Indian Journal of Library and Information Science

Editor-in-Chief A. Lal

Editors

Sanjay K. Kaushik, Maharshi Dayanand University, Rohtak S.S. Joshi, Guru Jambheshwar University, Hissar

International Editorial Advisory Board

Dong-Geun Oh, Keimyung University, South Korea Farnaz Fassihi, Iran Gabriel Gomez, Chicago State University, USA M. Shaheen Majid, Nanyang Technological University, Singapore P. Pichappan, UK R.M.R. Diyaelagedara, Ministry of Defense & Urban Development, Sri Lanka Tella, Adeyinka, University of Ilorin, Nigeria Yazdan Mansourian, Tarbiat Moallem University, Tehran, Iran

National Editorial Advisory Board

A.K. Sharma, Shyamlal College, New Delhi
B. Ramesh Babu, University of Madras, T.N.
Bhitre Leena Ramrao, Blooming BH, School, MS
Bulu Maharana, Sambalpur University, Odisha
C. Baskaran, Algappa University, T.N.
Gayas Makhdumi, Jamia Millia Islamia Univ, ND
Hemant Sharma, Jiwaji University, Gwalior
J.A. Siddiqui, Ch. Charan Singh University, U.P.
K. Praveena, Annamalai University, T.N.
Keshava, Karnatak University, Karnataka
M. Nagarajan, Annamalai University, T.N.
Mehtab Alam Ansari, Aligarh Muslim Univ, U.P.

Ramesha, Bangalore University, Karnataka S. Sudarshan Rao, Osmania University, A.P. S. Thanuskodi, Alagappa University, T.N. Sabitri Majhi, Sambalpur University, Odisha Shaista Parveen, Dr. BAM University, Maharshtra Shiva Kanaujia Sukula, CCS University, U.P. Sibsankar Jana, University of Kalyani, W.B. Sudha Azhikodan, Kannur University, Kerala Sudhir Kumar Arora, IGNOU, New Delhi Suresh Jange, Gulbarga University, Karnataka Syed Shah Ahmed Sarmast, Gulbarga V.R. Rajan, Pondicherry University, Puducherry Vinod Kumar, Guru Jambheshwar Univ,Hissar

Mod Imtiaz Ahmed, Pt. Ravishankar Shukla Univ, Raipur

Publication Editor - Manoj Kumar Singh

Indexing information: The journal is indexed with google Scholar, Index Copernicus, Poland, EBSCO Publishing's Electronic Databases, USA, Library & Information Science Source, USA, National Science Library, New Delhi, ProQuest, USA, Genamics JournalSeek.

^{© 2015} Red Flower Publication Pvt. Ltd. All rights reserved.

The views and opinions expressed are of the authors and not of the **Indian Journal of Library and Information Science**. The Indian Journal of Library and Information Science does not guarantee directly or indirectly the quality or efficacy of any product or service featured in the the advertisement in the journal, which are purely commercial.

Corresponding address: **Red Flower Publication Pvt. Ltd**, 48/41-42, DSIDC, Pocket-II, Mayur Vihar Phase-I, Delhi - 110 091(India), Phone: 91-11-22754205, 22756995, Fax: 91-11-22754205, E-mail: redflowerppl@vsnl.net, redflowerppl@gmail.com, Web:www.rfppl.co.in

Printed at: R.V. Printing Press, C-97, Okhla Industrial Area Phase-I, New Delhi - 110 020.

The Indian Journal of Library and Information Science (Print ISSN 0973-9548, Online ISSN 0973-9556, Registered with Registrar of Newspapers for India: DELENG/2007/22242) provides comprehensive international coverage of library & information science and technology. IJLIS is published 3 times a year by the Red Flower Publication Pvt. Ltd.

It presents peer-reviewed survey and original research articles on specific areas are: new information technology, education and training, human resource management, the changing role of the library, future developments, opportunities, bibliographic databases, cataloging issues, electronic publishing, acquisitions, collection development, administration, management, archives, preservation, and special collections, automation and cataloging. Its papers include letters to the editor, book reviews, calendar of events, conference reports, interviews, and much more.

Readership: Scholars, professionals, practitioners, faculty, students in the field of library and information science

Indexing information: The journal is indexed with google Scholar, Index Copernicus, Poland, EBSCO Publishing's Electronic Databases, USA, Library & Information Science Source, USA, National Science Library, New Delhi, ProQuest, USA, Genamics JournalSeek.

Subscription Information India

Individual 1 year Rs.7200 Life Subscription (Valid for 10 Years) Rs.72000 Institutional (1 year) Rs.8000

Rest of the World

Individual (1 year)	USD100
Insitutional (1 year)	USD600

PAYMENT METHOD

By cheque/Demand Draft:

Cheque should be in the name of **Red Flower Publication Pvt. Ltd**. payable at Delhi.

By Bank Transfer/TT: **Complete Bank Account No.** 604320110000467 **Beneficiary Name (As per Bank Pass Book):** Red Flower Publication Pvt. Ltd. **Address:** 41/48, DSIDC, Pocket-II, Mayur Vihar Phase-I, Delhi – 110 091(India) **Bank & Branch Name:** Bank of India; Mayur Vihar **Bank Address & Phone Number:** 13/14, Sri Balaji Shop,Pocket II, Mayur Vihar Phase- I, New Delhi - 110091 (India); Tel: 22750372, 22753401. **Email:** mayurvihar.newdelhi@bankofindia.co.in **MICR Code:** 110013045 **Branch Code:** 6043 **IFSC Code:** BKID0006043 (used for RTGS and NEFT transactions) **Swift Code:** BKIDINBBDOS

10. Beneficiary Contact No. & E-mail ID: 91-11-22754205, E-mail: redflowerppl@vsnl.net

Send all Orders to: **Red Flower Publication Pvt. Ltd.,** 48/41-42, DSIDC, Pocket-II, Mayur Vihar Phase-I, Delhi – 110 091, India, Phone: 91-11-22754205, 22756995, Fax: 91-11-22754205, E-mail: redflowerppl@vsnl.net, Website: www.rfppl.co.in

Indian Journal of Library and Information Science

	January - April 2015
Contents	Volume 9 Number 1
Original Article	
Information and Communication Technology (ICT) Use by Lecturers at the National University of Lesotho Wole Olatokun, Tsoenyo Julia Ntemana	5
Evaluation in information Retrieval – User Studies of Students of Shree chand Jain College, Library, Minjur, ThiruvallurDistrict, Tamil Nadu K. Muthukrishnan, P. Sivaraman	raprabhu 25
Effective use of ICTs and Digital Library Initiatives in Research Institutes and Organizations in Karnataka : A Study Ramesha, Raghavendra M.	1R & D 33
Design and Development of Library and Information Science Learning Object Retrieval System Amit Kumar Das	t (LISLO) 41
User's Satisfaction Towards Library Resources and Services in Maharaja Sura Institute of Technology of Guru Gobind Singh Indraprastha University, I An Evaluation Sanjay Kumar Pandey, M. P. Singh	ijmal Delhi: 53
A study of Information seeking Pattern of Faculty Members of Arts and Science in Thiruvallur District, Tamil Nadu K. Muthukrishnan, P. Sivaraman	ce Colleges 61
Review Article	
Digital Library in Open Universities – A Review V. Sheela, Puttamadaiah	75
Directory of Popular Search Engines Pavankumar M. Gudi, Syed Shah Ahmed Aarmast	79
Library and Information Services with a Touch of Mobile Applications Shiva Kanaujia Sukula	93
Guidelines for Authors	99

Revised Rates for 2015 (Institutional)			
Title	Freequency	Rate (Rs): India	Rate (\$):ROW
Dermatology International	2	4500	280
Gastroenterology International	2	5000	360
Indian Journal of Agriculture Business	2	4500	300
Indian Journal of Anatomy	2	6000	260
Indian Journal of Ancient Medicine and Yoga	4	7000	330
Indian Journal of Anesthesia and Analgesia	2	5000	600
Indian Journal of Anthropology	2	10500	500
Indian Journal of Applied Physics	2	3500	400
Indian Journal of Biology	2	3000	170
Indian Journal of Cancer Education and Research	2	6500	500
Indian Journal of Communicable Diseases	2	7500	58
Indian Journal of Dental Education	4	4000	288
Indian Journal of Forensic Medicine and Pathology	4	14000	576
Indian Journal of Forensic Odontology	4	4000	288
Indian Journal of Genetics and Molecular Research	2	6000	262
Indian Journal of Law and Human Behavior	2	5000	500
Indian Journal of Library and Information Science	3	8000	600
Indian Journal of Maternal-Fetal & Neonatal Medicine	2	8000	400
Indian Journal of Mathematics and Statistics	2	5000	200
Indian Journal of Medical & Health Sciences	2	6000	120
Indian Journal of Obstetrics and Gynecology	2	5000	200
Indian Journal of Pathology: Research and Practice	2	10000	915
Indian Journal of Plant and Soil	2	5000	1700
Indian Journal of Preventive Medicine	2	6000	250
Indian Journal of Reproductive Science and Medicine	4	3000	180
Indian Journal of Scientific Computing and Engineering	2	4000	280
Indian Journal of Surgical Nursing	3	3000	70
Indian Journal of Trauma & Emergency Pediatrics	4	8500	302
International Journal of Agricultural & Forest Meteorology	2	8000	800
International Journal of Food, Nutrition & Dietetics	2	4000	900
International Journal of History	2	6000	500
International Journal of Neurology and Neurosurgery	2	9000	276
International Journal of Political Science	2	5000	400
International Journal of Practical Nursing	3	3000	70
International Physiology	2	6500	240
Journal of Animal Feed Science and Technology	2	4000	280
Journal of Cardiovascular Medicine and Surgery	2	9000	238
Journal of Orthopaedic Education	2	4500	190
Journal of Pharmaceutical and Medicinal Chemistry	2	15000	350
Journal of Psychiatric Nursing	3	3000	70
Journal of Social Welfare and Management	4	7000	276
Meat Science International	2	5000	500
Microbiology and Related Research	2	6000	150
New Indian Journal of Surgery	4	7000	360
Ophthalmology and Allied Sciences	2	5000	150
Otolaryngology International	2	4500	300
Pediatric Education and Research	4	6500	150
Physiotherapy and Occupational Therapy Journal	4	8000	360
Urology, Nephrology and Andrology International	2	6500	350

Terms of Supply:

1. Advance payment required by Demand Draft payable to Red Flower Publicaion Pvt. Ltd. payable at Delhi.

2. Cancellation not allowed except for duplicate payment.

3. Agents allowed 10% discount.

4. Claim must be made within six months from issue date.

Order from

Red Flower Publication Pvt. Ltd., 48/41-42, DSIDC, Pocket-II, Mayur Vihar Phase-I, Delhi - 110 091 (India), Tel: 91-11-22754205, 45796900, Fax: 91-11-22754205. E-mail: redflowerppl@vsnl.net, redflowerppl@gmail.com, Website: www.rfppl.co.in

Information and Communication Technology (ICT) Use by Lecturers at the National University of Lesotho

Wole Olatokun*, Tsoenyo Julia Ntemana**

Abstract

This study investigated the characteristics which determine the rate of ICT use by lecturers at the National University of Lesotho (NUL). It also examined ICT use factors, competency level in usage, as well as challenges constraining use by the lecturers. Survey research design was adopted. Data were collected with a structured questionnaire administered to 213 respondents. Collected data were structured into grouped frequency distributions. Findings revealed that majority of the lecturers used various ICT resources and facilities and were competent in using ICT for most of their routine work. Easy access to updated information, easy communication and easy sharing of data/information were rated as the possible benefits that determined the adoption and use of ICT. Also, lecturers mainly used ICT facilities to search for information, fax documents, word processing, communicate with colleagues and for the storage and retrieval of materials. For ICT enabled resources, majority of lecturers used electronic mail, and WWW. The major challenges that constrained their use of ICT were inadequate access, inadequate ICT facilities to use and unreliable/erratic communication infrastructure. Based on these findings, it was recommended that the NUL authorities should improve ICT use among lecturers through training, provide more ICT equipment and services, facilitate easy access to ICT, invest in acquisition of ICT, and upgrade the bandwidth. It was further recommended that the Lesotho government should improve the electricity infrastructure and lower the tariffs on imported ICT technologies with a view to improving better exploitation of ICTs at NUL.

Keywords: Information and Communication Technologies (ICT); ICT enabled facilities; Gender; Lesotho.

Introduction

Although there are more personal computers and laptops in universities nowadays, in quite a large number of cases, they are not being used in relevant ways and the projected gains of ICT acquisition by universities has therefore not been met (Hopkins, 1996; Bondaryk, 1998). Between 1960 and 1980, there was a widespread consensus that computer use invariably led to productivity gains for any organization. Thus, with the rapid decline in the costs of acquiring computers, many universities, especially in developed countries, increased their investments in computerized systems. However, beginning from

E-mail: woleabbeyolatokun@yahoo.co.uk

the late 1980s, there began a growing realization, especially in the United States, that although universities were spending approximately half of their capital funds on computers and telecommunications, productivity was not keeping pace with increasing investments in ICT. In fact, in many universities, large investments in computers did not translate into major productivity boosts (Schrage, 1997; Kling, 1999). In developing countries, successful integration of ICT into the university system depends not only on access and availability but also on the extent to which staff and students embrace these technologies. For these universities to integrate ICT into their curriculum, lecturers (faculty members) are an important group of users who play a vital role in the successful implementation of information technologies. No doubt, the digital information revolution has implications for the "information literacy" skills expected of the citizen in general, lecturers and researchers in particular. Lecturing at university level nowadays is more challenging because the growing alternative sources of information provided by the digital revolution makes a person's relative efficiency in performing tasks compared to others to depend on his/her comparative abilities to exploit latest

Author's Affilation: *Africa Regional Centre for Information Science (ARCIS), No. 6 Benue Road, University of Ibadan, **National University of Lesotho, Maseru, Lesotho, Nigeria.

Reprint's Request: Wole Olatokun, Africa Regional Centre for Information Science (ARCIS), No. 6 Benue Road, University of Ibadan, Nigeria.

information sources constantly being provided by the Internet. Accordingly, among the critical competencies of information literacy in the digital age is the capability of lecturers to use computer systems and Internet to communicate, search for and apply information from different information sources to solve problems (UNCSTD, 1997). The progressive increase in the use of ICT in education has drastically changed the teaching/learning process. ICT assists in improving the education quality.

The ICT use situation at NUL is generally the responsibility of the Computer Services Unit (CSU) which provides ICT services to support teaching, learning, research and administrative business activities of the University. The CSU Department serves both staff and students of the University. (Computer Services Unit, 2007). CSU department provides services to the University based upon three goals:

- 1. Provide quality services and appropriate stateof-the-art ICT infrastructure and business applications, with seamless and secure access that support learning, teaching and research, and administrative functions.
- 2. Manage ICT Service Delivery and Service Support benchmarked against best-practice Service Management guidelines.
- 3. Establish an ICT infrastructure and services that enable cost reduction, cost sharing, and cost recovery and income generation to offset the cost of ICT service provision.

The CSU provides the following services among others: (1) system development and solution design involving the development and maintenance of ICT systems and applications - determining standards and best practices for systems development, promoting adoption of these standards; developing and implementing systems, (2) database services including managing all database platforms of the university-wide systems including transaction, reporting and management information systems, (3) acquisition and maintenance of ICT equipment and software: including network and applications security services; supporting enterprise infrastructure applications such as directory services and email services, and (4) network services (including Internet and web services): design, operation, and management of campus data communication services. Others are advising faculties and departments in ICTrelated matters, ICT Training, and Internet cafe services for students.

In spite of all these activities of the CSU, the actual number of the lecturers that are competent in using

ICT equipment, facilities and activities they use ICT for, and their capability to optimize ICT use is unknown by the university authority. This shows that NUL merely invests in ICT but does not really have statistics about usage and competency levels of lecturers using the ICT. In this connection, this study was guided by the following specific objectives: to examine the factors determining the adoption and use of ICT by lecturers, identify the ICT equipment/ facilities being used and to what extent, assess the skill and competency level of the lecturers, determine the activities they use ICT for and the challenges they face in using ICT. In order to achieve the study objectives, the following research questions guided the study:

- (i) Which ICT equipments/facilities are being used by lecturers at NUL?
- (ii) What is the ICT skills/competency level of the lecturers at NUL in the use of ICTs?
- (iii) What factors determine the adoption and use of ICTs by the lecturers?
- (iv) What are the activities the lecturers use ICTs for and its effects?
- (v) Are there gender differences in competency of ICT use among the lecturers at NUL?
- (v) What are the challenges faced by the lecturers in using ICTs?

It is hoped that the findings from this study will give NUL statistics about level of use and competency of the lecturers which has implications for ICT training plan and policies at NUL.

The National University of Lesotho (NUL)

According to information on NUL website, the origins of the National University of Lesotho dates back to April 8, 1945, when a Catholic University College was founded at Roma by the Roman Catholic Hierarchy of Southern Africa. It was known as Pius XII University College. By 1959, the College had 171 students, 141 of whom were students from outside Basutoland mainly from South Africa, Northern and Southern Rhodesia, and Nyasaland. At that time its mandate was to contribute in the training of future civil servants and teachers for the Bechuanaland Protectorate and Swaziland. In 1964, Pius XII University College was replaced by the in-dependent, non-denominational University of Basutoland, Bechuanaland Protectorate, and Swaziland with its own Charter granted by Queen Elizabeth 11. To be in line with the names chosen after independence in 1966, UBBS, became the University of Botswana, Lesotho and Swaziland (UBLS) in 1967. Ten years after its establishment, the UBLS was offering five degree courses, eleven diploma and certificate courses and four postgraduate degree courses. The decision to establish NUL on the Lesotho (Roma) campus site of the former UBLS was taken on October 20, 1975, by the National Assembly through Act No. 1 3 of 1975. NUL is the proud heir of Pius XII University College and UBLS. It occupies the same site, grounds, and buildings as its predecessors.

Today, NUL is a growing institution striving to meet the needs of the nation, through producing competent and skilled graduates who can easily take up the call to assist in the development of Lesotho. According to the World Fact book (2007), Lesotho has a severely underdeveloped ICT infrastructure and NUL has been the base for attempts at establishing ICT initiatives. For instance, a Technology Enhanced Learning Initiative of Southern Africa was established in the form of a tele-centre at the Institute for Extra Mural Studies based at NUL, although this project is no longer functional. NUL lecturers are presently expected to integrate ICT into teaching, learning, research, academic information services and administrative processes. January 1994 marked the beginning of the feasibility study and design of new Thomas Mafolo Library Information Systems at NUL. According to Hundie (2001) this was completed in January 1996 followed by the Implementation phase, during which 41 data points of Local Area Network (LAN) and an Integrated Library Management System, (STYLIS) were installed. In 1999, due to various reasons, the Library decided to changeover the STYLIS system to Integrated Tertiary System (ITS), which is an integrated system that is used throughout the University to date. ITS has a number of systems: Students system, Personnel system, Finance system, Space and Asset system, Management Information system, Library system, Cards system and others. The main Library LAN is connected to the campus-wide network through which all Library computers on the network have full Internet connection. Connecting the branch Libraries to the campus network is underway, as well as the plan to link it to regional and international Libraries. At present, all faculty members have computers in their offices and remote access from home. The University Library subscribes to a large number of data bases and full text electronic resources and provides on-line access to both students and faculty. All the faculties are interlinked with computer infrastructure in form of an intranet.

Previous Studies

Use of ICTs in Universities

Technology has proliferated to all parts of the

world. This proliferation has affected all sectors of life including higher education. There are fears though, that educational use of technology has lagged behind all other uses (Murray, 2008). A number of studies have been conducted to investigate factors that influence this low use of technology for educational purposes (Bauer and Kenton, 2005; Brzycki and Dudt, 2005; Cuban, Kirkpatrick and Peck, 2001; Gander, 2003; Levin and Wadmany, 2008; Nichols, 2008; Rogers, 2000; Sahin and Thompson, 2007; Surry, 1997). Such studies have shown that providing technologically superior tools neither result in guaranteed use nor assure integration in teaching and learning. Other factors interact to determine whether technology is adopted and finally integrated into teaching and learning. Technology has been viewed as an agent of change in all the countries. Reiser (2001) defined instructional technology to include "(a) the use of media for instructional purposes and (b) the use of systematic instructional design procedures (often simply called instructional design)" (p. 54). Instructional technology has the potential of transforming the way faculty members and students operate (Fillion, Limayem, Laferriere and Mantha, 2009; Girod and Gavanaugh, 2001). Stakeholders in education such as parents, administrators, and politicians have expressed the need for educators to use and integrate educational technology in the classroom (Keengwe, 2007). This has been against the backdrop that administrators have pumped large amounts of money and other resources in a bid to increase its availability to educational and corporate organizations. These developments have placed a lot of pressure on educators to transform school through technology (Becker, 2001; Brush et al., 2003; Brzycki and Dudt, 2005; Mehlinger, 1995; Sheingold and Hadley, 1990). Lecturers and students are under pressure to not only meet these demands but also to keep pace with the latest changes and modifications intended to make teaching and learning better (Brush et al., 2003; Brzycki and Dudt, 2005). Unfortunately, there still seems to be a gap between technology presence and its effective integration in higher academic institutions (Bryant, 2000; Eteokleous, 2008; Oncu, Delialioglu and Brown, 2008; Keengwe, Onchwari and Wachira, 2008).

Nicolle (2005) concurs with this notion when she asserts that university faculty members have been among the last educators to experience the educational thrust toward technology integration (Del Favero and Hinson, 2007; Nicolle, 2005). Despite increased availability and access to instructional computer use in higher education classrooms (Green, 2002); few faculty members have effectively and efficiently integrated computer technology in their classroom (Zayim, Yildrin and Saka, 2006). A number of barriers seem to stand in the way of faculty members' successful integration of educational technology in their teaching such as lack of hardware and software, lack of time, lack of funding, inadequate facilities and lack of support services, (Baltaci, and Huguet, 2008; Del Favero and Hinson, 2007; Fulford, 2008; Keengwe, Onchwari, Wachira, 2008; Morrison and Osborn, 2005; Moser, 2007; Nicolle, 2005). Other scholars have identified aversion to risk and attitudes as critical barriers experienced by non-adopters (Alamhaboub, 2000; Hagner and Schneebeck, 2001; Mehlinger and Powers, 2002; Nicolle, 2005). While professional development and training, faculty support, curriculum design and modification have been identified in numerous studies as being central to adoption and integration prospects (Nicolle, 2005; Watson, 2007), teacher perceptions of teaching with technology in the classroom also impacts integration (Knezeck and Christensen, 2002). In a study that investigated technology adoption into teaching and learning by university faculty, Nicolle (2005) found the link between effective teaching and the use of technology to be critical in helping faculty through the process of integration. University faculty members are concerned with effective teaching. Hence if they perceive technology as having a positive impact towards this effort, they are likely to get motivated to integrate it in their teaching (Baia, 2009).

Gilmore (1998) cited lack of training in information technology use as one of the greatest obstacles in the adoption of ICT faced by university faculty. She noted that lack of training affects their attitudes, abilities and desires to integrate information technology into the university classroom. She also pointed out that training must be continual for any degree of proficiency to be maintained. In her study of the impact of training on the information technology attitudes of university faculty, she found that university faculty who received training had an increasingly positive attitude to ICT. On the other hand, faculty who did not receive training showed a dramatic decline in attitude and used ICT increasingly less. Igbaria and Chakrabarti (1990) also found that higher levels of ICT training were associated with lower levels of ICT anxiety. Within the social system the informal influence of peers, early adopters and other influential players and agents has also been proposed as having the potential to significantly affect the rate of adoption of an innovation. For example, in a study of ICT adoption by humanist scholars, Wilberly and Jones (1994) reported that most of the scholars readily adopted word processing systems, usually at their own

expense, or on the recommendation of friends, family or colleagues. Studies have also shown that the degree to which an innovator's colleagues or peers use a technology can influence his or her technology acceptance and usage behaviour. Ahearne and Schillewaert (2001) observed that the acceptance of ICT by peers and colleagues spurs adoption in two ways: (1) it clearly signals the benefits of the system to others, and (2) it creates a form of social pressure within the organization for others to comply.

Dong (2003) investigated ICT use by the Chinese faculty, researcher and students. His study concluded that more men than women used the ICT. Respondents with higher degrees and lower age spent more time on the ICT. The mostly used e-mail (84.8%) and (58.2%) browsed WWW. They learned to use ICT mainly through self-instruction (46.1%) and colleagues and friends (35.7 %). Nasir (2003) investigated ICT use by 218 faculty members of the University of Rajshahi, Bangladesh. About twelve percent of his respondents had never used ICT. It was mainly used for e-mails (88.1 %), accessing WWW resources (70%) and downloading files (55.96%) and telephone (9.63%). They mainly used the for making contact with overseas education and research organizations (74.31 %), information about publications (68.82%) and finding information about higher education opportunities (53.67 %). The least used activities were job seeking (18.35 %), searching library resources (29.36 %) and seeking conference information (44.5 %). Very limited access to the Internet and slow speed were the major problems. ICT use by academics of the University of the South Pacific was studied by Mamtora (2003). A large majority of the respondents (86.5%) used e-mail to communicate and www to search information. The users needed specific training in the use of the ICT. Monami (2003) evaluated the nature, extent and satisfaction with the use of the ICT by applied science and technology faculty in Jordan. He concluded that the ICT was widely used with emphasis on research and communication and was perceived as a very useful tool. The respondents were mostly satisfied with current status of the Internet. The barriers identified included: lack of time, lack of access, lack of speed, lack of training and lack of the university support. Rehman and Ramzy (2004) investigated the use of the ICT by 131 health sciences faculty at Kuwait University. Most of respondents (86.6 %) expressed a need for improving their skills through formal training. Other crucial problem encountered by respondents from Rehman and Ramzy (2004) study is slow access speed, lack of time and lack of training.

Milken Exchange on Education Technology (1999)

identified three major ways of using ICT for teaching and learning. These are *information technology (IT) assisted learning, technology as a tool and computer and information science.* Information Technology (IT) assisted learning was divided into (i) computerassisted learning, which is the interaction between a student and a computer system designed to help the students learn (drill and practice, tutorials, simulations and virtual realities), (ii) Computer assisted research implies where ICT is used as an aid to doing library and empirical research. This is enhanced through the growth of World Wide Web which has created virtual library that can only be

accessed by the technologically literate, (iii) Distance learning, which is the use of telecommunications, designed to facilitate students' learning through email, interactive web sites and two-way audio/video teleconferencing.

In spite of ICT recognised potentials, its integration into the teaching learning process is often heavily dependent on teachers' knowledge, competence and willingness. Empirical findings have indicated that even teachers who have competence in the use of ICT do not integrate them in their teaching. For instance, Moursund and Bielefeldt's (1999) report on new teachers' use of information technology indicated that: - (i) the technology skills of teacher education faculty were comparable to the skills of the student they teach; and that (ii) most teacher educators did not model the use of technology in their teaching. Thus, new lecturers need to be inducted not only to be competent in using ICT but also in integrating them in instruction. In using ICTs, new lecturers need to be competent in the use of a variety of software, particularly, software that have specific application in various disciplines. For instance, apart from word processing, data processing, spreadsheet, and so on, that are important for all lecturers, lecturers in the social sciences, statistics, education, among others, should be able to use statistical packages (e.g. SPSS) to enhance their output. Also, lecturers in the Faculty of Engineering need to be competent in the use of design packages (e.g. AutoCAD). In the delivery of instruction, computer LCD display projector becomes relevant because the popularity of computer to generate presentation is growing daily. There is the need for new lecturers to get prepared for professional presentation ahead of time.

In research, the cliche "publish or perish" is quite popular in the university setting. This phrase underscores the importance attached to research in any university. In fact, it is the major index of an academic staff quality and the determinant of advancement. Research is a systematic attempt to find

Volume 9 Number 1, January - April 2015

solutions to problem or question. It may be targeted at describing events, predicting events or controlling events (WAIER, 1991). The value of ICTs cannot be over-emphasised in research design and implementation of experimental and descriptive studies, statistical analysis, data production and storage, and dissemination of research information. ICTs can guide lecturers into new frontiers in basic and fundamental research. Specific areas of relevance of ICT to lecturers in the areas of research are enumerates below. First, information and communication with one another through e-mail, mail lists, newsgroups and chat rooms. These ICT resources enable communication between scholars as they can post research, assignments book or journal lists references to on-line materials. Problems and solutions can be discussed between researchers and scholars can react to the work of others in an electronic manuscript. ICTs is further provide greater opportunities for research collaboration and networking among scholars spread throughout the world, thus national and international dimension of research issues can be studied as they can allow for communication with peers and experts around the world. Through collaborative knowledge building, studies can spotlight transnational trend analysis through human and instrumentation collaboration. Second, ICTs can facilitate research in any discipline as they provide quicker and easier access to most extensive and current information through digital libraries that provide digitized full-text resources to learners and researchers. Others are the electronic list - a directory of scholarly and professional econferences containing relevant topics and articles relevant to researchers, and electronic reference desks or virtual libraries. Others include electronic journal and catalogues and image database. Other Internet resources, gopher and CD-ROM can provide a researcher with current, in depth, firsthand information. Thirdly, ICT can be used to do complex mathematical and statistical calculations which are important in research. They can be used for data manipulation and analysis. The ICTs will facilitate the completion of data on time, performance of statistical analysis. In fact, complex statistical analyses are not only performed instantaneously but also more accurately than possible manually. The ICTs also provide researchers with a ready avenue for the dissemination of research reports and findings. Publication outlets include e-books, e-journals or through personal web-sites. ICTs provide ready means for production of research reports. Furthermore, digital video, audio, software simulation, synchronous and asynchronous chats and interactive software, among others, bring dynamism in describing a method or reporting result (Middleton, 2000).

Method

Survey research design was adopted. The study was conducted at the National University of Lesotho (NUL) the sole national university in the country with a student population of over 9,000. Like other tertiary institutions worldwide, The NUL was founded in an isolated valley of Roma, 34 kilometers from Maseru. NUL has seven (7) faculties: Agriculture, Education, Health Sciences, Humanities, Law, Science and Technology, and Social Sciences. There are thirtythree (33) academic departments, and an Institute of Education. The study population was the full time lecturers within academic departments. All of them were included in the study, except those who were either in managerial positions or on sabbatical leave. The study involved a complete enumeration of the study population. Thus a hundred percent (100%) sample was used. (Aina, and Ajiferuke 2002). The study adopted quantitative approach using questionnaire for data collection. A Cronbach alpha of (alpha=0.97, N=20) was achieved. Data were collected in the months of January-February, 2011. Two hundred and fifty (250) copies of the questionnaire were distributed among the lecturers in all the eight (8) faculties of NUL. Copies of the questionnaire were distributed individually by the researchers and were collected after three to five weeks of administration. All participants were informed of their right to refuse participation or withdraw from the study without compromising their work situation. Confidentiality was guaranteed by the use of identification codes instead of names. Participants were informed that if accepted for publication, their details will not be revealed. Out of the 250 copies of the questionnaire administered, two hundred and thirteen (213) were returned and found useful for analysis. This amounted to 82.5% response rate. The responses across the faculties revealed that Faculty of Humanities had the highest number of respondents with (23.1%), followed by the Faculty of Science and technology with (19%). The least responses came from the Institute of Education with 2%. Collected quantitative data was analysed using the Statistical Package for the Social Sciences (SPSS) software. Descriptive statistics was adopted in data analysis. Collected data were structured into grouped frequency distributions.

Results

Demographic Statistics of Respondents

The demographic profile of the respondents is presented in Table 1.

Gender

The gender distribution of the respondents showed that the majority were male. This is not very surprising for Lesotho institutions since the number of females who make it to the university is usually very low (Rudo, 1995). It is expected that low enrolment levels of female students would result in fewer females being recruited for any position in the university.

Age

Most of the respondents (31.5%) were in the 35-44 age category. The rest of them were distributed between age categories 25-34, 45-54 and 55-64. Age category 65 and above was the lowest.

Academic rank of Respondents

Majority of the respondents (58.2%) belonged to "lecturers" category. This was followed by "senior lecturers," and the assistant lecturers. Associate professors and professors categories were the least represented.

Types of ICTs Used and frequency of Use

The results presented in this section relates to the types of ICTs used and their frequency of use.

As presented in Table 2, majority of the lecturers were always using the following facilities for academic purposes: Computer/Laptop (93%), Internet (90.6%), Telephone (87%), Mobile phones (85%) and Printers (63.8%). Intranet, multimedia projectors, and facsimile were occasionally used by majority of the respondents while Intranet (31%) and multimedia projectors (29%) were never used. The fact that almost a third of the respondents indicated not using Intranet despite its availability at NUL and almost the same proportion indicating never to have used a multimedia projector shows that they might not understand what an Intranet was as the University through the computer service unit in collaboration with the technology team from other departments have provided the in house sites like the library has all the resources on the Intranet. For the multimedia projectors, the reason might be that there were limited facilities to use in the classrooms.

