

ICT Skills Proficiency of Library Professionals: A Case Study of Universities in Karachi, Pakistan

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ABSTRACT: The purpose of this study is to investigate the information and communication technology proficiency of the library professionals at the universities in Karachi, Pakistan as well as to find out their software development, system analysis, and design skills. The findings of this study can be utilized in the design of training programs and refresher courses and also in the evaluation of librarians' training need.

I. Introduction

Information and communication technology (ICT) has changed the landscape of libraries and librarianship. Libraries are being transitioned from the four walls to the cyber environment. Library resources are being transformed from print to digital and web resources. Information has been disseminated speedily around the globe due to advanced means of telecommunication. Therefore, it is being used extensively and has resulted in tremendous growth of information. The growing ICT-driven information services have posed challenges to library and information professionals.

Fourie (2004) opined that “They are part of a global world that is increasingly shaped by electronic networks and information technology” (p. 63). In this ICT-oriented environment, library professionals must become ICT literate in order to survive.

Markauskaite (2006) believed that ICT literacy “refers to knowledge of technology applied to information problem solving”.

Education Testing Service (2007) defined ICT literacy as “using digital technology, communications tools, and/or networks to access, manage, integrate, evaluate and create information in order to function in a knowledge society” (p. 17).

II. Objectives of the Study

The study was carried out to achieve the following objectives:

- To Investigate the proficiency of ICT skills of library professionals at the universities in Karachi, Pakistan
- To find out the areas in which library professionals need to acquire ICT skills

- To explore the relationship between library professionals' ICT skills and gender, and between public universities and private universities

III. Hypotheses

The following hypotheses were formulated to explore the relationships:

- H1. There is a significant relationship between gender and ICT skills proficiency of library professionals.
- H2. There is a significant relationship between the type of a university (i.e., public or private) and ICT skills proficiency of library professionals.
- H3. There is a significant relationship between years of experience and ICT skills proficiency of library professionals.

IV. Implications of the Study

The study aims to assess the proficiency of ICT skills of library professionals at universities in Karachi, Pakistan. The obtained results would be useful for library schools, professional library associations, and other relevant authorities for the planning of training programs and refresher courses. The findings may also be helpful for library educators to develop curriculum that meets the needs of library professionals.

V. Background Information

In Pakistan, computer has been used in libraries to provide quality services. To cope with the changing scenario of librarianship, library schools in Pakistan have revised their curriculum since 1980. These schools have offered courses on information sciences. And some schools have changed their name from "library science" to "library and information science".

The Department of Library Science of the University of Karachi was renamed as the Department of Library and Information Science in 1982 and offered courses on information science such as "Information Storage and Retrieval", "Library Automation", "Data Processing in Libraries", "Information Network", and "Data Bank of Systems". Since 2007, the following courses relevant to ICT applications in libraries have been taught: "Electronic Information Sources and Services", "Digital Libraries and Library Management Software", "Information Storage Processing and Retrieval", "Application of Information Technology", and "System Analysis and Design in Libraries".

In 1986, a computer lab was established in the Department of Library and Information Science at the University of Karachi. At that time, due to shortage of computers, it was used to demonstrate the use of computers for different applications in libraries but not for practical training.

In 1990, the Netherland government sponsored a project called the "Netherland Library Development Project (NLDP)" in Pakistan for the development of librarianship. The project

provided a computer, a printer, and a photocopier machine to each library school in Pakistan. Through NLDP, selected library professionals from Pakistan went to the Netherland for the training of CDS/ISIS. These professionals took initiative to automate their libraries after returning to Pakistan.

Collaborated with NLDP and Pakistan Development Banking Institute, the Pakistan Library Association (PLA) conducted a 15-day training program on CDS/ISIS in 1992. On Nov 25, 1993, a three-week practical program was offered on the library automation planning and implementation. PLA Sindh Branch established a computer center on July 4, 1993. For this computer center, NLDP provided computers and printers. From April 23 to 29, 1994, another training program was conducted by PLA Sindh on Library Automation and Management Program (LAMP).

