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Examining the ICT skills of university librarians in a developing country: a study from the University of the Punjab, Lahore, Pakistan.

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Examining the ICT skills of university librarians in a developing country: a study from the University of the Punjab, Lahore, Pakistan.

Abstract

Purpose

The purpose of this study is to investigate the awareness level of librarians about various ICT applications in University of the Punjab (PU) and to examine the constraints and issues they are facing in acquisition of modern ICT skills.

Methodology

A questionnaire was developed and administered to 80 professional librarians having graduate and postgraduate qualification. Data was analyzed using Statistical Package for Social Sciences (SPSS 19.0).

Findings

Data analysis revealed that 99% of the participants are computer literate, having good knowledge of library automation and digitization. The knowledge of web based services such as e-mail, search engine, chatting, e-resources search, knowledge of OPAC/Web OPAC, etc by professionals is quite encouraging. However, majority of them have less knowledge of programming languages, whereas, HTML (Hyper Text Markup Language) is comparatively more popular programming language. Lack of training culture, poor infrastructure, and tight working schedule have been among the most common constraints in the acquisition of ICT skills identified by the participants of this study.

Key Words

University Librarians, ICT Skills, Library Automation, Digitization, Web Services, Web OPAC, HTML, Developing Countries, Pakistan.

Introduction

The term Information and Communication Technology (ICT) pertains to the use of the internet and computers in order to provide communication services to a wide consumer base. ICT is considered as the arrangement of informatics technology with other interconnected technologies, particularly communication technology (UNESCO, 2017). Informatics is defined as the science which deals with the design, comprehension, assessment, use, and upholding of information processing systems and their technical, human and political implications (Anderson & Weert, 2002), while Informatics technology is the technological applications (artifacts) of informatics in society.

ICT is the core appliance for information and knowledge transportation both internationally and inside the countries (Greenberg, 2008). Interactivity, permanent availability, worldwide reach, and reduced costs are four major characteristics of ICT. ICTs as two-way and 24 hours accessible communication technologies eliminate physical distances, minimize the comparative expenditure of communication and facilitates learning of new skills (Prytherch, 2016). ICT skills are the abilities of an individual to deal with a variety of computer applications, these skills can be divided into four categories: internet skills, files and folders management, programming skills and finally the presentation skills (Jakobsdóttir, Jónsdóttir, & Hjartarson, 2004). ICT skills enable an individual to use computers to perform these functions.

Developments in the ICT have made many changes in each and every field of life and in the same way library and information set-up is shifting at a vibrant pace. Therefore, there is a transformation in the needs and interests of the readers. Hence, the position of library and information professionals has also been altered radically. Number of recently conducted studies reveals that application of ICT in academic environment has increased gradually in the recent decades for management of various library functions and this boom in information and communication technologies (ICTs) has been accompanied by breakthroughs in information administration and new outlook and focus on acquiring communication skills i.e. see (Farooq, Ullah, Iqbal, & Hussain, 2016; Gerolimos, Malliari, & Lakovidis, 2015; Tripathi, Chand, Sonkar, & Jeevan, 2017)

ICT skills give impetus to bring technological revolution and keeping up with its ever-changing trends. Technological advances require librarians to grasp basic as well as modern skills and knowledge for using these technologies more efficiently in libraries. Over past few decades, libraries' atmosphere has changed significantly with reference to the knowledge organization in both the cases; offline and online. E-resources have become a large part of a library's collection but still libraries are not abandoning the print library material altogether (Thomas, 2015). Based on fully automated transactions of library materials, new web based services are being offered by libraries to attract users' attention to use the libraries to get benefit from the advanced library services. Number of recently conducted studies, for example, (Mansour, 2017; S. Rehman & Alajmi, 2017; Robinson, Runcie, Manassi, & Mckoy-Johnson, 2015) support that in this environment librarians need to enhance their technological skills continually, in order to meet the expectations of users. ICT tools and services are currently employed in libraries to render the

services more professionally so that libraries can appropriately fulfill the user's demands. It is imperative for librarians to acquire and update their skills and knowledge with reference to the internet and to provide adequate services. For instance, organizing, archiving and preserving access to the electronic or digitized resources, automation of library activities, and use of social media technology in libraries have precipitated the need for librarians to acquire advanced information technology skills. These skills are necessary to cope with the problems and challenges for implementing new ways of computing for storage, management and processing of information libraries around the world.