ICT-enabled Resources Used

The survey investigated the ICT enabled facilities and resources the lecturers use and to what extent they use ICTs. The results are presented in Table 3.

On the ICT enabled facilities/resources used, it was found that majority of the respondents had never used the following facilities/resources: Videoconferencing (79.8%); WebCT (66.2%); Electronic blackboard (63.4%); Teleconferencing (62.9%); E-learning (52.1%); Instant Messaging (44.8%). The reason they never used the facilities might be that NUL has not provided them yet. However the majority of them always used Electronic mail (77%) and World Wide Web (70.4%), while E-Journals and E-books (40.8%) was the major ICT enabled facility occasionally used.

Activities ICTs are used for

The survey also investigated the activities ICTs were used for by the lecturers. The results are presented in Table 4.

The results presented in Table 4 showed that the majority of NUL lecturers are always using ICT facilities in their job functions to: search for information (89%); Word processing documents (80%); Conduct research (73%); Communicate/link with colleagues (70.4%); Prepare lecture materials (69.0%); Store and retrieve materials (61.0%); and make presentations (47.4%). It was also found out that the majority of the staff has never used ICTs for writing computer programs (73.2%), electronic commerce (68.5%);Administer quizzes (64.3%) and mark assignments and quizzes (53.1%), this shows that they might not be writing the computer programs because they are not specialist. They might not be interested or fear to use the electronic commerce facility.

Competency Level of Lecturers use of ICTs

The survey also investigated the skills and competency level of respondents. The results are presented in Table 5.

The results presented in Table 5 showed that, the skills/competency level of the majority of lecturers are Advanced in Word processing (55.4%); Internet search engines (46%); Power point presentation (42%). Those that were expert's users in the above mentioned software's were very few. They include only (18%) in word processing, (16%) in Internet Search Engines, in Electronic mail (13%), (9%) in spreadsheet Analysis. In contrast, majority of the lecturers have No skill in Institutional Repository (55%); Lexis and Nexus (53%) and Library Resources Databases (38%). We observe here that while No skill in some specialised areas are acceptable for the majority of the lecturers, necessary skill (Intermediate at least) is expected to have been obtained in OPAC, Institutional Repository, Lexis and Nexis, and library Resources Databases since these are basic software for conducting effective research and are available on the library web site which is within NUL Intranet.

Competency level of Lecturers in ICT Usage by Gender

Figures 1, 2, 3 and 4 present the differences in the lecturers' usage of software based on gender.

The results in Figures 1, 2, 3 and 4 show that males are advanced users of most of the software surveyed, including word-processing, spreadsheet, database management systems, presentations (PowerPoint), and desktop publishing. Others are graphics, data analysis, Internet search engines, multimedia, website design, geographical information systems, computer aided design, electronic mails, institutional

Table 1: Demographic Profile (N=213)			
Variable	Category	Frequency	Percent
Condon	Male	118	55.4
Gender	Female	95	44.6
	Under 25	7	3.3
	25-34	44	20.7
	35-44	67	31.5
Age group	45-54	51	23.9
	55-64	41	19.2
	65-above	3	1.4
	Assistant lecturer	31	14.6
Academic rank	Lecturer	124	58.2
	Senior lecturer	49	23.0
	Associate Professor	7	3.3
	Professor	2	0.9

Wole Olatokun & Tsoenyo Julia Ntemana / Information and Communication Technolog	gy (ICT)	Use by
Lecturers at the National University of Lesotho		

Table 2: ICT resources and facilities used by lecturers (N=213)							
Types of ICT	Always	Occasionally	Rarely	Never			
Computer/Laptop	198 (93.0%)	10 (4.7%)	1 (.5%)	4 (1.9%)			
Telephones	186 (87.3%)	22 (10.3%)	2 (.9%)	4 (1.9%)			
Internet	193 (90.6%)	15 (7.0%)	1 (.5%)	4 (1.9%)			
Intranet	40 (18.8%)	66 (31.0%)	42 (19.7%)	65 (30.5%)			
Scanners	28 (13.1%)	63 (29.6%)	69 (32.4%)	53 (24.9%)			
Printers	136 (63.8%)	72 (33.8%)	2 (.9%)	3 (1.4%)			
Mobile phones	181 (85.0%)	21 (9.9%)	4 (1.9%)	7 (3.3%)			
Multimedia projectors	21 (9.9%)	77 (36.2%)	54 (25.4%)	61 (28.6%)			
Facsimile	10 (4.7%)	81 (38.0%)	64 (30.0%)	58 (27.2%)			

repositories, lexis and nexus, and library resources. In contrast, females are only advanced users in OPAC. Males are expert users in multimedia, OPAC, website design and computer aided design. Analysis shows that females have more expertise in more software than their male counterparts. Expertise of females was in the following application software: PowerPoint presentations, desktop publishing, graphics, data analysis, Internet search engines, electronic mail, institutional repository, lexis and nexis and library resources databases. The findings that show females as expert users of PowerPoint presentation software, confirmed earlier findings where females were seen to be making presentations always more than the males. The expertise of both males and females were indicated in web page authoring, games and geographical information systems

Challenges faced by Lecturers in using ICTs

The challenges which most lecturers face in using ICTs were investigated and the results are presented in Table 6.

The results presented in Table 6 revealed that most lecturers at NUL are faced with challenges to a great extent of: Inadequate access to ICT facilities (44%),

not enough ICT facilities (41%), and Unreliable/ Erratic communication infrastructure (40%). However, it was also revealed that the following challenges have no or little extent on most NUL lecturers: cultural/religious inhibitions (84%), negative psychological impacts (54%), threats to privacy and confidentiality (42%) lack/inadequate skills (35%), and negative health impacts (34%)

Discussion of Findings

The findings revealed that majority of the lecturers were using computers or own laptops, telephone, Internet, printers, and mobile phones. Intranet, multimedia projectors and facsimile were occasionally used by majority of them. Ehikhamenor (2003) investigated the use and nonuse of Internet facilities by scientists in ten Nigerian universities and found that the scientists had computers at their disposal while others had access to, and were using, the Internet. Usluel, Askar and Bas (2008) found the same results in his study in Turkey. Intranet and multimedia projectors were indicated as never used. The fact that almost a third of the respondents indicated not using Intranet despite its availability at

Table 3: ICT enabled facilities/resources used (N=213)					
Facilities	Always	Occasionally	Rarely	Never	
e-learning	10 (4.7%)	41 (19.2%)	51 (23.9%)	111 (52.1%)	
WebCT	7 (3.3%)	22 (10.3%)	43 (20.2%)	141 (66.2%)	
Teleconferencing	1 (.5%)	25 (11.7%)	53 (24.9%)	134 (62.9%)	
Videoconferencing	7 (3.3%)	14 (6.6%)	22 (10.3%)	170 (79.8%)	
Electronic mail	164 (77.0%)	24 (11.3%)	6 (2.8%)	19 (8.9%)	
World Wide Web	150 (70.4%)	17 (8.0%)	6 (2.8%)	40 (18.8%)	
Electronic blackboard	9 (4.2%)	20 (9.4%)	49 (23.0%)	135 (63.4%)	
Instant Messaging (IM)	25 (11.7%)	60 (28.2%)	32 (15.0%)	95 (44.6%)	
Discussion groups	74 (34.7%)	59 (27.7%)	21 (9.9%)	58 (27.2%)	
e-Journals and e-books	70 (32.9%)	87 (40.8%)	23 (10.8%)	33 (15.5%)	
Internet chat services	51 (23.9%)	59 (27.7%)	35 (16.4%)	68 (31.9%)	
Bulletin board	10 (4.7%)	52 (24.4%)	105 (49.3%)	105 (49.3%)	

Table 4: Activities Lecturers use ICT facilities for in their job functions (N=213)						
Activities	Always	Occasionally	Rarely	Never		
Search for information	189 (88.7%)	21 (9.9%)	-	3 (1.4%)		
Faxing documents	26 (12.2%)	97 (45.5%)	55 (25.8%)	35 (16.4%)		
Communicate / link with colleagues	150 (70.4%)	43 (20.2%)	8 (3.8%)	12 (5.6%)		
Conduct research	155 (72.8%)	35 (16.4%)	14 (6.6%)	9 (4.2%)		
Word processing of documents	170 (79.8%)	24 (11.3%)	9 (4.2%)	10 (4.7%)		
Teach students	92 (43.2%)	58 (27.2%)	34 (16.0%)	29 (13.6%)		
Make presentations	101 (47.4%)	75 (35.2%)	17 (8.0%)	20 (9.4%)		
Prepare lecture materials	147 (69.0%)	53 (24.9%)	5 (2.3%)	8 (3.8%)		
Collaborate in research with colleagues	90 (42.3%)	70 (32.9%)	26 (12.2%)	27 (12.7%)		
Writing computer programs	20 (9.4%)	20 (9.4%)	17 (8.0%)	156 (73.2%)		
Administer quizzes	22 (10.3%)	27 (12.7%)	27 (12.7%)	137 (64.3%)		
Storage and retrieval of materials	130 (61.0%)	49 (23.0%)	10 (4.7%)	24 (11.3%)		
Mark assignments and quizzes	44 (20.7%)	42 (19.7%)	14 (6.6%)	113 (53.1%)		
Electronic commerce	13 (6.1%)	24 (11.3%)	30 (14.1%)	146 (68.5%)		

NUL and the same number of respondents indicating never to have used a multimedia projector shows that perhaps NUL has few multimedia projectors in the classrooms, or there is limited access to them. Another probable possible reason could be that the lecturers had limited skills in using the multimedia projectors. In addition, findings revealed generally that the lecturers were competent in using ICT for their routine work such as word processing, spreadsheet analysis, database management system and making presentations. There are others who use multimedia reasonably and also use the Internet search engines. Zhang and Deng (2004) examined perceptions of students learning achievements obtained in a multimedia classroom versus a traditional classroom and concluded that students in multimedia classroom had more positive perception of lecturers teaching methods than those in traditional classroom. This result indicates that lecturers' use of technology for teaching could enhance their teaching and motivate their students. Moreover, Murphy and Greenwood (1998) reported that younger lecturers showed a significantly higher level of confidence than older ones in the use of computers in teaching; but, contrarily, Muse (2003) found that computer confidence had no effect on the criterion variables of his study on ICT use. Osborn's study (in Muse, 2003) reported that, if users of ICT strongly valued the tools, they would develop confidence in their use. Wigfield (in Schunk, 2000) mentioned that valuing a task can lead to greater self-regulatory efforts. Therefore, to improve the perceptions towards e-learning implementation, it was suggested that users should be encouraged to increase their confidence in computing skills. Lack of confidence was reported as a reason for low ICT uptake (Murphy and Greenwood, 1998).

Furthermore, Veen (1993) suggested that the lack of initial training of teachers was a serious obstacle to ICT use and implementation. In a study conducted by Murphy and Greenwood (1998), it was reported that the lecturers felt that, compared to their students, they were not well-trained and adequately exposed to ICT tools. Thus, these findings suggested that more ICT training and confidence building in the area would be worthwhile in enhancing their abilities to teach with e-learning tools. Also, Jonassen (1996) mentioned that educators need to experience the personal value embedded in the technology as both productivity tools to increase efficiency and as mind tools for providing learning opportunities to students. On this note, Fabry and Higgs (1997) insisted that educators must experience the power of technology to implement it, while training is considered to be a critical factor in the successful implementation and integration of technology. Moreover, findings revealed that the following factors were rated respectively as the possible benefits that determine the adoption and use of ICT: easy access to updated information; easy communication, and easy sharing of data/information. Olatokun and Adeboyejo (2009) in their study of ICT use among reproductive health workers at the University College Hospital, Nigeria revealed that a clear majority (90%) of the RHWs always use ICTs for communication, communicate with colleagues quite frequently in order to remain current in their field. In addition, speedy medium for collaborative research and allowing lecturers to give students tests online and to provide immediate results. This finding concurs with that of Monami (2003) findings, when he evaluated the nature, extent and satisfaction with the use of the ICT by applied science and technology faculty in Jordan. He concluded that ICT was widely used with emphasis

Table 5: ICT skills/competency level of the lecturers at NUL (N=213)					
Types of Software used	No skill	Beginner	intermed iate	Advanced	Expert
Application software					
Word processing (eg. MSW ord)	5(2.3%)	8(3.8%)	44 (20.7%)	118(55.4%)	38(17.8%)
Spread sheet a nalys is (eg. MS Excell)	26(12.2%)	26(12.2%)	63 (29.6%)	79(37.1%)	19(8.9%)
Databases Management System (eg.MS Access)	62(29.1%)	36(16.9%)	65 (30.5%)	43(20.2%)	7(3.3%)
Presentation (eg. MSPowerPoint)	23(10.8%)	30(14.1%)	47 (22.1%)	89(41.8%)	24(11.3%)
Desktop Publishing	83(39.0%)	43(20.2%)	55(25.8%)	23(10.8%)	9(4.2%)
Graphics (eg.Corel draw, Instant artist, etc)	121(56.8%)	42(19.7%)	32(15.0%)	13(6.1%)	5(2.3%)
Statistical analysis (eg.SPPS, Epi – Info, etc)	118(55.8%)	29(13.6%)	30(14.1%)	32(15.0%)	4(1.9%)
Web page authoring (eg. HTML, DHTML, etc)	141(66.2%)	25(11.7%)	22(10.3%)	15(7.0%)	10(4.7%)
Internet search engines (eg. Google, Yahoo, etc)	30(14.1%)	11(5.2%)	42(19.7%)	97(45.5%)	33(15.5%)
Computer Aided Design	146(68.5%)	25(11.7%)	19(8.9%)	20(9.4%)	3(1.4%)
Multimedia	51(23.9%)	38(17.8%)	55(25.8%)	55(25.8%)	14(6.6%)
Games	95(44.6%)	39(18.3%)	50(23.5%)	25(11.7%)	4(1.9%)
Web site design (Front page, Dream weaver)	163(76.5%)	16(7.5%)	21 (9.9%)	4(1.9%)	9(4.2%)
Geographical Information Systems (GIS) (eg. Arc Info, Arc view, Idrissi, etc)	162(76.1%)	24(11.3%)	17(8.0%)	4(1.9%)	6(2.8%)
Electronic mail (eg. MS Outlook)	53(24.9%)	24(11.3%)	37(17.4%)	72(33.8%)	27(12.7%)
Customized software					
Online Public Access Catalogue (OPAC)	86(40.4%)	45(21.1%)	60(28.2%)	17(8.0%)	1(.5%)
Institutional Repository (eg. D-space)	117(54.9%)	35(16.4%)	43 (20.2%)	17(8.0%)	1(.5%)
Library resources Databases	81(38.0%)	43(20.2%)	65(30.5%)	19(8.9%)	5(2.3%)
Lexis & Nexis	112(52.6%)	40(18.8%)	43(20.2%)	17(8.0%)	1(.5%)

on research and communication and was perceived as a very useful tool. (Adeya and Oyelaran-Oyeyinka 2002; Fasheun-Motesho 2002) studied the adoption and growth of IT to find out the factors motivating computer users to accept IT. Their findings revealed that the major influence to the use of computers were organizational support and social pressure. The respondents rated all the possible benefits of ICTs

14

high, to show that they can benefit from using ICTs but surprisingly, they were not practicing what they claim here, they do not use multimedia, they said they had never used e-learning, do not mark assignments and quizzes, administer quizzes, videoconferencing, teleconferencing, WebCT. The study by (Becker 2001; Wozney, Venkatesh and Abrami 2006) has shown



Fig. 1: Software usage and competency level by Gender[1]



Fig. 2: Software usage and competency level by Gender[2]



Volume 9 Number 1, January - April 2015



that the more faculty members use computer based technology for personal purposes, the more they are likely to adopt and integrate technology into their teaching and students' learning. The findings indicated that ICTs are used mainly to search for information, to fax documents and to communicate or link up with colleagues. Eysenbach and Wyatt (2002) confirmed this perception when they reported that reproductive health workers use the Internet across the medical research process. On the other hand, a study carried out by Usluel and Seferoðlu (2004) revealed that faculty members used computers for "searching on the Internet" and as "a means of communication," for example for word processing, e-mail communication, and searching through the Internet resources and that they are not interested in databases, web publishing, and desktop publishing. In addition, findings also showed that ICT were used for conducting research. This is expected since a study by Eysenbach and Wyatt (2002), have reported ICT use in research. Word processing of documents is another activity ICTs were used for and very few of the lecturers use ICT to teach students. (Bullock 2004; Lai, Trewen and Pratt 2002; Whitfield and Latimer 2003) presented teachers with different models for teaching with technology. Lecturers make presentations, prepare lecture materials, store and retrieve materials. It was also found out that majority of the lecturers have never used ICT for writing computer programs, administer quizzes, mark assignments and quizzes and do electronic commerce. Lecturers were mostly using the computer for preparation of teaching notes and preparing examination results. The Internet was mostly being used for emails to colleagues and conducting research. Further the results indicated that while there seemed to be active engagement with computers and the Internet, such engagements mostly excluded classroom use. A few use PowerPoint presentations in their lessons.

These findings are similar to those of Hong and Koh (2002) and support Rogers (2003) diffusion of innovation theory that stated that individuals in a social system adopt an innovation over time. In contrast, the majority of the lecturers have no skill in the use of the Institutional Repository, Lexis and Nexis and Library Resources Databases. It was observed that some of the lecturers had no skill in some specialized areas but one would expect them to have the necessary skill in using the OPAC, Institutional Repository, and Library Resources Databases since these are basic software for conducting effective research. For the ICT enabled resources used, it was found that the majority of lecturers were not using videoconferencing, WebCT, Electronic board, teleconferencing and e-learning. The majority used electronic mail, WWW. Nasir (2003) investigated ICT use by 218 faculty members of the University of Rajshahi, Bangladesh. About twelve percent of his respondents had never used ICTs. ICT was mainly used for e-mails (88.1 %), accessing WWW resources (70%) and downloading files (55.96%) and telephone (9.63%). The users needed specific training in the use of the ICTs. A study by Usluel, Askar and Bas (2008) reported that at the University Of Massachusetts Institute of Technology, faculty members make use of

Table 6: Challenges faced by Lecturers in using ICTs (N=213)					
Challenges	No extent	Little extent	Moderate	Great extent	
Inadequate access to ICT facilities	40 (18.8%)	36 (16.9%)	44 (20.7%)	93 (43.7%)	
Not enough ICT facilities	12 (5.6%)	33 (15.5%)	81 (38.0%)	87 (40.8%)	
Lack/Inadequate skills to use ICTs	53 (24.9%)	74 (34.7%)	53 (24.9%)	33 (15.5%)	
Unreliable/erratic communication infrastructure	16 (7.5%)	38 (17.8%)	74 (34.7%)	85 (39.9%)	
Threats to privacy and confidentiality	64 (30.0%)	89 (41.8%)	30 (14.1%)	30 (14.1%)	
Cultural/Religion inhibitions	178 (83.6%)	22 (10.3%)	7 (3.3%)	6 (2.8%)	
Negative psychological impacts (addiction, obsession, compulsive computing behavior)	115 (54%)	80 (37.6)	8 (3.8%)	10 (4.7%)	
Negative health impacts (eye and joint strains, backache etc)	72 (33.8%)	67 (31.5%)	57 (26.8%)	17 (8.0%)	

ICT mostly as a means of communication, searching for information and preparing their lecturer notes, announcements concerning the course on WWW. Also, Nicolle (2005) found the link between effective teaching and activities lecturers use ICT facilities to be critical in helping faculty through the process of integration. University faculty members are concerned with effective teaching. Hence if they perceive technology as having a positive impact towards this effort, they are likely to get motivated to integrate it in their teaching, Baia (2009).

Along the dimension of gender, findings revealed that male respondents used ICTs facilities more, and their competency level was higher than the females at varying degrees, particularly in computers, Internet, Intranet, printers, and mobile phones. Concerning ICTs enabled facilities, they also used them more than their females counterparts, like e-learning, WebCT, e-mail, electronic board and WWW which gives some credence to results of previous studies that technology is a male sphere. Olatokun and Adeboyejo (2009). The results of this study suggest that female lecturers are lagging behind males in the adoption of ICT. This finding is similar to Spotts, Bowman and Mertz (1997), who stated that although there is little if any evidence that supports the existence of gender differences in attitudes toward ICTs, and there are potential gender differences related to faculty use of ICTs in higher education. Dong (2003) investigated Internet use by the Chinese faculty, researchers, and students. More men than women used the Internet. Email and search engines were the most used tools. These study concur with Olatokun and Adeboyejo (2009) when it comes to the differences in usage of ICTs between male and female. Their study was on RHWs at the University College Hospital (UCH) in Nigeria. The average usage level of all the facilities and services was higher among male respondents than their female counterparts, although the disparity varied among technologies. However, while earlier research indicated males use the Internet more than the females Noguchi (2005), more recent findings show that girls and women are as frequent Internet users as men (Enochsson 2005; Fallows 2005). Thought the respondents in Nyamboga, Ongonda and Raymond (2004) had not received training, it showed that, males were using ICTs more than females.

The study equally found that most lecturers at NUL are faced with the following challenges to a great extent. These are inadequate access to ICTs facilities, not enough ICTs facilities and unreliable/erratic communication infrastructure. Studies have reported that most African Universities suffer from insufficient ICTs facilities leading to inadequate access. Ehikhamenor (2003) investigated the use and nonuse of Internet facilities by scientists in ten Nigerian Universities. His study attributed non-use of the Internet to problems of accessibility, ease of use and cost. He also reported that the university in which a scientist worked might have had the greatest effect among the background factors that influenced the data in his study. Also unreliable communication infrastructure is a major inhibition to optimally benefit in ICTs in Africa. (Lee 2000; Braak 2001; Butler and Sellbom 2002), revealed that insufficiency or lack of ICTs facilities as significant barriers in Universities. In addition, it was revealed that the following challenges have no or little extent on most NUL lecturers: threats to privacy, cultural/religious inhibitions, negative psychological impacts, and confidentiality, lack/inadequate skills and negative health impacts. Findings from this study suggest that majority of the lecturers at NUL are willing and ready to use ICTs but the inadequacy of ICTs resources and capability appeared to be major challenges. (Baltaci, and Huguet 2008; Del Favero and Hinson 2007); said there are barriers that seem to stand in the way of faculty members' successful integration of educational technology in their teaching such as lack of hardware and software, lack of time, lack of funding, inadequate facilities and lack of support services. Monami (2003) identified barriers as: lack of time, lack of access, lack of speed, lack of training and lack of the university support at the applied science and technology faculty in Jordan when evaluating the nature, extent and satisfaction with the use of ICTs. Rehman and Ramzy (2004) got the same results when investigated the use of ICTs by health sciences faculty at Kuwait University.

This view was supported by informal discussions, and the respondent observed that: "ICTs integration will be a fantastic idea, provided the university can provide the facilities when needed, and in the right quantities, all lecturers would become keen and willing to learn and adopt ICTs in teaching and the university adopts an effective and efficient maintenance culture. ICTs usage at NUL has great extent barrier of inadequate access to ICTs facilities, the ICTs facilities are not enough, and there is lack and inadequate skills to use ICTs among lecturers, unreliable and erratic communication infrastructure. This corroborates the findings from previous studies. (Beggs 2000; Bussey, Dormody and VanLeeuwen 2000). Other important problems were "lack of time" and "lack of access to the Internet from home" Similar problems, in varying degrees, have been pointed out by other researchers, (Monani, 2003; Rehman and Ramzy 2004). Other crucial problems encountered by respondents from Rehman and Ramzy (2004) study is slow access speed, lack of time and lack of training. (Alamhaboub 2000; Hagner and Scheneebeck 2001; Mehlinger and Powers 2002; Nicolle 2005) have identified aversion to risk and attitudes as critical barriers experienced by nonadopters.

Conclusions and Recommendations

From the findings, it is noteworthy that majority of lecturers in NUL use ICT facilities and ICT enabled resources like electronic mail, WWW, and discussion group's facility at varying degrees. Also, the gender dimension of ICT showed that generally, males use ICT more than females. But females have more expertise in the use of PowerPoint presentation, desktop publishing, graphics, database analysis, Internet search engines, electronic mail, Institutional Repository, Lexis and Nexis and Library resources databases more than males. In addition, they were faced with major challenges including inadequate access to ICT facilities, inadequate skills to use ICT, and the unreliable/erratic communication infrastructure. In view of these findings and conclusions, the following recommendations are made: NUL authority should enhance ICT use, as findings indicated that a third of the respondents have never used the Intranet and multimedia projectors. Thus, NUL authorities should promote ICT awareness among the various departments and provide the in house websites for the lecturers to learn more about Intranet services. This way, ICT usage will increase and its benefits become noticeable. Also, NUL should improve quality control of ICT by installing highly reliable technology and by improving systems for checking and maintaining ICT. This will improve the ICT facilities as lecturers had indicated that computer systems are slow. The findings revealed that lecturers did not use enabled ICT resources such as WebCT, and other resources which could be used in e-learning. Thus, NUL should design continuous training programmes on the use of ICT and its integration into teaching to enhance learning. In addition, since findings revealed some of the challenges lecturers faced in ICT use like inadequacy of ICT facilities, it is recommended that the Lesotho government should assist NUL as a fountain of education in the country by lowering tariffs paid on ICT equipment to enable more lecturers to afford to purchase them. Also, a highly intensive ICT environment requires broadband infrastructure that will ensure faster data transmission services. This might be too expensive for NUL to provide without government assistance. The Lesotho Government can assist NUL through increased funding so that stateof-the art ICT infrastructure could be procured. Furthermore, since gender imbalance exists between male and female lecturers at NUL in their use of ICTs, the government can evolve ICT policy to bridge the gender imbalance in the use of ICTs. Finally, this study focused only on the use of ICTs by lecturers at NUL without investigating its use by other key players and stakeholders at NUL including students and administrators. Future studies might focus on the use of ICT by these groups. Also, the effects of university policies on ICT use is another area that has not been covered in the study and therefore further research could give more insights and shed light into factors that affect ICT use by university lecturers.

References

1. Adeya, Catherine N & Oyelaran-oyeyinka, Banji. *The Internet in African universities: Case* studies *from Kenya and Nigeria*. Study carried out for the Institute of New Technologies (INTECH), United Nations University. Maastricht, the Netherlands:

- Adika, Gifty. Internet use among faculty members of university of Ghana. *Library Review*. 2003; 52 (1): 29-37. Available from: http:// www.emeraldinsight.com [Accessed 24 April 2009]
- Ahearne, Michael And Schillewaert, Niels. The effect of information technology on salesperson performance. *Institute for the Study of Business Markets Working Papers ljm23*. 2001. Available from: http://www.ebusiness.xerox.com/isbm/ dscgi/ds.py/Get/File- 176/05-2001.pdf. [Accessed 20 May 2009]
- 4. Aina, Lenrie Olatokunbo & Ajiferuke, Isola Yisau. Research Methodologies in Information Science In. *Research in Information Sciences: An African Perspective.* Ibadan: Stirling-Horden; 2002.
- 5. Alamhaboub SF. Attitudes toward computer use and gender differences among Kuwaiti sixth grade students. Doctoral dissertation. University of North Texas; 2000.
- Baia Patricia L. The Role of Commitment to Pedagogical Quality: The Adoption of Instructional Technology in Higher Education. 2009. Available online from: http://scholar.lib.vt.edu/theses/ available/etd-04132009-095508. [Accessed 05 April 2010]
- Baltaci-Goktalay, Sehnaz & Huguet, Marie-Pierre. Faculty Concerns about Online Technologies in a Developing Country. In *Proceedings of World Conference on Educational Multimedia Hypermedia and Telecommunications* 6308-6315. Chesapeake, VA: AACE; 2008.
- Bauer, Jeffery & Kenton, Jeff. Toward technology integration in the schools: Why it isn't happening. *Journal of Technology and Teacher Education*. 2005; 13(4): 519–546.
- Becker, H Jay. Findings from the teaching, learning, and computing survey: Is Larry Cuban right? *Education Policy Analysis Archives*. 2001; 8(51). Available from: http://epaa.asu.edu/ epaa/v8n51/ [Accessed 03 April 2010]
- Beggs TA. Influences and barriers to the adoption of instructional technology. 2000. Available from: http://www.mtsu.edu/~itconf/proceed00/ beggs/beggs.htm. [Accessed 03 April 2010]
- Bondaryk Leslie. Publishing new media in higher education: Overcoming the adoption hurdle. *Journal of Interactive Media in Education*. 1998; 98(3). Available from: http://www-jime.open. Ac.uk/ 98/3/bondaryk-98-3.pdf. [Accessed 02 June

2009]

- 12. Braak J Van. Factors influencing the use of computer mediated communication by teachers in secondary schools. *Computers & Education*. 2001; 36: 41-57.
- Brush Thomas, Glazewski K, Rutowski K, Berg K, Stromfors C & Van-Nest MH. Integrating technology in a field-based teacher training program. 2003. Available from: http:// pt3.ed.asu.edu/docs/5101-05.pdf [Accessed 23 January 2010]
- 14. Bryant AL. Investment in education and technology: The key to preparing for the digital age. In Technos: *Quarterly for Education and Technology*. 2000. Available from:http:// www.findarticles.com/cf_dls/m0HKV/4_9/ 68951437/p1/article.jhtml [Accessed 23 October 2009]
- 15. Brzycki Dolores & Dudt Kurt. Overcoming barriers to technology use in teacher preparation programs. *Journal of Technology and Teacher Education.* 2005; 13(4): 619-641.
- 16. Bullock David. Moving from theory to practice: An examination of the factors that preservice teachers encounter as they attempt to gain experience teaching with technology during field placement experiences. *Journal of Technology and Teacher Education*. 2004; 12(2): 211–237.
- 17. Bussey Julia M, Dormody Thomas J & Vanleeuwen Dawn. Some factors predicting the adoption of technology education in New Mexico public schools. *Journal of Technology Education*. 2000; 12(1): 4-17.
- Butler Darrell L & Sellbom Martin. Barriers to adopting technology. *Educause Quarterly*. 2002; 2: 22-28.
- 19. Carlson Sam & Gadio Cheick Tidiane. Teacher Professional Development in the use of ICT. In: Haddad WD & Draxler A (Eds.). *Technology for Education*. Washington, DC: UNESCO: Academy for Educational Development; 2002, 118 - 132.
- 20. Computer Services Unit. *Policy on working standards and procedures for the Computer Services Unit.* National University of Lesotho; 2007.
- 21. Cuban Larry, Kirkpatrick Heather & Peck Craig. High access and low use of technology in high school classrooms: Explaining an apparent paradox. *American Educational Research Journal*. 2001; 38(4): 813-834.
- 22. Del Favero Marietta & Hinson JM. Evaluating Instructor Technology Integration in Community

and Technical Colleges: A Performance Evaluation Matrix. *Community College Journal of Research and Practice.* 2007; 31(5): 389-408.

