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Summer 5-18-2020

Factors Affecting Digital Skills of University Librarians for Developing & Managing Digital Libraries: An Assessment in Pakistan

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Khan, Dr. Shakeel Ahmad and Bhatti, Professor Rubina, "Factors Affecting Digital Skills of University Librarians for Developing & Managing Digital Libraries: An Assessment in Pakistan" (2020). *Library Philosophy and Practice (e-journal)*. 4230.

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Factors Affecting Digital Skills of University Librarians for Developing & Managing Digital Libraries: An Assessment in Pakistan

Abstract

The purpose of this study was to assess the digital skills of librarians working in university libraries. This study measures their digital skills to create and manage the digital library and the factors affecting their digital skills. The study also provides practical solutions to overcome those factors. This study used a mixed-method research design that is based on qualitative and quantitative research. In the first phase, an in-depth review of related literature was conducted to identify the research problem and formulate research objectives. Data were collected using a questionnaire and analyzed through SPSS software. An interview guide was developed to collect qualitative data from 50 key experts. A thematic approach was used to analyze data. The current status of digital skills of librarians working in university libraries of Pakistan is not encouraging to develop and manage a digital library. Results showed that library schools in Pakistan are not offering practice-based training to their graduates to develop their digital skills. There is a dire need to offer practice-based training and short courses for librarians working in university libraries of Pakistan to improve their digital skills. Experts recommended in-house training programs and hiring master trainers to improve the digital skills of librarians. The results of this research are limited to librarians working in university libraries of Pakistan. This study has practical implications for librarians, library schools, library administration, and university libraries to develop digital skills of librarians and combat the factors/issues that are affecting their digital skills. This study has not only identified the key factors/issues that are affecting the digital skills of librarians but also provides practical solutions on how to overcome those factors.

Keywords – Digital Skills, Digital Library Creation, Management, Librarians, Universities, Expert’s Opinion, Practical Solutions, Pakistan

Introduction/Background

The use of information technology in libraries has brought a dramatic change in providing information services (Gottesman, 2002). The new technological environment in libraries demands digital skills from library staff to play an effective role in providing digital information to the library users. Library professionals must possess knowledge and skills to utilize e-resources and offer web-based library services. They must be skillful in developing and managing digital libraries and institutional repositories (Thanuskodi, 2011). They must acquire ICT skills and digital competencies to work in a digital library environment. They should provide access to e-journals, e-databases, and web-resources. Internet and online services must be provided to library users (Khademizadeh, 2012). Choi and Rasmussen (2006) envisaged that future librarians will be technologically expert and more skillful. Lin and Abels (2010) said:

“Digital library environment demands interdisciplinary skills from librarians. We have the opportunity to explore our vision and create online learning spaces etc”. (p. 22). Bawden et al. (2005) studied that digital library demands practical skills for developing digital libraries, metadata creation, digital interface designing, and skills to work in networked digital libraries. Trepanier (2012) defined digital skills as the capabilities to use digital tools including computer hardware, software, and apply appropriate security measures to protect digital information. It includes essential skills to locate, select, and retrieve digital information.

The review presents the need for skillful librarians to work in a digital library environment. Librarians must possess practical skills and sound knowledge of IT to develop and manage a digital library. So, the current study has been designed to assess the digital skills of librarians for developing and managing digital libraries in universities of Pakistan. Various studies have been conducted to measure digital skills of librarians, however, there is a lack of literature to assess their digital skills to develop and manage digital libraries. This research study specifically focuses on those digital skills which are essential to develop and manage a digital library.

Research Objectives:

The research objectives of the study are given below:

1. To measure the digital skills of librarians to develop and manage a digital library.
2. To identify the factors/issues affecting their digital skills.
3. To study the role of library schools in developing digital skills of librarians in Pakistan.
4. To explore practical solutions for librarians to develop their digital skills.