At the other hand, it is equally important to focus on librarians' attitude towards acquisition of such skills and to suggest further improvement keeping in view the future scenario of rapid development in the library and information science practice. A deeper understanding of the ICT skills of library professionals and how they may best be utilized in digital library environment will be helpful in managing libraries in more effective way (Fay & Nyhan, 2015). The current digital climate has become exceedingly diverse and innovative due to unceasing technological advances. There is a need to take an account about the fundamental competencies and, computer concepts librarians have experienced. Examining skills of library professionals to access, store and effectively communicate digital data will be helpful for developing professionals for digital age. This study will examine the level of skills needed for effective digital communication. The purpose of this study is to make an overview of current knowledge of ICT technologies and issues associated with acquiring those ICT skills. This study aims to evaluate the current state of affairs of the librarians who are currently working in the University of the Punjab, Lahore, Pakistan.

Objectives

Main objectives of this study are:

- To identify the awareness level of LIS professionals about various ICT technologies including programming languages, library automation software, digital library software and web based services.
- To assess the knowledge of LIS professional about online ICT tools and their purposes of using these tools.
- To find out the ICT skills acquisition methods and constraints faced by LIS professionals while acquiring these skills.

Literature Review

Computer literacy has progressively become a significant proficiency for librarians in a variety of positions. Computer literacy basically deals with using microcomputers in order to carry out the following tasks such as obtaining information solving problems and performing responsibilities related to the processing of data. Related to an elementary knowledge of microcomputers, it is a basic understanding of the implementation of a variety of packages pertaining to application (Van Vliet, Kletke, & Chakraborty., 1994). Zhou (1996) carried out a study in which he highlighted market changes related to the need of computer literacy of librarians in both public and academic libraries during the period 1974 -1989. He mentioned that computers and their applications have changed in a variety of ways, which has impact on the services which libraries offer their users.

Evolution in technological changes has resulted in questioning about librarians' future and the required competencies to survive professionally. Librarians should be able to install, configure and use a browser. It is also important that LIS professionals be familiar with HTML (Hyper Text Markup Language), browsers, graphic assignments, CGI (Common Gateway Interface) programming, UNIX and Java (Saunders-McMaster, 1997; Woodsworth, 1997). The last few decades has seen a dramatic change in librarianship when compared to its previous history. The reasons behind this transition can be divided into four categories: economical, technological, higher education and managerial. Therefore, the American Association of Law Libraries has approved the Law Students Research Competencies and Information Literacy Principles in 2011 due to inclusion of ICT in legal education and research (Alam & Mugade, 2016). But the most important aspect of the current library profession environment is to prepare the staff in using technology in an efficient manner. Where ICT usage has increased and improved libraries, on the other hand it is associated with a number of concerns and problems for library. To overcome these challenges, there is an urgent need to update the skills and competency required to adequately deal with information from a digital angle. One of the most basic factors is that libraries need to be more cognizant of computer literacy/skills and technology, on a whole, than they have been doing.

Latham (2000) argued that it is necessary for all librarians to be familiar with an office suite which includes a number of processes such as spreadsheets, databases, word processing and programme scheduling. In this scenario, library professionals should have a number of competencies related to creation of charts, importing graphics, filing attachments etc. Technical

literacy, according to Latham (2000), helps librarians to survive in their chosen profession. This skill is named as, “computer literacy”, however, a clear cut definition is required in order to highlight exactly which capabilities are required in this area. Chisenga and Rorissa (2001) describe that library professionals are still finding their footing with respect to the digital information environment. A number of skilled areas, related to ICTs, are now mandatory for the librarians. These skills are about digital information management, electronic publishing and knowledge management along with the more conventional information management skills. ICT tools need to be implemented in such a way that library’s collections are properly maintained. Information professionals are required to work intimately with ICT users and providers (including IT staff) and to work in team with others in the work line (Volman, Eck, & Wittwer, 2001).