- Dong, Xie. Searching information and evaluation of Internet: A Chinese academic user survey. *International Information and Library Review*. 2003; 35(2-4): 163-87. Available from: http:// www.citeulike.org/journal/els-10572317 [Accessed 15 April 2009]
- 24. Ehikhamenor Fabian A. Internet facilities: use and non-use by Nigerian university scientists. *Journal of Information Science*. 2003; 29(1): 35–48.
- Enochsson, Annbritt. Gender perspective on Internet use: Consequences for information seeking. *Information Research*. 2005; 10(4). Available from: http://informationr.net/ir/10-4/paper237.html [Accessed 24 April 2010]
- 26. Eteokleous Nikleia. Evaluating Computer Technology Integration in a Centralized School System. *Computers & Education*. 2008; 51(2): 669-686.
- Eysenbach Gunther, & Wyatt Jeremy. Using the internet for surveys and health research. *Journal* of Medical Internet Research. 2002; 4(2). Available from: www.pubmedcentral.nih.gov/article render.fcgi?pmid=12554560 [Accessed 05 May 2010]
- 28. Fabry Dee L & Higgs John Rollie. Barriers to the effective use of technology in education: Current status. *Journal of Educational computing Research*. 1997; 7(4): 385-395.
- 29. Fallows Deborah. *How women and men use the Internet*. Pew Internet and American Life project report. 2005. Available from: www.pewinternet.org/ Reports/2005/How-Women-and-Men-Use-the-Internet.aspx. [Accessed 24 April 2010]
- 30. Fasheun-Motesho, Y Olajumoke. Adoption and growth of information technology in Nigerian architectural firms. *African Journal of Library Archives and Information Science*. 2002; 11 (2): 109–124.
- Fillion Gilles, Limayem Moez, Laferriere Therese, & Mantha Robert. Integrating ICT into Higher Education: Investigating Onsite and Online Professors' Points of View. *International Journal on E-Learning*. 2009; 8(1): 17-55.
- 32. Fulford C, Main-Anakalea C & Boulay R. Sabbaticals for Technology Integration. In Proceedings of World Conference on Educational Multimedia, Hypermedia and Telecommunications

2008. Chesapeake, VA: AACE; 2008, 660-669.

- 33. Gander James P. Technology Adoption and Labor Training under Uncertainty. *Economics of Education Review*. 2003; 22(3): 285-289.
- 34. Gates K, Moore J, Oberlin J, Rusiecki S & Wascom T. Equipping faculty for success with technology. In EDUCAUSE 2000: Thinking IT Through: Proceedings and Post-Conference Materials. Nashville, Tennessee: ERIC; 2000. Available from: library.sjfc.edu/docs/ITILT_initiative.doc. [Accessed 2 June 2009]
- 35. Gilmore Elizabeth. Impact of training on the information technology attitudes of university faculty. Doctoral Dissertation. Denton: University of North Texas; 1998. Available from: www.tcet.unt.edu/research/dissert/gilmore/ needs.html [Accessed 2 June 2009]
- 36. Girod Mark & Gavanaugh Shane. Technology as an agent of change in teacher practice. *T.H.E Journal*. 2001. Available from: from http:// thejournal.com/articles/15380_1 [Accessed 23 January 2010]
- 37. Green Kenneth C. The 2001 National Survey of Information Technology in US Higher Education. The campus computing project. 2002. Available from: http://www.campuscomputing.net/ summaries/2001. [Accessed 23 January 2010]
- 38. Hagner Paul R, & Schneebeck Charles A. Engaging the faculty. In CA Barone & PR Hagner (Eds.). Educause leadership strategies: Vol 5. Technology-enhanced teaching and learning. San Francisco, CA: Jossey-Bass; 2001, 1-12.
- Heeks Richard. Information and Communication Technologies, Poverty and Development. Online Development Information Working paper series no. 5. 1999 Available from: http:// idpm.man.ac.uk/wp/di/di_wp05abs.htm [Accessed 28 June 2009]
- 40. Hong KS & Koh CK. Computer Anxiety and attitudes toward computers among rural secondary teachers: A Malaysian perspective. *Journal of Research on Technology in Education.* 2002; 35(1): 27-47.
- 41. Hopkins John D. Information technology and the information society in Europe: expectations and barriers to the implementation of new media in the higher education and research sector. Deploy Project Summary Report; 1996. Available from: http://www.uta.fi/FAST/JH/iteurope.html. [Accessed 17 June 2009]
- 42. Igbaria Magid & Chakrabarti Alok. Computer

Anxiety and Attitudes toward Microcomputer Use. *Behaviour and Information Technology*. 1990; 9(3): 229-241.

- 43 Johassen David. Computers in the classroom: Mindtools for critical thinking. Englewood Cliffs, NJ: Prentice-Hall; 1996.
- 44. Keengwe Jared. Faculty integration of technology into instruction and students' perception of computer technology to improve student learning. *Journal of Information Technology Education*. 2007; 6: 169-180.
- Kling Rob. What is social informatics and why does it matter? *D-Lib Magazine*. 1999; 5(1). Available from: http://www.dlib.org.dlib/ january99/kling/01kling.html. [Accessed 12 June 2009]
- Knezek Gerald & Christensen Rhonda. Impact of new information technologies on teachers and students. *Education and Information Technologies*. 2002; 7(4): 369-376.
- 47. Lai Kowk-Wing, Trewen Ann & Pratt Keryn. Computer coordinators as change agents: Some New Zealand observations. *Journal of Technology and Teacher Education*. 2002; 10(4): 539–551.
- Lee C Cheng. Interactivity tools in online learning. *The Internet TESL Journal [On-line Serial]*. 2000; 8(7). Available at :http://iteslj.org/Techniques/ Lee-InteractivityTools/. [Accessed 23 May 2009]
- 49. Leedy Paul D & Ormrod Jeanne Ellis. *Practical Research: Planning and Design*, 10th Edition. Upper Saddle River, Boston: Pearson Educational International; 2010.
- 50. Levin Tamar & Wadmany Rivka. Teachers' Views on Factors Affecting Effective Integration of Information Technology in the Classroom: Developmental Scenery. *Journal of Technology and Teacher Education.* 2008; 16(2): 233-263.
- Mamtora Jayshree. The efficacy of academic use of the Internet at USP. *COMLA Bulletin*. 2003; 1: . 34-9. Available from: http://www.emerald insight.com [Accessed 15 April 2009]
- Middleton John A. From manuscript to multimedia. *How Technologies Transform Education Research*. 2000; 3(2). Retrieved January 13, 2004, from http://cie.asu.edu/Voiumes3/ number2/inde.html
- 53. Mehlinger Howard D. School reform in the information age. Bloomington, IN: Center for Educational Excellence at Indiana University; 1995.
- 54. Mehlinger Howard D & Powers Susan M.

Technology & teacher education – A guidebook for educators and policymakers. Boston: Houghton Mifflin; 2002.

- 55. Milken Exchange on Education Technology. *Will new teachers be prepared to teach in a digital age?* Santa Monica: Milken Family Foundation; 1999. Retrieved January 13, 2004, from http:// www.mff.org/pubs/ ME1544)df.
- 56. Monami HA. Evaluation of the nature, extent, and satisfaction with the use of the Internet by applied science and technology faculty members in Jordan. PhD dissertation. Pittsburgh, PA: University of Pittsburgh; 2003. Available from: http://www..editlib.org [Accessed 25 April 2009]
- 57. Morrison James L & Osborn Hugh. Implementing organic education. An interview with Chris Osborne. *Innovate*. 2005; 2(2). Available from: h t t p : / / i n n o v a t e o n l i n e . i n f o / index.php?view=article&id=236 [Accessed 23 October 2009]
- Moser FZ. Faculty Adoption of Educational Technology. *EDUCAUSE Quarterly*. 2007; 30(1): 66-69.
- 59. Moursund David & Bielefeldt Talbot. Will new teachers be prepared to teach in a digital age? Santa Monica: Milken Family Foundation; 1999.
- 60. Murphy C & Greenwood L. Effective integration of information and communications technology in teacher education. *Journal of Information and Technology for Teacher Education*. 1998; 7(3): 413-429.
- 61. Murray Gregor. On the Cutting Edge (of Torpor): Innovation and the Pace of Change in American Higher Education. *AACE Journal*. 2008; 16(1): 47-61.
- 62. Muse Jr, HERBERT E. The Web-based community college student: An examination of factors that lead to success and risk. *Internet and Higher Education.* 2003; 6: 241-161.
- 63. Nasir R. Mohd. Measuring the Effectiveness of a Web-based Online Knowledge Portal for the Research Community. The third International Conference on Knowledge, Culture and Change in Organisations, Penang, Malaysia. 2003. Available from: http://www.nottingham. edu.my/faculties/ social/NUBS/People/Pages/RosniwatiMohd Nasir.aspx [Accessed 25 April 2009]
- 64. Nichols M. Institutional Perspectives: The Challenges of E-Learning Diffusion. *British Journal of Educational Technology*. 2008; 39(4): 598-609.

65. Nicolle Pamela M. Technology adoption into teaching and learning by mainstreams university faculty: A mixed methodology study revealing the "how, when, why and why not". Unpublished doctoral dissertation, Louisiana State University and Agricultural and Mechanical College. Baton Rouge, LA: 2005. Available online from: http://etd.lsu.edu/docs/ available/etd-07132007-114639. [Accessed 03 April 2010]

22

- Noguchi Yuki. Women narrow the internet gender gap, survey finds. Washington Post. 2005;
 Available from: http://www.washington post.com /wp-dyn/content/article/2005/12/ 28/AR2005122801403.html [Accessed 05 May 2010]
- 67. Nyamboga CM, Ongonda MA & Raymond W. Experiences in the use of the internet at Egerton University Library, Njoro-Kenya. *DESIDOC Bulletin of Information Technology*. 2004; 24(5): 11-24.
- 68. Olatokun Wole Michael & Adeboyejo Olufunke Christey. Information and communication technology use by reproductive health workers in Nigeria: state of the art, issues and challenges. *Human technology: An interdisciplinary Journal on human in ICT Environments.* 2009; 5(2):181-207.
- 69. Oncu Semiral, Delialioglu Omer, & Brown Cattherine A. Critical Components for Technology Integration: How do Instructors Make Decisions? *Journal of Computers in Mathematics and Science Teaching*. 2008; 27(1): 19-46.
- 70. Pelgrum WJ, Anderson RE (Eds.). ICT and the emerging paradigm for lifelong learning: a worldwide educational assessment of infrastructure, goals, and practices. Amsterdam: IEA; 1999.
- 71. Pelgrum WJ & Law Nancy. *ICT in Education Around the World: Trends, Problems and Prospects.* Paris: UNESCO; 2003.
- 72. Radloff Alex. Getting Online: The Challenges for Academic Staff and Institutional leaders. 2001. Available from http://www.ascilite.org.au/ conferences/melbourne01/pdf/papers/ radloffa.pdf[Accessed 13 April 2011]
- 73. Rehman S & Ramzy V. Internet use by health professionals at the Health Sciences Centre of Kuwait University. Online Information Review. 2004; 28(1): 53-60.
- 74. Reiser Robert A. A history of instructional design

and technology: Part I: A history of instructional media. *Educational Technology Research and Development*. 2001; 49(1): 53-64.

- 75. Rogers Patricia L. Barriers to Adopting Emerging Technologies in Education. *Journal of Educational Computing Research.* 2000; 22(4): 455-472.
- 76. Rogers Everett M. *Diffusion of innovations* (5th ed.). New York: The Free Press; 2003.
- 77. Sahin Ismail & Thompson Ann. Analysis of Predictive Factors that Influence Faculty Members Technology Adoption Level. *Journal of Technology and Teacher Education*. 2007; 15(2): 167-190.
- 78. Schrage Michael. The real problem with computers. *Harvard Business Review*. 1997; 75 (5): 178–183. Available from: http:// www.iskme.org/what-we do/publications/ thinking_schools.pdf [Accessed 26 June 2009]
- 79. Sheingold Karen & Hadley Martha. Accomplished teachers: Integrating computers into classroom practice. New York: Center for Technology in Education, Bank Street College; 1990.
- 80. Spotts Thomas H, Bowman Mary Ann & Mertz, Christopher. Gender and Use of Instructional Technologies: A study of University Faculty. *Higher Education*. 1997; 34: 421-436.
- 81. Surry Daniel W. Diffusion theory and instructional technology. 1997. Available from http:// www.gsu.edu/~wwwitr/docs/diffusion/ [Accessed 24 March 2010]
- UNCSTD (United Nations Commission on Science and Technology for Development). (1997). Report of the Working Group on Information and Communication Technologies for Development. Prepared for the 3rd Session, 12 May, Geneva, Switzerland. UNCSTD, E/CN.16/1997. Available from: http://www.idrc.ca. [Accessed 05 October 2009]
- Usluel, Yasemin Koçak, A^akar, Peter & Ba^a, Turgey. A Structural Equation Model for ICT Usage in Higher Education. *Educational Technology & Society*. 2008; 11(2): 262-273.
- 84. Usluel, Yasemin Koçak. & Seferoðlu, S. Sadi. Öðretim elemanlarýnýn bilgi teknolojilerini kullanmada karþýlaþtýklarý engeller, çözüm önerileri ve öz-yeterlik algýlarý. Eðitim Bilimleri ve Uygulama. 2004; 6(3): 143-157.
- 85. Veen W. The role of beliefs in the use of information technology: Implications for teacher education, or teaching the right thing at the right time. *Journal of Information Technology for Teacher*

Education. 1993; 2: 139-153.

- 86. Waier. Strategic review of research in education. Issues in Education. 1991; 1(1): 43 - 45. Retrieved October 1, 2009, from http:// education.curtin.edu.au/iier/iier1/waierviewpoint.html.
- 87. Watson C Edward. Self-efficacy, the innovationdecision process, and faculty in higher education: Implications for faculty development. Unpublished doctoral dissertation. Blackburg, VA: Virginia Polytechnic Institute and State University; 2007.
- Whitfield CM, & Latimer BT. A model for technology integration. *Learning and Leading with Technology*. 2003; 30(4): 50–55.
- Wilberly Jr, SE & Jones WG. Humanists revisited: a longitudinal look at the adoption of information technology. *College and Research Libraries*. 1994; 55(6): 499–509.
- 90. World Fact Book. 2007. Available from: https:// www.cia.gov/cia/publications/factbook/geos/ lt.html/http://hdr.undp.org/hdr2006/ statistics/countries/country_fact_sheets/

cty_fs_LSO.html. [Accessed 19 September 2009]

- Wozney Lori, Venkatesh Vivek & Abrami Philip C. Implementing computer technologies: Teachers' perceptions and practices. *Journal of Technology and Teacher Education*. 2006; 14(1): 173-207.
- 92. Young LT Bagby, RM Cooke, RG Parker, JDA, Levitt AJ & Joffe RT. A comparison of Tridimensional Personality Questionnaire dimensions in bipolar disorder and unipolar depression. 2000. Available from: http:// www.sciencedirect.com/science [Accessed on 22 September 2009]
- 93. Zhange Y & Deng W. Perception of learning effectiveness in the multimedia classroom vs. the traditional classroom: A case study. *College & University Media Review*. 2004; 11(1): 87-107.
- 94. Zayim Nese, Yildirim Soner & Saka Osman. Technology adoption of medical faculty in teaching: differentiating factors in adopter categories. *Educational Technology & Society.* 2006; 9(2): 213-222.

Subscription Form

I want to renew/subscribe to international class journal **"Indian Journal of Library and Information Science"** of Red Flower Publication Pvt. Ltd.

Subscription Rates:

• India: Institutional: Rs.8000, Individual: Rs.7200, Life membership (10 years only for individulas) Rs.72000.

• All other countries: \$600

Name and complete address (in capitals):

Payment detail: Demand Draft No. Date of DD Amount paid Rs./USD

1. Advance payment required by Demand Draft payable to Red Flower Publicaion Pvt. Ltd. payable at Delhi.

2. Cancellation not allowed except for duplicate payment.

3. Agents allowed 10% discount.

4. Claim must be made within six months from issue date.

Mail all orders to **Red Flower Publication Pvt. Ltd.** 48/41-42, DSIDC, Pocket-II, Mayur Vihar Phase-I, Delhi - 110 091 (India) Tel: 91-11-22754205, 45796900, Fax: 91-11-22754205 E-mail: redflowerppl@vsnl.net, redflowerppl@gmail.com Website: www.rfppl.co.in

Evaluation in information Retrieval – User Studies of Students of Shree Chandraprabhu Jain College, Library, Minjur, Thiruvallur District, Tamil Nadu

K. Muthukrishnan*, P. Sivaraman**

Abstract

Objective: This research is conducted to provide a new insight on the usage of the library by the students of Shree Chandraprabhu Jain College, Library Minjur, Thiruvallur District, Chennai Metro, Tamil Nadu, South India. The data has been collected using questionnaire method. **Methods:** Questionnaire method, user performance, learning evaluation. **Results:** Evaluation in education has a key role in making the users truly information literate. Teaching is no longer lecture-based and teacher-based Evaluation is a win-win process which mutually benefits the teachers as well as the students. **Conclusion:** This paper attempts to highlight the role of constructivist approach in constructing knowledge by the learner. The base ideas of constructivism emphasize appropriate facilitator-supported learning that is initiated and directed by the learner. The learner faced with a problematic situation, actively engages in exploration to solve the problem and construct his own knowledge. The students are evaluated through a continuous assessment procedure. In the implementation of curriculum, theory teaching assumes more importance than practical work. Students should, on their own initiative, take an interest in the learning process rather than be passive listeners.

Keywords: Evaluation; Utilization; Library; Library services; Library users; User's needs; Information retrieval.

Introduction

The student community, in particular seeks information on their future. A user is one who seeks some information from the library. The focal word is "Information". The word "information" includes almost every subject under its ambit. The goal of any library and information system is to provide an organized and accessible collection material to support the needs of users. The output of academic performance system of the students is judged not only by the quantity of product but also by the quality of that product. This is also true for the system of higher education. The internal judgment of the output as assessed by the educational evaluation itself and second, the external judgment of the output as

Author's Affilation: *Research Scholar, Annamalai University-Working as a Sr. Librarian in Shree Chandraprabhu Jain College, Minjur, Thiruvallvur District, **Associate Professor, Dept. of Library and Information Science, DDE, Chidambaram, Tamil Nadu, India.

Reprint's Request: K. Muthukrishnan, Sr. Librarian, Shree Chandraprabhu Jain College, Minjur, Thiruvallvur District, Tamil Nadu -601 203, India.

E-mail: krish_fort@yahoo.com

assessed by society. According to the Russian born American poet and novelist Ayn Rand "The only purpose of education is to teach a student how to live his life-by developing is mind and equipping him to deal with reality. The training he needs is theoretical, i.e., conceptual. He has to be taught to think, to understand, to integrate, to prove. He has to be taught the essentials of knowledge discovered in the past; he has to be equipped to acquire further knowledge by his own effort."Quality education and evaluation is a win-win process which mutually benefits the teachers as well as the students.

Related Studies

A comprehensive review of literature is necessarily an integral part of any research endeavor, as it helps to identify the gap in research and aids the investigator in designing and analyzing research work. A literature review is a critical and in depth evaluation of previous research studies. Only a few reviews are considered for this study.

Miles and Huberman, (1994) defined the quantitative versus qualitative arguments. They made an "analytic" approach to understanding a few controlled variables, and a "systemic" approach to understanding the interaction of variables in a

complex environment. Both approaches can coexist if required by the objectives of the particular study.

Marshall, (1995) examined that evaluation involved the use of research methods to measure the effectiveness of library and information services and systems. It was also called action research because of its application in assessing the effectiveness of specific programmes or measuring particular approaches.

Devarajan, (1995) suggested that user education is a neglected phenomenon in many libraries, which may result in the under utilization of resources available in the libraries. This under utilization had a direct adverse effect on the intellectual creativity of the individuals and will further lead to under development of the country with a minimum number of intellectual works coming from the researcher. Competitive advantages are possible only when users can gather, analyze and disseminate information in a proper manner. These functions are mostly carried out by libraries. But these functions are only complete if the libraries come forward to expose their resources to their users.

Kelleher, (1996) inferred that the systems approach was the one most usually found in the context of electronic library projects, and revealed at the heart of the Tavistock model of evaluation used in the UK e-Lib projects. This **was** where aspects of information system performance lay at the heart of the evaluation, with data on the impact of the system on users. Data also was found to impact more widely, when explicitly collected. The literature of evaluation suggested the importance of including qualitative as well as quantitative data as the basis for evaluation.

Lancaster (1997), McClure (1999), Clarke (1999). Saracevic (2000) identified the ethnographic, sociological, systems, economic and political approaches, which will be appropriate for differing audiences, with differing goals for their evaluation. At previous conferences on performance measures, papers have been presented by leading workers in the field who have made strong pleas for the central role of qualitative evidence and its involvement in the performance measurement process.

Wilson (2000), republished a paper in which he discussed the methods used in information research, which he saw as a particularly diverse field of study, more of an applied than a basic science. The output of information science research is applied in a given managerial or organizational setting. Wilson stressed the importance of this method. He saw that social survey methods were often misused to collect a great deal of data without the researcher having a theoretical (or even descriptive) framework into which to fit the data. He suggested that, in effect, collecting data became a substitute for thinking about the problem. This was a particular risk in the case of practitioner-based research.

Oliver and Conole, (2000) made a statement that the strategies for quality enhancement rely on the identification of areas of potential improvement and the specification and implementation of plans. Evaluation can fulfill a variety of roles in the quality assurance process, including acting as part of the quality assessment process or as a structure for devising quality enhancement plans. Toolkits are decision making frameworks based on expert models. The formats of toolkits mean that they can be used in a standard, linear fashion, or can be 'dipped into' by users whose level of expertise is stronger in some areas of the design process than others.

Huotari M-L, Wilson TD (2001), attempted to demonstrate the mapping process of the CSFs (Critical success factors) and the related information needs. This way of displaying the organizational information needs support the comprehensive analysis required to fulfill the advisory role of an information audit. The figures can be further elaborated, for example, to display the problems in the information flows or with the use of IS to access essential information. By giving an overview of the critical issues and problems to be overcome, it provides the auditor with a solid base for recommendations for different units or organizational levels. A participative process involving major actors in each unit is necessary to create a coherent framework of organizational information behaviour for ensuring interactive IS (Information System) design and development. However, it should be noted that some factors might be more time-dependent than others. Thus, the auditing process should be repeated at regular intervals.

Rowley (2003) investigated a number of studies that focused on the needs of library and information professionals or the systems development communities, and increasingly academic-librarian partnerships. To begin to explore student behaviour from an educational perspective, this paper reported the results of a small-scale study that aimed to investigate an example of current information literacy provision by observing student behaviour in the online environment with a view to future enhancement. Haklay and Tobón, (2003) made an effort to evaluate and understand a web site's usability by the number of people using it.

Mutula (2004) suggested that libraries required

sufficient funds to acquire modern ICT facilities such as computers, servers, scanners, photocopiers, software as well as paying for online and offline services such as e-journals and digital libraries. Most of these ICT facilities and services are very expensive and can be purchased from developed countries. On the contrary, experience reveals that most university libraries in Africa and other developing countries can get very little funds from their parent institutions and the government for support of their activities. (OECD, 2006). International comparisons of education can be achieved through comprehensive quality management and quality criteria (Finnish National Board of Education, 2008; (Organization for Economic and Development). As a result, the emphasis is shifting from developing physical learning environments using norms and regulations to comparing these environments on the basis of qualitative improvement.

Academic libraries must understand the information needs of faculty members, research scholars and students in order to address those needs. These related studies explore quality education in the evaluation of user studies.

Student evaluation

Student's feedback is an essential tool for quality enhancement. It requires to be highlighted that student feedback can be taken in terms of institutional functioning in which students are actually involved. Methods of student evaluation are many such as-Students' feedback, Colleagues feedback, Self assessment, and Teaching effectiveness...etc. Studies are commonly seen as being either quantitative or qualitative. Quantitative data are seen as being objective, quantifiable, hard, generalisable, based on numbers, whereas qualitative data are seen as being subjective, socially constructed, soft and non general sable, based on words. User studies are, by definition, about people, behavior and contexts. They need both quantitative and qualitative approaches to be combined to produce the both the holistic view and the robust data needed to triangulate and thereby validate data collected.

Quality of Education

Quality is not a destination but a continuous journey. The quest for quality never ends. Quality requires judgments by users with experience, standards related to objectives of appropriate academic standards by teachers that are essential. The improvement of quality is essential to enrich the dimensions like teaching-learning process, research consultancy and evaluation, student support service and co-curricular activities of institutions. Teaching is external and learning is internal .Value oriented education should include student participation in decisions about discipline and evolving a voluntary accepted system of public morality. The true education for students must promote the inculcation of noble motives and objective thinking for implementation of one's decisions.

Monitoring Evaluation

Evaluation and Quality in education are two popular words. They are dictating the trends of present world order in higher education. Evaluation is a complex term. Its real meaning and implications are generally inadequately understood. It has remained a subject of debate among academia and policy makers. However, evaluations should be cost effective. Many institutions of higher learning are beginning to work under corporate management. Methods for evaluation should be based on variety of indicators that may be norm-referenced, criterionreferenced, or self-referenced. Evaluation and feedback on a student's progresses are important both to the student and to the faculty.

Methods of evaluation in study skills

There are many methods for the evaluation of library's performance and its effectiveness a few of these evaluation skills are presented below.

- *a. Individual study skills:* Case studies are a superior vehicle for encouraging students to carry out independent research outside of the classroom environment.
- b. Information analysis skills: Many case studies require resource investigation and encourage students to utilize a number of information from different sources, i.e., Internet, library, laboratory results and contacting experts in industry. During this process the learning becomes faster than normal.
- *c. Presentation skills:* Most of the case studies require students to present their work in a variety of roles or formats. These include oral presentations, poster presentations and summary presentations of reports or outcome from a given situation or case.

Systematic and formative feedback of evaluation

Evaluation is the systematic assessment of the worth or merit of some object. There are many types

of evaluations that do not necessarily result in an assessment of worth or merit-Descriptive studies, implementation analyses, and formative evaluations, to name a few. The definition is that emphasizes the information-processing and feedback functions of evaluation. Evaluation is the systematic acquisition and formative assessment of information to provide useful feedback about some object.

Both definitions agree that evaluation is a systematic endeavor and both use the deliberately ambiguous term 'object' which could refer to a program, policy, technology, person, need, activity, and so on. The latter definition emphasizes acquiring and assessing information rather than assessing worth or merit because all evaluation work involves collecting and sifting through data, making judgments about the validity of the information and of inferences we derive from it, whether or not an assessment of worth or merit results.

Types of Evaluation

There are many different types of evaluations depending on the object being evaluated and the purpose of the evaluation. Perhaps the most important basic distinction in evaluation types is that between formative and summative evaluation. Formative evaluations strengthen or improve the object being evaluated .They help form it by examining the delivery of the program or technology, procedures, inputs, and so on. Summative evaluations examine the effects or outcomes of some object. They summarize it by describing what happens subsequent to delivery of the program or technology. They assess whether the object can be said to have caused the outcome. They determine the overall impact of the causal factor beyond only the immediate target outcomes and estimating the relative costs associated with the object.

Definition of Evaluation

Evaluation involves the use of research methods to measure the effectiveness of library and information services and systems. According to Lancaster felt that evaluation is performed to gather data useful in problem-solving or decision making activities. Winkworth recommended that every library should undertake regular evaluation, including occasional formal events and Gauri Srivastava focused on student evaluation from gender perspective.

Most significant characteristics of a good library will depend upon the availability of the following services in the students' perspective.

- > The availability of books
- Availability of periodicals
- > Availability of non-book materials
- Quality of reference service
- good reference collection
- A quiet place conductive to reading and study
- ➢ Integrity of the catalogue
- > Friendly service
- Copying facilities
- Helpful librarians
- Audio and Videotaping.
- Course portfolios and others.

Measuring Techniques

This part is not intended to survey all instruments of measuring the quality of library services, but only a selection of useful methods applicable to an academic library. As more and better measures of performance are devised and used, the task of library evaluation will become easier.

The researcher has distributed 105 questionnaires to evaluate for each service.93 of the questioned responded for each service and the result is given in the table.

Membership service

As per the questionnaire, 23of the students have scored the membership service as excellent whereas 26 students have given their opinion as very good. The rest of 27 and 16 students have given their opinion as good and fair. So the students are satisfied with the membership service as good.

Circulation service

As per the questionnaire, 29 of the students have scored excellent for the membership service whereas 22 students have given their opinion as very good and the remaining 24 and 18 students have given their opinion as good and fair. It shows that most of the users are agreed that the circulation service is excellent.

OPAC service

As per the questionnaire, 24 of the students have presented as excellent for the membership service

whereas 28 students have given their opinion as very good and rest of 21 and 20 students have given their opinion as good and fair. Hence the students are convinced in OPAC service which is very good.

Reference service

As per the questionnaire, 21 of the students have opined the reference service excellent whereas 23 students have given their opinion as very good and the remaining 24 and 25 students have given their opinion as good and fair. Hence majority of the user's community are satisfied that the reference service is fair.

Suggestions

Based on the findings of the study, the following suggestions are put forward to improve the library services in user community.

- To improve the library service new arrivals of books may be displayed.
- Periodicals/books that are displaced should be properly arranged every day.
- Current awareness service may be implemented to increase the satisfaction level of the library service.
- Interpretation oriental program may be conducted to the faculty members.
- The reading section should be separate without any disturbance.

- Faculty development program has to be conducted by exploring various library facilities namely online journal availability and e-books.
- While seeking information from internet the users should use more than one search engine because only one search engine cannot be considered as comprehensive.
- Reading circles and reading societies can be created which will meet periodically to read aloud, discuss and talk about particular authors and topics.
- Open House can be conducted where students are requested to come out and offer their suggestions for improving the library.
- Students can be asked to enter their suggestions for books and authors which the library currently does not have.
- There is a need for library attenders specially for cleaning the library.
- It is suggested that more Book bank books may be purchased,.
- While seeking information it is important to spell correctly in order to reach the source.

In an age of globalization and expansion in the frontiers of knowledge assisted by modern communication technologies, it is very essential that the pattern of student's evaluation meet the global standards.



India has the third largest higher education system in the world, behind only the US and China producing about 2.5 million graduates every year. This is just about 10% of India's youth. There is no dearth of talent in India. We have to put in place a system that helps spur creativity and innovative thinking .Students skill potential may enable our institutions to shine on the global higher education map. In view of the parameters set for the global ranking, we have to revamp our evaluation system and then introduce with the joint effort of the universities and other statutory bodies of higher education Instititutions.

Conclusion

In conclusion, the author highlighted the fact that developed and developing countries of the world should design a pattern of student's evaluation. It encourages students all over the globe to pursue their cherished goals and get enrolled in institutions of their choice. Library evaluation is an important management function in library and information services. Subject command as well as communication skill should be blended for the improvement of a student. Teaching is no longer lecture-based and teacher-based .Evaluation is a win-win process which mutually benefits the teachers as well as the students. Students' feedback is an essential tool for quality enhancement.

References

- 1. Miles MB & Huberman AM. Qualitative data analysis: an expanded sourcebook. Sage Publications; 1994.
- Marshall JG. Using evaluation research methods to improve quality. *Health Libraries Review*. 1995; 12: 159–172.
- 3. Devarajan G. Library and information. New Delhi: User and User Studies Becin Book; 1995.
- 4. Kelleher. Evaluation of the Electronic Libraries Programme. Guidelines for Elib project evaluation. London: The Tavistock Institute; 1996.
- Lancaster FW. Evaluating the Digital Library. In: Proceedings of the Second Northumbria International Conference on Performance Measurement in Libraries and Information Services, 7-11 September. DILM University of Northumbria; 1997: 47-57.

- Clarke, Z. EQUINOX: the development of performance indicators for the electronic library. In Proceedings of the Third Northumbria International Conference on Performance Measurement in Libraries and Information Services. DILM, University of Northumbria; 1999. Available at http:// equinox.dcu.ie/reports/pilist.html (13 Jan. 2003)
- McClure CR.Issues and Strategies for Developing National Statistics and Performance Measures for Library Networked Services and Resources. In: Proceedings of the Third Northumbria International Conference on Performance Measurement in Libraries and Information Services, 27-31 August. DILM University of Northumbria; 1999.
- 8. Saracevic T. Digital library evaluation: toward an evolution of concepts. *Library Trends.* 2000; 49(3): 350-369.
- 9. Wilson TD. Recent trends in user studies: action research and qualitative methods. *Information Research*. 2000; 5(3). Retrieved 1 December 2003 from http://informationr.net/ir/5-3/paper76.html
- 10. Oliver M & Conole G. Assessing and enhancing quality using toolkits. *Journal of Quality Assurance in Education*. 2000; 8(1): 32-37.
- 11. Huotari M-L, Wilson TD. Determining organizational information needs: the critical success factors approach. *Information Research*. 2001; 6 (3).
- 12. Rowley, J. Profiling and understanding student information behaviour: methodologies and meaning. *ALT-J.* 2003; 11(1): 28–40
- 13. Haklay M, Tobón C. Usability evaluation and PPGIS: towards a user- centred design approach. *International Journal of GIS*. 2003; 17(6): 577-592.
- Mutula S. IT diffusion in Sub-Sharan Africa: Implications for developing and managing digital libraries. *New Library World*. 2004; 105(7/ 8): 281 – 289.
- 15. OECD (Organization for Economic Co-operation and Development). CELE (Centre for Effective Learning Environments) Organizing Framework on Evaluating Quality in Educational Spaces. 2006. www.oecd.org/edu/facilities/evaluating quality.
- 16. Arun K Gupta and Renu Gupta. Students feedback for quality assessment: challenges and tasks ahead. *University News*. 2007: 5.

17. Karam Pal Narwal and RS Jaglan. Students Learning-Evaluation through Case Method: a Promising Approach. Published in 'University NewsA Weekly Journal of Higher Education'. 2009; 47(45): 108-112.

