is very low as majority of users prefer to visit monthly or weekly basis. Libraries must take proper steps in order to catch good number of readers on daily basis. Majority of the users are not satisfied with the quality of periodicals, so libraries will revisit their present policy of periodical selection. The data also reveal that the most of users prefer to use text books and seek assistance from the library staff. The findings of the study will be helpful to higher authorities and librarians of the colleges in terms of knowing the collection, user perspectives and services and made aware them about the strength and weakness of the library.
Keywords *Collection; Resources; Colleges; Satisfaction; Problems*

1. Introduction

Education at higher level has been described more as a process of learning than of teaching and this signifies the self-efforts to be put in by students. Class-room instruction can only initiate a student in his subject but it cannot provide all the needed opportunities for attaining the complex educational objectives. It's at this juncture that the libraries come to help the students. It's in the library that the more vital phase of learning occurs. As such a heavy responsibility rests on the libraries in the colleges to provide facilities for learning.

The library is a part and parcel of the institution which it serves. The library is not only the connecting link between teaching and learning. Libraries occupy a place a prominence in higher education. In colleges and universities the library supplement rich resources what the class-room falls short to provide. As such a library in college and universities has a very significant role to play in the educational process. A college library is the heart of a college. A college library is the information centre established, maintained and administered by a college to meet the information needs of students and faculty. The vital role played by college libraries has been well recognized by all those

who were concerned with higher education like educationists, educational commission and committees, planners, libraries community (Daxa L., Gajera and Neharika Udani, 2013).

The process of scheduling and acquiring a reasonable collection of library resources of many formats is called collection development. It is often considered as synonymous to “Collection building”, which means that there are already core of collection in the library and the librarian is going to build up the collection further (Ratha). A library's collected works include Journals, books, newspapers, manuscripts, films, maps, prints, documents, microform, CDs, cassettes, videotapes, DVDs, Discs, e-books, audio books, databases, and other formats. To maintain a good and impartial collection in libraries, evaluation of a library collection is compulsory. Evaluation is a gauge to assess the performance against user expectations, or it is the testing of an organization or system for effectiveness and efficiency. There are two basic methods of evaluating a library collection i.e. user centered that depends upon survey of faculty and students, circulation records shelf availability studies, inter library loan statistics, and citation studies. The other method is collection centered that depends upon examining the collection directly by checking the collection against core list of resources, catalogs, or bibliographies, or compiling comparative statistics on collection size and expenditure (Ameen & Haider, 2007).

The main objective of collection evaluation is to provide a collection that is relevant and meets the needs of its patrons. Evaluation plays an important role in the development of college and university libraries. It enhances the library infrastructure, management and standardization. The study is an attempt to evaluate the collection and services of degree colleges of Srinagar.

2. Problem

Evaluation of library and information services is an integral part of good library management. It testifies whether the resources spent have properly resulted in the attainment of desired objectives or not. It tells how well the collection development is being carried out. The study is an effort to evaluate the collection, services and facilities of college libraries of Srinagar.

3. Objectives

1) To envisages the up to-datedness’ of college library collection with regards to the needs of its users.
2) To analyze the satisfaction level of users with different types of services being provided by the college libraries.

4. Scope

The scope of the study is confined to the 6 college libraries of Srinagar. The lists of the selected colleges are as under:

1) Amar Singh Degree College
2) Women College Nawakadal
3) Islamia College of Science & Commerce
4) Bemina Degree College
5) Women College M.A. Road
6) Shri Pratab College

5. Review of Related Literature

The literature survey reveals that many studies have been carried out at global level on different facets of collection evaluation, usage and impact. The present review makes an attempt to scan various works carried out at global level in the area. According to Biradar, Kumar & Mahesh (2009) reveals that almost all the users visit the library. Though the documentary and non-documentary sources are sufficient but frequency use of sources is low, non-documentary sources are less used perhaps owing to lack of awareness or inconvenience in use. Another study by Pratap & Joshi (2009) is of the opinion that there is urgent need to fill in the existing vacancies in these libraries, so that these libraries can achieve their objectives successfully. Among other thing is to improve library collection and IT applications in the library.