Beside these programs, PLA's computer centers offered a 3-month computer training program for working librarians. The first one was started in October 1993. The objective of the program was to provide fundamental concepts of library computerization. The practical training of word processing software packages included "WordPerfect" and "WordStar". Other fundamental concepts, such as library database and management using database III and library software package CDS-ISIS were taught. This program was held on a regular basis until 1996 when PLA became inactive. As a result, this program was discontinued.

However, the Department of Library and Information Science of the University of Karachi conducted refresher courses and practical training courses time to time since 1990. In these courses, training of WinISIS, GenISIS, MS Office, web designing, etc. was provided. The objectives of these courses are to provide training to those library professionals who are not ICT literate. The Department of Library and Information Science at the University of Karachi is the main source that prepares information professionals for the job market. The department has a fully equipped computer lab with necessary hardware and software such as 45 computers, 3 printers, a scanner, multimedia, a barcode reader, an overhead projector, CD-ROM devices, a tape recorder, a photocopier, and a laptop. Computers are interconnected through a local area network. Internet access is provided through the campus-wide network of the University of Karachi. It is a fiber optic based LAN with wireless support networking.

V. Literature Review

Batool and Ameen (2010) studied the status of technological competencies of librarians at Punjab University. Their findings revealed that all librarians there had word processing skills but not very skilful in computer hardware expertise, that they knew how to use basic Internet functions but not advanced services, and that they had expertise in using web Dewey, OPAC, and MARC records. The researchers pointed out that lack of coverage in the curriculum, lack of refresher courses, and lack of training workshops were major problems in learning of technology.

Safahieh and Asemi (2010) observed that the majority of librarians at Ispahan University, Iran did not have good computer skills. 46.3% regarded their level of skills as fair. None of the librarian perceived their level of skills as very good. However, 48.8% librarians got computer training from formal IT program. Their findings revealed that computer was used in libraries

more often for circulation operation and then Internet online searching. The majority of the librarians believed that computers increase the efficiency of operations.

Mahmood and Ajmal (2007) argued that the majority of library professionals in Pakistan need to learn specialized courses of ICT-like computer programming in Visual Basic, JAVA, and networking, etc. Besides, they also need to learn of particular courses of librarianship, for example, designing of digital library, MARC etc.

Babu, Vinayagmoorthy, and Krishan (2007) assessed the ICT skills of 171 librarians of engineering educational institute of Tamil Nadu. Their findings revealed that 48% of librarians had some knowledge of library automation software but were weak in web page design and electronic bulletin board.

Adomi and Anie (2006) analyzed the computer skills of professional librarians at Nigerian universities. Their findings showed that librarians were not highly computer literate as most of them had recently been introduced to computers in libraries. Computers were used mostly for cataloguing and for serials on a limited scale.

Adeyoyin (2006) investigated on the ICT literacy level of library staff in West African universities. His findings showed that in Anglophone countries, 48.38% of professional staff were ICT literate whereas 51.62% were not ICT literate.

Bakar (2005) surveyed information professionals in Malaysia on their IT competencies in 13 categories from basic competencies like Word processing, emails, Internet and intranet, graphics, presentations, publishing, spreadsheets, and project management to system maintenance, system analysis, and programming.

Mahmood (2001) investigated the competencies needed for academic librarians in Pakistan. Among all competencies, information technology got the highest rank. The changing scenario of libraries in Pakistan demanded library professionals to learn technology and automation. Academic librarians need to get expertise in use of the Internet, networking, intranet, multimedia, imaging technology, and full text databases.