STATEMENT ABOUT OWNERSHIP AN "Indian Journal of Library and Int	ND (form	OTHER PARTICULARS ABOUT ation Science" (See Rule 8)
1. Place of Publication	:	Delhi
2. Periodicity of Publication	:	Quarterly
3. Printer's Name	:	Asharfi Lal
Nationality	:	Indian
Address	:	3/258-259, Trilok Puri, Delhi-9
4. Publisher's Name	:	Asharfi Lal
Nationality	:	Indian
Address	:	3/258-259, Trilok Puri, Delhi-9
5. Editor's Name	:	Asharfi Lal (Editor-in-Chief)
Nationality	:	Indian
Address	:	3/258-259, Trilok Puri, Delhi-9
6. Name & Address of Individuals	:	Asharfi Lal
who own the newspaper and particulars of	:	3/258-259, Trilok Puri, Delhi-9
shareholders holding more than one percent		
of the total capital		

Sd/-(Asharfi Lal)

Subscription Form

I want to renew/subscribe to international class journal **"Indian Journal of Library and Information Science"** of Red Flower Publication Pvt. Ltd.

Subscription Rates:

• India: Institutional: Rs.8000, Individual: Rs.7200 Life membership (10 years only for individulas) Rs.72000

• All other countries: \$600

Name and complete address (in capitals):

Payment detail: Demand Draft No. Date of DD Amount paid Rs./USD

1. Advance payment required by Demand Draft payable to Red Flower Publicaion Pvt. Ltd. payable at Delhi.

2. Cancellation not allowed except for duplicate payment.

3. Agents allowed 10% discount.

4. Claim must be made within six months from issue date.

Mail all orders to **Red Flower Publication Pvt. Ltd.** 48/41-42, DSIDC, Pocket-II, Mayur Vihar Phase-I, Delhi - 110 091 (India) Tel: 91-11-22754205, 45796900, Fax: 91-11-22754205 E-mail: redflowerppl@vsnl.net, redflowerppl@gmail.com Website: www.rfppl.co.in

Effective use of ICTs and Digital Library Initiatives in Research Institutes and R & D Organizations in Karnataka : A Study

Ramesha*, Raghavendra M.**

Abstract

Digital library initiatives are vertebral column for development of digital libraries in the professional world and Information Communication Technology (ICT) become inevitable in the present information explosion. The heavy usage of digital and electronic resources has increased expectations of library profession so to meet the needs and expectations of the user's one stop solution is adopt modern ICT facilities. The present study focuses on LIS professional's background, research institutional R & Organizations library information, ICT facilities, LIS services offered, digital library initiatives, professional expertise in research institutions and R & D organizations in Karnataka.

Keywords: Information Communication Technology (ICT); Digital Library Initiatives; Research Institute; R & D Organization.

Introduction

Digital library Initiatives and Digital Libraries are made information access very easy due technological advancement particularly in Information Communication Technology (ICT) has converted globe in to modern informative globe, information available anywhere in the world can be accessed through the present digital libraries. Present libraries are adopting new technologies to fulfill the needs and requirements of the users than before.

Research institutes and research organizations libraries are providing innovative services to their user community; still the advancement of technology has made professionals to bite nails in some issues. The present situation demands professional expertise, technical expertise, ICT infrastructure requirement and proper electronic and digital resources for developing good user oriented library and information resource centers. With this in

Reprint's Request: Ramesha, Professor, Dept. of Library and Information Science, Bangalore University, Jnana Bharathi Campus Off Mysore Road, Bengaluru, Karnataka- 560 056

E-mail: bbramesha@gmail.com

background the authors conducted a study analyze the ICT facilities, digital library initiatives, LIS services offered by the Research Institute and Research & Development (R & D) Organizations libraries in Karnataka.

Objectives of the Study

- 1. To know background of LIS professionals wor king in Research Institutes and R & D organizations in Karnataka State.
- 2. To study the R & D organizations and institutio nal information as well as Library and Information Centers
- 3. To assess the availability of electronic resources under the study institutions and organizations.
- 4. To analyze the Library and Information Services provided by the research institutions and R & D organizations in Karnataka State
- 5. To understand the ICT based services provided by the institutions and organizations under the study.
- 6. To examine the professional expertise in handling modern technologies such as ILMS, Digital Library and IR software etc.,
- 7. To know the state of the art of information communication technology (ICT) facilities in research institutes and Research organizations in Karnataka

Author's Affilation: *Professor, Dept. of Library and Information Science, Bangalore University, Bangalore-560056, **Librarian, Govt. First Grade College and Research Scholar Dept. of Library & Information Science, Bangalore University, Bangalore-560056.

- 8. To know the digital library initiatives in research institutions and R & D organizations in the State of Karnataka.
- 9. To suggest the networking of research institutes and R & D organizations for better resource sharing between and among the library and information centers.

Methodology of the study

A well structured questionnaire was designed keeping in view of the objectives of the study. The questions were simple consisting of both open and closed ended questions. The structured questionnaire was distributed to librarians/information scientists, for this purpose the principal researcher has visited personally all the forty libraries information centers in different part sof Karnataka. The response was positive and the professionals working in these organizations encourage the researchers to complete the task in time. After obtained the completed the questions were tabulated using MS excel and the same were analyzed.

Analysis of the Data

4.1. Background information about Librarians/ Information Scientists

It can be observed from the table 1 that 22 (55.00%) of the respondents are male Librarians or i/c scientists and rest of them i.e.,18 (45.00%) of them are female librarians were working in different research institutes and R & D organizations of Karnataka. The maximum number of respondents are 41-50 years of age group and 23 (57.50%), of them are have prescribed educational qualification. The above average 35 (87.50%) respondents are less than 15 years of experience i.e., 21(52.50%). It was interesting to note that majority 38 (95.00%) of the respondents were enrolled as a member in various professional discussion to forms. On the other hand only 16 librarians and or information scientists are taken membership various professional association such as ILA, IASLIC, SLA etc.,

	Table 1: Background information about Librarains						
Sl. No.	Personal Information	Groups	Respondents	%	Cum. %		
1	Sav	Male	22	55.00	55.00		
1.	Sex	Female	18	45.00	100.00		
		31-40	3	7.50	7.50		
2.	Age	41-50	23	57.50	65.00		
	-	50+	14	35.00	100.00		
		Librarian	24	60.00	60.00		
3.	Designation	Asst. Librarian	2	5.00	65.00		
	C	In-Charge	14	35.00	100.00		
4	Educational	Prescribed	35	87.50	87.50		
4.	Qualification	Over Prescribed	5	12.50	100.00		
_		Less (<15 years)	21	52.50	52.50		
5.	Experience	More (>15 years)	19	47.50	100.00		
(Yes	38	95.00	95.00		
0.	Member of Forum	No	2	5.00	100.00		
7	Membership in Library	Yes	16	40.00	40.00		
1.	Association	No	24	60.00	100.00		

4.2. Institutional and Background Library and Information Center

The State of Karnataka is the hub of Information Technology and research institutes and R & D organizations covering different research field. From the table 2, it was observed there are 31 (77.50%) research institutes and 9 (22.50%) R & D organizations are conducting research different areas. These institutes and organizations are have large of research scholars i.e., 9403(79.80%) followed by administrators and scientists. The majority 23 (57.5%) of the library and information centers are following open access system followed by mixed access 17 (42.50%) i.e., both open access as well closed access to reading and research materials. Almost all the libraries are non air conditioned i.e., 39(97.50%) but

Table 2. Institutional and background Elbrary and Information Center									
SI. No.	In stitutional In for mation	Groups	Respondents	%	Cum. %				
1.	Organization Type	Research Institute	31	77.50	77.50				
2.	Library users	Scientists Administrators Research Students	223 2158 9403	1.90 18.30 79.80	1.90 20.20 100.00				
3.	Library Access type	Open Access Closed Access Mixed	23 - 17	57.50 - 42.50	57.50 57.50 100.00				
4.	Air conditioned	No Yes	39 1	97.50 2.50	97.50 100.00				
5.	Security and Disaster Management measures taken	Yes No Planned Separate building	39 - 1 21	97.50 - 2.50 52.50	97.50 - 100.00 52.50				
6.	Library housed in	Part of Main Organization building	19	47.50	100.00				
7	Source of Finance	State Government. Central Government Consultancy and Project	6 32 2	15.00 80.00 5.00	15.00 95.00 100.00				

Table 2: Institutional and Background Library and Information Center

adopted good security and disaster management system. Above average libraries are functioning in a separate library buildings i.e., 21(52.50) and majority 32(80%) of the libraries are funded by the central government and only 6(15.00%) libraries funded by state government.

4.3. Library and Information Services offered by the Library

Research libraries and information centres are service oriented center to support to parent organization and institutions, whose primary goal is to identify, collect, organize, sotre and provide access to information through variety of library and information services. Since from early days research libraries are offering variety of library and information services depending on the scientists needs and also based on resources and facilities available in libraries and information centers now they have expanded their range of services with the emergence of electronic and digital scholarly resources with blending of ICT. The table 4 presents the various library and information services incuding electronic services provided by the research institutes and R & D organisations in Karnataka State. It is quite obvious that all most all the libraries 40(100%) are providing circualtion, interlibrary loan and photocopying services to their scientific community. 36(90.00%) libarries are providing telephone, fax facility, typing, scanning and printing services. 31(77.50%) and 28(70.00%) of libraries are providing newspaper clipping service and display of new arriavles of documents. 16(40.00%) libraries are offering audio visual presentation shows, only 5(12.50%) of libraries conducting user education.

Electronic information services have became the vital part of research and scientific life in the 21st century. It has rapidly changed the way of seeking and disseminating information particularly in research and development organisation. All the research and R & D libraries (40) under the study are providing Current Awareness (CAS) and Reference services. These services are necessary for the scientific community to update current development in their respective field, subsequently 33(82.50%) libraries are providing SDI and referral services. 31(77.50%) and 25(62.50%) libraries are offering bibliographical service and indexing and abstracting service respectively. Only 8(20.00%) libraries are supplying documents through document delivery service(DDS). Though the article alert service, information literacy progammes and literature search services are most essential services for the scientific community but only few research libraries are offering these services. On the other hand the research and R & D libraries are adopted extensively information and communication technology to provide electronic and online services. It was observed from the table all the libraries are computerized and providing OPAC and WebOPAC access facility to search and retrieve the documents available in the library followed by online access to database i.e., 35(87.50%) and E-current

SI.		١	Yes		No					
No.	Library & Information Services		%	No.	%					
1.	Circulation Service	40	100.0	-	-					
2.	ILL Service	40	100.00	-	-					
3.	Newspaper Clipping Service	28	70.00	12	30.00					
4.	User Education	5 21	12.50	35	87.50					
5. 6	Display of New Arrivals Typing scanning and printing Service	31	77.50 90.00	9	22.50					
0. 7	Digital photography and photo editing	3	7 50	37	92.50					
8.	Photo copying service	40	100							
9.	Telephone/Fax Service	36	90.00	4	10.00					
10.	Audio Visuals Presentation Shows	16	40.00	24	60.00					
Information Services										
11	Current Awareness Service (CAS)	40	100							
12	SDI Service	33	82.50	7	17.50					
13	Reference Service	40	100							
14	Referral Services	33	82.50	5	17.50					
15	Bibliographical Service	31	77.50	9	22.5					
16	Indexing and Abstracting Services	25	62.50	15	37.50					
17	Article Alert Service/Content Page of Journal	6	15.00	34	85.00					
18	Document Delivery Service (DDS)	8	20.00	32	80.00					
19	Information Literacy Programme	3	7.50	37	92.50					
20	Literature Search Service	2	5.00	38	95.00					
Electronic Information Services										
21	E-current A wareness Services (E-CAS)	32	80.00	8	20.00					
22	E-Document delivery Service (E-DDI)	6	15.00	34	85.00					
23	Online Access to databases	35	87.50	5	12.50					
24	E-Bibliographic Service	26	65.00	14	35.00					
25	OPAC, Web OPAC	40								
26	CD-ROM Search Service	24	60.00	16	40.00					
27	Digital/Virtual Reference Service	4	10.00	36	90.00					
28	Ask Librarian/Online Chat	18	45.00	22	55.00					
29	Bulletin Board Service	1	2.50	39	97.50					

Table 3: Library Services provided by the respondents

awareness service 32(80.00%). 26(65.00%) and 24 (60%) libraries providing E-bibliography service CD-ROM search facility. It is interesting to note that 18(45%) libraries are offering ask librarian and chat services to scientific community.

4.4. Professional expertise among the Librarians/ information scientists

With the technological advancements and emerging innovative technology the LIS professionals need to have through knowledge in the technological development and its positive application to library housekeeping operation and providing effective library and information services to user's community. In the context the researcher want to know the level of professional expertise in handling of computer, competency in trouble shooting, ILMS, OPAC, Library web portal management, various internet tools and search techniques, building and management of digital library and Institutional repository. It was good to know that all most all the librarians and information scientists expressed that they have sufficient knowledge on the above attributes.

4.5. Availability of Infrastructure facilities in libraries

The ICT infrastructure such as computers, communication and network accessories, graphical
Table 4: Professional Staff Expertise among the Respondents							
SI.	Professional Staff Exportise	Ŋ	Yes	No			
No.	T Tolessional Starr Expertise	No.	%	No.	%		
1.	Computer Expertise (Hardware & Software)	38	95.00	2	5.00		
2.	Competency and Trouble Shooting	38	95.00	2	5.00		
2	Integrated Library Management System	40	100.00	-	-		
3.	(ILMS)						
4.	OPAC/Web OPAC	40	100.00	-	-		
5.	Web Portal	40	100.00	-	-		
6.	Internet Tools and Techniques	40	100.00	-	-		
7.	Digital Library	40	100.00	-	-		
8.	Institutional Repository	40	100.00	-	-		

reproduction systems, printers and other technologies including the UPS facilities are the essential requirements to provide easy, fast and wider access to information resources and services. Since early days the library and information centres are adopting the contemporary technologies both for library housekeeping operations and also to provide networked information access and retrieval facilities for the users. Hence, researcher made an attempt to investigate the existence of ICT infrastructure

	Table 5: Availability of Infrastructure facilities						
SI. No.	Equipments		Available		ailable	Total in Nos.	
1.	Computers	40	100.0	-	-	343	
2.	Servers	40	100.0	-	-	50	
3.	Mirror Server	15	37.50	25	62.50	15	
4.	CD. Net Server	12	30.00	28	70.00	12	
5.	CD ROM Tower	31	77.50	9	22.50	42	
6.	CD DVD Writer	40	100			48	
7.	LCD Projector	10	25.00	30	75.00	10	
8.	Television	2	5.00	38	95.00	3	
9.	VCR	1	2.50	39	97.50	1	
10.	Clients Computer Workstations	25	62.50	15	37.50	72	
11.	Type of Campus Network	14	35.00	26	65.00	14	
12.	Blue Ray Disc	40	100.0	0	0.00	0	
13.	Scanners	40	100			63	
14.	Barcode Scanner and Reader	29	72.50	11	27.50	33	
15.	Barcode Printer	29	72.50	11	27.50	30	
16.	Dot Matrix Printer	14	35.00	26	65.00	16	
17.	Ink Jet Printer	17	42.50	23	57.50	19	
18.	Laser Printer	40	100.0			68	
19.	Back up Device	40				38	
20.	UPS	40			2.50	40	
21.	Generator	3	7.50	37	92.50	3	
22.	Web/Digital Camera	2	5.0	38	95.00	2	
23.	Campus Network	1	2.50	39	97.50	1	
		Total				923	

38 Ramesha & Raghavendra / Effective use of ICTs and Digital Library Initiatives in Research Institutes and R & D Organizations in Karnataka : A Study

facilities in research institutes and R & D organisations in Karnataka. It is observed from the table that all the 40 libraries with 100% coverage have requisitely good ICT infrastructure facilities in terms of Computers, Servers, Blue Ray Disc, Scanners, Laser printers, backup devices and UPS handling library activities and functions. Some libraries are having barcode printer and scanner i.e., 29(72.50%), client computer work stations 25(62.50%), and mirror servers 15(37.50%) in their libraries. Only few libraries are having LCD projectors i.e., 10(25.00%), Generator

i.e., 3(7.50%) etc., It is now found in most of Library and information centres these above are some of the common and essential ICT infrastructure facilities provided for the use of the information resources and services.

4.6. Digital Library Initiatives

Out of 32 research institutes 11 of them are set up the digital library store, organize, disseminate and preserve the digital resources. On the other hand out 9 R & D organizations 6 of them are developed the digital library.

Table 6: Digital Library Initiatives in research institutes and R & D organization						
SI.	Digital Library Initiatives	Y	es	I	No	
No.	Digital Library Initiatives	No.	%	No.	%	
1.	Research Institutes	11	27.50	29	72.50	
2.	Research & Development Organizations	6	15.00	34	85.00	

Major Findings of the study

- Majority of the 22 (55.00%) of the respondents are male Librarians or i/c scientists and rest of them i.e.,18 (45.00%) of them are female librarians were working in different research institutes and R & D organizations of Karnataka.
- It was interesting to note that majority 38 (95.00%) of the respondents were enrolled as a member in various professional discussion to forms. On the other hand only 16 librarians and or information scientists are taken membership various professional association.
- There are 31 (77.50%) research institutes and 9 (22.50%) R & D organizations are conducting research different field.
- Majority 23 (57.5%) of the library and information centers are following open access system followed by mixed access 17 (42.50%) i.e., both open access as well closed access to reading and research materials.
- Above average libraries are functioning in a separate library buildings i.e., 21(52.50) and majority 32(80%) of the libraries are funded by the central government and only 6(15.00%) libraries funded by state government.
- It is quite obvious that all most all the libraries 40(100%) are providing circualtion, interlibrary loan and photocopying services to their scientific community. 36(90.00%) libarries are providing telephone, fax facility, typing, scanning and printing services. 31(77.50%) and 28(70.00%) of

libraries are providing newspaper clipping service and display of new arriavles of documents.

- It was observed from the study all the libraries are computerized and providing OPAC and WebOPAC access facility to search and retrieve the documents available in the library followed by online access to database i.e., 35(87.50%) and E-current awareness service 32(80.00%).
- It was good to know that all most all the librarians and information scientists working in research institutes and R & D organizations in Karnataka expressed that they have sufficient professional knowledge to held ILMS, digital library and IR.
- All the libraries are having sufficient computers, servers, Blue Ray Disc, scanners, laser printers, backup devices and UPS handling library activities and functions.
- It was found that the most of research Institutes and R& D organization libraries are having good infrastructure and ICT facilities.
- Almost all the research libraries are having good collection of print and non print collection including E-database & E-journals and they are providing quite good number of services to their users.
- Out of 32 research institutes 11 of them are set up the digital library store, organize, disseminate and preserve the digital resources. On the other hand out 9 R & D organizations 6 of them are developed the digital library.

Suggestions

- Nearly half the research institute and R & D Libraries in Karnataka is head i/c of the Library and Information centers. It is recommended from the study the concerned competent authorities need appoint professionally qualified Librarian or Information Scientist to management and provide better library and information services to scientific community.
- The LIS professionals working in the research institutes and R & D organizations are not taken any membership from the professionals association. Therefore strongly suggest from the study, the LIS professional working in these institute should take membership both National and International association to uphold the professional values and image.
- Nearly half of the research libraries are function ing in part of main building of the research institute. It suggest that the concerned authorities and both central and state government need to provide financial assistant to construction of new independent library building for better functioning and to provide innovative library and information services.
- The professionals working in research institute and R & D organizations under study are having good expertise in handling modern technological tools, techniques and strategies blending with availability of all state of the art technologies it need be collaborated scholarly and intellectual work for over success of library and information centers.
- Further the networking of all the libraries in In dia in general and Karnataka in particular to facilitate greater resource sharing between and among the research institutions and R & D organization it minimize the cost of resources and maximize user satisfaction.
- Though the ICTs are widely available with professional expertise, only few libraries are initiated the digital library and Institutional repositories. It strong suggests from the study that all the research libraries and R & D organizations need develop digital library IR for scholarly digital resources and services.

Conclusion

The technological emerging trends and growing convergence in digital technology, networking,

processing and storage technologies, and computer networks has provided a means whereby information can be stored, retrieved, disseminated and duplicated in a fast and efficient manner and can be accessible anywhere, anytime and also in a desired mode or format. This implies that digital library technologies are by now well established and understood throughout where information is a key input in the organization development and provide a competitive advantage over others. The Research and Development (R & D) organizations and higher educational institutions are the potential users of the most information resources, either in the form of 'born-digital' materials or the archival digital resources. The universities and more so the R & D Organization Library and Information Centers in particular, have been on the dynamic path of development of the so-called 'digital collection or digital libraries'. It is stated by Dillion (1999) that most current libraries based on a working model conceptualized in the 19th century are simply not structured to handle the current volume of books, journals, multimedia and other electronic resources.

References

- 1. Arms W. Digital libraries. Cambridge, MA: MIT Press, 2000, p2.
- Dillon D. Making the wild wind invisible: Information technology in a brave new world. S.H Lee (Ed.), Collection development in a digital environment. The Haworth Press, New York, 1999.Jeevan V.K.J. Digital library development: Identifying sources of content for developing countries with special reference to India. *The International Information & Library Review*, Elsevier publication, 2004, 36, 185–197.
- 3. Fox E.A. NDLTD: Networked digital library of theses and dissertations. 1997. http://www.ndltd.org Retrieved on 20th December, 2014.
- 4. Choudhary, Pravin Kumar. *Et all*, Challenges for LIS professionals in the digital era. Library and information networking. Papers of the National convention on library and information networking (NACLIN), Cochin (India), October 21-24, 2002. Ed. By H.K.Kaul and M.D.Baby. New Delhi: DELNET, 2002, pp254-267.
- 5. Suleman Hussein, and Edward A Fox. A framework for building open digital libraries, *D*-*Lib Magazine*, 2001, 7(12). http://www.dlib.org/dlib/december01/suleman/12suleman.html. Retrieved on 24th December 2014.

Red Flower Publication Pvt. Ltd.

Presents its Book Publications for sale

1. Breast Cancer: Biology, Prevention and Treatment	Rs.395/\$100
2. Child Intelligence	Rs.150/\$50
3. Pediatric Companion	Rs.250/\$50

Order from

Red Flower Publication Pvt. Ltd. 48/41-42, DSIDC, Pocket-II, Mayur Vihar, Phase-I Delhi - 110 091 (India) Tel: 91-11-22754205, 45796900, Fax: 91-11-22754205 E-mail: redflowerppl@gmail.org, redflowerppl@vsnl.net Website: www.rfppl.co.in

Design and Development of Library and Information Science Learning Object (LISLO) Retrieval System

Amit Kumar Das*

Abstract

The paper outlines the opportunities that Learning object has put forward for teaching and learning. Focusing on a particular aspect of learning object retrieval system i.e., design and develop the mechanism of learning object on library and information science learning object (LISLO) using open source software (Greenstone) and open standards (IEEE LOM), the paper discusses about the online and offline CD ROM product and services of LISLO. It enhance modified IEEE LOM metadata incorporation for digital archiving and retrieval system using Greenstone Metadata schema (GEMS).

Keywords: Digital Library; Learning Object; Learning Object Metadata; Learning Object Metadata Standards; IEEE LOM Standard.

Introduction

Internet and Web provide us a comprehensive multimedia-driven platform for knowledge communication. Digital libraries are major application entities of Internet and Web technologies. These are considered as next generation library services. In simple words, Digital libraries are managed collections of digital objects. These entities enable the creation, organization, maintenance, management, access to, sharing and preservation of digital knowledge bearing objects or document collections. Learning objects are the entities of digital learning system. Digital learning objects are accessible from anywhere, by anyone, at anytime, in any format and in any language. The term "digital library" has been culled from the literature by (Fox,1998), and their spirit is captured in the following brief characterization: A collection of digital objects, including text, video, and audio, along with methods for access and retrieval, and for

E-mail: dasamitkumar2007@gmail.com

selection, organization and maintenance of the collection. According to the Digital Library Federation (DLF, 2009) definition, "Digital libraries are organizations that provide the resources, including the specialized staff, to select, structure, offer intellectual access to, interpret, distribute, preserve the integrity of, and ensure the persistence over time of collections of digital works so that they are readily and economically available for use by a defined community or set of communities". The DELOS Digital Library Reference Model (Candela...[et al.], 2009) defines a digital library as: An organization, which might be virtual, that comprehensively collects, manages and preserves for the long term rich digital content, and offers to its user communities specialized functionality on that content, of measurable quality and according to codified policies. Akscyn and Witten, (Akscyn and Witten, 1998), views digital libraries as "organized collections of digital information," and wisely recommends that they articulate the principles governing what is included and how the collection is organized. The digital libraries, digital archives, institutional repositories and learning objects repositories are also products of advanced research in the areas of ICT and information storage and retrieval system (ISARS). With the advent of Information and Communication Technologies (ICT), libraries are increasingly attempting to digitize learning object for perpetual access (long time preservation as well as access) and thereby make digital learning object more productive to the LIS

Author's Affilation: *Librarian,Torkona Jagabandhu High School (H.S.)Torkona, Taluk-Burdwan, Dist-Bardhaman – 713 423 West Bengal

Reprint's Request: Amit Kumar Das, Librarian, Torkona Jagabandhu High School (H.S.)Torkona, Taluk -Burdwan, Dist -Bardhaman - 713 423 West Bengal

community. In India, a number of institutions already have initiated digitization projects and programmes that will later integrate into digital library or digital repository systems.

Learning Object

With the growing number of e-resources, it has become imperative for information professional to redefine their role in disseminating information to the users due to information explosion on library and information centers. (IEEE 1484.12.1-2002) In this Standard, learning object is any entity, digital or nondigital, that may be used for learning, education, or training Learning objects are also known as digital objects, knowledge objects, educational objects, instructional objects, intelligent objects, reusable learning objects, data objects. The learning objects, like, selflearning study materials, tutorials, exercises, assignments, case studies, project reports, dissertations, theses, articles, seminar presentations, conference papers, audio-visual materials, etc. are essentially used by the open and distance learners in their learning process.

The advantages of digitizing learning objects are as follows (Deegan and Tanner, 2002):

- The qualitative learning objects can be shared by learners of different programmes within open and distance learning (ODL) institution;
- The qualitative learning objects can be shared by learners of different ODL institutions within or outside the country;
- The learning objects would be made available to the cross sections of the learners;
- The learning objects would be made available to learners of different ODL institutions;
- Duplication of efforts of preparing self-learning study materials can be minimized;
- Duplication of final projects, dissertations, theses of learners can be restrained;
- Creativity and innovation of the learners can be ignited when they see others' works; and
- Visibility and prestige of the ODL institutions, which initiate learning objects repositories, would be increased.

Learning Object Metadata

Learning Object Metadata is a data model, usually

encoded in XML, used to describe a learning object and similar digital resources used to support learning. The purpose of learning object metadata is to support the reusability of learning objects, to aid discoverability, and to facilitate their interoperability, usually in the context of online learning management systems (LMS) as well as learning object digital repository/library. The IEEE 1484.12.1 - 2002 Standard for Learning Object Metadata is an internationally-recognized open standard (published by the Institute of Electrical and Electronics Engineers Standards Association, New York) for the description of "learning objects". The drafting of the IEEE Learning Object Metadata is contributed by (an international consortium) IMS Global Learning Consortium.

- Learning Object Metadata (LOM) is a metadata standard to describe educational resources
- The IEEE Learning Object Metadata (LOM) standard specifies the syntax and semantics of Learning Object Metadata, defined as the attributes required to fully/adequately describing a Learning Object. Learning objects are defined here as any entity, digital or non-digital, which can be used, re-used or referenced during technology supported learning.

The features of Learning Object Metadata are

- In web based learning, the trend is to encode learning materials with meaningful and machine understandable metadata in order to facilitate modular and reusable content repositories.
- Learning object metadata is usually represented in XML or RDF format.
- Metadata is used not only in searching and acce ss to the learning object repositories but also in reusing learning object materials and learning objects aggregation.
- Learning object metadata is the base of most operations on learning objects.
- Learning object repository stores both learning objects and their metadata in two different ways
- Storing them physically together
- Learning Objects and their metadata stored separately
- Most Learning Object Repositories are actually learning object metadata repository in which every metadata includes the link to the learning object resource (content is somewhere else).

The standards of Learning Object Metadata are

Instructional Management Systems Project (IMS), Advanced Distributed Learning Initiative (ADL) and SCORM, Alliance of Remote Instructional Authoring and Distribution Networks for Europe (ARIADNE), Dublin Core Metadata Initiative, IEEE Learning Technology Standards Committee (LTSC) Learning Object Metadata- IEEE 1484, Canadian Core Learning Object Metadata (CanCore), World Wide Web Consortium (W3C), METADATA. The available LO metadata standards application profiles are ADL SCORM, ARIADNE, SingCore, UK Curriculum online, Australian Learning Federation, Standard (IEEE/ISO) and others. In this context, the existing Learning Object Repositories are CAREO (Campus Alberta Repository of Educational Object), GEM (Gateway to Educational Materials), JA-SIG (Java in Administration Special Interest Group), and MERLOT (Multimedia Educational Resource for Learning and Online Teaching).



Chart 1: Elements of IEEE LOM (source-IEEE LOM)

All the data elements of IEEE 1484.12.1 – 2002 LOM Standard (IEEE LOM, 2002)) are represented here in chart 1. A detail description of each IEEE LOM element is available in the project website.

IEEE LOM Standard consists 65 simple data elements with additional container elements. The IEEE LOM standards divided into 9 categories. These are general, lifecycle, meta-metadata, technical, educational, rights, annotation, classification. The schematic representation of the hierarchy of elements in the LOM data model () is represented in Figure-1.

The IEEE LOM Application Profile needs to be modified to suit the requirements of this project. A simple but robust set of data elements has been created by using GSDL metadata element set (GEMS) tool. The modified elements set given below (Table-1)

This project deals with the Design and Development of web integrated services dealing with Learning Object (LO) in Library and Information Science (LIS) entitled LISLO. The main purpose of this work is to provide offline information (CD -ROM) to the Community of LIS to solve their availability of course material. This work is to be useful to students, library professionals, research scholars and information scientists.

Greenstone is a suite of software for centralized building and distributing digital library collections. It provides a new way of organizing information and publishing it on the Internet or on CD-ROM. Greenstone is produced by the New Zealand Digital Library Project at the University of Waikato, and



Fig.1: Schematic representation of the hierarchy of elements in the IEEE LOM data model (Source-IEEE LOM)

Element Name	Description	Source	Mandatory?	Searchable?
Contributor	Right of the LO	lo.Contributor	Mandatory	No
Course Title	Course title of a paper	lo.CourseTitle	Mandatory	Yes
Course Number	Number of a paper	lo.CourseNumber	Mandatory	No
Block Title	Block title of LOs	lo.BlockTitle	Mandatory	Yes
Block Number	Number of a block of a paper	lo.BlockNumber	Mandatory	No
Unit Title	Unit title of LO	lo.UnitTitle	Mandatory	Yes
Unit Number	Number of a unit title	lo.UnitNumber	Mandatory	No
Keywords	Subject & Keywords of LO	lo.Keywords	Mandatory	Yes
Language	Language of LO	lo.Language	Mandatory	No

Table 1: Modified Elements of IEEE LOM

developed and distributed in cooperation with UNESCO and the Human Info NGO. It is open-source software, available from http://greenstone.org under the terms of the GNU General Public License.

Objective

The objectives of this project work are as follows: -

 To design and develop the mechanism for LISLO through the application of open sources software (GSDL) and open standard.

 To export the LISLO Products on CD-ROM for offline access.

Hypothesis

To design and development of LISLO in CD-ROM compatible format is user-friendly access mode for digitized LO Information resources through the integrated use of –

- Greenstone Digital Library Software (GSDL) as Digital Media Archive (DMA) software;
- Apache as Web server ;
- Browsers as client software ; and
- Locally modified IEEE LOM as metadata elements sets.

Research Design and Methodology

To enhance the accessibility of knowledge, Indira Gandhi National Open University (IGNOU) has initiated a Digital Repository named e-Gyankosh to share its valuable resources with educational institutions and learners internationally. eGyanKosh is a National Digital Repository to store, index, preserve, distribute and share the digital learning resources developed by the Open and Distance Learning Institutions of IGNOU in India and powered by DSpace. Items in eGyanKosh are protected by copyright, with all rights reserved by IGNOU, unless otherwise indicated. To access the items in repository registration is required (Figure-2).