The study by Murugan, Sundaravadivel & Thirunavukarasu (2010) suggests that Library professionals must organize awareness programmes like orientation programmes, library week celebration, book exhibitions of the library resources and services so that users gets maximum benefit from these resources. Daxa L., Gajera and Neharika Udani (2013) are of the opinion that College libraries are the integral part of the teaching- learning process, where the students practice independent learning. The librarian should take the student to libraries for their required information. The librarian should regularly scan the course contents and match with the available collection, to make sure that the collection is adequate for meeting the information requirements of user community.

Another study by Mangrum & Pozzebon (2012) divulges that libraries being essentially information providers need a shared framework regarding the criteria determining the decisions about resources and ways for implementing such decisions.

6. Methodology

In order to fulfill above laid down objectives the study was carried out by using a specially designed questionnaire to know the users perspective about the library facilities, resources and services. A total of 1200 library users are randomly selected from colleges of Srinagar (i.e. 200 respondents from each college) and the questionnaire was distributed randomly among students. The Table 1 provides the clear outlook of the colleges.

Table 1: *List of Selected Colleges of Srinagar*

S. No.	College	No. of Respondents Selected
1	Women College Nawakadal	200
2	Bemina Degree Colleges	200
3	Islamia College of Science and Commerce	200
4	Amar Singh Degree College	200
5	Women College M.A. Road	200
6	Shri Pratab College	200
	Total	1200

7. Data Analysis

7.1. Frequency of Visiting Library

While envisaging data, it is found that a highest of 49.2 % students from all six colleges prefer to visit library on weekly basis while analyzing colleges on individual level, majority of students prefer visiting library on weekly and monthly basis. Results reveal that frequency of visits is very low when it comes to daily visits. A clear picture is offered by Table 2.

Table 2: *Frequency of Respondents Visiting Library*

Frequency	Women's College Nawakadal	Bemina Degree College	Amar Singh College	Islamia College Of Science & Commerce	Women College M.A Road	Shri Pratab College	Total
Daily	50	40	48	76	70	56	340
Once in Week	106	90	100	100	90	104	590
Monthly	38	60	46	22	40	37	243
Never	6	10	6	2	0	3	27

7.2. Use of Resources

The data depicts that a highest of 45.0 % from all six colleges use text book. Whereas analyzing colleges the use of e-resource is very low (2.3%). While as 16.7 % of students use text books and newspapers, 13.3 % use newspapers. Result reveals most of users prefer to use text books. A clear vivid picture is offered by Table 3.

Table 3: *Use of Resources*

Resources	Women College Nawakadal	Bemina Degree college	Amar Singh college	Islamia Degree college	Women College M.A Road	Shri Pratab college	TOTAL
Text books	110	90	106	45	87	102	540
Magazines	10	10	10	7	19	20	76
E- Resources	4	4	8	2	6	4	28
News paper	30	60	40	2	9	19	160
Text books & Magazines	6	30	23	11	12	18	100
Text books & News papers	20	3	3	79	65	30	200
Text books & e-Resources	12	2	3	20	1	5	43
Magazine & e-resources	3	0	4	14	1	2	24
Magazines & Newspapers	5	0	1	12	0	0	18
e-Resources & Newspapers	0	1	2	4	0	0	7
e-Resources, Magazines & Newspapers	0	0	0	4	0	0	4
TOTAL	200	200	200	200	200	200	1200

7.3. Satisfaction of Users Regarding Library Collection

While analysis of data it is revealed that 36.5 % of the students are of the opinion that collection in the libraries is appropriate to their course. While as 3.5 % are of the opinion that their collection never meets their course needs. A total of 37.2 % and 22.8 % show that the range of users is satisfied sometimes and always respectively. Thus the results reveal that the users are mostly satisfied with their college collection. A clear picture is offered by Table 4.