Information professionals are now considered to be more responsive, proficient of using technology and good representative of emerging ICTs (Nwakanma, 2003). In current years, information professional require new skills due to the changes brought about, by the stable appearance of applicable new technologies (Ashcroft, 2004). Rehman (2006) described that librarians’ job description plays a role on how to choose the skills for learning to provide the innovative services to the modern users.

Bolton (2014) recommended that libraries in Africa need to include mobile phone services in their resources. This is important especially with reference to information literacy through text reference and an outreach program. Various academic & research libraries are still facing the challenges to acquire the librarians who have mastered in electronic information tools. Australian Government’s Department of Communications in 2013 provided a training on digital literacy skills to support advanced broadband infrastructure nation-wide. Half of these internet training centers were established in public libraries (Rolan, Denison, & Mackenzie, 2015).

Bernaoui and Hassoun (2015) highlighted the percentage of librarians in Algerian university libraries who had used or been using ICTs with respect to the users to provide the library services. The simplest examples of ICT usage are emails, text messages and social networking sites like LinkedIn, Face book and Twitter etc. They found that various social networks (such as blogs, RSS feeds, and Twitter Facebook etc.) facilitate the sharing and propagation of information among the library users regarding events taking place in libraries. Rodriguez (2015) elaborated on existing internal expertise of academic librarians in United States and tabulated methods through which librarians could be trained with reference to current communication practices. The

participants were quite open to the training and were conducive to most of the activities those were employed.

ICT development has been analyzed in many third world countries, including those, within the Asia. These studies have shown how ICT skills are at the best minimal among the librarians due to a number of reasons. Keeping this in mind, it can be said that there are two types of researchers. The first type of researchers focused on the need of ICT competency in Information Science through the perspective of job openings, for example, (Beile & Adams, 2000; Gerolimos & Konsta, 2008; Khurshid, 2003; Kwasik, 2002; Mishra, 2009; Shiholo & Ocholla, 2003; Zhou, 1996). The second type of researchers concentrated on the actual ICT competency exhibited by librarians working in different libraries, for example, (Ademodi & Adepoju, 2009; Adeyoyin, 2005, 2006; Hoskins, 2005; Kumar, 2013; Mugwisi & Ocholla, 2002; Nath, Bahl, & Kumar, 2007; Thanuskodi, 2011; Ugboma, 2008) to name a few. However, literature shows that little attention has been paid to both contexts in Pakistani scenario. Ameen (2009) elaborated that academic librarianship in Pakistan demands information professionals to have improved teaching and communication skills. Thus, it is essential for those in executive positions to be familiar with the crucial continuing professional development (CPD) and make sure that staff is capable in maintaining up-to-date levels of expertise. Although librarians are facing difficulties in choosing the ICT skills to learn. Academic as well as public libraries, are being greatly changed by the information technology (IT) not only the basic infrastructure is changing but also the delivery of services to the consumers. Where resources are drying up in academic libraries there is a greater demand for an increased number of services and there is a need for library websites to become more evolved to provide library services (Farooq, et al., 2016; Iqbal & Warraich, 2012). It is well argued by Farooq et al. (2016) that they should acquire not only conventional skills related to the theoretical aspect of the profession but they should also focus on basic computer literacy skills to prepare themselves for interconnected environments. Librarians must know what the internet entails; this also includes evaluation of software and hardware networks; and understanding crucial computer and information science concepts.

The significance of pre-professional experience has been noted but the significance of in service learning is a main opening point. Flourishing service learning experiences include: workshop and partnerships with libraries required for the provision of technology-related library services.

Methodology

A quantitative design is adopted for this study. In order to carry out this study, a questionnaire was developed which was distributed by the researcher herself. The questionnaire was composed of three parts: first part dealt with demographic details, the second portion included questions regarding the level of skills of library professionals. The Likert scale items were provided for response with reference to different aspects of ICTs, with response categories ranging from excellent – 1, good – 2, average – 3, poor – 4, no knowledge – 5. Third portion of the questionnaire measured the frequencies of different factors about the purposes of using ICT skills and constraints faced during skills acquisition.