VI. Research Methodology

A questionnaire was designed to collect data. The targeted population was the library and information professionals working at university libraries in Karachi, Pakistan, which are owned either by the government or the private sector. Altogether, there are four government (public) universities and 11 private universities in Karachi. Participants were selected from all four public universities and 8 private universities. The 8 private universities were selected randomly. A questionnaire was designed on the basis of literature review. Besides, the core competencies of different university libraries were also examined, such as "Technology core competency for California library workers", "Competencies of the National library of Canada", and "ETS Higher Education iSkills Assessment Fit with ACRL Standards". The questionnaire included questions on gender, qualification, type of university, and experiences. In addition, questions were asked to assess the proficiency level of ICT. It specifically focused on the use of hardware, system

maintenance, software development, web design, system analysis and design, networking, digitization and imaging technique, and web-based functions. Six point scales is used to assess the level of proficiency ranged from very high to very low to get the weighted values. The respondents assessed their own ICT skills by this scale. The data was analyzed using Stata 12, a software package for statistical analysis. The descriptive statistics (i.e., frequency, percentages, mean standard deviation, and t-test values) were used to measure the variables. Moreover, the test of significance was used to test the hypotheses.

VII. Findings

1. Profiles of Respondents

All respondents were librarians working at universities in Karachi, Pakistan. The gender distribution of the respondents is almost equal, 26 male (50.94%) and 27 (49.05%) female. Of the 53 respondents, 31 (58.49%) belong to public universities and 22 (41.50%) to private universities. All respondents have Master's degree in Library and Information Science.

Table 1. Distribution of Respondents by Experience

Years of Experience	No. of Respondents	Percentage (%)
1-5	16	30.18
6-10	8	15.09
11-15	4	7.54
16-20	8	15.09
21-25	4	7.54
26-30	6	11.32
31-35	6	11.32
36-above	1	1.88

Table1 shows that 16 (30.18%) respondents have worked in libraries for 1-5 years, 8 (15.09%) for 6-10 years, 4 (7.54%) for 11-15 years, 8 (15.09%) for 16-20 years, 4 (7.54%) for 21-25 years, 6 (11.32%) for 26-30 years, 6 (11.32%) for 31-35 years, and 1 (1.88%) for 36 years or more. In other words, more than half of the respondents have worked in libraries for 10 years or more.

2. Proficiency in Using Hardware

Table 2. Mean Distribution of Hardware Proficiency

Variable	VH	H	M	L	VL	NP	Mean	SD
Laptops	16	10	14	5	7	1	2.622	1.444
Multimedia	13	14	11	7	8	nil	2.679	1.383
Digital cameras	16	12	14	3	8	nil	2.528	1.381
OCR devices	10	10	10	5	14	4	3.283	1.656
Printers	28	12	5	nil	8	nil	2.018	1.420
Scanners	23	10	3	5	11	1	2.509	1.682
Barcode readers	21	6	4	4	7	11	3.056	2.060

Notes: VH=Very High; H=High; M=Moderate; L=Low; VL=Very Low; NP=Non Proficient

A list of hardware (i.e., laptops, multimedia, digital cameras, OCR devices, printers, and barcode scanners) was provided to the participants for them to assess their level of proficiency using a six-point scale. Table 2 shows that most respondents are very high or high in their proficiency of using various types of hardware listed.

3. Proficiency in System Maintenance

Table 3. Mean Distribution of System Maintenance Proficiency

Variable	VH	H	M	L	VL	NP	Mean	SD
Drivers installation	17	6	6	7	14	3	3.075	1.774
Windows installation	21	4	4	4	17	3	3.018	1.896
Software installation	21	12	4	3	10	3	2.584	1.736

Notes: VH=Very High; H=High; M=Moderate; L=Low; VL=Very Low; NP=Non Proficient

System maintenance is an integral part of ICT skills needed by libraries. It includes the installation of Windows OS, and software drivers as well as formatting computers. The respondents were asked to assess their proficiency in system maintenance. Table 3 shows that driver installation is the function in which respondents are moderate proficient with mean value 3.075, followed by Windows OS installation (mean=3.018).