Registration is free. In, (IGNOU) have deposited total number of 30515 digital learning resources till 23rd June, 2012. In, e-gyankosh, Bachelor of Library and Information Science (BLIS) [163], Certificate in ICT Applications in Library (CICTAL) [44], Master's Degree in Library and Information Science (MLIS) [184] from three learning object (Total=391) (excluding theses, streaming video) are downloaded. The total number is 352. But few LO of e-gyankosh are not available at the present time. These non available course materials are MLI002 (Block1, 2, 3), MLI005 (Internet Resources), MLI006 (Content Development, Content analysis), Library Classification Theory (Approaches to Library Classification, unit9.pdf), Current Awareness Services, MLI007 (Block2, Programming in specific languages), MLIE105 (Informetrics & Scientometrics), MLIE106 (Public Library Systems and Services), Library Management (Block3- Human Resource Management, Block4- Managerial Quality & Leadership, Block5- Organisational Behaviour). egyankosh is searchable by search including advance search facilities, browsing by titles and authors. For conducting this study, the search facilities of LO used extensively by search (including advanced search), browse by course title, block title, a-z lists (unit title) and the CDROM product will install necessary



Fig.2: Homepage of e-gyankosh

retrieval programs and web browser (Open source web browser) into the standalone PC accessing by any user. The retrieval program of GSDL will seek data from the CDROM against user queries. To design of this project, IEEE LOM Application profile (locally modified) is applied as metadata elements sets using Greenstone Editor Metadata Set (GEMS). This research project utilizes Greenstone Digital Library software (GSDL), as DMA software, and Greenstone Librarian Interface (GLI), as a tool for designing a searchable and browsable information product available on optical storage media. The five basic tasks that are involved for building the product are as follows-

- \star Gather Storage of LO resources in LIS
- ★ Enrich Encoding each object through modified IEEE LOM schema
- ★ Design Controlled indexing of DLO resources
- ★ Create Building of the collection on LO in LIS
- ★ Format Designing user interface for searching and browsing

The methodology for successful implementation of the above mentioned design issues will be as follows –

Group I: Installation and Configuration of the System

- ★ Installation of Apache webserver;
- ★ Installation of Java runtime Environment;
- ★ Installation of Greenstone Digital Library softw are; and
- ★ Linking of Apache and GSDL for web based access.

In this step, GSDL and its prerequisites software are already existed in LAMP (Linux, Apache,

Mysql, Perl which is already included in GSDL) architecture machine.

Group II: Creation of Metadata

★ Creation of modified IEEE LOM metadata using Greenstone Element Metadata Set (GEMS)

Group III: Collection Development

★ Decision on scope and coverage (Includes LO (BLIS, CICTAL, MLIS) of IGNOU learning materials from egyankosh); ★ collect and storage of PDF formatted LO in LIS from egyankosh into a folder on local drive

Group III: Collection Organization

- ★ creation of a digital learning database entitled "LISLO"
- ★ Uploading the pdf formatted LIS LO in Local storage space through GLI;
- ★ Incorporation of metadata (modified IEEE LOM) in GSDL through GLI using Enrich tab;
- ★ Design of the user interface by search (Course Title, Block Title, Unit Title, Key Word, Full Text) and browser (Course Title, Block Title, A-Z lists of Unit Title);
- ★ Designing of display format;
- ★ Testing and debugging;
- ★ Checking and verification of the product;
- \star Exporting to CDROM.

Snapshots of Group II

Creation of modified IEEE LOM element set:

In this process, the following steps are:

- creation of modified IEEE LOM metadata eleme nts set using Greenstone Editor for Metadata Sets (GEMS);
- 2. adding the element by right clicking on modified IEEE LOM metadata schema;
- shows the addition of element entitled "Contribute";
- 4. element additions in modified IEEE LOM schema;
- 5. saving the modified IEEE LOM Schema

Group III: Collection Organization

The following steps are as follows:

- creation of a new collection entitled "LISLO" and the descri ption about Library and Information Science Learning Object;
- 2. gathers the three folders (BLIS, CICTAL, and MLIS) from local drive;
- 3. data incorporation of modified IEEE LOM metadata;
- 4. designing step, MGPP is selected as advance search engine within Green stone LISLO digital collection;



Fig. 3: creation of modified IEEE LOM metadata elements set using Greenstone Editor for Metadata Sets (GEMS)

				E Protection States	
My My	Greenstone Librarian Interfac	te	- 🗆	×	
Gre Cop GLI Thi	enstone Librarian In yright (C> 2005, New comes with ABSOLUTE s is free software,	terface (GLI) Zealand Digital Library Pro LY NO WARRANTY; for details and you are welcome to redis	ject, University Of Waikato see LICENSE.txt tribute it		
Che Che	🚰 Greenstone Librarian Inte	erface Mode: Librarian Collection: Gargi (gargi)	- 🗆 ×	
Che	File Edit			🐞 Help	
100	🔄 Download 🕹 Gat	her 🛛 🔛 Enrich 🏽 🛞 Design 🛛 🎆 Cr	eate		The second s
	Workspace		Collection		
	E Local Filespace	enstone Collections	1.par		No. of Concession, Name
	😐 🦲 Home Folder (Ad	<u> </u>			and the second second
1845	±Downloaded File:			An ush	
		To create a new collection fill ou	t the fields below.		A SHARE AN A SHARE AN A SHARE AN
		Collection title: LISLO			
Uncorne		Description of content:	Learning Object		the same of the same of the same
avast					
CALIFORNIA		Base this collection on: New C	Collection		State of the second distance of the
1		ок	Canc	el	Contraction of the local distance
Mosilla III					State of the second state
	Show Files All Files		Show Files All Files	X	A CONTRACTOR OF THE OWNER
Nero StartSm	No action requested	No action requested	Stop		
1					
genlibV	V gsdl_all pazpar	an see a same		The subscript	
d' sta	art 🔜 😸 West Bengal	College 🦷 🚧 Greenstone Librarian	Greenstone Librarian 📃 Documer	nt1 - Microsof	🐨 💬 🚼 💽 🚳 👪 🛛 5:57 PM

Fig. 4: creating a new collection entitled LISLO and the description about Library and Information Science Learning Object

- managing the search indexes by lo.BlockTitle "Block Title", lo.CourseTitle "Course Title", lo.Keyword "Keyword", lo.UnitTitle "Unit Title", text "Full Text";
- creation of browsing classifier by classify AZCompactList -metadata lo.CourseTitle, classify Hierarchy -metadata lo.BlockTitle -sort lo.UnitTitle - buttonname "Block Title", and

classify AZList -metadata lo.UnitTitle buttonname"A_ZLists";

- 7. display format creation;
- 8. selection of modified IEEE LOM metadata;
- 9. testing the various search results from LISLO collection and modification.

Various steps are showed in snapshots as follows:-



Fig. 5: Data incorporation in modified IEEE LOM metadata

Database Design



Fig. 6: MGPP is selected as advance search engine within Green stone LISLO digital collection

Ny Documents marced: NISC DISCOVER	koha	_ _
My computed Greenstone Librarian Interface M File Edit Download D Gather	nde: Librarian Collection: Initest4 (Initest41) Enrich 🍪 Design 🐉 Create	L D X
eccent indexes Search Indexes Search Indexes Search Indexes Partition Indexes Pormat Features Translate Text Metadata Sets Metadata Sets	Search Indexes Manage Levels Assigned Indexes Io.BlockTitle "Block Title" [Default Index] Io.CourseTitle "Course Title" Io.Keyword "Keyword" Io.UnitTitle "Unit Title" rext "Full Text" Index Name: Block Title ex.Joate ex.Date ex.Encoding Build index on: ex.FileSize ex.ColtRATOR ex.Language ex.NumPages Add combined searching over all Add Index Replace Index	Help for this screen Move Up Move Down Set Default Index Indexes (allfields) Add All Remove Index

Fig. 7: Ddesign of search indexes by lo.BlockTitle "Block Title", lo.CourseTitle "Course Title", lo.Keyword "Keyword", lo.UnitTitle "Unit Title", text "Full Text"



Fig. 8: Design of browsing classifier by classify AZCompactList -metadata lo.CourseTitle, classify Hierarchy -metadata lo.BlockTitle -sort lo.UnitTitle - buttonname "Block Title", and classify AZList metadata lo.UnitTitle -buttonname "A_Z Lists"



Fig. 9: Design of display format



Fig. 10: Search results of LISLO collections

Conclusion

Digital libraries are very important sources of structured well-organized and well-stored information. Next generation digital libraries will supply a comprehensive range of services on network. The information professional has to keep constant watch for new developments and noticeable changes in the field of their concern. Greenstone is a comprehensive software system for creating digital library collections. It builds data structures for searching and browsing from the material provided, rather than relying on any hand-crafting. Browsing is based on modified IEEE LOM metadata. Browsing is controlled by "classifiers" that process metadata into browsing structures (by course title, block title, a-z list by unit title). Further research on multilingual digital learning object, multimedia based learning object, interoperability and crosswalk of learning object standards is essential for the establishment of successful digital learning object library system.

Bibliographical Reference:

1. Akscyn RM, Witten, IH. Report on First Summit on International Cooperation on Digital Libraries. 1998 [cited on 2012 April 09] Available from : ks.com/idla-wp-oct98.

- 2. Deegan Marilyn, Tanner Simon. Digital futures: strategies for the information age. London: Library Association Publishing, p.22, pp30-35 and p.139.
- 3. DLF, USA. 2009 Availabile from: http:// www.dlf.org.
- 4. Fox E. Digital library definitions. 1998 [cited on 2012 Aug 08] Available from : ei.cs.vt.edu/~fox/dlib/def.html.
- IEEE LOM. Draft Standard for Learning Object Metadata, IEEE Learning Technology Standards Committee, IEEE 1484.12.1-2002, [cited on Jul 2002] Available from: url:http://ieeeltsc.org/ wg12LOM/lomDescription.
- 6. Candela et al. The DELOS Digital Library Reference Model - Foundations for Digital Libraries. Version 0.98, [cited on 2009 Feb 15]. Available from:
- http://disi.unitn.it/~bernardi/Courses/DL/ Extra/extra_DL_Conceptual_Model_version 0.98.pdf.
- 8. Websites, http://greenstone.org, http://nzdl.org, http://humaninfo.org, http://www.unesco.org.
- 9. Learning Technology Standards Committee. The learning object metadata standard. Available from: http://ieeeltsc.org/wg12LOM/lomDescription.

Instructions to Authors

Submission to the journal must comply with the Guidelines for Authors. Non-compliant submission will be returned to the author for correction.

To access the online submission system and for the most up-to-date version of the Guide for Authors please visit:

http://www.rfppl.co.in

Technical problems or general questions on publishing with IJLIS are supported by Red Flower Publication Pvt. Ltd's Author Support team (http://www.rfppl.co.in)

Alternatively, please contact the Journal's Editorial Office for further assistance.

A Lal

Publication -in-Charge Indian Journal of Library and Information Science Red Flower Publication Pvt. Ltd. 48/41-42, DSIDC, Pocket-II Mayur Vihar Phase-I Delhi – 110 091 India Phone: 91-11-22754205, 45796900, Fax: 91-11-22754205 E-mail: redflowerppl@gmail.com, redflowerppl@vsnl.net Website: www.rfppl.co.in

Users' Satisfaction Towards Library Resources and Services in Maharaja Surajmal Institute of Technology of GGSIP University, Delhi : An Evaluation

Sanjay Kumar Pandey*, M. P. Singh**

Abstract

The present study evaluates the Users' satisfaction towards library resources and services at Maharaja Surajmal Institute of Technology of Guru Gobind Singh Indraprastha University, Delhi. The Users have been a key component of modern libraries for evaluating their resources and services in the information technology environment provide to their users. The study has been using Survey Method and 100 structured questionnaires were distributed between the faculty members and students and 82 questionnaires were received duly filled and found suitable for data analysis. The study found that a majority of the respondents was agreed with the availability of library printed resources like books, reference source, and journals, but the majority of the respondents was not agreed with the availability of electronic resources like E-books, E-journals and online databases. The results also founds that majority of respondents were satisfied with Services provided by the library such as circulation, reference and book bank, whereas the majority of respondents were dissatisfied with OPAC and photocopying services.

Keywords: Users Satisfaction; Library Resources; Services; ICT; Engineering Colleges.

Introduction

In present competitive Information world users' emerged a key element for evaluation of Library effectiveness and main motive of any library is to satisfy the needs of their users. Satisfaction can be defined as highly personal sentimental and intellectual reactions of users about uses of resources and services provided by the library according to users' expectation, perception and needs and reactions may be in negative and positive. The present study is based on evaluation of user satisfaction towards library resources and services to find out the information needs, information seeking behavior of faculty members and students and impact of ICT application for users of engineering college. As stated by (Swanson, 1979)¹ that for a library to be sure that it is carrying out its mandate to its users, "the totality of features and characteristics of its resources and services must be able to satisfy all users as stated or implied needs".

E-mail: sanjaypandey7219@gmail.com

In the Engineering College libraries, users are more aware about information technology compared with other library users towards different information needs, expects, and information gathering skills. The rapid technological advancement, innovation and different types of information resources are easily available to the users, libraries may have to adopt a new strategic plan in which the creation and providing satisfactory services for their users. Library resources and services are most important and influencing component to users' satisfaction in an ICT based environment. The availability of resources and quality of services can have significant influence on user's satisfaction and dissatisfaction (White & Abels, 1995)².

Need for the Study

The various research works have been done in European countries since last four decades on users' satisfaction towards library resources and services, but in India very few research works have been observed on the library users' centric theme. (National Knowledge Commission Report, 2006)³ also have been emphasizing for conducting more research on library users opinion to evaluate resources and library services. There is a need for engineering College libraries understand the user's need and satisfy their library resources and research needs for support in ongoing learning activities. The Govt. of NCT of Delhi established the first University

Author's Affilation: *Research Scholar, **Associate Professor, Department of Library and Information Science, BBA University, Vidya Vihar, Raebareli Road, Lucknow, Uttar Pradesh- 226 025

Reprint's Request: Sanjay Kumar Pandey, C1/38,Dayal Pur (Near David Model school), Delhi-110 094

by the name Guru Gobind Singh Indraprastha (GGSIP) University in 1998. It is a teaching and colleges affiliating university with the explicit objectives of facilitating and promoting the study, research work in emerging areas of higher education on professional education with focus (www.ipu.ac.in, 2014)⁴ The present study attempts to examine and investigate the various issues related to the study on users' satisfaction towards libraries resources and services, provided by the Maharaja Surajmal Institute of Technology (MSIT) library to their users of GGSIP University. This will help to the engineering college library in reconstructing their library information resources and services to provide users in a more effective manner.

Maharaja Surajmal Institute of Technology (MSIT): A Profile

The Govt. of NCT of Delhi established first Technical affiliated University with the name Guru Gobind Singh Indraprastha University (GGSIPU) in 1998, with the explicit objectives of facilitating and promoting "study, research and extension work in emerging areas of higher education with focus on professional education". MSIT is a private selffinancing institution of Guru Gobind Singh Indraprastha University; established in 2001. It offers Bachelor of Technology course in the different streams of Engineering like Electronics & Communication, Computer Science, Information Technology, Mechanical & Automation and Instrumentation & Control Engineering (www.msit.in, 2014)^{5.} The Library has a well-stocked fully computerized library with latest editions of books by eminent authors & is having a huge collection of books on education, management, computer science, engineering, science and humanities to cater to the needs and requirements of the faculty as well as students. The library has a rich quality collection of 51,299 books, 90 printed journals, 449 CD/DVD. The Library is also subscribed to 4833 e-journals and 363 E-books (Springer Link, Science direct and IEL).

Literature Review

The review of related literature is the key process of any research, which helps to understand about of a subject or a problem. (Bailey and Pearson, 1983)⁶ defined satisfaction in a broader sense, "Satisfaction as the sum of feelings or attitudes, both positive and negative, affecting the specific situation exhausted all necessary avenues to find an answer to the query". As (Zeithalm & Bitner, 2003)⁷ defined satisfaction as "the customer evaluation of a product or service in terms of whether that product or service has met their needs and expectations. Failure to meet the needs and expectation is assumed to result in dissatisfaction with the product and service". The various reviews of related literature describe about users' satisfaction measurement towards library resources and services in earlier and contemporary studies.

A case study conducted by (Singh & Chand, 2014)⁸ on users' satisfaction in engineering institution libraries among 250 users. The study found that the large numbers of users preferred use of print information resources and satisfied with availability of library resources and facilities. (Halder & Chandra, 2013)9 also conducted the study on library facilities provided by the private engineering colleges in Kolkata. They investigate the gap between available library services and information demands of the users. It also concluded that the library and information science professionals are to make them relevant by reaching out to users. A user survey conducted by (Walton & Leahy, 2013)¹⁰ at university of Loughborough about frequency of use of the library building, frequency of use of the library's digital services, importance and satisfaction levels with 15 library services. They found that were, 16% of respondents visit the library daily, 90% of academic staff uses the library online on at least every week. The people ranked the enquiry desk services as the they were most important,57% of library users indicated the library was the best place for their study, 91% agreed to the library was providing a good level of services and 35% users would like an increase in PC provision in building improvements .Another study conducted by (Velnamy & Sivesan, 2013)11 they evaluated the service quality of University libraries in Sri Lanka and measured service quality on the basis of 23 variables and found finally extracted four factors using factor analysis, such as Current Information ,Convenient opening hour, comprehensive collection ,current information and convenient access to the collection.

(Saufi, 2012)¹² have evaluated in their study on the "Outcome Budget Evaluation (OBE)" for gauging the level of space, services and facilities available in the library of past and present among 60 degree-level students across seven faculties was selected and these students who have been using both infrastructures; both the old and new UTHM libraries, are involved with parameters as space, services and facilities. In overall, results of this study reveal that 98 percent of respondents are very satisfied with the present library including space, facilities and services. Lesson learned in this study has implications not only on student satisfaction, however much more internal perspectives on space, facilities and services in the library. (Norliva, 2009)¹³ have evaluated the library performance by measuring the users' satisfaction with the library services, collection/ information about the library as a whole among 650 students from three faculties. The respondent was relatively most satisfied with the infrastructure, followed by collection or information, and library services to users in that order. The result also indicated about significant differences in the satisfaction on services, infrastructure and libraries' collection/information. In other words, his study mainly concerned and identified about user satisfaction towards library resources like printed and e-resources and services, Information needs, different information seeking behavior of users and impact of ICT application on users. Therefore users' satisfaction should be considered an essential part of evaluating library performance, which are depends to some extent on users' needs, expectations and the availability of resources and services.

Objectives

The objectives of the study are as follows:-

 To identify the available variety of Library Resources to meet users information needs

- > To identify most preferred service use by users
- To find out the Impact of ICT on users
- To measure user satisfaction levels with library resources and services in college library
- To evaluate and suggests the new recommendations in order to improve the library resources and services on the basis of users feedback.

Research Methodology

Research Methodology is an important and crucial process to solve the research problem by logically adopting different steps. The Survey Method and questionnaire tool have been employed for collection of data. A well designed questionnaire was distributed personally to 100 users' and 82 questionnaires were received back. The correctly filled questionnaire has been selected for data analysis. To find out the User satisfaction towards library resources and services, data have been collected from Library, faculty members and students of MSIT.

Data Analysis

The data have been analyzed by using MS-Excel 2007. The simple tabular representations with percentage analysis were made to show the findings.

		•			
S.No.	Users	Distribution of Questionnaire	No of Response	%	
1	Faculty	20	15	75	
2	Student	80	67	83.75	
	Total	100	82	82	

Table 1: Distribution and Response of Questionnaires

The table 1 shows that categories wise distribution of questionnaire among faculty members and students of the college. This table indicates that the 83.75% highest respondents were students, 75% respondents were faculty members and the overall response rate was 82%.

The respondents were asked about the availability and use of different variety library printed and electronic resources in the library to meet information needs of users. The table 2 indicates that a majority of respondents said "Yes" about the printed resources like Books (82.93%), followed by the Reference Sources (76.83%), Journals/magazine (57.32 %) and in regards of E-Resources, majority number of respondents said "Yes" on the Internet (69.51%), CD/DVD (57.32%) to meet their information needs. Whereas the majority of respondent said "No" about the Project Reports (64.63%), Conference/Seminar proceedings (58.54%). and majority of respondents said "No" about Eresources like E-books (62.20%), E-Journals (52.44%) and databases (51.22%).

The figure 1 shows that 53(64.63%) respondents knew about Information communication Technology and but 29(35.36%) respondents were unaware of Information communication technology.

information needs						
S.No.	Types of Resources	Response Yes (%)	Response No (%)			
1	(Printed Resources)	68	14			
	Books	(82.93%)	(17.07%)			
2	Reference Sources	63	19			
		(76.83%)	(23.17%)			
3	Journals/Magazines	47%	35			
		(57.32%)	(42.68%)			
4	Project Report	29	53			
		(35.37%)	(64.63%)			
5	conference/seminars proceedings	34	48			
		(41.66%)	(58.54%)			
6	(E-Resources)	47	35			
	Audio-Video /CDs/DVDs	(57.32%)	(42.68%)			
7	Internet	57	25			
		(69.51%)	(30.49%)			
8	E-Books	31	51			
		(37.80%)	(62.20%)			
9	E-journals	39	43			
	·	(47.56%)	(52.44%)			
10	Databases	40	42			
		(48.78%)	(51.22%)			

Table 2: Variety of Printed and Electronic Resources Availability and Use in library to meet user's information needs

Fig. 1: Awareness about Information Communication Technology



The above figure 2 illustrates that 31(37.80%) respondents were agreed, 19(23.17%) were strongly agreed on that the adequate computers and ICT application important for the betterment and efficient library services and, 15(18.29%) were not sure, 9(10.98%) were disagreed and 8(9.76%) respondent were strongly disagreed with that above opinion.

The respondents were asked to indicate that ICT has affected and motivated their library visit.

The above Figure 3 shows that 57(69.51%) respondents were said "Yes" that ICT has affected and motivated their library visit and only 15(18.29%) respondents said "No".

The respondents were asked to their satisfaction level about printing and e-resources .The table 3 reveals that total majority **85.37** % (29.27% VS,32.93% S,23,17% PS) of respondents were satisfied with books, followed by **82.93** % (30.49 % VS,35.37%



Fig. 2: Adequate computers and ICT application are essential for efficient service

Fig. 3: ICT affected and motivated users' library visit



S,17.07% PS) satisfied with Reference source, **74.4**% (14.63% VS,24.40% S,35.37 % PS) satisfied with Ejournals, **68.29** % (13.41% VS,47.57% S,7.31% PS) with Journals/magazines , **60.97** % (15.85% SV,12.19% S,32.93% PS) satisfied with E-books. Whereas **56.1** % (34.15% PD, 21.95% D) were dissatisfied with Online databases, followed by **54.89%** (20.74% PD, 34.15% D) dissatisfied with CDs/DVDs and **53.66** % (28.05% PD, 25.61% D) dissatisfied with Project Reports,

The respondents were asked to their satisfaction level about the services provided by the library. The table 4 reveals that total majority **79.27** % (25.61% VS, 37.80% S,15.86% PS) of respondents were satisfied with the circulation services, followed by **76.83** % (21.95% VS ,29.27% S,25.61% PS) satisfied with

PS) satisfied with Book-bank Service **67.07** % (13.41% VS,47.57 % S,6.09 % PS) satisfied with Reference service, **54.88** % (**17.07**% VS,12.20% S,25.61% PS) satisfied with CAS and **52.45** % (12.20% PS,20.74 %19.51% D) satisfied with Newspaper paper clipping, Whereas total majority **54.88**% (26.83% PD,28.05%

Internet service, 68.3 % (24.39% VS,36.59% S,7.32%

Whereas total majority **54.88**% (26.83% PD,28.05% D) dissatisfied with photocopying service followed by **52.44** % (26.83% PD, 25.61% D) of respondents were dissatisfied with Inter library Loan service and **51.23** % (20.74% PD, 30.49% D) dissatisfied with OPAC service and.

The respondents were asked to indicate most preferred Library Services used by them. The Figure

	Table 3: Users satisfaction level with printed and electronic resources of library						
S.No	Resources	Very Satisfied(VS)	Satisfied(S)	Options Partially Satisfied(PS)	Partially Dissatisfied(PD)	Dissatisfied (D)	
1	(Printed) Books	24 (29.27%)	27 (32.93%)	19 (23.17%)	8 (9.75%)	4 (4.88%)	
2	Reference Source	25 (30.49%)	29 (35.37%)	14 (17.07%)	9 (10.97%)	5 (6.10%)	
3	Journals/magazines	11 (13.41%)	39 (47.57%)	6 (7.31%)	10 (12.19%)	16 (19.52%)	
4	Project Reports	11 (13.41%)	17 (20.74%)	10 (12.19%)	23 (28.05%)	21 (25.61%)	
5	(E-Resources) E-books	13 (15.85%)	10 (12.19%)	27 (32.93%)	21 (25.61%)	10 (12.19%)	
6	E-Journals	12 (14.63%)	20 (24.40%)	29 (35.37%)	12 (14.63%)	9 (10.97%)	
7	Multimedia (CD/DVD)	10 (12.19%)	15 (18.29%)	12 (14.63%)	17 (20.74%)	28 (34.15%)	
8	Online databases	11 (13.41%)	21 (25.61%)	4 (4.88%)	28 (34.15%)	18 (21.95%)	

Table 4: Users Satisfaction Levels with Library Services

S. No	Services			Options		
		Very Satisfied(VS)	Satisfied(S)	Partially Satisfied(PS)	Partially Dissatisfied(PD)	Dissatisfied (D)
1	Circulation	21	31	13	12	6
		(25.61%)	(37.80%)	(15.86%)	(14.63%)	(7.31%)
2	Reference	11	39	5	8	19
		(13.41%)	(47.57%)	(6.09%)	(9.75%)	(23.18%)
3	Book Bank	20	30	6	14	12
		(24.39%)	(36.59%)	(7.32%)	(17.07%)	(14.63%)
4	Newspaper	10	17	16	10	29
	clipping	(12.20%)	(20.74%)	(19.51%)	(12.19%)	(35.37%)
5	Inter library Loan	6	21	12	22	21
	2	(7.31%)	(25.61%)	(14.63%)	(26.83%)	(25.61%)
6	Current	14	10	21	24	13
	Awareness	(17.07%)	(12.20%)	(25.61%)	(29.27%)	15.85%
	Service(CAS)	× ,	· · · · ·			
7	Internet	18	24	21	9	10
		(21.95%)	(29.27%)	(25.61%)	(10.97%)	12.20%
8	OPAC	13	12	15	17	25
		(15.85%)	(14.63%)	(18.29%)	20.74%	(30.49%)
9	Photocopying	6	12	19	22	23
	17 6	(7.31%)	(14.63%)	(23.17%)	(26.83%)	28.05%



4 reveals that 80.49. % majority of respondents was most preferred to circulation services, as a core service followed by 78.05 % of the book-bank services, 58.54 % to reference services, 36.59% of News paper clipping 29.27 % of photocopying service. 26.83 % to CAS, 20.73 % to Indexing and abstracting, 19.51 % to OPAC, and 15.85 % for interlibrary loan services as a least preferred service.

Findings

The following major findings are as:

1. A Majority of respondents were agreed on the availability of using the printed and e-resources resources like books, reference sources, journals/ magazines and CDs/DVDs, Internet to meet their information needs, whereas the majority of respondents were not agreed of using resources like project reports, conference proceedings-books, E-journals and online databases.

2. The majority of respondents were known about Information communication, majority of respondent was agreed with the statement of adequate computer and ICT application are essential tools for library for providing efficient service, and the majority of respondents was affected and motivated from ICT to visit the library.

3. The total majority of respondents were satisfied with books, reference sources, Journals/Magazines, Internet, E-books and E-journals, whereas the majority of respondents were dissatisfied with Project Reports, online database and CDs/DVDs.

4. The total majority of respondents were very satisfied with circulation services, reference services, book bank services, newspaper clipping service and Current Awareness service, whereas total respondents were partially dissatisfied with interlibrary loan, OPAC and photocopying services.

5. The circulation service is a most preferred used by users as a core service and interlibrary loan services least preferred service.

Suggestions

The following suggestions are based on various users' comments as follows:

- The some of the users desired more textbooks should be procured based on the syllabus of GGSIP University and students' demands.
- The numbers of borrowing tickets should be increased.
- More computer system should be installed in the library for access to the students and internet speed should be increased.
- Students should allow downloading data from Internet into personal devices
- Awareness should be generated towards diff erent types of resources specifically on E-resources available in the library.

60 Sanjay Kumar Pandey & M. P. Singh / Users' Satisfaction Towards Library Resources and Services in Maharaja Surajmal Institute of Technology of Guru Gobind Singh Indraprastha University, Delhi : An Evaluation

Conclusions

Today any modern academic library has prime concerns to users' information needs and satisfaction. The study will support for MSIT libraries to understand the user's information needs, information seeking behaviours and satisfaction level towards library resources and service in ongoing learning activities. Today library needs to adopted new information technology application for reconstructing in library resources and services to providing satisfactory services for their users. The library working culture currently undergone radical change due to revolutionary advancement of Information technology and emergence of Eresources has a significant impact on library users and uses of resources and services. MSIT library has a rich collection of printed and electronic resources with good infrastructure. But library should conduct some users' orientation programs to improve usages of project reports and electronic resources such as CDs/DVDs, databases and services such as interlibrary loan, photocopying and OPAC service make available to users.

References

- 1. Swanson, D.R. (1979). The measurement and evaluation of libraries services. *The library quarterly*, 49 (1).
- White,M.D.& Abels,E.G. (1995). Measuring s ervice quality in special libraries:lessons learned from marketing. *Special Libraries*, 86 (4), 36-45.
- National Knowledge Commission. (2006). NKC recommendation on libraries:letter to Prime Minister. Delhi: Govermrnt of India.
- 4. Guru Gobind Singh Indrapratha University, Delhi. Retrieved August 14, 2014, from http:// www.ipu.ac.in

- 5. Maharja Surajmal Institute of Technology,Delhi. Retrieved August 16, 2014, from http:// www.msit
- Bailey, J.& Pearson, S. (1983). Development of to ols for measureing and analysing computer usersatisfaction management science. In J. P. Bailey.
- Zeithaml, V.A. & Bitner, M.J. (2003). Services marketing:integrating customer focus across the firm (3rd ed.). N.York: McGraw Hill.
- Singh, N & Chand, S. (2014). User satisfaction in Engineering Institutions Libraries: a Case study of Advanced Institute of Technology & Management. *Global Journal of Multidisciplinary*, 3 (4), 8-20.
- Halder,S.N.&Chandra,S. (2013). A Critical of the Library Facilities Provided by the Private Engineering Colleges in Kolkata. *International Journal of Library and Information Science*, 5 (5), 134-139.
- Walton,G & Leahy,F. (2013). Survey on University library users satisfaction 2012. Loughborough: University of Loughborough.
- 11. Velnamphy, T. & Sivesan, S. (2013). Factor analysis of service quality in University in Sri Lanka : An application of Servqual Model. *Industrial engineering letters*, 40-49.
- Saufi,M.C.R.et.all. Library customer satisfaction (LCS)at library of University Tun Hussein Onn Malaysia: a study of space, facilities and services. *International conference on active learning* (ICAL2012), (pp. 292-295).
- Norliya, A K. (2009). Evaluation users, satisfaction on academic library performance. *Malaysian Journal of Library & Information Science*, 14 (2), 101-115.

A study of Information seeking Pattern of Faculty Members of Arts and Science Colleges in Thiruvallur District, Tamil Nadu

K. Muthukrishnan*, P. Sivaraman**

Abstract

This article deals with the study about the Information seeking Pattern of Faculty Members of Arts and Science Colleges in Thiruvallvur District, Tamil Nadu. The study covers methods adopted by Faculty for keeping abreast of current developments, amount spent in information gathering ,utilization of library services, use of information channels and to assess the adequacy, availability and accessibility of the college library collection. Teachers of various faculty members were interviewed about their use of electronic information resources for research purposes, their perception of electronic and print materials and the problems faced by the faculty members during information search.

Keywords: Communication Behaviour; Faculty Members; Information Channels; Users Satisfaction; Search Strategies.

Introduction

Information is a valuable resource required in any society. The process of information is acquiring, using and implementing information seeking behaviour. Through the survey method, we can evaluate the strength and weakness of the library services. A SWOT analysis of the library helps us to evaluate the strength, weakness, opportunity, and threat of the library. Acquiring and using information are critical and important activities. It is considered as the first element in the search for wisdom in the human chain process. Information means the communication of knowledge about an event or a given condition or the spread of knowledge derived from observation, study, experience or instruction, whatever may be the formats and channels in which the information is available. It is essential for a Librarian to know to what extent these are useful to the user community in meeting their requirements. In any type of library, the user studies play a vital

E-mail: krish_fort@yahoo.com

role in planning, designing and introducing new information services and in assessing the quality of remaining services, facilities and their utilities. Information resources are various aspects covered in the user studies.