Descriptive statistics were used for data analysis using SPSS (Statistical Package for Social Sciences). Data was collected from LIS (library and information science) professionals working in University of the Punjab, Lahore (PU). PU is one of the oldest university of Pakistan situated at Lahore, having a central library and more than forty seminar libraries with professional librarians working in nearly all libraries. Respondents of this study are 80 professional librarians having Master degree in Library & Information Science while other paraprofessional staff was excluded from this study. Out of total working librarians, 67 responses were collected which corresponds to 84% of response rate.

Data Analysis

Demographic Information of Respondents

It is pertinent to note that a number of factors affect the ICT skills and competency to have these skills, some of which are designation, qualification (academic or professional), gender and experience. Data shows that majority of librarians 43 (64.2%) working in Punjab University libraries are male. Female constitute nearly half in numbers 24 as compared to their male counterparts. As for as the designations of the respondents are concerned, there is one (1.5%) chief librarian, five (7.5%) deputy chief librarians, twenty-four (35.8%) senior librarians and thirty seven (52.2%) librarians who responded in this study.

Table 1 shows gender-wise, designation-wise, qualification-wise, and experience-wise distribution of the respondents.

Table 1: Demographic Information of Respondents N=67

Gender	Frequency	Percentage (%)
Male	43	64.2
Female	24	35.8
Designation		
Chief Librarian	1	1.5
Deputy Chief Librarian	5	7.5
Senior Librarian	24	35.8
Librarian	37	52.2
Qualifications		
Ph. D	1	1.5
MPhil	4	6
MLIS	62	92.5
Experience (in years)		
Up to 5	18	26.9
6-10	22	32.8
11-15	15	22.4
More than 15	12	17.9

Knowledge of Programming Languages

Data analysis reveals that 66 respondents (98.5%) are computer literate and have adequate knowledge of the different ICT tools. Programming languages play an integral part in the designing of webpages and classifying open source software because editing in programming language (CSS style sheets) results in customization and modification of web based interfaces. Data was collected specifically keeping in mind the importance of basic understanding of various computer languages. As shown in Table 2, we found that only few librarians have knowledge of Cascading Style Sheet (CSS), followed by JAVA. The mean score more than 4.4 indicates the low level of skill about programming languages among librarians.

Table 2: Frequency distribution of “Knowledge of programming languages”

Programming Language	Excellent	Good	Average	Poor	No Knowledge	Mean
CSS	1(1.5%)	2(3.0%)	7(10.4%)	10(14.9%)	44(65.7%)	4.47
JAVA	1(1.5%)	1(1.5%)	8(11.9%)	6(9.0%)	47(70.1%)	4.54

Excellent – 1, Good – 2, Average – 3, Poor– 4, No knowledge – 5.

Knowledge of Library Automation and digital library/institutional repository software

Library automation along with creating, managing, and supervising, digital libraries is no exception for librarians in the digital era. Therefore, library automation and its training along with the basic knowledge of digitization has become a prerequisite for librarianship. Data analysis reveals that a good number of librarians in University of the Punjab have the knowledge of library automation software. Frequency distribution shows that respondents have good knowledge of Multilingual Library and Information Management System (MLIMS) automation software followed by Library and Information Management System (LIMS), Koha, Winisis, and Virtua. The reason could be that Punjab University is using MLIMS (developed by university IT department) software officially in departmental/seminar libraries and main library of the university.

For libraries, institutional repository and digital libraries are the most recent ICT tools. Therefore, information professionals must have the knowledge to effectively use these tools to provide the services associated with digital library and institutional repository. Data reveals that a less number of library professionals have the knowledge of digital library software. Table 3 shows frequency distribution of the respondents regarding knowledge of library automation and digitization software.