4. Proficiency in Word Processing

Table 4. Mean Distribution of MS Word Processing Proficiency

Variable	VH	H	M	L	VL	NP	Mean	SD
Printing documents	29	13	2	2	7	nil	1.962	1.400
Formatting documents	30	12	2	2	7	nil	1.943	1.406
Creating documents	33	9	2	1	8	nil	1.905	1.457
Saving documents	37	6	3	nil	7	nil	1.754	1.385

Notes: VH=Very High; H=High; M=Moderate; L=Low; VL=Very Low; NP=Non Proficient

The respondents were asked to rate their proficiency in MS Word processing. Table 4 shows that all respondents assessed themselves high in Word processing skills. Their mean values are 1.962 (Printing documents), 1.943 (Formatting documents), 1.905 (Creating documents), and 1.754 (Saving documents) respectively.

5. Proficiency in Spread Sheet

Table 5. Mean Distribution of Spread Sheet Proficiency

Variable	VH	H	M	L	VL	NP	Mean	SD
Using formula	16	8	11	7	10	1	2.811	1.557
Producing graphs	15	12	12	3	10	1	2.698	1.513
Formatting documents	18	13	9	2	10	1	2.547	1.551
Creating spread sheet	22	12	7	1	10	1	2.396	1.585

Notes: VH=Very High; H=High; M=Moderate; L=Low; VL=Very Low; NP=Non Proficient

Table 5 shows that the respondents assessed their proficiency as high in creating and formatting slides with the mean score of 2.396 and 2.547 respectively whereas they are moderately proficient in producing graphs (2.698) and using formula (2.811).

6. Proficiency in Presentation Software

Table 6. Mean Distribution of Presentation Software Proficiency

Variable	VH	H	M	L	VL	NP	Mean	SD
Formatting slides	18	13	9	2	10	1	2.358	1.676
Saving presentation	29	6	4	2	10	2	2.32	1.74
Creating presentation	28	9	3	2	9	2	2.264	1.688

Notes: VH=Very High; H=High; M=Moderate; L=Low; VL=Very Low; NP=Non Proficient

Table 6 shows that the respondents assessed themselves highly proficient in all options of presentation software with the mean values of 2.264, 2.358, and 2.320 respectively.

7. Proficiency in Software Development

Table 7. Frequency Distribution of Software Development Skills

Variable	VH	H	M	L	VL	NP	Mean	SD
Oracle	5	3	3	4	24	14	4.528	1.551
MySQL	4	1	8	5	22	13	4.519	1.448
WinISIS	13	3	10	6	12	9	3.528	1.835
MS Access	14	8	11	5	9	6	3.094	1.746

Notes: VH=Very High; H=High; M=Moderate; L=Low; VL=Very Low; NP=Non Proficient

Software development is an essential skill for librarians in the universities in Karachi where the majority of universities do not have much financial resources to fully automate their libraries at once. Librarians must have skills of software development so that they can develop software themselves. A list of software package was provided to assess proficiency in software development. Table 7 shows that the respondents are not high or very high in software development proficiency. The majority of the respondents are moderately proficient in WinISIS and MS Access with mean values of 3.528 and 3.094 respectively while they are less proficient in MySQL (4.519) and Oracle (4.528). The reason behind this is that a practical training of MS Access and WinISIS started in MLIS since 2004. Those who passed MLIS before 2004 were not trained. Besides, most librarians do not try to upgrade their software development knowledge.

8. Proficiency in Web-Base Functions

Table 8. Mean Distribution of Web-Base Functions Proficiency

Variable	VH	H	M	L	VL	NP	Mean	SD
Send and receive voice mail	25	6	4	5	11	2	2.566	1.77
Availability of e-information services	22	11	9	2	8	1	2.538	1.52
Chat in web discussion groups	25	7	5	3	11	2	2.509	1.749
Access and download e-information services	34	7	2	3	6	1	2.283	1.459

Use search engines to find information	31	9	4	nil	8	1	2.018	1.537
Web searching skills	31	11	2	nil	7	2	2	1.568
Download files from Internet	31	9	4	8	1	nil	1.924	1.504
Browse Internet	37	5	5	2	4	nil	1.698	1.249
Send and receive e-mail	38	5	4	1	5	nil	1.679	1.282

Notes: VH=Very High; H=High; M=Moderate; L=Low; VL=Very Low; NP=Non Proficient

Table 8 shows that the respondents are highly proficient in all web-base functions except voice mail. The mean value of emailing is 1.679, browsing the Internet 1.698, downloading files 1.924, chatting in web discussion groups 2.509, web search skills 2, using search engines 2.018, accessing e-information services 2.283, and availability of e-information services 2.358.