Review of Related Literature

Librarians' Need for Digital Skills to Work in Digital Library Environment

Digital librarian facilitates the users to access e-resources and find the desired information in a very short time. To meet the information challenges of the 21st century, librarian needs to acquire digital skills (Graham, 2003). Missingham (2006) described that the new information environment is dynamic with pod-casting, wikis, and the use of many other technologies to offer new services. Singh and Pinki (2009) emphasized that library professionals must develop core competencies and skills to manage change and address the information needs of users. He pointed out that a new information environment demands modern skills and LIS professionals must remain flexible and adaptable for this new environment. Hendrix (2010) emphasized that the librarian must embrace the technological opportunities of the 21st century and ensures his relevancy with the changing information landscape as his need will remain as a navigator in changing the information environment. Raju (2014) concluded that librarians having essential knowledge to use technology in libraries are highly demanded. Knowledge of digitization, metadata creation and management, preservation, and general computer skills are important for a librarian to work in an online information environment. Yaker (2007) explained that the successful librarian will remain relevant to the environment of rapid change. Gorny et al. (2010) alarmed to those librarians, who are not technically skilled, should perceive a digital library as a significant threat to their employment. Satpathy and Maharana (2011) mentioned that librarians are facing problems in acquiring digital skills due to a shortage of time and poor training opportunities. Thanuskodi (2011) measured ICT literacy among library professionals working in engineering institutions in Tamil Nadu. Participants described that they face problems in developing ICT skills due to their busy schedules of work and inadequate training opportunities.

Role of Library Schools in Developing Digital Skills of Librarian

The subject of the digital library in the LIS profession is receiving overwhelming attention at the national and international levels. The demand for digital libraries and digital librarian is increasing. In this regard, library schools should have to offer technology-based courses to develop digital skills among their graduates. They should offer a comprehensive subject on digital skills by giving practice-based assignments to their students. Digital library curriculum must include comprehensive courses on digital library design, preservation, information retrieval theory, database development, network technology, metadata, developing

digital archives and digital conversion technology, e-publishing, and copyright management (Baro, 2010). Digital library education would be useful in developing a conceptual understanding of what a digital library is and how does it work. LIS students should be familiarized with digital library resources and their usage. They should be educated and trained to provide technical services, understanding digital architecture and concepts and knowledge of databases. Their technological proficiency to participate in different digital library activities should be developed (Allard, 2002).

So, library schools have an important role in providing digital library education to meet the current demand for digital librarianship. They must offer practice-based digital library education to their graduates.

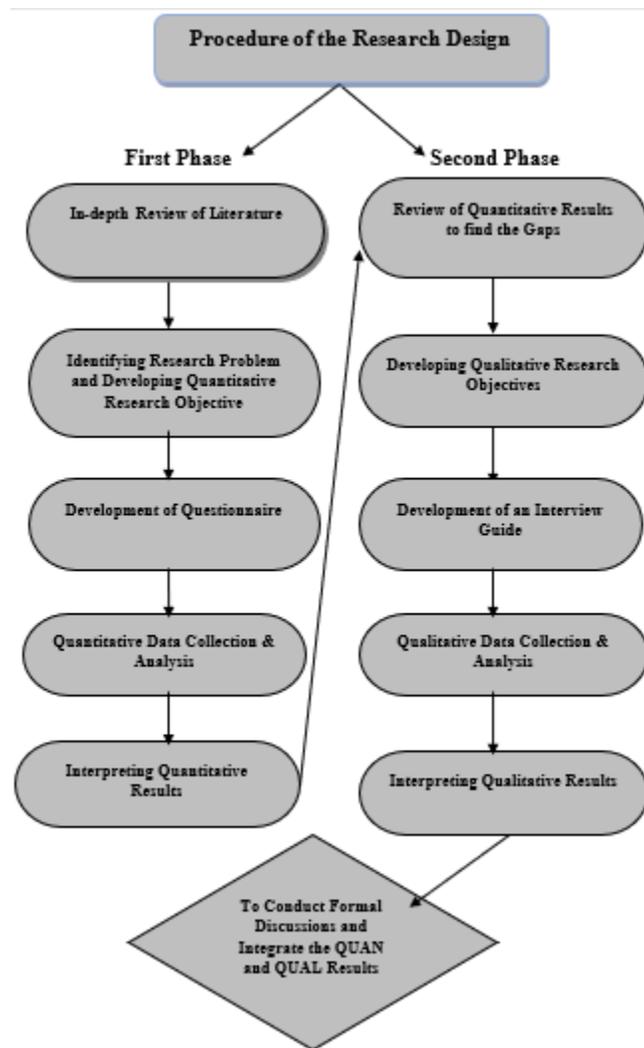
Need of Digital Librarian in University Libraries of Pakistan