Review of Literature

The literature of information seeking behaviour of faculty members available is greatly broad ranging. An attempt has been made to cover a number of works that go beyond discussions of the information seeking behavior itself and its direct applications to closely related topics such as information seeking. This broad review also includes topics like information seeking of faculty members.

Sethi, 1990¹ has examined the information seeking behaviour of social science faculty in Indian university. Respondents preferred journals, books, government documents and reference sources for meeting their information needs.

Hast, 1993² reported that faculty made about seven visits each semester to the library and looked at how scholars in different disciplines vary in their use of library resources.

Allen, 1996 ³emphasized that the user's information seeking is believed to be the concept of information needs, which fall into various categories: need for new information, need to expand or clarify the information obtained and need to confirm or

Author's Affilation: *Research Scholar, Department of Library Information Science, Annamalai University, Annamalai Nagar, Chidambaram, Tamil Nadu 608002 ** Associate Professor Department of Library and Information Science, DDE, Chidambaram, Tamil Nadu, South India.

Reprint's Request: K. Muthukrishnan, Research Scholar, Department of Library Information Science, Annamalai University, Annamalai Nagar, Chidambaram, Tamil Nadu-608002

validate the information added, that the goal of user's information seeking activities is to find information that satisfies his or her information needs. Wilkins and Leckie, 1997⁴ the information technology revolution is expected to bring significant changes in the information-seeking behaviour of users. Modern technology has resulted in new services, targeted at the specialized and unique information needs of users. The availability of electronic communication facilities such as e-mail, discussion groups, bulletin boards, electronic conferencing, and chit-chat groups, has opened new channels for communication.

Babbie, 1998⁵ adopted a qualitative approach to information-seeking behavior using the interview method as a tool for data collection. The interviewer is a neutral medium through which questions and answers are transmitted.

Fidazani, 1998⁶ conducted a study at University of Botswana, Gabon on the information needs and information-seeking behaviour of graduate students. Findings revealed that the students relied on library books, textbooks, and journals. Spitzer et al, 1998⁷ emphasized the importance of using information problem-solving skills across situations and their model gave students a systematic framework for solving information problems.

Nicholas and Williams, 1999⁸ reported the findings of research conducted in UK to establish the impact of the Internet on information seeking behaviour in the media, specifically among journalists.

According to Line, 2000⁹ in an information world radically changed by the Internet, it is judged as being essential to carry out new studies into information uses and needs.

Dalgleish and Hall 2000¹⁰ studied the information seeking behavior pattern of researchers in the web environment. They found that access of online library information resources become easy and fast, without any space and time constraints. Researchers have shown that many information seekers prefer to use electronic resources and the Internet to obtain information quickly and easily.

Nazli 2001¹¹ conducted a study to find out the information seeking behavior of user community at the Islamia University of Bahawalpur Library. No study to date has been conducted at national or local level to find out the Information needs and seeking behavior of college teachers and administrators in Pakistan.

Kuhlthan and Tama 2001¹² explained the information search process of lawyers. Findings

revealed that these lawyers frequently were involved in complex tasks; they preferred printed texts over computer databases.

Bilal 2002¹³ reports the key findings of the information seeking behaviour and success of students in using the web. The students' behaviour and success were compared in his study. The study reveals that the use of search engine and the level of research skills are directly proportional to their success.

Surya, Sangeetha and Nambi 2004¹⁴ studied that information seeking behavior of faculty members for Government Arts College in Cuddalore District, to evaluate information –seeking patterns of faculty members in the library. Most of the respondents visited the library several times a week to meet their information needs.

Callinan, 2005¹⁵ has studied students' awareness and use of different sources of information for their course-work. Further he analyzed the students habits to visit the University library, types of assistance used for collection of information, etc. Tahir, Mahmood, and Shafique 2008¹⁶ studied the information needs and seeking behavior of Arts and Humanities Teachers of University of the Punjab.

Thannaskodi 2009¹⁷ conducted a smaller kind of study at Central Law College, Salem, India. The study revealed that Law faculty members' preferred conventional source of information over IT based library resources and facilities for their academic and research purposes. They preferred personal collection. (Pradeep and Panchanathan 2010¹⁸ had studied the e-learning in Arts and Science College Students. They did not concentrate more in using ejournals and e-books when comparing to the Engineering College students.

Sharma et.al. 2012¹⁹ conducted a study of information seeking behaviour of faculty members at Sher-e-Kashmir University of Agricultural Sciences and Technology, Jammu. Authors revealed that faculty members preferred to use the Internet for seeking information on respective subjects and the use of the internet has influenced the usage of print resources.

Umesha and Chandrashekara 2013 ²⁰ tried to understand the information seeking and searching behaviour of dental science professionals in Karnataka. This paper tries to find out the suitable einformation sources available for dental professionals, the areas in which dental professionals seek information, and the barriers they face in accessing information.

Objectives of the study

- To study the information needs of the faculty members of arts and science colleges.
- To identify the major sources of bibliographic information.
- To find out the utilization of library and its services.
- To know how far the staff members are dependent on the library.
- To identify the various modes of access to information sources.
- To assess the use of information channels.
- To analyze the user satisfaction.
- To evaluate the adequacy, availability and accessibility of the college library collection.
- To determine whether or not different kinds of information needs leads to different information seeking behavior and communication channels.

Information Seeking Behaviour

Information Seeking Behaviour is mainly concerned with who needs what kind of Information and for what reasons and how information is found, evaluated and used, and how their needs can be identified and satisfied. The following process takes place in the information seeking behaviors identifying objectives, defining needs, accessing information system, establishing sources of information, information acquisition, and use of information and satisfaction. The present study attempts to understand, justify and explain the library usage and consequently, to gain more knowledge about the use of library facilities by the faculty members of arts and Science Colleges.

Methodology and Scope

The present study is based on primary data collected from the faculty members through a well designed questionnaire. Besides, secondary data have been collected from the sources of journals, reference books and conference proceedings and other facilities and services of faculty members. The information needs and information seeking behaviour of faculty members differ from person to person. The review of literature helps to formulate research design. Information technology has developed rapidly today. So that it has had a huge impact on access to information and information seeking behavior.

Data collection

Data analysis and Interpretation

For the purpose of collecting the data the faculty members were asked to fill in the pre-structured questionnaire on the above mentioned topic. The

Name of the Colleges (Thiruvallur District)	Questionnaires Distributed		Response Received	
· · · ·	No	%	No	%
Shree Chandraprabhu Jain College, Kattur Road, Minjur	45	18.29	34	13.82
DRBCCC Hindu College, Pattabiram.	48	19.51	42	17.07
Sriram College of Arts & Science, Perumalpattu.	54	21.95	45	18.29
Jaya College of Arts & Science, Thiruninravur.	52	21.14	44	17.89
Sri Subramaniswami Govt. Arts College, Tiruttani.	47	19.11	38	15.45
Total	246	100	203	83

Table 1: College-wise distributing the respondents

questionnaires were distributed to 246 respondents of faculty members in five Arts and Science colleges around Thiruvallur District. The respondents were distributed randomly for the purpose of collecting the data.203 faculty members responded to the questionnaires (i.e.) 83%.Data collected from 203 respondents in the form of tables and diagrams were designed. Table - 1shows that the research questionnaires were distributed to 246 faculty members, working in five colleges and 120 faculty members responded for this study. From the sample, 13.82% of respondents belong to Shree Chandraprabhu Jain College, 17.07% of respondents belong to DRBCCC Hindu College and 18.29% respondents belong to Sriram College of Arts & Science, 17.89% respondents belong to Jaya

Tal	ole 2: Respondents form	al Communication Beha	viour	
Name of the Colleges	No. of research articles Journals/conferences.	Published in the	Books Published	Total
	National Journals/Con.	International Journals/Con.		
Shree Chandraprabhu Jain College	26(16.88)	18(20.00)	2(16.66)	46(17.96)
DRBCCC Hindu College	32(20.78)	16(17.78)	4(33.33)	52(20.31)
Sriram College of Arts & Science	28(18.78)	20(22.22)	1(8.33)	49(19.14)
Jaya College of Arts & Science	35(22.73)	14(15.56)	3(25.00)	52(20.31)
Sri Subramanisawmi Govt. Arts College	33(21.43)	22(24.44)	2(16.67)	57(22.27)
	154(100)	90(100)	12(100)	256(100%)

College of Arts & Science, 15.45% Sri Subramanisawmi Govt. Arts College.

Table -2 indicates that 22.73% are published in the national journals/conferences by the respondents whom they belong to Jaya College of Arts & Science, 22.22% are published in the International Journals/Conferences. They belong to Sriram College of Arts & Science. Maximum number of books 33.33% is published by the DRBCCC Hindu College.

Table -3 shows the purpose of using computer based services for accessing information. 19.05% of respondents using online public access catalogue in which belong to DRBCCC Hindu College.27.27% of Staff members belong to Jaya College of Arts & Science using CD-ROM data bases. . Both colleges (35.56%, 42.11% of respondents) belong to Sriram College Arts & Science and Sri Subramanisawmi Govt Arts College to browse Internet.36.36% of respondents are using e-mail services which belong to Jaya College of Arts & Science. It is derived from Table-4 that 28.57% of respondents of DRBCCC Hindu College felt that their libraries were very adequately stocked and 38.10% of respondents are on a level adequately stocked in the stock effectiveness level. 40.91% of respondents of Jaya College of Arts& Science are moderately stocked and 15.90% of the staff members of Jaya College of Arts &Science are very inadequately stocked. 21.05% of respondents of Sri Subramaniswami Govt. Arts College are inadequately stocked whereas a few of the respondents of all colleges indicate they do not know stock effectiveness level.

Table - 5 shows the purpose of visit by the respondents for accessing of information. 20%, 22.22%, and 26.67% of respondents of Sriram College of Arts & Science visit the library for preparing class lectures, for updating knowledge, and for doing research work.15.91% and 11.36% of respondents of Jaya College of Arts & Science are coming to the library for writing and preparing papers and for entertainment. 11.90% and 14.29% of respondents of

Table 3: Purpose of using Computer based services.								
Computer based	Shri	DRBCCC	Sriram	Jaya College of	Sri	Total		
Services	Chandra	Hindu	College	Arts & Science	Subramani-			
	prabu	College	Arts &		swami			
	college		Science		Govt.Arts			
					College			
To use OPAC	4	8	5	6	4	27		
(online public	(11.96%)	(19.05%)	(11.11%)	(13.64%)	(10.53%)	(13.30%)		
access catalogue)								
To search CD-	8	6	10	12	7	43		
ROM databases	(23.53%)	(14.29%)	(22.22%)	(27.27%)	(18.42%)	(21.78%)		
To browse Internet	12	15	16	10	16	69		
	(35.29%)	(35.71%)	(35.56%)	(22.73%)	(42.11%)	(33.99%)		
To use e-mail	10	13	14	16	11	64		
facilities	(29.41%)	(30.95%)	(31.31%)	(36.36%)	(28.94%)	(31.53%)		
Total	34	42	45	44	38	203		
	(100%)	(100%)	(100%)	(100%)	(100%)	(100%)		



- Shri Chandra prabu college Respondents
- Shri Chandra prabu college Percentage
- DRBCCC Hindu College Respondents
- DRBCCC Hindu College Percentage
- Sriram College Arts & Science Respondents
- Sriram College Arts & Science Percentage
- Jaya College of Arts & Science Respondents
- Jaya College of Arts & Science Percentage
- Sri Subramani-swami Govt.Arts College Respondents
- Sri Subramani-swami Govt.Arts CollegePercentage

Volume 9 Number 1, January - April 2015

Table 4: Adequacy of Stock availability in the Library							
Adequacy of Stock effectiveness level	Shri Chandra prabu college	DRBCCC Hindu College	Sriram College of Arts & Science	Jaya College of Arts & Science	Sri Subramani- swami Govt.Arts College	Total	
Very adequately	5	12	8	10	7	42	
stocked.	(14.71%)	(28.57%)	(17.78%)	(22.73%)	(18.42%)	(20.69%)	
Adequately stocked	7	16	9	5	8	45	
	(20.59%)	(38.10%)	(20%)	(11.36%)	(21.05%)	(22.17%)	
Moderately stocked	10	7	14	18	9	58	
	(29.41%)	(16.67%)	(31.11%)	(40.91%)	(23.68%)	(28.57%)	
Inadequately	6	4	7	4	8	29	
stocked	(17.65%)	(9.52%)	(15.56%)	(9.09%)	(21.05%)	(14.28%)	
Very inadequately	4	2	5	7	5	23	
stocked	(11.76%)	(4.96%)	(11.11%)	(15.90%)	(13.16%)	(11.33%)	
Do not know	2	1	2	-	1	06	
	(5.88%)	(2.38%)	(4.44%)		(2.63%)	(2.96%)	
Total	34	42	45	44	38	203	
	(100%)	(100%)	(100%)	(100%)	(100%)	(100%)	



66

Table 5: Distribution of purpose of information seeking.									
Purpose of information seeking	Shri Chandra prabu college	DRBCCC Hindu College	Srira m College of Arts & Science	Jaya College of Arts & Science	Sri Subramani- swami Govt.Arts College	Total			
For preparing class lectures	5	7	9	8	7	31			
	(14.71%)	(16.66%)	(20%)	(18.18%)	(18.42%)	(15.27%)			
For updating	3	5	10	4	6	32			
Knowledge	(8.82%)	(11.90%)	(22.22%)	(9.09%)	(15.7 9%)	(15.76%)			
For writing and preparing paper	6	6	4	7	3	27			
	(17.65%)	(14.29%)	(8.88%)	(15.91%)	(7.89%)	(13.30%)			
For doing research	7	8	12	8	6	36			
work	(20.59%)	(19.05%)	(26.67%)	(18.18%)	(15.79%)	(17.73%)			
For guiding	4	5	3	4	4	24			
research work	(11.59%)	(11.90%)	(6.67%)	(9.09%)	(10.53%)	(11.82)			
For guiding rearchers	3	6	2	5	3	19			
	(8.82%)	(14.29%)	(4.44%)	(11.36%)	(7.89%)	(9.36%)			
For doing PhD	2	3	4	3	7	20			
	(5.88%)	(7.14%)	(8.88%)	(6.82%)	(18.42%)	(9.85%)			
For entertainment	4	2	1	5	2	14			
	(11.76%)	(4.76%)	(2.22%)	(11.36%)	(5.26%)	(6.90%)			
Total	34(100%)	42(100%)	45(100%)	44(100%)	38(100%)	203(100%)			



	Tuble 0. Distribution of fucilities in Library.														
Facili-ties in Library	i-ties Shri Chandra Prabhu brary Jain College		Prabhu	DRBCCC Hin du College		Sriram College of Arts & Science		Jaya College of Arts & Science		Sri subramani- swami Govt. Arts College.					
	Y	Ν	Т	Y	Ν	Т	Y	Ν	Т	Y	N	Т	Y	Ν	Т
Open- ing hours	26 (20)	8	34	32 (18)	10	42	28 (15)	17	45	35 (18)	8	44	22 (15)	16	38
Library environ- ment	19 (14)	15	34	33 (19)	8	42	32 (17)	13	45	32 (17)	12	44	18 (12)	20	38
Location	20 (15)	14	34	29 (16)	13	42	36 (19)	9	45	20 (11)	14	44	25 (17)	13	38
Coll. of books &	18 (14)	16	34	31 (18)	11	42	26 (16)	19	45	38 (20)	6	44	32 (22)	6	38
Issue-return system	22 (17)	12	34	28 (16)	14	42	38 (15)	7	45	34 (18)	10	44	26 (18)	12	38
Arrange- ment of materials	28 (21)	6	34	24 (14)	18	42	31 (13)	14	45	31 (16)	13	44	24 (16)	14	38
Percent-age Total	65 133	35 71	% 204	70 177	30 74	% 251	71 191	29 79	% 270	75 190	25 63	% 253	64 147	36 81	% 228

Table 6: Distribution of facilities in Library.

Table 7: Problems faced by faculty members.

Problems faced by faculty members	Shri Chandra prabu college	DRBCCC Hindu College	Sriram College of Arts & Science	Jaya College of Arts & Science	Sri Subramani- swami Govt.Arts College	Total
Non availability of	7	10	12	16	14	59
needed information materials	(20.59%)	(23.81%)	(26.67%)	(36.36%)	(36.84%)	(29.06%)
Old collection of	9	13	16	12	9	59
books	(26.47%)	(30.95%)	(35.56%)	(27.27%)	(23.68%)	(29.06%)
Lack of Knowledge	7	8	4	4	3	26
on IT based services	(20.59%)	(19.05%)	(8.89%)	(9.09%)	(7.89%)	(12.81%)
Difficulties in	5	4	3	5	7	24
understanding of English knowledge	(14.71%)	(9.52%)	(6.67%)	(11.36%)	(18.42%)	(11.82%)
Lack of time	6	7	10	7	5	35
	(17.65%)	(16.67%)	(22.22%)	(15.91%)	(13.16%)	(17.24%)
Total	34(100%)	42(100%)	45(100%)	44(100%)	38(100%)	203(100%)

68

Problems faced by faculty members.



DRBCCC Hindu College visit the library for guiding research work and for guiding researchers whereas 18.42% of respondents of Sri Subramaniswami Govt. Arts College are coming to the library for doing PhD.

Table 6 indicates that 20% of respondents of Shri Chandra Prabhu Jain College were satisfied with the opening hours facilities whereas 19% of respondents of DRBCCC Hindu College were contented with the Library environment facilities.19% of respondents of Sriram College of Arts & Science were satisfied with the location of the library. 22% of respondents of Sri Subramaniswami Govt. Arts College were contented with the collection of books and journals whereas 18% of respondents of Jaya College of Arts & Science and Sri Subramaniswami Govt. Arts College were satisfied with the Issue-return system .21% of respondents of Shri Chandra Prabhu Jain College were satisfied with the arrangement of materials in the library.

Table -7 shows that the problem are faced by the faculty members in Library. 36.36% of respondents of Jaya College of Arts & Science inform the Librarian about the non- availability of needed information materials in Library.35.56% of respondents of Sriram College of Arts & Science inform the Librarian that the materials are outdated collection of books. 19.05% of respondents of DRBCCC Hindu Colleges display

lack of Knowledge on IT based services.18.42% of respondents of Sri Subramanisawmi Govt. Arts College face difficulties in understanding of English language whereas 22.22% of respondents of Sriram College of Arts & Science indicate the lack of time with the Library.

Table 8 reveals that the faculty members are using search engines.38.10%,36.36% of both respondents of two colleges namely, DRBCCC Hindu College and Jaya College of Arts & Science are using Google engines.33.33% and 13.33% of respondents of Sriram College of Arts & Science are using Yahoo and Sanook engines.14.29% and15.79% of respondents of DRBCCC Hindu College and Sri Subramanisawmi Govt. Arts College are using Excite engines whereas15.56% and 15.91% of Sriram College of Arts & Science and Jaya College of Arts & Science are using Altavista engines.

Table- 9 indicates that the faculty members are using preferred study places. 47.47% of respondents of Sri Subramanisawmi Govt. Arts College are using Home for study places.16% of respondents of Jaya College of Arts & Science College use Library for study places. 33.33% and 22.22% of respondents of DRBCCC Hindu College prefer using staff room and other places for study.

Search Engines	Shri Chandra prabu college	DRBCCC Hindu College	Sriram College of Arts & Science	Jaya College of Arts & Science	Sri Subramani- swami Govt.Arts College	Total
Google	14	16	12	16	13	71
	(41.18%)	(38.10%)	(26.67%)	(36.36%)	(34.21%)	(34.98%)
Yahoo	11	10	15	14	12	62
	(32.35%)	(23.81%)	(33.33%)	(31.82%)	(31.58)	(30.54%)
Sanook	3	5	6	4	3	21
	(8.82%)	(11.90%)	(13.33%)	(9.09%)	(7.89%)	(10.34%)
Excite	2	6	5	3	6	22
	(5.88%)	(14.29%)	(11.11%)	(6.82%)	(15.79%)	(10.84%)
Altavista	4	5	7	7	4	27
	(11.76%)	(11.90%)	(15.56%)	(15.91%)	(10.53%)	(13.30%)
Total	34(100%)	42(100%)	45(100%)	44(100%)	38(100%)	203(100%)



Study Places	Shri Chandra prabu college	DR BCC C Hindu College	Sriram College Arts & Science	Jaya College of Arts & Science	Sri Subramani- swami	Total
					Govt.Arts	
					College	
Home	17 (50%)	12(28.57%)	16(35.56%)	13(29.55%)	18(47.47%)	76(37.44%)
Library	8(23.53%)	10(23.81%)	15(33.33%)	16(36.36%)	8(21.05%)	57(28.08%)
Staff room	5(14.71%)	14(33.33%)	10(22.22%)	12(27.27%)	7(18.42%)	48(23.65%)
Other	4(11.76%)	6(22.22%)	4(8.89%)	3(6.81%)	5(13.16%)	22(23.65%)
places						
Total	34(100%)	42(100%)	45(100%)	44(100%)	38(100%)	203(10.84%)



Summary of Findings

- 1. It is clearly understood that the majority of the articles published by the staff members are in national journals/conferences
- 2. It shows most of the staff members are able to browse the Internet.
- 3. It is inferred that the majority of the respondents are able to inform the level of books which are adequately stocked.
- 4. It is observed that most of the staff members are getting information for doing research work.
- 5. The user community is being faced by the nonavailability of needed information materials and outdated collection of books.
- 6. It indicates that the majority of the staff members are using Google as a search engine.
- 7. It is found that most of the staff members preferred the Library as a place to study.

Suggestions

Based on the findings of the study, the following suggestions are put forward to improve the library services in user community.

- To improve the library service new arrivals of books may be displayed.
- Periodicals / books that are displaced should be properly arranged every day.
- Current awareness service may be implemented to increase the satisfaction level of the library service.
- Interpretation orientation program may be conducted to the faculty members.
- The reading section should be separate without any disturbance.
- Faculty development program has to be conduc ted by exploring various library facilities namely online journal availability and e-books.

While seeking information from internet the users should use more than one search engine because only one search engine cannot be considered as comprehensive

Conclusion

Today is an age of information and tremendous flow of information is emerging in all fields throughout the world. So it has become very difficult to manage the information manually due to exponential growth of literature and publications. The problem of providing timely information is not due to lack of information, but the way in which it is handled to enable the user to fulfill his needs. Henceforth this study has examined the acquaintance of the faculty members with the information seeking process. The findings showed that main information needs of faculty members are related to their class teaching and research purposes. The internet and email are the main channels for obtaining the latest information. However, majority of faculty members use the library as their place of study. The problems identified by faculty members that they cannot locate the targeted sources as information is scattered in too many sources. Therefore the library staff members will provide the right information to the right users at the right time as per Ranganathan's definition for reference service. Finally the study hopes that faculty and university authority will take note of the findings, and endeavor towards meeting the

information needs for more development of academic function.

References

- 1. Sethi, A 1990. Information seeking behaviors of social scientist: An Indian conspectus, New Delhi: Hindustan Publishing Corporation.
- 2. Hart, R.L (1993).The information –gathering behaviour of the faculty of a four Year state college.Ph.DTheses: University of North Carolina.
- 3. Allen, B. L., (1996) Information Needs. In Information task; Toward a User Centered Approach to Information System CA: Academic Press, (pp.55-107).
- 4. Wilkins, J.L.H. and Leckie, G.J. (1997). University professional and managerial staff: information needs and seeking. College & Research Libraries, Vol. 58, no. 6, 561-574.
- 5. Babbie, Earl (1998). The Practice of Social Resear ch. Wadsworth Publishing Company.
- 6. Fidzani, B. T. C (1998). Information needs and information-seeking behavior of graduate students at the University of Botswana. *Library Review* 47(7): 329-340.
- 7. Spitzer, K. et al (1998). Information literacy: essential skills for the information age. ERIC Clearinghouse on Information and Technology. New York: Syracuse.
- Nicholas, D., & Williams. P. (1999). The changing information environment: The impact of the internet on information seeking behaviour in the media. In T.D. Wilson & D.K. Allen (Ed.), Information Needs, Seeking and Use in Different Contexts. Proceedings of the Second International Conference on Research in Information Needs, Seeking and Use in Different Contexts, 1998(451-462). Los Angeles: Taylor Graham Publishing.
- 9. Line, M.B. (2000). Social science information: The poor relation. IFLA Journal, 26(3), 177–179.
- 10. Dalgleish, A.; Hall, R.(2000) Uses and Perceptio ns of the World Wide Web in an informationseeking environment. Journal of Librarianship and Information Science, v.32, n.3, p.104-116
- 11. Nazli, S. (2001). Information seeking behaviour of community of IUB library users unpublished master's thesis, Department of Library and Information Science, the Islamia University of
Bahawalpur.

- 12. Kahlthan, C.C. & Tama, S.L. (2001).Information search process of lawyers: a call for "just for me" information services. Journal of Documentation. Vol.57 (1).pp25-43.
- 13. Bilal, D. (2002). Perspectives on children's navigation of the World Wide Web: Does the type of search task make a difference? Online Information Review, 26(2), 108-117.
- 14. Suriya, M.Sangeetha, G., and Nambi, M.A (2004) Information seeking behavior of faculty members from government arts colleges in Cuddalore district.In: Kaul, H.K and patil S.KIEds), Library and information networking (NAACLIN 2004).New Delhi 2165-292.
- 15. Callinan, E.J (2005).Information seeking behaviour of undergraduate Biology students. A comparative of first year and final year student.
- Tahir, M., Mahmood, K. & Shafique, F. (2008). Information Needs and Seeking Behavior of Arts and Humanities Teachers. Library Philosophy and Practices. Retrieved December 2008, from: http://digitalcommons.unl.edu/libphilprac/ 227

- Thanuskodi, S. (2009). Information-seeking behavior of law faculty at central law college, Salem. Library Philosophy and Practice (June), 1-8. Retrieved from http:// www.webpages.uidaho.edu/~mbolin/ thanuskodi-legal.htm on November 10, 2009.
- Pradeep kumar, E.I & Panchanafthan, N (2010).A study on impact of rural college students in elearning in e-learning (Nagapattinam District, Tamilnadu-India).
- 19. Sharma, B & Gupta, S. (2012). Information seeing behavior faculty member at Sher-e- Kashmir University of Agricultural Sciences and technology, Jammu, India in Internet era: a Survey. IASLIC Bulletin, 57(1), 23-33.
- Umesha, U., & Chandrashekara, M. (2013). Information Seeking and Searching Behaviour of Dental Science Professionals in Karnataka. DESIDOC Journal of Library & Information Technology, 33(2). 147.

Indian Journal of Library and Information Science

Library Recommendation Form

If you would like to recommend this journal to your library, simply complete the form below and return it to us. Please type or print the information clearly. We will forward a sample copy to your library, along with this recommendation card.

Please send a sample copy to:

Name of Librarian Library Address of Library

Recommended by:

Your Name/ Title Department Address

Dear Librarian,

I would like to recommend that your library subscribe to the **Indian Journal of Library and Information Science**. I believe the major future uses of the journal for your library would be:

- 1. As useful information for members of my specialty.
- 2. As an excellent research aid.
- 3. As an invaluable student resource.

4. I have a personal subscription and understand and appreciate the value an institutional subscription would mean to our staff.

5. Other

Should the journal you're reading right now be a part of your University or institution's library? To have a free sample sent to your librarian, simply fill out and mail this today!

Stock Manager **Red Flower Publication Pvt. Ltd.** 48/41-42, DSIDC, Pocket-II, Mayur Vihar, Phase-I Delhi - 110 091 (India) Tel: 91-11-22754205, 45796900, Fax: 91-11-22754205 E-mail: redflowerppl@gmail.com, redflowerppl@vsnl.net Website: www.rfppl.co.in

Digital Library in Open Universities - A Review

V. Sheela*, Puttamadaiah**

Abstract

Digital Library as **Library without walls** or **wall free** electronic work station to access universal knowledge irrespective of the distant location. Digital Library is a user-friendly interface, which can provide information that was already scanned previously from the volumes inside the library itself and/ or data obtained from outside sources. When we search through computer network system for our information related requirements and needs for our use, we in fact search every bit of information all over the world. Internet is the best example of digital library and information system. In digital library, information is digitized, collected, operated by electronic computers, transmitted by the computer network, and freely shared. In this way, required information can be easily and efficiently retrieved and disseminated.

Keywords: Digital Libraries; Libraries; Open Universities; Universities; Information organization; Information preservation.

Introduction

Digital Libraries may be defined as electronic information collections containing large and divers repositories of digital objects, which can be accessed by a large number of geographically distributed users. The content of digital libraries include data, metadata that describe various aspects of the data (eg. representation, creation, ownership, reproduction rights), and metadata that consists of link or relationship to other data or metadata, whetherinteranl or external to the digital library

Association of research libraries (ARL) in definitions and purpose of a digital library has defined a digital library as having these qualities:

- The digital library is not a single entity :
- The digital library use technology to line the resources of many :

E-mail: She579@gmail.com

- The linkages between the many digital libraries and information services are transparent to the end user : and
- Digital library collections are not limited to document surrogated they extend to digital artifacts that cannot be represented or distributed in printed formats

It can be said form all the above definitions that ideal digital library is one that possesses every information in digital form and all the functions are automated using advanced technologies.

Traditional libraries V/s Digital libraries

Traditional libraries possess in their stack books periodicals maps and atlases standard and specifications, trade catalogues, reprints and preprints etc. mainly in printed format. In this collection in development and services are provided, organized, information is retrieved and disseminated mainly manually. It takes much time, requires more space and needs a sizable number of library staff to perform duties in this environment. But with the pace of time, information users as well as the library and information peoples feel the need of the hour and information technology tools have come to the help of librarians and information professional. On the other hand digital libraries use information technologies, communication technologies, online

Author's Affilation: *Assistant Librarian, **Library Assistant, Karnataka State Open University, 14th Cross, 2nd Stage, Opposite St. Joseph's School, Mukhtagangotri, Mysore, Karnataka 570006

Reprint's Request: V.Sheela, Assistant Librarian, Karnataka State Open University, 14th Cross, 2nd Stage, Opposite St. Joseph's School, Mukhtagangotri, Mysore, Karnataka- 570 006

databases, CD- ROMs, multimedia databases, email services to serve the users needs digital libraries also requires national and international networks. Some issues such as information protection, property rights relevance of information and information security are there and should be taken care of and resolved before designing and be implementing the digital library.

Why we need the digital libraries?

We need digital library technology to manage large amounts of digital content, such as thousands of images or hundreds of audio clips to perform searches that are impracticable manually. The WWW makes it easier and possible to transfer such information over national networks.

There are various factors that explain the need or digital libraries.

- (a) Information explosion This is an era of information explosion due to multidisciplinary and interdisciplinary research, proliferation of publication activities and transfer of information among user community. Digital libraries can fulfill the requirements of providing high quality output to the users.
- (b) Storage of information in order to solve the space problem in libraries, many libraries are going ahead or planning to go further in order to provide electronic access of information to their users.

Challenges of digital libraries

One of the major challenges to digital libraries is the development, which takes palace in IT environment available to librarians. The librarians have to experience various problems such as resource crunch, non availability of infrastructure, lack of trained manpower lack of self- exposure lack of motivation and unwillingness of the library staff to adopt the new environment of design and development of digital library. Process of conversion of information from paper to electronic format is known as digitalization apart from the challenge of digitization of the available information in the library, there is a challenge of electronic publishing digital collection building storage organization of the digitized documents transmission of digital information creation and use of hypertext and hypermedia systems networks and manpower development

Objectives of digital libraries

The main objectives of digital library are:

- (a) To provide fast and efficient access with multiple access mode.
- (b) To provide efficient information retrieval.
- (c) To Identity all relevant sources quickly
- (d) To provide rapid access to bibliographic as well as full text information.
- (e) To incorporate learning as well as access.
- (f) To provide richer context for people to interact with information.
- (g) To act as a powerful instrument of change in social and work practices.
- (h) To have collection which -
 - (i) are large, and persist overtime:
 - (ii) are well organized and managed;
 - (iii) contain objects, not just representation;
 - (iv) contain objects which may be otherwise unobtainable;
 - (v) contain some objects which are originally digital.

Digital libraries act as global, multilingual repositories of data, knowledge, sound and images. Digital libraries are inherently international.

Advantages of Digital Libraries

There are many advantages of digital library such as-

- (i) material can be delivered directly to the users' computer
- (ii) information search is easy, and
- (iii) any number of documents can be given to any users.

Not only that, multiple copy distribution at any time to anywhere is also possible and maintenance is easy.

Some of the main advantages which digital libraries provide include the following:

- (a) Digital libraries are completely of paperless systems which contain technology and information sources and allow remote access of its resources to other libraries by breaking down the physical barriers through national and international computer networks.
- (b) Another advantages is that at the same time users from many locations can access simple

electronic information, can copy, print and preserve at his location or wherever he desires.