9. Proficiency in web designing

Table 9. Mean Distribution of Web Design Proficiency

Variable	VH	H	M	L	VL	NP	Mean	SD
Macromedia Dreamweaver	3	3	5	6	27	9	4.471	1.353
HTML/DHTML	5	7	5	10	19	7	3.981	1.55
MS Front Page/MS Publisher	8	5	6	6	20	8	3.924	1.696

Notes: VH=Very High; H=High; M=Moderate; L=Low; VL=Very Low; NP=Non Proficient

The respondents were asked to rate their proficiency in web design. Table 9 shows that their mean values are HTML 3.981, FrontPage 3.924, and Dreamweaver 4.471. In other words, the respondents have low proficiency in web design.

10. Proficiency in Digitization and Imaging Technique

Table 10. Mean Distribution of Proficiency in Digitization and Imaging Technique

Variable	VH	H	M	L	VL	NP	Mean	SD
Image digitization	9	9	9	4	14	8	4.075	1.662
Digitize document containing characters in different languages	7	5	4	7	21	9	3.547	1.760

Notes: VH=Very High; H=High; M=Moderate; L=Low; VL=Very Low; NP=Non Proficient

Digitization and imaging technique is essential for librarians. Valuable print sources need to be digitized for preservation for future. These digitized documents are also used for reprographic purpose which can be sent to users residing in remote areas. Table 10 shows that the respondents are moderately proficient with a mean value of 3.547 for “digitize document containing characters in different languages” and had low proficiency for “image digitization” with a mean value of 4.075.

11. Proficiency in System Analysis and Design

Table 11. Mean Distribution of Proficiency in System Analysis and Design

Variable	VH	H	M	L	VL	NP	Mean	SD
File design	10	13	12	4	10	4	3.056	1.598
Detail investigation	13	7	16	3	10	4	3.037	1.628
Hardware selection	13	9	13	3	11	4	3.037	1.663
Preparation of feasibility report	11	12	12	5	9	4	3.018	1.599
Primary investigation	14	10	12	2	10	5	2.981	1.715
Output design	13	9	15	3	9	4	2.962	1.616
Input design	13	12	12	3	9	4	2.905	1.632

Notes: VH=Very High; H=High; M=Moderate; L=Low; VL=Very Low; NP=Non Proficient

Table 11 shows that all respondents are moderately proficient in all aspects of system analysis and design.

12. Proficiency in Networking

Table 12. Mean Distribution of Proficiency in Networking Skills

Variable	VH	H	M	L	VL	NP	Mean	SD
Network essentials & infrastructure	9	12	10	2	16	4	3.301	1.67
Use WAN	14	12	8	7	8	4	2.905	1.655
Use intranet (LAN)	22	10	11	1	7	2	2.377	1.547
Use Web	24	12	5	3	7	2	2.301	1.588

Notes: VH=Very High; H=High; M=Moderate; L=Low; VL=Very Low; NP=Non Proficient

Table 12 shows that the respondents are highly proficient in using LAN and the Web with mean values of 2.377 and 2.301 respectively

13. Software Development

Table 13. Software Development in Programming Language or with Software Package

Name of software	Frequency	Percentage (%)
Nil	41	77.35
MS Access	6	11.3
WinISIS	5	9.43
LMS	2	3.77
Oracle	1	1.86
Igloo	1	1.86
GenISIS	1	1.86
Web Lib	1	1.86
Koha	1	1.86
RFID Library Software	1	1.86
Web hosting/Site Builder	1	1.86
Transfer/ Convert LAMP to WinISIS	1	1.86