Table 3: Frequency distribution of “knowledge of library automation software and Digital library/ Institutional repository”

Library Automation Software	Excellent	Good	Average	Poor	No Knowledge	Mean
LIMS	23(34.3%)	34(50.7%)	3(4.5%)	-	3(4.5%)	1.83
MLIMS	35(52.2%)	25(37.3%)	4(6.0%)	1(1.5%)	-	1.55

Koha	7(10.4%)	20(29.9%)	9(13.4%)	8(11.9%)	13(19.4%)	3.00
Winisis	6(9.0%)	5(7.5%)	5(7.5%)	2(3.0%)	14(20.9%)	3.41
Virtua	2(3.0%)	2(3.0%)	2(3.0%)	-	6(9.0%)	3.50
Digital Library Software						
Green stone	2(3.0%)	13(19.4%)	10(14.9%)	7(10.4%)	18(26.9%)	3.52
DSpace	6(9.0%)	14(20.9%)	13(19.4%)	7(10.4%)	6(9.0%)	2.85
Eprint	1(1.5%)	7(10.4%)	9(13.4%)	7(10.4%)	13(19.4%)	3.65
Fedora	3(4.5%)	-	9(13.4%)	4(6.4%)	17(25.4%)	3.97

Excellent – 1, Good – 2, Average – 3, Poor– 4, No knowledge – 5.

Knowledge of Web-Based Services

Internet technologies and presence of libraries on web has made possible for the librarians to provide a wide range of services to the library users (Iqbal & Warraich, 2012). From the collected data, internet knowledge has been categorized further into the segments i.e. i) Email, ii) Chat, iii) Browsing, and iv) use of OPAC (Online Public Access Catalog). Mean score indicates that respondents have profound knowledge about email, chatting, search engines and e-resources because these fall in the library domain. On the other hand, only 5(7.5%) respondents perceive themselves excellent and 12(17.9%) good in having knowledge of web designing. While 9(13.3%) are poor and 21(31.3%) have no knowledge of webpage designing. Almost 25% respondents are average to have this skill. Frequency distribution is given below in table 5.

Table 5: Frequency distribution of “knowledge of Web-based service”

Web based services	Excellent	Good	Average	Poor	No Knowledge	Mean
E-mail	39(58.2%)	26(38.8%)	-	-	-	1.40
Chat reference	35(52.2%)	26(38.8%)	1(1.5%)	1(1.5%)	3(4.5%)	1.65
Search engines	37(55.2%)	25(37.3%)	4(6.0%)	-	-	1.50
E-resources search	32(74.8%)	26(38.8%)	7(10.4%)	-	-	1.62
Use OPAC/Web OPAC	26(38.8%)	29(43.3%)	11(16.7%)	-	-	1.77
Webpage design	5(7.5%)	12(17.9%)	17(25.4%)	9(13.4%)	21(31.3%)	3.45

Participation in online Tools

With the advent of ICTs there is the development of a number of tools which has helped to bridge the gap among the ‘users’ needs’ and ‘library services’. Data analysis shows that majority of respondents 37.3% have rated themselves excellent and 49.3% respondents have rated themselves good in using and knowledge of social networking tools (Facebook, Twitter etc.). There is not even a single person who has poor knowledge in this regards. However, blogging is not famous among librarians.

Table 6: Frequency distribution of “knowledge of online tools”

Online tools	Excellent	Good	Average	Poor	No	Mean
Social Networking	25(37.3%)	33(49.3%)	4(6.0%)	-	2(3.0%)	1.77
Web based Forum	21(31.3%)	27(40.3%)	10(14.9%)	3(4.5%)	3(4.5%)	2.06
Mailing list	23(34.3%)	30(44.8%)	10(14.9%)	1(1.5.3%)	1(1.5%)	1.88
Instant messaging	22(32.8%)	26(38.8%)	11(16.4%)	-	3(4.5%)	1.97
Blogging	10(14.9%)	24(35.8%)	13(19.4%)	2(3.0%)	12(17.9%)	2.70

Purpose of using online ICT Tools

ICT tools’ use varies on an individual basis. Respondents declared that the basic reason for using ICT tools is communication; indicated by 71.6% respondents. Other purposes were study & research, providing information service, and entertainment respectively.

Table 7: Purpose of using online ICT tools

Purpose	No. of responses	Percentage (%)
Communication	48	71.6
Study & research	42	62.7
providing information service	38	56.7
Entertainment	31	46.3
Other	9	13.4

Means & Methods of Acquiring ICT Skills

Librarians use different methodologies to acquire ICT skills. We inquired about these methods and found that 42 (62.7%) respondents go for 'formal education/training' while acquiring ICT skills; followed by other methods such as getting help from colleagues and self-learning.