- (c) Digital libraries provide better retrieval and faster communications.
- (d) Digital storage permits libraries to expand the range of material that they can provide to its users.
- (e) Digital libraries provide one document to more than one reader at a time.
- (f) Due to advent of digital libraries there is a significant growth in the use of Internet to share information.

Problems of Digital Libraries

Although digital libraries offer many advantages, they are not free from certain problems. These problems are as below:

- (a) Expensive: The major obstacle to digitization is that it is very expensive.
- (b) Copyright: It is very easy to copy, duplicate and distributes digital information but at the same time copyright law is being violated in digital environment due to lack of control over contents access and reproduction of multiple copies of digital media.
- (c) Technological Obsolescence: The major risk to digital objects is not physical deterioration, but technological obsolescence of these devices (hardware and software) to read them.
- (d) Dependence of Technologies: Digital libraries are mostly dependent on suitable telecommunications links and computer systems for proper utilization and information transfer, libraries depend much on suitable technology and training of end users in handling a variety of retrieval software's search strategies.
- (e) Preservation: Archiving and preservation of electronic information may be one of the most challenging of all tasks. The digital storage network such as hard disks, tapes, CD s and floppy disks have a very short life span due to rapid technological obsolescence.

Conclusion

Digital libraries are nothing but an organized collection of digitized materials, accessible entirely from a desktop computer over a network. Using available modern technology we can create and maintain such library which is the need of the day. Fortunately most of the new information created today is already in digital form, and may just require conversion to formats appropriate to digital library.

Digitization projects have been important for libraries aiming the digitization of manuscripts, these, dissertation, special collections, which are special in nature. Some of the research and special libraries have already undertaken digitization projects in their full swing. Few digitization initiatives by university libraries could be seen. Yet efforts are to be made in this direction by university libraries in India. It will provide solution to their several problems, like space, preservation of age old and fragile materials users' satisfaction, network based full text browsing time, etc., Electronic library and digital library mean one and the same thing. When the electronic libraries/digital libraries are connected via various networks particularly the Internet, this is called a virtual library.

Reference

- 1. Lal.C, ed : Information literacy in the digital age.
- 2. William Y.Arms : Digital libraries.
- 3. Ian H. Witten, David Bainbridge, David M. Nichols: How to Build a Digital Library.
- 4. Judith Andrews, Derek G. Law-Digit al libraries: policy, planning, and practice.
- Lucy A. Tedd, J. A. Large Digital libraries: principles and practice in a global environment.
- 6. Kay Johnson, Elaine Magusin Exploring the Digital Library: A Guide for Online Teaching and Learning.
- Rajagopalan. Libraries of the digital age : Issues and challenges. New Delhi: SBS Pub, 2006. Print.
- 8. Badhusha, K Nazeer. Digital library architecture. New Delhi: Ane books, 2008.
- Bishop, Ann. Digital library use:social practice in design and evaluation. New Delhi: Anne books, 2005.
- 10. Chowdhury, G G. Introduction to digital libra ries. London: Facet pub, 2007.
- 11. Deegn, Marityn. Digital futures: Stratergies for the information age. London: Library association, 2002.
- 12. Digital library automation: Planning, designing and development. Delhi: Akhand, 2012.
- 13. Harris, Lesley-Ellen. Licensing digital content : A practical guide for libraries. New Delhi: Ess Ess, 2010.

- 14. Lakshmi J, Vijaya . Digital library and archives. New Delhi: Isha books, 2004.
- 15. Lakshmi, Vijaya. Digital library : Principles and practices. Delhi: Isha books, 2004.
- 16. Lakshmi, Vijaya. Issues of digital library environment. Delhi: Isha books, 2004.
- 17. Rajashekaran, K. Digital library basics : A practical manual. New Delhi: Ess and Ess, 2010.
- Sampath Kumar, G K. Digital library and information technology: changing concepts. Delhi: Altar pub, 2012.
- 19. Satpathy, Sunil Kumar. Modernisation of libraries : A challenge in digital era. New Delhi: Mahamaya pub, 2008.

- 20. Siddiqui, J A. Classification and catalog in digital libraries. New Delhi: Cyber tech pub, 2007.
- 21. Singh, Deepak. Digitization and information networks in library. New Delhi: Anmol pub, 2013.
- 22. Singh, Jagtar. Library and information science in digital age. New Delhi: Ess Ess, 2009.
- 23. Sreekumar, M.G. Digital libraries in knowledge mesuarement. New Delhi: Ess Ess, 2006.
- 24. Srivastava, M D. Metadata creation in digital libraries. Delhi: Pacific pub, 2011.
- 25. Verma, Kusum. Metadata and digital library systems. New Delhi: Akansha pub, 2004.
- 26. William Y, Ams. Digital libraries. New Delhi: Ane books, 2005.

Directory of Popular Search Engines

Pavankumar M. Gudi*, Syed Shah Ahmed Aarmast**

Abstract

Digital library initiatives are vertebral column for development of digital libraries in the professional world and Information Communication Technology (ICT) become inevitable in the present information explosion. The heavy usage of digital and electronic resources has increased expectations of library profession so to meet the needs and expectations of the user's one stop solution is adopt modern ICT facilities. The present study focuses on LIS professional's background, research institutional R & Organizations library information, ICT facilities, LIS services offered, digital library initiatives, professional expertise in research institutions and R & D organizations in Karnataka.

Keywords: Information Communication Technology (ICT); Digital Library Initiatives; Research Institute; R & D Organization.

Introduction

Internet is a network of networks scattered all over the world. It allows millions of people all over the world to communicate and use their ideas and information. These days the internet seems to be everywhere.

Number of information sources for education and research are available on the web including scholarly journals, Technical reports, Theses etc. As a result the web has become an ocean of all kinds of information finding information from the huge information reservoirs become extremely difficult. In order to overcome this difficulty in retrieving information WWW, Several companies and institutions are developed various search aids called as search engines.

Definition

"A search engine is computer software that searches a collection of electronic materials to retrieve

Author's Affilation: *Librarian, Seshadripuram First Grade College Yelahanka New Town, Bangalore-560064 Karnataka. **Lecturer and head Dept. LIS N V Degree College, Gulbarga, Karnataka.

Reprint's Request: Pavankumar M. Gudi, Librarian, Seshadripuram First Grade College, Yelahanka New Town Bangalore-560064, Karnataka.

E-mail: pgudi612@gmail.com

citation, document or information that matches or answers a user's query. The retrieved materials may be text documents, images, sounds, video etc." Search engine is a tool which helps in retrieving information from the internet.

Functioning of search engine

When a user invokes a search, user runs a client program that contacts the server when the request arrives at the server. When the request arrives at the server, the server doesn't contact all the computers on the internet. Instead, the server consults the list it has compiled in its local disk, which is similar to looking for an answer in telephone directory.

Search engine automatically runs a program that contacts the computer on the internet to obtain a new list of available items or WebPages. Such programs are called WebCrawler or spiders or indexing programs.

Later when a user makes a request the browser on the use's computer becomes a client, contacts search engines server and send the string the user has entered. The server compares the string with the items stored on its local disks and return by URLs in which that strings has occurred.

Search engine actually enumerates a webpage that contains the results of search and returns it to the user's browsers.

The webpage that results from search is a dynamic page using the technological Common Gateway

Interface (CGI).

Types of search engines

Through many tools exist for searching and retrieving information on the web, the differs significantly from each other. Search services have evolved through various mechanisms for searching and indexing the web. Search engines are divided in to two types.

- 1. Robot driven search engines
- 2. Web directories search engines

Robot driven search engines have three major elements; A robot, an index and a search program. The robot is an automated software agent that scans public WebPages and follows hyper links to other pages on the web. Every thing the robot retrieves goes into the index. After a webpage is indexed, the search engines search program may retrieve it. When a searcher enters search terms into a search engine, the software shifts through the indexed relevance criteria. Different robot driven search engines produce different results because of the ways the robot, the index and the search program work.

Though the principles behind each search engine are the same, each search engine indexes different parts of documents with various priorities. For example, most robots drove search engines index HTML documents only, where as the robot for google indexes both HTML and PDF documents.

Meta Search Engine

Meta search engines use a number of basic search engines simultaneously that provide a uniform interface where a search on a query can be conducted in a several search engines and directories, meta search engine don't have their own databases and directories.

They don't WebPages, don't accept URL additions are classify and revive the web sites. Instead they sent queries simultaneously to multiple web search engines and web directories.

Example: Dogpile

It applies for 13 search engines simultaneously. Some of the Meta search engines allows for use of Boolean operators while other allows only for simple search.

Some shows their results simultaneously and rank the results. Some eliminates the duplicates while others do not.

Need for study

The advents of World Wide Web and digital techniques have changed the mode of search strategy. This has resulted in multiplication of search engines. Hence, information related to library and information science is scattered on the internet in digital form. Users find it difficult to locate most appropriate resource to retrieve relevant information matching their needs. Based on the retrieval of web resources, an attempt has been made here, to prepare a directory of important and popular search engines on internet.

Scope and limitations

The scope of the project extends to include all type of search engines which are most important and popular on internet. It also covers important and popular Meta search engines.

Methodology

Step by step procedure followed for the compilation of "directory of important and popular search engines on internet" was by using internet

- 1. At the beginning stage all the important key words, concepts of title were identified.
- 2. All synonymous related terms of key words were identified.
- Clear search strategy was prepared based on information need.
- Alltheweb.com and WorldWideWeb search engine.com were selected for searching information.
- All the different types of directory were selected for searching information.
- 6. The result of search was viewed.
- 7. Among the hits, relevant hits were chosen.
- 8. Collected information/search engines were arranged in alphabetical order.

General Search Engine

Α

AllTheWeb 101

Description: Profile of AllTheWeb. www.allTheweb.com

AltaVista 101

Description: Learn how to use AltaVista. www.altavista.com

AOL Search 101

Description: News and information about AOL Search.

www.aolSearch.com

Ask Jeeves 101

Description: Ask the butler anything!

www. Ask Jeeves.com

Anti-Terrorism Search Engine

Description: Blog posting about an anti-terrorism search engine in production.

www.antiterrorism.com

Anatomy of a Search Engine

Description: Blog posting discussing search engines, inside and out, and how they affect search engine optimization.

www.anatomy.com

Artcyclopedia

Description: Artcyclopedia.com is a art search engine that covers "1800 art sites, and offer over 60,000 links to an estimated 150,000 artworks by 8,100 renowned artists."

www.Artcyclopedia.com

Amazon and A9

Descrption: Brief profile of Amazon's search engine, A9.

www.amazon.com

Acronyma.com

Description: Brief profile of Acronyma.com, a search engine that only searches acronyms and their meanings.

www.Acronyma.com

A9.com

Description: A9.com is a search engine put together by the good folks at Amazon, one of the largest and most successful online retailers in the world. Find out what A9.com has to offer, how to use it, and how it works.

www.a9.com

Answers.com

Description: Answers.com is a great search tool that will help you find the answers you're looking for fast, with maximum credibility.

www.answer.com

AuctionMapper

Description: An extremely cool eBay search engine. www.auctionmapper.com

B

Bit Torrent Search Engine

Description: Review of Isohunt, a Bit Torrent search engine.

www.bittorrent.com

Bitoogle.com

Description: Brief profile of Bitoogle, a bit torrent search engine.

www.bitoogle.com

Basic Boolean Search

Description: Most search engines can be searched more effectively by utilizing these Boolean search tips.

www.basicboolean.com

Basics of Search

Description: Find what you're looking for in search engines and directories using these basic search tips.

www.basics.com

Boots4Troops.com

Description: Brief profile of this search engine that was created to support American soldiers.

www.boots4troops.com

Blingo.com

Description: Profile of Blingo.com, a search engine that offered prizes for searching.

www.blingo.com

Blogs and Search Engine Optimization

Description: Learn how blogs and search engine optimization can fit together.

www.blogs.com

Blowsearch.com

Description: Discussion of the Blowsearch toolbar, the secured instant messenger techology they've developed, and how they intend to deal with click fraud.

www.blowsearch.com

Blogdigger.com

82

Description: Search engine that enables the user to search for blogs in their local area.

www.blogdigger.com

Blog Search Engines

Description: A collection of various specific blog search engines.

www.blogsearch.com

Bloggernity

Description: Search engine for blogs, with categorized directory listings.

www.bloggernity.com

BrightPlanet.com

Description: Read my interview with Michael K. Bergman of BrightPlanet.com.

www.brightplanet.com

Blowsearch - Click Fraud Interview

Description: Read my interview with Blow search partner Marcelo Fuenzalida, and hear how Blow search is planning on dealing with click fraud.

www.blowsearch.com

Free Blogging Guide

Description: Read this press release about Michael Bergman and his free comprehensive blogging guide.

www.freeblogg.com

BigClique.com

Description: BigClique.com is a crawler based search engine with an impressive index size. Read my review of BigClique.com to see if it might be a good search engine fit for you.

www.bigclique.com

BigClique Creator

Description: If you've ever wondered what would be involved in starting your own search engine, then this is the interview for you. Read about BigClique: how it started, where it's at, and where it's going.

www.bigcliquecreater.com

BrainBoost

Description: Find answers, not just search results, with BrainBoost.

www.brainboost.com

BoardTracker

Description: Read about BoardTracker, a message board and forums search engine.

www.boardtracker.com

С

Search Engine Crawlers

Description: Definition of search engine crawlers. www.crawlers.com

Create a Search Home Page

Description: Save time and frustration by creating a central search engine or search directory home page.

www.createserch.com

CompletePlanet.com

Description: Read my profile of CompletePlanet.com,a Deep Web search engine.

www.completeplanet.com

Codase

Description: Codase is a developer's search engine; it only searches source code.

www.codase.com

D

Do Search Engines Search The Entire Web?

Description: Learn the answer to this intriguing question.

www.searchentire.com

Dictionary.com

Description: Find word definitions, antonyms, synonyms, and more with Dictionary.com, a free online dictionary that searches over 20 different dictionaries.

www.dictionary.com

Top Ten Domain Name Search Engines

Description: Here are my picks for the top ten domain name search engines.

www.topdomainname.com

Daypop

Description: Day pop is a current events search engine; it searches the blogosphere and regularly updated sites.

www.daypop.com

Droogle, a Drink Recipe Search Engine

Description: Droogle is a search engine that focuses only on drink recipes.

www.droogle.com

Directory of Open Access Journals Search engine

Description: Search engine that searches all subjects Free Journal which were hosted on Internet.

www.doaj.com

Ε

Excite.com

Description: Excite is a medium/large scale search engine and portal that is increasing its popularity.

www.excite.com

EventJAR.com

Description: Use EventJAR.com to find a cultural or entertainment event near you, including festivals, museum exhibitions, and more.

www.eventjar.com

Eurekster Swicki

Description: Make your very own search engine and place it on your site or blog with Eurekster's Swicki, a "new kind of search engine that allows anyone to create deep, focused searches on topics you care about."

www.eureksterswicki.com

Exalead.com

Description: Read my profile of Exalead, a general purpose search engine.

www.exalead.com

EducationWorld

Description: Read about EducationWorld, an education search engine.

www.educationworld,com

F

Fourth of July Search Engine Graphics

Volume 9 Number 1, January - April 2015

Description: See how some of the search engines celebrated the Fourth of July.

www.fourthsegraph.com

Foodie View, a Free Recipe Search Engine

Description: Searchers can find all kinds of recipes on here from a multitude of different recipe sites, including Food Network, Wolfgang Puck, AllRecipes.com, Martha Stewart, and more.

www.foodieview.com

Factbites

Description: Fact bites is a cross between a search engine and an encyclopedia.

www.factbites.com

FirstGov

Description: FirstGov.gov is an absolutely mammoth search engine/portal that gives the searcher direct access to searchable information from the United States government, state governments, and local governments.

www.firstGov.gov

FindArticles

Description: A search engine dedicated to mining the Web and the Deep Web for article content.

www.findarticles.com

G

Google 101

Description: Learn more about the search engine that's on top of the heap.

www.google.com

Google Search Engine Optimization on a Budget

Description: Optimize your site for the biggest budget search engine out there.

www.googlebudget.com

Google Quiz

Description: Test your Google knowledge with this fun quiz.

www.googlequiz.com

Google Catalogs

Description: Find catalogs on Google, anything from apparel to curriculum to toys.

www.googlecatalogs.com

Google Site Submission

Description: Learn the basics of submitting your site to Google.

www.googlesitesubmition.com

Google Facts

Description: Learn a few little known facts about Google. Does Google Worry About Spelling and Capitalization? Learn the answer to this question.

www.googlefacts.com

Google Gmail

Description: Open to the general public, this is a great email service.

www.googlegmail.com

Google Talk

Description: Read more about Google's instant message client.

www.googletalk.com

Google Desktop

Description: Google Desktop comes now with sidebar, floating deskbar, and more.

www.googledesktop.com

NASA Takes Google on Journey into Space

Description: Here's the official NASA press release about Google and NASA's new partnership.

www.googlenasa.com

Google Cheat Sheet

Description: Here are the top Google Shortcuts that any savvy Googler should have under his or her belt. search power, and an excellent user experience.

www.googlecheat.com

Google Base

Description: Read my detailed profile of Google Base-how to upload content, how to edit content, and more.

www.googlebase.com

Googly.com

Description: Here's my profile of Googly, an Internet search engine with some interesting features, good advanced

www.googly.com

Gigablast.com

Description: Search engine specifically targeting blogs. Here's my profile of Gig blast, an Internet search engine with some interesting features, good advanced

www.gigablast.com

Н

How Search Engines Work

Description: Learn what makes search engines tick.

www.howsengineswork.com

How To Submit Your Site to Search Engines and Directories

Description: A very bare bones tutorial on the basics of submits.

www.howsubsite.com

Human Search Engine

Description: A human-edited search engine (or directory, depending how you want to look at it) created by Ajeet Khurana, our About.com Guide to Business Majors.

www.humansearch.com

Harry Potter and Hogwarts - September Scavenger Hunt

Description: September's web scavenger hunt is all about Harry Potter and his own back to school adventures: Hogwarts, professors, school, books, and more.

www.harrypotter.com

Halloween Scavenger Hunt

Description: October's web scavenger hunt is all about Halloween traditions, Halloween history, and Halloween trivia.

www.halloweenscavenger.com

Healthline.com

Description: Find medical information with Healthline.com.

www.healthline.com

I

Isohunt.com

Discription: Profile of Isohunt.com, a peer to peer file search engine.

www.isohunt.com

Internet Explorer Default Search Engine Settings

Description: Learn how to change Internet Explorer's default, or pre-programmed, search engine.

www.iedefault.com

Invisible Web Gateways

Description: A collection of invisible web search tools.

www.invisiblewebgateways.com

Image Search Engines-Directories-Collections

Description: Find images on the Web using these image-specific search engines, directories, and collections.

www.image.com

Info.com

Description: Info.com, a "search platform which draws together the best of the Web", recently answered some basic questions for me.

www.info.com

Interview with Chris Tolles of Topix.net

Description: Read this fascinating interview with Chris Tolles, VP of Sales and Marketing for Topix.net, and find out what Topix is all about, what they've been doing, and what they're planning to do.

www.interviewtopix.net

Isohunt

Description: Learn more about Bit Torrents, Bit Torrent clients, Bit Torrent downloads, and how to find files with Isohunt.

www.isohunt.com

J

July Scavenger Hunt

Description: Use search engines and directories to complete this scavenger hunt.

www.julyscavenger.com

Κ

Kelkoo integrates Sight'Up artificial intelligence in its search system

Description: Kelkoo, one of the largest search engines in Europe and owned by Yahoo, recently integrated artificial intelligence technology in its database search system for faster and more efficient operating. Read this press release for more information.

www.kelkoo.com

L

LJSeek.com

Description: Search engine that searches Live Journal entries.

www.ljseek.com

Lycos 101

Description: Search better on Lycos with Lycos 101.

www.lycos.com

LookSmart 101

Description: Learn more about Look Smart with this short and sweet profile.

www.looksmart.com

LookSmart Rolls Out Biggest Vertical Search Launch In Web History

Description: Here's a transcript of my chat with Dave Hills, CEO of Look Smart, about their huge vertical search launch on October 27, 2005. Thirteen separate topic clusters are now live with 181 separate vertical search destinations.

www.looksmartrools.com

Law and Order Search Engines

Description: Find crime and law enforcement information on the Web with these law and order search engines.

LjSeek.com

Description: A search engine dedicated to the Live Journal blogging community.

www.ljseeklivejournal.com

Μ

MagPortal.com

Description: Search for magazine articles with MagPortal.com, a magazine search engine.

www.magportal.com

Top Five Medical Search Engines

Description: Read more about my picks for the top five medical search engines.

www.medicalsearch.com

MSN Search 101

Description: Learn more about Microsoft's search engine MSN Search in MSN Search 101. Version 7.5 up and running.

www.msnsearch.com

Multiply.com

Description: Social networking search engine. www.multiply.com

0

Open Directory 101

Description: Learn more about one of the oldest directories on the Web.

www.opendirectory.com

OneLook.com

Description: A search engine for words and phrases.

www.openlook.com

Opinmind:

Description: Opinmind is a unique kind of blog search engine - it searches opinions as well as blogs.

www.onelook.com

Oodle

Description: Oodle is a search engine dedicated to only finding classified ads.

www.oodle.com

Р

Page Rank

Description: What is Google Page Rank, and is it important?

www.pagerank.com

Podscope

Description: Podscope is a specialized podcast search engine.

www.podscope.com

Personalized Search

Description: Recap of Search Engine Strategies Session: Personalized Search and Search History.

www.personalized.com

Pretrieve - A Free Public Records Search Engine

Description: Find free public records with Pretrieve, a free public records search engine. Find people online, search for business information, look for addresses and phone numbers.

www.pretrieve.com

Podcasting Hacks-A Review

Description: Here's my review of Jack D. Herrington's book Podcasting Hacks. You'll find tips and tricks for picking the perfect microphone, how to reduce noise, give listeners access to your shows, and even voice training sessions.

www.podcasting.com

Podzinger

Description: Read my review of Podzinger, a free podcast search engine with a lot of potential.

www.podzinger.com

PreviewSeek

Description: Read my review of PreviewSeek, a search engine that somewhat misguidedly bills itself as the "world's most advanced search engine."

www.previewseek.com

Picsearch

Description: Learn more about Picsearch, an image search engine

www.picsearch.com

\mathbf{S}

Search Engine Optimization FAQ

Description: Answers to the most common SEO questions.

www.serengoptimization.com

Search Engine Quiz

Description: Test yourself and your search engine knowledge.

www.searchenginequiz.com

Search Engines and Spam

Description: Find out what spamming the search engines is, why you shouldn't do it, and how it relates to search engine optimization.

www.sespam.com

Search Engine Friendly Web Design

Description: Be friendly to the search engines and they will be friendly to you.

www.searchengwebdes.com

Search Engines and the Internet

Description: Brief discussion on the growth of the Net and how search engines are trying to keep up.

www.serengnet.com

Search Engines for Kids

Description: Find search engines and other sites on the Web specifically targeted for kids.

www.serengkids.com

Subject Directory

Description: Learn what subject directories are and how you can use them.

www.subdir.com

Search Engine Strategies San Jose 2005, Recap of First Session

Description: Read my recap of my first session at Search Engine Strategies 2005 in San Jose -Introduction to Search Engine Marketing.

www.sessr.com

Site Submission

Description: Part of the search engine optimization process can include submitting your site to the various engines and directories. If you choose to submit your site, I've laid out the basics for you.

www.sitesub.com

Simply Fired

Description: Great site for when you're feeling a bit down about where your career is going. Read this press release from SimplyFired.com, and learn who won the SimplyFired contest of who had the worst "being fired" story.

www.simplyfried.com

SLI Systems

Description: Read my interview with SLI Systems. www.slisystems.com

Scirus

Description: Read about Scirus, an extremely comprehensive search engine that only searches science-specific content.

www.scirus.com

Search.com

Description: Excellent Meta search engine put together by CNET.com.

www.search.com

SurfWax, search Engine

Description: SurfWax is a great search engine with lots of excellent advanced search features.

www.surfwax.com

Snap

Description: Read about Snap, an interesting new kind of search engine.

www.snap.com

Т

Trivial Pursuit and Search Engines

Description: An experiment to see how well search engines play Trivial Pursuit.

www.trivialpersuit.com

ThinkExist.com

Description: A specialized search engine just for quotations.

www.thinkexist.com

Technical Requirements for Online Multimedia

Description: Use these resources to figure out what technical requirements you'll need to utilize multimedia content on the Web, as well as choose a media player.

www.tecrecolmm.com

Topix.net

Description: Topix is an immense news site that is a combination news search engine and news aggregator. Find out why this particular search tool is now one of my favorite Web destinations. www.topix.net

Travel Search Engines

Description: Phil Carpenter, VP of Corporate Marketing with travel search engine Sidestep, gives us an inside look into the travel search engine world.

www.travel.com

Turbo10, an Invisible Web Search Engine

Description: Turbo10 is a search engine that trawls the Invisible, or Deep Web for results.

www.turbo10.com

Теота

Description: Read my review of Teoma, a good general search engine.

www.teoma.com

Travelocity

Description: Read my profile of travel search engine Travelocity.

www.travelocity.com

Torrent Typhoon, a Bit Torrent search Engine

Description: Read about Torrent Typhoon, a BitTorrent search engine.

www.torrenttyphoon.com

Technorati, a Blog Search Engine

Description: Read about Technorati, a search engine dedicated to the blogosphere.

www.technorati.com

TalkDigger

Description: TalkDigger is a way to track conversations across the Web.

www.talkdigger.com

U

Ujiko.com

Description: A visual search engine that "learns" as you use it.

www.ujiko.com

V

Vebasearch.com

Description: Find people with vebasearch.com, a free people search engine. You can search by what is available in the public domain for free public access

www.vebsearch.com

W

WiseNut

Description: Read my profile of WiseNut, a good general search engine.

www.wisenut.com

Υ

Yahoo Search 101

Description: Search better on Yahoo with Yahoo 101.

www.yahoo.com

Yahoo My Web 2.0

Description: Yahoo's social search engine.

www.yahoomyweb.com

Yahoo Shortcuts

Description: Learn how to make Yahoo work faster and more efficiently with Yahoo search shortcuts.

www.yahooshortcuts.com

Yahoo Site Submission

Description: Learn the basics of submitting your site to Yahoo.

www.yahoositesub.com

Yahoo Special Properties

Description: There are many special Yahoo properties that are not part of its searchable subject index and search engine listings.

www.yahoospecialpro.com

YubNub.org

Description: A search engine and directory shortcut generator.

www.yubnub.org

Yahooligans

Description: My review of Yahooligans, a fun kids search engine and directory.

www.yahoolingans.com

Yahoo Reference

Description: Find out what Yahoo! has to offer in the reference section.

www.yahooreference.com

Yahoo Bulk Submit

Description: Yahoo's new Bulk Submit option is up.

www.yahoobulksub.com

Yahoo Local

Description: Yahoo has made some great strides in their Local Search and I believe it's one of the best out there.

www.yahoolocal.com

Yahoo Cheat Sheet

Description: Here are the top Yahoo Search Shortcuts that will make your Yahoo search experience fast, fun, and ultimately efficient.

www.yahoocheatsheet.com

Ζ

Zabasearch.com

Description: Find people with Zabasearch.com, a free people search engine. You can search by what is available in the public domain for free public access. A Zabasearch Blog In The Works?: This controversial search engine is stirring the pot with blogs attached to individual names.

www.zabasearch.com

Zaplms.com

Description: Learn more about Zaplms, a great meta search engine that delivers fast, relevant results with plenty of extra search features, such as Quick View, results snapshot, and advanced relevance filtering.

www.zaplms.com

ZoomInfo

Description: Read about ZoomInfo, a people search engine.

www.zoominfo.com

META SEARCH ENGINE

Blowsearch – Meta Search Engine Click Fraud Interview

Description: Read my interview with Blow search partner Marcelo Fuenzalida, and hear how Blow search is planning on dealing with click fraud on Meta Search engine.

www.blowsearch.com

Clusty

Description: Learn about Clusty, a met search engine with lots of interesting features, including a blogosphere met search option, customization tabs, and of course, clustering.

www.clusty.com

Dogpile

Description: Dogpile, a met search engine, is a great way to compare and compile results from many different search engines and directories at the same time.

www.dogpile.com

Ithaki for Kids

Description: Ithaki for Kids is a kid-friendly, safe search, Meta search engine.

www.ithaki.com

Ithaki for Teenager-Meta Search Engine

Description: Ithaki for Teenager is a user-friendly, safe search, meta search engine.

www.ithakiteenager.com

Ixquick, a Metasearch Engine

Description: Read my profile of Ixquick, a solid metasearch engine.

www.ixquick.com

Kartoo.com

Description: Kartoo is a visual meta search engine, "with visual display interfaces."

www.kartoo.com

Metacrawlers and Metasearch Engines

Description: Metacrawlers and metasearch engines look at the web's various search engines with just one query.

www.metacrawler.com

MrSapo.com

Description: MrSapo.com is a search engine metainterface that allows the user to search many different search engines all at the same place.

www.mrsapo.com

MyStanky.com

Description: Read my interview with Steve Stankiewicz, creator of MyStanky.com, a metasearch engine that is virtually a one-man show.

www.mystanky.com

Mamma.com, a Meta Search Engine

Description: Mamma.com is a good, solid meta search engine that provides fast and relvant results and excellent advanced search options. Read my profile of Mamma.com, a meta search engine with lots to offer the serious meta search user.

www.mamma.com

Search.com

Description: Excellent meta search engine put together by CNET.com.

www.search.com

SurfWax, a Metasearch Engine

Description: SurfWax is a great metasearch engine with lots of excellent advanced search features.

www.surfwax.com

Turbo10, an Invisible Web Meta Search Engin

Description: Turbo10 is a search engine that trawls the Invisible or Deep Web for results.

www.turbo10.com

Torrent Typhoon, a Bit Torrent Metasearch Engine

Description: Read about Torrent Typhoon, a BitTorrent metasearch engine.

www.toorrentyphoon.com

Technorati, a Blog Search Engine

Description: Read about Technorati, a search engine dedicated to the blogosphere.

www.technorati.com

Zapmeta.com

Description: Learn more about ZapMeta, a great meta search engine that delivers fast, relevant results with plenty of extra search features, such as Quick View, results snapshot, and advanced relevance filtering.

www.zapmeta.com

AUDIO & VIDEO SEARCH ENGINE

Audio and Video Search Engines

Description: Find music and videos with these specialized search engines.

www.audiovideo.com

Audio Search Engines and Directories

Description: Find out how to find audio content on the Web, and what technical requirements you'll need to listen to these files.

www.ausedir.com

Audiolicious

Description: Turn Any RSS Feed Into A Podcast With Audiolicious.

www.audiolicious.com

Blinkx

Description: Read my profile of Blinkx TV, a search engine that allows you to search the Web for video and audio clips.

www.blinkx.com

EventJAR.com

Description: Use EventJAR.com to find a cultural or entertainment event near you, including festivals, museum exhibitions, and more

www.eventjar.com

FindSounds.com

Description: FindSounds.com is a dedicated sounds search engine. You can search for sound effects, movie sounds, animal sounds, nature sounds, and much more.

www.finsoun.com

Hindi audio lyrics.com

Description: Hind audiolyrics.com is a dedicated sounds search engine. You can search for hind songs effects, movie songs, and much more

www.hinaudlyr.com

The Internet Movie Database

Description: Largest movie database and movie search engine on the Web.

www.intmovdata.com

Top Ten Lyric Search Engines

Description: Searching for lyrics to a song can be a daunting task, but not with these Top Ten Lyric Search Engines. Find a song lyric, do a song search by lyric, and more.

www.toplyricsearch.com

Top Ten AV Search Engines

Description: Searching for audio and video song can be a daunting task, but not with these Top Ten av Search Engines. Find a song lyric, do a song search by lyric, and more.

www.avser.com

SingingFish

Description: Whether you're looking for Maria Callas's arias, Sponge Bob cartoons, or the latest from NPR's Brian Naylor, SingingFish will help you with its dedicated multimedia search service.

www.singingfish.com

TVGenius.com

Description: A UK TV show search engine.

www.tvgenius.com

Video Search Engines and Directories

Description: Find what you're looking for with these specialized video search engines and directories.

www.videosearch.com

Video Search Engines

Description: Find what you're looking for with these special films video search engines.

www.vidser.com

Video and Audio Search Engines

Description: Find music and videos with these specialized search engines.

www.videoaudio.com

JOB SEARCH ENGINE

Best jobs

Description: Here's my picks for the best jobs search engines on the Web.

www.bestjob.com

ClickAJob

Description: A UK-based job search engine.

www.clickajob.com

Indeed.com

Description: Need to find a job? You might want to check out my profile of Indeed.com, a vertical search engine that returns results from hundreds of www.Indeed.com

Job Search Engines

Description: Here's my picks for the top ten job search engines on the Web.

www.jobsearch.com

LinkedIn.com

Description: Brief profile of LinkedIn.com, a job search engine.

www.LinkedIn.com

Maximum job.com

Description: Need to find a job? You might want to check out my profile of Maxijob.com, a vertical search engine that returns results from hundreds of job boards, companies, newspapers, niche sites, and more.

www. Maxijob.com

new gen jobs

Description: A UAE-based job search engine.

www.newgenjob.com

SHOPING SEARCH ENGINE

Best Shopping Search Engines

Description: Your source for the best shopping search engines on the Web.

www.bestshop.com

Become.com

Description: Brief profile of Become.com, a specialized shopping search engine.

www.become.com

China and Search Engines

Description: Brief blurb about the growth of China's search market.

www.china.com

Consumer-generated Content

Description: Search Engine Strategies Recap: Vox Populi: Understanding the Role of Consumer Generated Content.

www.consumergencon.com

Clipfire

Description: Clipfire is a community shopping search engine, much like Digg.

www.clipfire.com

Expedia, a Travel Search Engine

Description: Expedia is a comparison shopping travel search engine.

www.expedia.com

FatLens.com

Description: Read about FatLens.com, an excellent shopping search engine that also allows you to search for event tickets.

www.fatlens.com

GoDefy.com

Description: Read about GoDefy.com, a small but specialized vertical shopping search engine that focuses only on search marketing and search engine optimization products, information, and software.

www.godefy.com

Kelkoo.com

Description: Here's a profile of Kelkoo.com, a comparison shopping search engine based in Europe that is headquartered in Europe and owned by Yahoo.com.

www.kelkoo.com

Kelkoo integrates Sight'Up artificial intelligence in its search system

Description: Kelkoo, one of the largest shopping search engines in Europe and owned by Yahoo, recently integrated artificial intelligence technology in its database search system for faster and more efficient operating. Read this press release for more information.

www.kelkoointegrates.com

OnePal.com

Description: Brief profile of this shopping search engine.

www.onepal.com

Pay Per Click Advertising

Description: From Dan Skeen, Director of Search Engine Marketing at Quarry Communications, an excellent article on managing your pay per click advertising campaign.

www.payperclickadv.com

Shopping Search Engines

Description: Read my reviews of some of the best shopping search engines out there.

www.spopping.com

References

For collection of Introduction and Background Information about Search Engine, I had refereed Intranet and Computer and networking related journals.