MS SQL Server	1	1.86
MS.Net	1	1.86
Green Stone	1	1.86

The respondents were asked whether they had ever developed any software in any programming language or software package. Table 13 shows that the respondents have low proficiency in software development. 41 (77.35%) of the respondents have never developed any library software. It is interesting to note that MS Access has the highest figure (6, 11.32%) whereas WinISIS has 5 (9.43%), followed by LMS (2, 3.77%). Only one program was developed in Oracle, Igloo, GenISIS, Web Lib, Koha, RFID library software, Web hosting/Site Builder, MS.NET, and Green Stone each.

14. Areas of ICT Skills Where Training Is Required

Table 14. Required ICT Skills Training

Areas of iSkill	Frequency	Percentage (%)
Software design	22	41.5
Software installation / operations	15	28.3
All areas of iSkills	12	22.64
Web design	7	13.2
Digitization and imaging technology	5	9.43
Online cataloguing (MARC)	4	7.54
Online classification (NLM)	4	7.54
System analysis and design	3	5.66
Networking	3	5.66
MS Office	3	5.66
Database searching technique	2	3.77
Transformation of data	1	1.88
OCR Devices	1	1.88

ICT skill is a broader term which encompasses various skills. The respondents were asked an open-ended question about the areas where they need training to perform their job well. Table 14 shows that the respondents have different levels of proficiency in ICT skills. 12 (22.64%) respondents need training in all areas of ICT skills. 22 (41.5%) respondents need training in software design, followed by 15 (28.3%) in software installation or operations, 7 (13.20%) in web design, 5 (9.43%) in digitization and imaging technology, 4 (7.54%) in online cataloguing (MARC) and online classification (NLM) each, 3 (5.66%) in system analysis and design, networking, and MS Office each, 2 (3.77%) in database searching technique, and 1 (1.88%) in transformation of data and OCR devices each.

15. Composite Mean and Standard Deviation of ICT Skills Proficiency

Table 15. Composite Mean and Standard Deviation of ICT Skills Proficiency

Variable	Mean	SD	Level of Proficiency
Word processing	1.89	5.41	High
Presentation software	2.31	4.99	High
Web-based functions	2.115	11.7	High
Digitization and imaging technique	3.8	3.23	Low
Using hardware	2.6	9.1	Moderate
System maintenance	2.8	5.15	Moderate
Spreadsheet	2.613	5.9	Moderate
Software development	3.909	5.34	Moderate
Web design	4.125	14.4	Moderate
System analysis and design	3	10.97	Moderate
Networking	2.72	5.7	Moderate

Table 15 show that the respondents are highly proficient in 3 skills (i.e., Word processing, Presentation software, and Web-based functions) and moderately proficient in 7 skills (i.e., Using hardware, System maintenance, Spreadsheet, Software development, Web design, System analysis and design, and Networking). But they have low proficiency in Digitization and imaging technique.

VIII. Hypotheses Testing

Group Test

Group	t-statistics	Level of significance	Interpretation
Male-Female	0.0471	Highly Insignificant	No difference in ICT skills proficiency between male and female participants
Public-Private	0.3317	Highly Insignificant	No difference in ICT skills proficiency between participants from public and private universities
Experience*	2.59	Significant	Two groups have different mean values.

* Experience is categorized in two groups. Group 1 consists of experience between 0 and 10 years. Group 2 consists of experience of more than 10 years

t-test was applied to determine the relationship in ICT skill proficiency between male and female participants. The value of 0.0471 shows no significant difference. Therefore, Hypothesis 1 is rejected.

t-test was applied to determine the relationship in ICT skill proficiency between public and private universities. The value of 0.3317 shows no significant difference. Therefore, Hypothesis 2 is rejected.

t-test was applied to determine the relationship in ICT skill proficiency based on work experience. Experience is categorized in two groups. Group1 consists of experience up to 10 years whereas Group2 consists of experience above 10 years. The value of 2.5934 shows a significant difference. Therefore, Hypothesis 3 is accepted.