In Pakistan, the use of digital resources of information has been increased by the information users as they are greatly utilizing Higher Education Commission (HEC) National Digital Library, Digital Research Repository, and various other digital information resources to acquire the required information. University libraries have started different projects to digitize their publications, theses, manuscript, and rare documents. They are also acquiring access to online scholarly databases and journals for their users. HEC is also offering access to digital databases, e-journals, and e-books to higher education institutions in Pakistan. Shafique (2007) envisaged that the future of librarianship in Pakistan is digital. She indicated that the new competitors in the market will be digital librarians, technology experts, and database developers. Ahsan (2009) in his study found that in Pakistan, libraries are aware of the benefits of electronic information and have started digitization of their rare material. Rafiq and Ameen (2012) in their study reported that demand for digitized documents has been increased in higher education institutions of Pakistan. They recommended that libraries of higher education institutions should focus on acquiring information resources in digital format and start digitization projects. Rafiq and Ameen (2013) reported that university libraries in Pakistan are digitizing their material with the major goal to offer web-based access to their resources. They concluded that in the coming years' digitization in university libraries shall become more popular and more universities will start digitization projects.

Research methodology

This study used a mixed-method research design that is based on quantitative and qualitative research. Keeping in view the specific nature of its research objectives which were quantitative and qualitative, this study was conducted in two research phases. In the first phase, an in-depth review of related literature was conducted to identify the research problem and formulate research objectives. Quantitative data was collected by distributing questionnaires among 297 librarians working in universities in 54 Higher Education Commission (HEC) recognized universities of Pakistan. The collected data was analyzed by SPSS software. In the second phase, an interview guide (Appendix E) was developed and used to collect qualitative data by conducting interviews with a panel of 50 key experts. The qualitative data were analyzed using a thematic approach. Apart from interviews with experts, informal discussions with librarians and academicians were also conducted to find out the hidden issues that were inherent to the research problem. The given Figure 1 shows the mixed-method research process that was followed.

Figure: 1



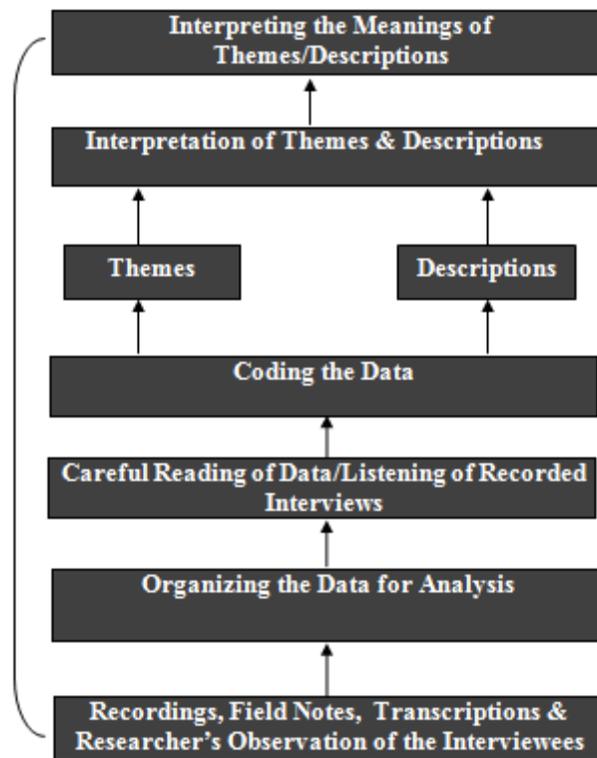
In the quantitative phase, a survey research strategy was adopted to collect data by using questionnaire as a research instrument. A draft questionnaire (Appendix A) was prepared after conducting a comprehensive review of related literature. It was peer-reviewed by the relevant subject experts to get their valuable feedback and remove the shortcomings. It was pre-tested on a small group of 30 respondents. The population of the study was librarians working in 54 selected universities in four provinces of Pakistan. The sampling procedure was adopted to identify the population of the study. A list of Higher Education Commission (HEC) recognized universities (Appendix B) was prepared with the help of HEC website. Then, simple random sampling was done to get a 50% sample of the universities from each province. According to this ratio, a total 54 HEC recognized universities were identified for the survey. Hence, the list of sampled universities (Appendix C) was prepared, and based on this list; the sample frame (Appendix D) was made which was consisting of a total of 297 respondents working in 54 universities in four provinces of Pakistan. To determine a valid sample size from the total population, a table given by Powell and Connaway (2004, p. 107) was used. According to this table, the required valid sample size was (S= 169) at the degree of accuracy (0.05). Questionnaires were sent to 297 respondents. Out of 297 questionnaires, 212 valid