Table 8: Methods of acquiring ICT skills

Methods	No. of responses	Percentage (%)
Formal education/ training	42	62.7
Informal education/ training	26	38.8
From colleagues/ friends	41	61.2
Trail & error basis	24	35.8
Self-study	23	34.3

Constraints in Acquiring ICT Skills

The following chart shows the data that has been gathered with reference to the strictures that librarians face the different constraints to learn the ICT skills. As per the analysis of data, shown in Table 9, more than half of the respondents (55.2%) indicate that the main hurdle in acquisition of ICT skills is tight working schedule. Other constraints identified by the respondents were lack of cooperation from the Institution's authority, lack of service training provision, and poor infrastructural facilities respectively.

Table 9: Constraints in acquiring ICT skills

Constraints	No. of responses	Percentage
Tight working schedule	37	55.2
Poor infrastructural facilities	18	26.9
Lack of cooperation from the authority	27	40.3
Lack in service training provision	25	37.3
Personal inabilities	10	14.9
Any other	9	13.4

Findings and Discussion

Most of the librarians who work at the University of Punjab hold a postgraduate degree in Library and Information Sciences. Moreover, most of the libraries at the University of the Punjab are run by professional librarians. Majority of librarians have sound knowledge of computers and adequate awareness of Information and Communication Technology. LIS professionals in Punjab University have poor knowledge of programming languages, which may be because that there's no subject of programming language taught at graduation level. It is evident from the lack of knowledge about programming languages. Librarians do not have the skills of developing library web pages. Another reason could be that technical staff positions (computer specialists) exist in libraries and computer science department of the university help in managing the websites of university libraries, therefore, library staff is paying much attention to acquire skills of programming languages.

Majority of the librarians are well-aware of the digitization practices and good number of librarians are aware of the automation software known as MLIMS. Computer science department of the University of the Punjab is providing trainings and support to the library professionals carrying out automation activities in various libraries.

Additionally, some of the librarians are aware of repositories stored in institutions and libraries which are available in media other than the print form. Dspace is the only famous software among librarians and reason for this could be that the institutional repositories and digital library concepts, are still in their infancy at libraries in the University of the Punjab. Web based services such as use of search engines, emailing, chat reference, e-resources searching, and knowledge of OPAC/Web OPAC, etc. are common among librarians which is quite encouraging. Majority of the librarians are involved in social networking, using listservs and online professional forums.

Most LIS professionals use ICT to communicate, to provide adequate services to the library users and also to improve their users' experience of library usage for the research purpose. Most LIS professionals acquire ICT skills through professional trainings and self-learning. They are getting help from peers and colleagues.

Biggest hurdle, faced by librarians in acquiring ICT skills was inflexible job timings as well as indifference of their superiors, lack of training programs, and poor infrastructural facilities.

Conclusion and Recommendations

Above discussion on the data analysis suggests that librarians working in the PU are well aware of the commonly used ICT tools and applications, however, they are lacking in sophisticated ICT applications such as webpage designing, use of mailing lists and blogging. Knowledge of programming languages such as JAVA is also a lacking side of the studied population which is not only required to make utmost use of the free and open source software (FOSS) but is also required to keep abreast with advanced functionality of routine work in MS Office applications. Keeping in view the rapid growth in advancement of ICT, this study suggest that university administration needs to develop effective professional development programs so as to improve the librarians' acquisition and improvement of ICT skills. Also the parent organizations are required to support and nourish the ICT infrastructure, its use and development.

Farooq et. al., (2016) pointed out that university LIS professionals do not properly grasp the difference between their perceived and acquired ICT skills yet, we have noticed the same and suggest that it is necessary for academic library authorities to conduct training need assessment (TNA) before designing any ICT training workshop/course for their staff.

With advances in technology a great number of changes have arisen in the LIS profession, this in turn it, has influenced the manner in which service provision was made. In this context, the curriculum of LIS programs needs to highlight the ICT applications properly in order to match the ever-changing environment of modern libraries. The library consortium, as suggested by Siddique & Mahmood (2014) is also supported to be established at national level with the alliance of LIS schools and associations, to promote the training culture and education in the area of ICT for LIS professionals.

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