IX. Conclusion

The library professionals in universities in Karachi, Pakistan are not equally proficient in all areas of ICT skills. The majority are moderately proficient. Neither gender nor types of universities have a significant bearing on their proficiency. On the other hand, work experience does have an impact on one's skills.

The library professionals who earned their MLIS degree in the last five years have ICT skills. However, as they are working mostly in pre-automation libraries, their training and skills are not utilized due to the unavailability of computers. In fact, only two universities in Karachi are fully automated. Twelve are partially automated, and two are not automated at all.

Those who graduated from library schools earlier did not have a chance to learn ICT skills. It is the responsibility of library schools and library professional associations to conduct regular training programs to meet their needs in the changing librarianship.

References

- Adeyoyin, S. O. (2006). ICT literacy among the staff of West African university libraries: A comparative study of Anglophone and Francophone countries. *The Electronic Library*, 24(5), 694-705.
- Adomi, E. E.; & Anie, S. O. (2006). An assessment of computer literacy skills of professionals in Nigerian university libraries. *Library Technology News*, 2, 10-14.
- Association of College and Research Libraries. (2005). *ETS higher education iSkills assessment fit with ACRL standards*. Available at: http://www.ets.org/Media/Tests/ICT_Literacy/pdf/acrl_standards.pdf
- Babu, B. R.; Vinayagmoorthy, P.; & Gopalkrishnan, S. (2001). ICT skills among librarians in engineering educational institute in Tamil Nadu. *DESIDOC Bulletin of Information Technology*, 27(6), 55-64.
- Bakar, A. B. A. (2005). IT competencies in academic libraries: The Malaysian experience. *Library Review*, 54(4), 267-277.
- Batool, S. A.; & Ameen, K. (2010). Status of technological competencies: A case study of university librarians. *Library Philosophy and Practice*. Available at: <http://unllib.unl.edu/LPP/batool-ameen.pdf>

Bernbom, G. (1998). *The information professions and the information professionals*. Available at: <http://old.cni.org/regconfs/1997/ukoln-content/repor~11.html>

Bryant, J.; & Poustie, K. (2001). *Competencies needed by public library staff*. Gutersloh. Ger.: Bertelsmann Foundation.

California Library Association. (2005). *Technology core competencies for California library workers*. Available at: http://infopeople.org/sites/all/files/past/2006/managing/Handout-CLA_Core_Competencies.pdf

Educational Testing Service. (2007). *Digital transformation: A framework for ICT literacy: A report of the international ICT literacy panel*. Available at: http://www.ets.org/Media/Tests/Information_and_Communication_Technology_Literacy/ictreport.pdf

Fourie, I. (2004). Librarians and the claiming of new role: How can we try to make a difference? *ASLB Proceedings*, 56(1), 62-74.

Kavulya, J. M. (2007). Training of library and information science (LIS) professional in Kenya: A needs assessment. *Library Review*, 56(3), 208-223.

Mahmood, K. (2001). Competencies needed for future academic librarians in Pakistan. *Education for Information*, 20, 27-43.

Mahmood, K.; & Ajmal, M. (2007). ICT training for LIS professionals in Pakistan: A need assessment. *Program: Electronic Library and Information Systems*, 41(4), 418-427.

Markauskaite, L. (2006). Towards an integrated analytical framework of information and communication technology literacy: From intended to implemented and achieved dimensions. *Information Research*, 11(3). Available at: <http://www.informationr.net/ir/11-3/paper252.html>

Safahieh, H.; & Asemi, A. (2010). Computer literacy skills of librarians: A case study of Isfahan University libraries, Iran. *The Electronic Library*, 28(1), 89-99.

Somerville, M. M.; Smith, G. W.; & Macklin, A. S. (2008). The ETS Iskills™ assessment: A digital age tool. *The Electronic Library*, 26(2), 158-171.

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