Table 4: *Satisfaction of Users Regarding Library Collection*

Satisfaction	Women College Nawakadal	Bemina Degree College	Amar Singh College	Islamia Degree College	Women College M.A Road	Shri Pratab College	TOTAL
Always	68	58	24	35	42	55	438
Mostly	94	70	40	30	39	32	446
Sometimes	38	62	30	28	19	10	274
Never	0	10	6	7	0	3	42
Total	200	200	200	200	200	200	1200

7.4. Satisfaction of Users Regarding Asking for Reference or Information Assistance

Data analysis depicts that 33.0 % of students at different colleges seek reference/ information assistance and 12.4 % never take any assistance. A total 24.7 % and 12.4 % mostly and always take assistance. Result reveals that most of users some seek for reference assistance. A more detailed picture is offered by Table 5.

Table 5: *Satisfaction of Users Regarding Asking for Reference or Information Assistance*

Satisfaction	Women College Nawakadal	Bemina Degree College	Amar Singh College	Islamia Degree College	Women College M.A Road	Shri Pratab College	TOTAL
Always	14	22	90	110	90	70	396
Mostly	30	26	50	50	60	80	296
Sometimes	130	110	30	29	30	30	359
Never	26	42	30	11	20	20	149

7.5. Response of Users Regarding the Approach for Seek Suggestions and Guidance

Data reveals that highest of 60.5% students take assistance from library personnel, 21.6% from colleagues and 7.83 % from others. Therefore libraries must have professional staff, rather than having non-professionals. A clear picture is offered by Table 6.

Table 6: *Response of Users Regarding the Approach for Seek Suggestions and Guidance*

Source of Assistance	Women College Nawakadal	Bemina Degree College	Amar Singh College	Islamia Degree College	Women College M.A Road	Shri Pratab College	TOTAL
Faculty	30	24	22	20	18	12	126
Colleagues	40	30	60	36	70	18	254
Library Personnel	122	130	100	138	80	156	726
Others	8	16	18	6	32	14	94

7.6. Response Regarding Quality of General Reference Books

While envisaging data, it reveals that a total of 47.50 % students are moderately satisfied with general reference books while as 6.92 % are very satisfied, 6 % are fully satisfied and 15.42 % are not satisfied. Results reveal that the reference collection seems to be moderately adequate despite of the fact that good numbers of students are satisfied with the collection. A clear view is offered by Table 7.

Table 7: *Response Regarding Quality of General Reference Books*

Quality of General Reference Books	Women College Nawakadal	Bemina Degree College	Amar Singh College	Islamia Degree College	Women College M.A Road	Shri Pratab College	TOTAL
Not satisfied	28	80	20	7	40	10	185
Barely Satisfied	60	30	40	50	40	70	290
Moderately Satisfied	70	70	104	128	108	90	570
Very Satisfied	12	14	22	12	5	18	83
Fully Satisfied	30	6	14	3	7	12	72

7.8. Response Regarding the Quality of Periodicals

Data analysis reveals that highest of 46.67 % of students are moderately satisfied with the collection, 4.42 % are fully satisfied and while as 18.50 % are not satisfied and 21.7 % are barely satisfied. The result reveals that students are moderately satisfy with the periodical collection. A clear picture is offered by Table 8.

Table 8: *Response Regarding the Quality of Periodicals*

Quality of Periodical	Women College Nawakadal	Bemina Degree College	Amar Singh College	Islamia Degree College	Women College M.A Road	Shri Pratab College	TOTAL
Not satisfied	40	20	40	26	44	52	222
Barely Satisfied	30	50	40	50	40	44	254
Moderately Satisfied	90	110	80	94	90	96	560
Very Satisfied	27	18	22	18	18	8	111
Fully Satisfied	13	2	18	12	8	0	53

7.9. Response Regarding the Satisfaction Circulation and Reservation Facilities

While analyzing data, It is found that 48.3 % students are moderately satisfied with reserve books and circulation, 20.3 % are barely satisfied, 6.0 % are fully satisfied and while as 17.0 % are not satisfied. The result reveals that the circulation and reserve books seem to be moderately adequate. A good number of students are satisfied. A clear picture is offered by Table 9.