- 1. http://www.allthe web.com
- 2. http://www.worldwideweb search engine.com
- 3. http://www.searchengine.com

_____0______

Library and Information Services with a Touch of Mobile Applications

Shiva Kanaujia Sukula*

Abstract

The paper discusses the recently introduced mobile applications in the library and information services. Currently the libraries are facing problems of fewer footfalls as well as abundant availability of information. The mobile applications into library services are paving a way for efficient information services as well as opening doors for more number of users. This paper digs deep into the variety of experiments being carried in different libraries all over the world. The conclusion gives a glimpse into the need of such initiatives in Indian libraries at large scale also.

Keywords: Mobile Phone Applications; Libraries; Information Centers.

Introduction

The developing countries especially India is witnessing the rapid enforcement as well as willful welcome of the emerging technologies. The field of mobile technologies has been tremendously affecting lives of each strata of Indian society. When a storm is walking through neighborhood, the libraries are not supposed to act as a mute spectator. Yes, the libraries have had initiated their say, by introducing the mobile applications in the information services. The last two centuries have been busy in incorporating the web 2.0 application through social networking, followed by 'mobile scenario'. The literature reflects the use of computers, internet, computer skills and information searching behaviour on the web as well as the OPAC. The users are accessing the web for communication purposes as well as for locating general and academic information. The similar situation is found in a university setting among students at the postgraduate level from rural and urban backgrounds in a comparative analogue (Shiv Kumar, 2012).

Definitely the digital divide exists yet the difference is continuously declining. The only significant differences found among both groups were for their

E-mail: shivajrf@rediffmail.com

reactions during unsuccessful searches. Thus, the background of users at the postgraduate level does not significantly affect the use of computer and internet, information searching behaviour patterns on the web and library systems, especially OPAC. Various studies are examining users through varying information channels for academic purposes in library systems in India. Different aspects of Web 2.0, Library 2.0 and Library 3-D are in vogue. In the neighboring country, the concepts of Library 2.0 and Library 3-D are explored. The study provided a proposal for taking advantage of the new opportunities prevailing in the adoption of Library 2.0 and Library 3-D concepts and explored how a user-centered library can be developed with the help of Library 2.0 and Library 3-D applications. In an era of emerging technologies, the users are widely aware of the use of Library 2.0 Second Life for Library Services. Information professionals are being advised in using Library 2.0 and Library 3-D applications for library services (Farzana Shafique, Ann Riedling, 2013).

Academic Libraries and Mobile Phone Technologies

The literature reflects on current and near future issues and trends concerning academic libraries. The embedded librarianship, participatory and collaborative approaches to library services have emerged. The academic libraries adapting their roles and develop stronger relationships. Embedded roles through collaboration are outreaching to academic community. Libraries are seeking to add mobile technologies in order to enhance their traditional services. The changing scenarios are explaining the need to make them not only more available, but also

Author's Affilation: *Dy. Librarian, Central Library, Dr. B.R. Ambedkar University, Agra, UP, India.

Reprint's Request: Dr. (Ms.) Shiva Kanaujia Sukula, Dy. Librarian, Central Library, Dr. B. R. Ambedkar University, Paliwal Park, Agra, Uttar Pradesh- 282 004, India.

more relevant to their users. Library personnel and teachers are also familiar with Web 2.0 concepts, tools and services, and applications related to services and education. The change in scenario as well as technology is visible among the users. The shift is from wide screens of computer system to handy, pocketed and tiny screens of mobile phones. Mobile phone services are providing applications so that users could search the catalog, access the reserves module, renew books and find information such as library hours. The mobile application services are also evaluated by usability testing, comprising preand post-usability test questionnaires and "think out-loud" usability tests. In a study (Ronan Hegarty, Judith Wusteman, 2011), it was found out that changes to the interface can ensure greater usability. Libraries are increasingly turning to the Mobile Web to offer new services to their patrons. Smartphones are likely to become central to the future delivery of information services.

While a study (Sarika Sawant, 2012) reflects that LIS instructors, in some Indian universities, have a low level of familiarity regarding the use of Web 2.0. Most of the instructors use Web 2.0 for video sharing via YouTube. Nearly, half of teachers have never used Wikis. The main problem in use of Web 2.0 in teaching was the lack of training programs organized by universities and other institutions for instruction in the use/teaching of Web 2.0 tools. The later developments in the interactive services happened due to the augmented usage of mobile phone technologies. There are seven mobile initiatives in the libraries (Lilia Murray, 2010):

- i. Library Web sites;
- ii. SMS Reference;
- iii. MOPACs (Mobile OPACs) and Integrated Library Systems;
- iv. Mobile Collections;
- v. eBooks and Mobile Reading;
- vi. Mobile Instruction;
- vii. Mobile Audio/Video Tours.

In this context, a number of well-known blogs have discussed mobile initiatives in libraries. The literature has examined the seven initiatives. As they are moving beyond mere trends and are becoming best practices. The development and implementation of these mobile services range from work-intensive and expensive to scalable, inexpensive solutions (Joanne Dillon, 2013).

Mobile Applications and Digital Library Software

Last decade has been very influential in use and spread of open source digital library software. The amicable platforms bridge the technological applications such as mobile technology and digital library. Using the open source software for an information resource is a useful application. These types of technological experiments can be beneficial, especially for the developing countries. Another study describes the process of selecting and customizing XTF open source digital library software for a unique application. The Rutgers University Libraries, in collaboration with the University of Liberia, and with grants from the Engineering Information Foundation (EIF), the United States Agency for International Development (USAID), and with contributions from the International Society of Electrical Engineers (IEEE), have created The EAKO System - Engineering Access to Knowledge Offline, a prototype "Library in a Box" for engineering information at the University of Liberia. The product runs on the open source platform XTF, created by California Digital Library, and is based on TEEAL, The Essential Electronic Agricultural Library, developed by Cornell University. XTF is an easily customizable and powerful open source digital library solution, which met the needs of The EAKO System. The use of open source digital library software concerns the automation of data entry, as well as creating mobile access (Laura Bolton Palumbo, 2012).

Mobile Applications and Reference Services

The text reference environment has created its niche. In this context, the Reference and User Services Association (RUSA) behavioral guidelines are helpful. These guidelines are supportive to the librarians in text reference service. The current text reference literature amplifies the ongoing inclusion of mobile applications in library services in the untouched areas of library world. The journey which began by My Info Quest, the USA's first collaborative text reference service is continued all over the world. The considerations for developing a service are primarily defined as relating to budget, staffing, and usability. Text reference is characterized as somewhere between synchronous and asynchronous, increasing in volume, and mostly concerned with short, straightforward questions and answers. There are two models of text reference service that are popular: mobile device based and computer application based. To develop more enhanced reference service and models, there is demand to understand user experience with text

reference service. Effectively establishing text reference service will need continuous implementation of the highly researched outcomes into practice. The experiences of other libraries and published literature present a detailed set of considerations for libraries. Such explorations might prove useful for launching text reference service (Lili Luo, 2011).

User Behavior and Information Environment

Many libraries are creating Virtual Learning Environment to develop a one-stop-shop for information resources and help in developing information skills for users. The user behavior and their expectations from the library are sometimes unexpected and rather unspecified and unarticulated. Where the libraries, have been designing the mobile application based information services with the background of user feed-back, need to observe their relevance and optimum usage in constant manner. Sometimes the background, information literacy level and adaptation to newer technology play significant role in absorption of the user's information seeking behavior.

The "non-traditional" students, and unfamiliar with technology and electronic sources of information are almost distance learners (Averil Robertson, 2010). As explained, the libraries develop a resource that would give the students easy access to collections of, such as:

- i. online resources grouped by subject;
- ii. current awareness services;
- iii. practical worksheets and online resources to help students develop their information skills;
- iv. links to key government publications; and so on.

The library-user relationship is crucial in ensuring the use and value libraries by the users. Keeping the changing environment motivating as well as guiding factor, the libraries are designing and planning information services in order to sustain a viable library-user relationship. *Librarians* need to pay attention constantly to the common sense factors when designing, planning, implementing and reviewing library facilities, resources and services. *The abundant choices are available to information users*. These choices (Fatt Cheong Choy, 2011) often affect the user decision making based on:

- i. The usefulness and quality of information resources and services.
- The expediency and innovative library resources and services.

- iii. Convenience
- iv. Attention
- v. Awareness
- vi. Perception of value

Use of SMS Application

Short Message Service (SMS) application is widely used in libraries. The SMS is useful to enhance the use of the resources by marketing the library services. This is an essential service for the benefit of the users as well as to market the library resources. Since the SMS application is very popular among young generation, so the users can be easily motivated. The limitation with the longer SMSs exists. They need to be either split up into several messages or stored in the server as a webpage and sent as a hyperlink in SMSs. This situation arises when the SMS cannot be sent by the SMS server. Creation of a prototype has been suggested to serve as an important milestone in integrating such a service into the future integrated library services (ILS) (John Paul Anbu K., Makana R. Mavuso, 2012). They aimed to look at how SMS technology can be very effectively used in library and information services with a glimpse into a pilot project conducted by University of Swaziland and Emerald Group Publishing Limited and the subsequent need for creating a prototype for the SMSbased library alert services and marketing of library services. Sometimes the SMS application requires more planning for implementation as it cannot be claimed as a single click SMS-based alert service.

Various Tools, Mobile Products and Hybrid Technologies

Libraries are increasingly turning to the Mobile Web to offer new services to their patrons. Smartphones are likely to become central to the future delivery of information services (Ronan Hegarty, Judith Wusteman, 2011). One of the subject related tools is GeoStoryteller. GeoStoryteller is a tool developed by the researchers that runs on smart phones, such as an iPhone or Android. This tool helps learning about a historical topic on the places where significant events occurred by providing the user multimedia stories about the historical sites (Anthony Cocciolo, Debbie Rabina, 2013). The information is delivered via the mobile web or through Layar (an augmented reality web browser). Such tools require attention in the user interfaces, usability issues etc. Studies are concentrating on exploring the mobile phone services in the following areas (Nor Shahriza Abdul Karim, Siti Hawa Darus, Ramlah Hussin, 2006):

- i. The utilization of mobile phone services in the educational environment.
- ii. The nature of mobile phone use among users.
- iii. The perception of users on mobile phone uses in library and information services.

Time to time, respondents in researches indicated their willingness to become the users of such services if offered. The studies should assist libraries in designing the system that allows for effective access to various information and library services using mobile phones. The emphasis is also on wireless application services. Brian T. Johnstone (2011) provided an overview of the Boopsie product for creation of a mobile device application for deployment on all major mobile devices. This mobile app product has been implemented at Bucks County Community College Library, including interfacing with the integrated library system and preexisting web-based services. As stated, cloud computing becomes mobile when a mobile device tries to access the shared pool of computing resources provided by the cloud, on demand. Libraries are focusing on digital resources residing in the "cloud", the responsibility has become more complex. It is observed that mobile applications may enrich their functionality by delegating heavy tasks to the clouds as the remote processing and storage have become possible by adding asynchronous behavior in the communication. However, developing mobile cloud applications involves working with services and APIs from different cloud vendors, which mostly are not interoperable across clouds. Such services require high scalability and quality of service (QoS). Huber Flores, Satish Narayana Srirama, Carlos Paniagua, (2012) design a middleware framework, Mobile Cloud Middleware (MCM), which handles the interoperability issues and eases the use of processintensive services from smartphones by extending the concept of mobile host. It is possible to handle hybrid cloud services from mobiles by using MCM.

In multilingual information needs and academic environment, the information portals assisting mobile devices are need of the hour. The research finds that students are assisted by mobile portals created in their native language directing them to important sources of information on campus (Kevin Curran, Winston Huang, 2008). The study informs about the unique implementation of a multilingual Chinese–English Campus information portal for mobile devices which assists fresh arrivals in locating important information about the university. Another quotable example is; the New York Law School's Mendik Library chose a vendor, and rolled out the service with a multimedia information campaign leading to an award-winning product (Terry Lee Ballard, Anna Blaine, 2013).

Conclusion

The worldwide applications and experiences reveal the wide spread implementation of mobile phone application in the library and information scenario. The libraries and information centres in India are also endeavoring to join this revolution. The case studies show the efforts of a good number of libraries to initiate such applications. The next level in this direction is the increasing the awareness among the librarians as well as the users; how this tiny yet powerful gadget improve the work experience and service environment.

References

- Anthony Cocciolo, Debbie Rabina. Does place affect user engagement and understanding?: Mobile learner perceptions on the streets of New York. *Journal of Documentation*. 2013; 69(1): 98 – 120.
- 2. Averil Robertson. Using the University's VLE to Provide Information Support for Midwifery Students at the University of Bedfordshire. *New Review of Academic Librarianship*. 2010; 16(1). DOI: 10.1080/13614530903240569.
- Brian T Johnstone. Boopsie and librarians: connecting mobile learners and the library. *Library Hi Tech News*. 2011; 28(4): 18 – 21.
- Farzana Shafique, Ann Riedling. Survival avenues for Pakistani libraries in the era of emerging technologies: Adoption of Library 2.0 and Library 3-D. *Electronic Library, The.* 2013; 31(4): 412 – 432.
- Fatt Cheong Choy. From library stacks to libraryin-a-pocket: will users be around? *Library Management*. 2011; 32(1/2): 62 – 72.
- Huber Flores, Satish Narayana Srirama, Carlos Paniagua. Towards mobile cloud applications: Offloading resource-intensive tasks to hybrid clouds. *International Journal of Pervasive Computing and Communications*. 2012; 8(4): 344 – 367.
- 7. Joanne Dillon. Building Mobile Library Applications (The Tech Set No. 12). *Library*

Review. 2013; 62(4/5): 345 – 346.

- John Paul Anbu K, Makana R Mavuso. Old wine in new wine skin: marketing library services through SMS-based alert service. *Library Hi Tech*. 2012; 30(2): 310 – 320.
- Kevin Curran, Winston Huang. A multilingual mobile university information portal designed to cater for visiting overseas students. *Interactive Technology and Smart Education*. 2008; 5(1): 4 – 28.
- Laura Bolton Palumbo. Building a "Library in a Box" with an out of the box solution: creating a prototype engineering library using XTF. *Library Hi Tech News*. 2012; 29(6): 8 – 10.
- Lili Luo. Text reference service: delivery, characteristics, and best practices. *Reference Services Review*. 2011; 39(3): 482 – 496.
- 12. Lilia Murray. Libraries "like to move it, move it". *Reference Services Review*. 2010; 38(2): 233 – 249.

- Nor Shahriza Abdul Karim, Siti Hawa Darus, Ramlah Hussin. Mobile phone applications in academic library services: a students' feedback survey. *Campus-Wide Information Systems*. 2006; 23(1): 35 – 51.
- 14. Ronan Hegarty, Judith Wusteman. Evaluating EBSCOhost Mobile. *Library Hi Tech*. 2011; 29(2): 320 333.
- Sarika Sawant. The study of the use of Web 2.0 tools in LIS education in India. *Library Hi Tech News*. 2012; 29(2): 11 – 15.
- Shiv Kumar. Use of computer, internet, and library OPACs among rural and urban postgraduates in Indian universities. OCLC Systems & Services. 2012; 28(3): 144 – 163.
- 17. Terry Lee Ballard, Anna Blaine. A library in the palm of your hand. *New Library World*. 2013; 114(5/6): 251 258.

RF Library Services Pvt. Ltd.

RF Library Services Pvt. Ltd. is a global market leader in managing professional information. We develop and deliver innovative services that enable the use of knowledge to its full extent. As the only information Services Company to be globally and we play a key role in today's complex information marketplace. Founded in 1985 as a registered company under sub-section (2) of section 7 of the Companies Act, 2013 and rule 8 of the Companies (Incorporation) Rules, 2014, the business draws on more than a decade of experience within the information industry. With this knowledge, we service the needs of thousands of customers from over 30 countries. We are a division of Red Flower Publication Pvt. Ltd.

Where we are based

RF Library Services Pvt. Ltd headquarters is in Delhi, India, and has a representative office in Cochin. Visit "Our Offices" page to locate your nearest regional office.

RF Library Services Pvt. Ltd.

D-223/216, Laxmi Chambers, Laxmi Nagar, Near Laxmi Nagar Metro Station, Delhi-110092(India) Tel: 011-22756995, Fax: 011-22756995 E-mail: rflibraryservices@vsnl.net, rflibraryservices@@gmail.com Wesite: www.rf-libraryservices.com Manuscripts must be prepared in accordance with "Uniform requirements for Manuscripts submitted to Biomedical Journal" developed by international committee of medical Journal Editors.

Types of Manuscripts and Limits

Original articles: Up to 3000 words excluding references and abstract and up to 10 references.

Original articles: Up to 2500 words excluding references and abstract and up to 10 references.

Case reports: Up to 1000 words excluding references and abstract and up to 10 references.

Online Submission of the Manuscripts

Articles can also be submitted online from http:// www.rfppl.com (currently send your articles through e-mail attachments)

I) First Page File: Prepare the title page, covering letter, acknowledgement, etc. using a word processor program. All information which can reveal your identity should be here. use text/rtf/doc/PDF files. Do not zip the files.

2) Article file: The main text of the article, beginning from Abstract till References (including tables) should be in this file. Do not include any information (such as acknowledgement, your name in page headers, etc.) in this file. Use text/rtf/doc/PDF files. Do not zip the files. Limit the file size to 400 kb. Do not incorporate images in the file. If file size is large, graphs can be submitted as images separately without incorporating them in the article file to reduce the size of the file.

3) Images: Submit good quality color images. Each image should be less than 100 kb in size. Size of the image can be reduced by decreasing the actual height and width of the images (keep up to 400 pixels or 3 inches). All image formats (jpeg, tiff, gif, bmp, png, eps etc.) are acceptable; jpeg is most suitable.

Legends: Legends for the figures/images should be included at the end of the article file.

If the manuscript is submitted online, the contributors' form and copyright transfer form has to be submitted in original with the signatures of all the contributors within two weeks from submission. Hard copies of the images (3 sets), for articles submitted online, should be sent to the journal office at the time of submission of a revised manuscript. Editorial office: **Red Flower Publication Pvt. Ltd., 48/41-42, DSIDC, Pocket-II, Mayur Vihar Phase-I, Delhi – 110 091, India, Phone: 91-11-22754205,**

45796900, Fax: 91-11-22754205, E-mail: redflowerppl@vsnl.net. Website: www.rfppl.co.in

Preparation of the Manuscript

The text of observational and experimental articles should be divided into sections with the headings: Introduction, Methods, Results, Discussion, References, Tables, Figures, Figure legends, and Acknowledgment. Do not make subheadings in these sections.

Title Page

The title page should carry

- 1) Type of manuscript (e.g. Original article, Review article, Case Report)
- 2) The title of the article, which should be concise, but informative;
- 3) Running title or short title not more than 50 characters;
- The name by which each contributor is known (Last name, First name and initials of middle name), with his or her highest academic degree(s) and institutional affiliation;
- 5) The name of the department(s) and institution(s) to which the work should be attributed;
- 6) The name, address, phone numbers, facsimile numbers and e-mail address of the contributor responsible for correspondence about the manuscript;
- The total number of pages, total number of photographs and word counts separately for abstract and for the text (excluding the references and abstract);
- 8) Source(s) of support in the form of grants, equipment, drugs, or all of these;
- 9) Acknowledgement, if any; and
- If the manuscript was presented as part at a meeting, the organization, place, and exact date on which it was read.

Abstract Page

The second page should carry the full title of the manuscript and an abstract (of no more than 150 words for case reports, brief reports and 250 words for original articles). The abstract should be structured and state the Context (Background), Aims, Settings and Design, Methods and Material, Statistical analysis used, Results and Conclusions. Below the abstract should provide 3 to 10 keywords.

Introduction

State the background of the study and purpose of thestudy and summarize the rationale for the study or observation.

Methods

The methods section should include only information that was available at the time the plan or protocol for the study was written such as study approach, design, type of sample, sample size, sampling technique, setting of the study, description of data collection tools and methods; all information obtained during the conduct of the study belongs in the Results section.

Reports of randomized clinical trials should be based on the CONSORT Statement (http://www. consort-statement.org). When reporting experiments on human subjects, indicate whether the procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional or regional) and with the Helsinki Declaration of 1975, as revised in 2000 (available at http://www.wma.net/e/policy/l 7c_e.html).

Results

Present your results in logical sequence in the text, tables, and illustrations, giving the main or most important findings first. Do not repeat in the text all the data in the tables or illustrations; emphasize or summarize only important observations. Extra or supplementary materials and technical details can be placed in an appendix where it will be accessible but will not interrupt the flow of the text; alternatively, it can be published only in the electronic version of the journal.

Discussion

Include summary of key findings (primary outcome measures, secondary outcome measures, results as they relate to a prior hypothesis); Strengths and limitations of the study (study question, study design, data collection, analysis and interpretation); Interpretation and implications in the context of the totality of evidence (is there a systematic review to refer to, if not, could one be reasonably done here and now?, what this study adds to the available evidence, effects on patient care and health policy, possible mechanisms); Controversies raised by this study; and Future research directions (for this particular research collaboration, underlying mechanisms, clinical research). Do not repeat in detail data or other material given in the Introduction or the Results section.

References

List references in alphabetical order. Each listed reference should be cited in text (not in alphabetic order), and each text citation should be listed in the References section. Identify references in text, tables, and legends by Arabic numerals in square bracket (e.g. [10]). Please refer to ICMJE Guidelines (http://www.nlm.nih.gov/bsd/ uniform_requirements.html) for more examples.

Standard journal article

[1] Flink H, Tegelberg Å, Thörn M, Lagerlöf F. Effect of oral iron supplementation on unstimulated salivary flow rate: A randomized, double-blind, placebo-controlled trial. J Oral Pathol Med 2006;35:540-7.

[2] Twetman S, Axelsson S, Dahlgren H, Holm AK, Källestål C, Lagerlöf F, et al. Caries-preventive effect of fluoride toothpaste: A systematic review. Acta Odontol Scand 2003;61:347-55.

Article in supplement or special issue

[3] Fleischer W, Reimer K. Povidone iodine antisepsis. State of the art. Dermatology 1997;195 Suppl 2:3-9.

Corporate (collective) author

[4] American Academy of Periodontology. Sonic and ultrasonic scalers in periodontics. J Periodontol 2000;71:1792-801.

Unpublished article

[5] Garoushi S, Lassila LV, Tezvergil A, Vallittu PK. Static and fatigue compression test for particulate filler composite resin with fiber-reinforced composite substructure. Dent Mater 2006.

Personal author(s)

[6] Hosmer D, Lemeshow S. Applied logistic regression, 2nd edn. New York: Wiley-Interscience; 2000.

Chapter in book

[7] Nauntofte B, Tenovuo J, Lagerlöf F. Secretion and composition of saliva. In: Fejerskov O, Kidd EAM,

editors. Dental caries: The disease and its clinical management. Oxford: Blackwell Munksgaard; 2003. p. 7-27.

No author given

[8] World Health Organization. Oral health surveys - basic methods, 4 edn. Geneva: World Health Organization; 1997.

Reference from electronic media

[9] National Statistics Online – Trends in suicide by method in England and Wales, 1979-2001. www.statistics.gov.uk/downloads/theme_health/ HSQ 20.pdf (accessed Jan 24, 2005): 7-18. Only verified references against the original documents should be cited. Authors are responsible for the accuracy and completeness of their references and for correct text citation. The number of reference should be kept limited to 20 in case of major communications and 10 for short communications.

More information about other reference types is available at www.nlm.nih.gov/bsd/uniform_ requirements.html, but observes some minor deviations (no full stop after journal title, no issue or date after volume, etc).

Tables

Tables should be self-explanatory and should not duplicate textual material.

Tables with more than 10 columns and 25 rows are not acceptable.

Number tables, in Arabic numerals, consecutively in the order of their first citation in the text and supply a brief title for each.

Explain in footnotes all non-standard abbreviations that are used in each table.

For footnotes use the following symbols, in this sequence: *, \P , †, ‡‡,

Illustrations (Figures)

Graphics files are welcome if supplied as Tiff, EPS, or PowerPoint files of minimum 1200x1600 pixel size. The minimum line weight for line art is 0.5 point for optimal printing.

When possible, please place symbol legends below the figure instead of to the side.

Original color figures can be printed in color at the editor's and publisher's discretion provided the author agrees to pay Type or print out legends (maximum 40 words, excluding the credit line) for illustrations using double spacing, with Arabic numerals corresponding to the illustrations.

Sending a revised manuscript

While submitting a revised manuscript, contributors are requested to include, along with single copy of the final revised manuscript, a photocopy of the revised manuscript with the changes underlined in red and copy of the comments with the point to point clarification to each comment. The manuscript number should be written on each of these documents. If the manuscript is submitted online, the contributors' form and copyright transfer form has to be submitted in original with the signatures of all the contributors within two weeks of submission. Hard copies of images should be sent to the office of the journal. There is no need to send printed manuscript for articles submitted online.

Reprints

Journal provides no free printed reprints, however a author copy is sent to the main author and additional copies are available on payment (ask to the journal office).

Copyrights

The whole of the literary matter in the journal is copyright and cannot be reproduced without the written permission.

Declaration

A declaration should be submitted stating that the manuscript represents valid work and that neither this manuscript nor one with substantially similar content under the present authorship has been published or is being considered for publication elsewhere and the authorship of this article will not be contested by any one whose name (s) is/are not listed here, and that the order of authorship as placed in the manuscript is final and accepted by the coauthors. Declarations should be signed by all the authors in the order in which they are mentioned in the original manuscript. Matters appearing in the Journal are covered by copyright but no objection will be made to their reproduction provided permission is obtained from the Editor prior to publication and due acknowledgment of the source is made.

Abbreviations

Standard abbreviations should be used and be spelt out when first used in the text. Abbreviations should not be used in the title or abstract.

Checklist

- Manuscript Title
- Covering letter: Signed by all contributors
- Previous publication/ presentations mentioned Source of funding mentioned
- Conflicts of interest disclosed

Authors

- Middle name initials provided.
- Author for correspondence, with e-mail address provided.
- Number of contributors restricted as per the instructions
- Identity not revealed in paper except title page (e.g. name of the institute in Methods, citing previous study as 'our study')

Presentation and Format

- Double spacing
- Margins 2.5 cm from all four sides
- Title page contains all the desired information. Running title provided (not more than 50 characters)
- Abstract page contains the full title of the manuscript
- Abstract provided: Structured abstract provided for an original article.
- Key words provided (three or more)
- Introduction of 75-100 words
- Headings in title case (not ALL CAPITALS). References cited in square brackets
- References according to the journal's instructions

Language and grammar

• Uniformly American English

- Abbreviations spelt out in full for the first time. Numerals from 1 to 10 spelt out
- Numerals at the beginning of the sentence spelt out

Tables and figures

- No repetition of data in tables and graphs and in text.
- Actual numbers from which graphs drawn, provided.
- Figures necessary and of good quality (color)
- Table and figure numbers in Arabic letters (not Roman).
- Labels pasted on back of the photographs (no names written)
- Figure legends provided (not more than 40 words)
- Patients' privacy maintained, (if not permission taken)
- Credit note for borrowed figures/tables provided
- Manuscript provided on a CDROM (with double spacing)

Submitting the Manuscript

- Is the journal editor's contact information current?
- Is a cover letter included with the manuscript? Does the letter
- 1. Include the author's postal address, e-mail address, telephone number, and fax number for future correspondence?
- 2. State that the manuscript is original, not previously published, and not under concurrent consideration elsewhere?
- 3. Inform the journal editor of the existence of any similar published manuscripts written by the author?
- 4. Mention any supplemental material you are submitting for the online version of your article?

Contributors' Form (to be modified as applicable and one signed copy attached with the manuscript)

Indian Journal of Trauma and Emergency Pediatrics

Handsome offer for subscribers!!

Subscribe **Indian Journal of Trauma and Emergency Pediatrics** and get any one book or both books absolutely free worth Rs.400/-.

Offer and Subsctription detail

Individual Subscriber One year: Rs.1000/- (select any one book to receive absolutely free) Life membership (valid for 10 years): Rs.5000/- (get both books absolutely free)

Books free for Subscribers of **Indian Journal of Trauma and Emergency Pediatrics.** Please select as per your interest. So, dont' wait and order it now.

Please note the offer is valid till stock last.

CHILD INTELLIGENCE

By Dr. Rajesh Shukla ISBN: 81-901846-1-X, Pb, vi+141 Pages Rs.150/-, US\$50/-Published by **World Information Syndicate**

PEDIATRICS COMPANION

By **Dr. Rajesh Shukla** ISBN: 81-901846-0-1, Hb, VIII+392 Pages Rs.250/-, US\$50 Published by **World Information Syndicate**

Order from **Red Flower Publication Pvt. Ltd.** 48/41-42, DSIDC, Pocket-II, Mayur Vihar, Phase-I Delhi - 110 091 (India) Tel: 91-11-22754205, 45796900, Fax: 91-11-22754205 E-mail: redflowerppl@gmail.com, redflowerppl@vsnl.net Website: www.rfppl.co.in

STATEMENT ABOUT OWNERSHIP AND OTHER PARTICULARS ABOUT "Indian Journal of Library and Information Science" (See Rule 8)

1. Place of Publication	:	Delhi
2. Periodicity of Publication	:	Quarterly
3. Printer's Name	:	Asharfi Lal
Nationality	:	Indian
Address	:	3/258-259, Trilok Puri, Delhi-91
4. Publisher's Name	:	Asharfi Lal
Nationality	:	Indian
Address	:	3/258-259, Trilok Puri, Delhi-91
5. Editor's Name	:	Asharfi Lal (Editor-in-Chief)
Nationality	:	Indian
Address	:	3/258-259, Trilok Puri, Delhi-91
6. Name & Address of Individuals	:	Asharfi Lal
who own the newspaper and particulars of	:	3/258-259, Trilok Puri, Delhi-91
shareholders holding more than one percent	- ,	
of the total capital		

I Asharfi Lal, hereby declare that the particulars given above are true to the best of my knowledge and belief.

Sd/-(Asharfi Lal)