questionnaires were received with a response rate of 71 %. Hence, the achieved sample size in this study was (S= 212). The acquired data were analyzed by using SPSS software.

In the qualitative phase, semi-structured in-depth interviews were conducted with a panel of 50 key experts to explore practical solutions for librarians working in universities to develop their digital skills. Expert sampling was applied to select a panel of 50 experts that include senior librarians and academicians having adequate digital skills and practices involved in digital library development and management projects. Their opinion was obtained about possible practical solutions for librarians working in universities in Pakistan to overcome the identified factors and develop their digital skills.

Thematic analysis of interview data was conducted to capture a comprehensive picture of the phenomenon under investigation. The given diagram shows the process of qualitative data analysis.

Figure: 2



Quantitative Data Analysis

Type of Participant Universities

Results showed that 54 Higher Education Commission (HEC) recognized public and private sector universities from four provinces of Pakistan participated in the study. Table-I shows that there were 30 public sectors and 24 private sector universities. The given table also shows that more than 50% of universities participated in the survey.

Table I

Type of Participant Universities		
University Type	Frequency	Percent
Public sector	30	55.6

Private sector	24	44.4
Total	54	100.0

Gender of the Respondents

Results regarding the gender of respondents identified that of the 212 respondents, 175 (82.5%) were ‘male’ and 37 (17.5%) were ‘female’. (See Table II)