Table 9: *Response Regarding the Satisfaction Circulation and Reservation Facilities*

Circulation & Reservation Facilities	Women College Nawakadal	Bemina Degree College	Amar Singh College	Islamia Degree College	Women College M.A Road	Shri Pratab College	TOTAL
Not satisfied	34	50	14	50	10	46	204
Barely Satisfied	22	22	50	60	60	30	244
Moderately Satisfied	120	120	110	40	100	90	580
Very Satisfied	12	6	22	20	20	20	100
Fully Satisfied	12	2	4	30	10	14	72
Total	200	200	200	200	200	200	1200

7.10. Response Regarding the Quality of Audiovisuals Collection

While analysis data, it is found that 61.5% of students are not satisfied with the collection while as 26.0 % are barely satisfied and 1.6 % are fully satisfied. 6.9 % and 4.0 % are moderately and very satisfied. Thus the result reveals that the users are not satisfied with the quality of audio-visual collection. A clear picture is offered by Table 10.

Table 10: *Response Regarding the Quality of Audiovisuals Collection*

Audio Visual Collection	Women College Nawakadal	Bemina Degree College	Amar Singh College	Islamia Degree College	Women College M.A Road	Shri Pratab College	TOTAL
Not Satisfied	116	130	110	132	110	140	738
Barely Satisfied	60	40	60	46	60	46	312
Moderately Satisfied	10	24	12	15	12	10	83
Very Satisfied	8	4	16	5	12	3	48
Fully Satisfied	6	2	2	2	6	1	19

7.11. Response Regarding the Availability of Computers/Internet Facility

Data analysis shows that highest of 52.33 % are not satisfied with the service, however 24.50% and 12.33 % are barely and moderately satisfied. 4.92 % and 5.92 % are very and fully satisfied. Over results reveal that the users are not satisfied with the internet facility in the libraries. A clear picture is offered by Table 11.

Table 11: *Response Regarding the Availability of Computers/Internet Facility*

Computer & Internet Facility	Women College Nawakadal	Bemina Degree College	Amar Singh College	Islamia Degree College	Women College M.A Road	Shri Pratab College	TOTAL
Not satisfied	120	130	122	70	82	104	628
Barely Satisfied	40	40	44	60	60	50	294
Moderately Satisfied	16	14	18	30	40	30	148
Very Satisfied	10	9	6	14	10	10	59
Fully Satisfied	14	7	10	26	8	6	71

8. Major Findings and Conclusion

The main findings of the study are given below:

1) Frequency of visitors to libraries is very low as majority of users prefer to visit monthly or weekly basis. This is very alarming situation concerned libraries. They must take proper steps in order to catch good number of readers on daily basis. Libraries need to organize orientation courses. Library day and library week should be celebrated in the libraries. Workshop and seminars should be organized regularly.

2) Since the result reveals that most of users prefer to use text books, the libraries have good number of text book collection, they must duplicate best rather than acquiring many. Free e-books that are available through open consortia and other educational websites. Library authorities need to aware users regarding different information sources via print and electronic resources available.

3) Most of users seek to have assistance from the library staff. Therefore libraries must have professional staff, rather than having casual labours. They should provide IT training and implement the same in the libraries. At circulation desk there should be user friendly environment.

4) As we know that reference sources are the basis for any libraries, so the libraries must have good number of reference books, which help the user gain more insight and in-depth knowledge in their related fields.

5) Many readers are adequately satisfied with the quality of periodicals, that doesn't mean libraries will not revisit there policy of periodical selection. The libraries must revisit its policy. Titles that fall into scope of colleges and that are more in demand or new titles that are more fruitful to the student community, while as talking about e-resources, Audio visuals and CD/DVDS, we are aware that modern generation prefers to use that collection. So such collection must be managed properly.

The study will be helpful to the colleges in terms of knowing their collection, users and services and made aware about their strength, weakness, opportunities and threats.

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