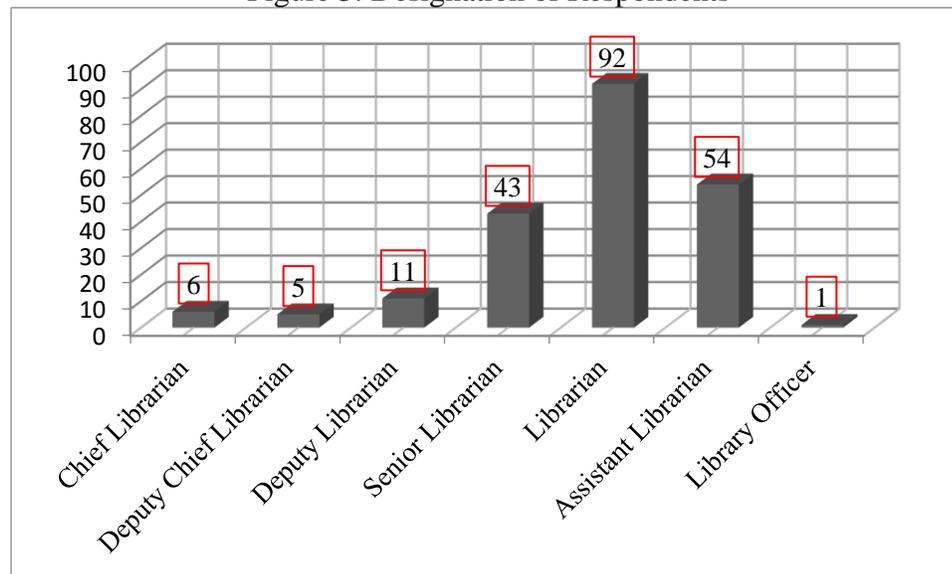
Table II
Gender of the Respondents

Qualification	Frequency	Percent
Male	175	82.5
Female	37	17.5
Total	212	100.0

Designation of Respondents

Respondents of the study were librarians working in selected universities and having professional status. The analysis shows that of the 212 respondents, a vast majority was ‘librarian’ (n= 92). The second category of high response was from ‘assistant librarian’ (n= 54) and ‘senior librarian’ (n= 43). The frequency distribution of other categories of respondents has been given in Figure 3. Thus, the analysis shows that majority of the participants were the librarian, assistant librarian, and senior librarian. (See Figure 3)

Figure 3: Designation of Respondents



Professional Experience of Respondents

The analysis of data regarding professional experience indicates that the majority of respondents (n= 105) had 6-10 years of professional experience. It shows that the highest response was from the respondents having 6-10 years of professional experience. The second highest response lies among the respondents having 0-5 years of professional experience (n= 52). The given table III presents the frequency distribution of other categories of professional experiences.

Table III
Professional Experience of Respondents

Professional Experience	Frequency	Percent
0-5 Years	52	24.5
6-10 Years	105	49.5
11-12 Years	35	16.5
13-15 Years	12	5.7
16-20 Years	02	.9
21-25 Years	06	2.8
Total	212	100.0

Qualification of Respondents

Results about the academic qualification of respondents show that majority of respondents had a master degree in Library and Information Science (n= 171). Forty one respondents had M. Phil degree. (See Table IV)

Table IV
Qualification of Respondents

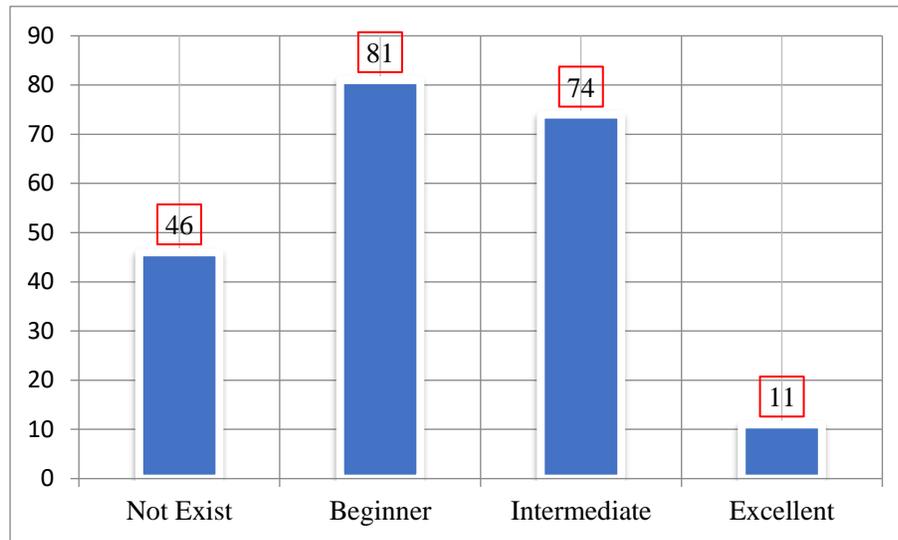
Qualification	Frequency	Percent
MLIS	171	80.6
M. Phil	41	19.3
Total	212	100.0

Level of Digital Librarians universities in Pakistan

Skills of working in

Respondents were asked to rate their current status of digital skills to work in a digital library environment. Majority of respondents rated their digital skills as ‘beginner’ (n= 81) and ‘intermediate’ (n= 74). Very few respondents (n= 11) rated themselves as ‘excellent’. Forty-six librarians rated their digital skills as ‘not exist’. The analysis of results highlighted that majority of participants rated their digital skills as ‘intermediate’ (n= 74). However, those who rated themselves as ‘beginner’ and ‘not exist’ need the training to develop their digital skills. (See Figure 4)

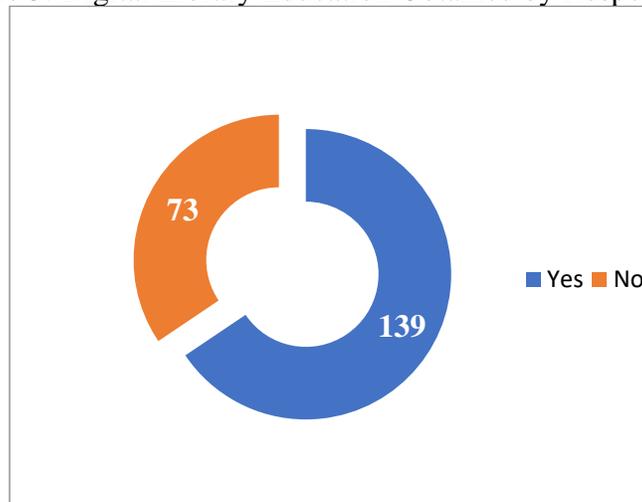
Figure 4: Level of Digital Skills of Librarians working in Universities in Pakistan



Digital Library Education Obtained by Respondents

To estimate the educational knowledge of librarians working in universities, they were inquired about the status of their digital library education. According to results, a good number of respondents (n= 139) mentioned that they have obtained digital library education to work efficiently in a digital library system. However, some seventy-three respondents mentioned that they did not acquire any digital library education. It shows the need to arrange training for these respondents. (See Figure 5)

Figure 5: Digital Library Education Obtained by Respondents



Type of Digital Library Education Obtained by the Respondents

Respondents who mentioned that they have acquired digital library education were further asked to mention the type of digital library education they obtained. A vast majority of respondents (n= 154) mentioned that they attended workshops and training programs to get knowledge of the digital library. The second big segment was of those respondents who studied the digital library as a course during their LIS education (n= 78). Some sixty-eight respondents described that they learned about the digital library through self-training. Others mentioned that

they got digital skills from skilled professionals (n= 65). The given table presents that only a few respondents (n= 19) got digital library education via training programs conducted by library associations. This highlights that library associations in Pakistan should play their active role in organizing training/workshops and symposiums to enhance the digital skills of librarians. It is also obvious from the results that librarians working in universities are willing to participate in training programs and workshops to get digital skills. (See Table V)

Table V

Type of Digital Library Education Obtained by the Respondents

Type of Digital Library Education	Frequency	Percent
Through formal LIS education	78	36.8
Trainings/workshops	154	72.6
Through skilled professionals	65	30.7
Through library associations	19	9.0
Self-training	68	32.1

Results of Chi-square Test to Measure Relationship between Digital Library Education of Respondents and their level of Digital Skills

The relationship between the ‘digital library education’ of respondents and the level of their digital skills was measured by applying a Chi-square test. Results showed that a significant relationship exists between digital library education of respondents and their level of digital skills (Chi-square value $\chi^2= 53. 201$, Sig. = .000). This result shows that digital library education is essential for developing digital skills of librarians. Hence, it is an important factor. (See Table VI)

Table VI

Results of the Chi-square Test to Measure the Relationship between Digital Library Education of Respondents and their Digital Skills

Statement	Chi-square value	df	Sig.
Relationship between ‘Digital Library Education’ of respondents and their ‘Digital skills’	53. 201	03	.000*

Note: *Significant difference (at the 0.05 alpha level)

The given diagram shows the direction of the relationship between digital library education and the digital skills of respondents. It shows that there is a positive relationship between both. The increase in digital library education and knowledge of digital tools will improve the digital skills of a librarian. (Figure 6)

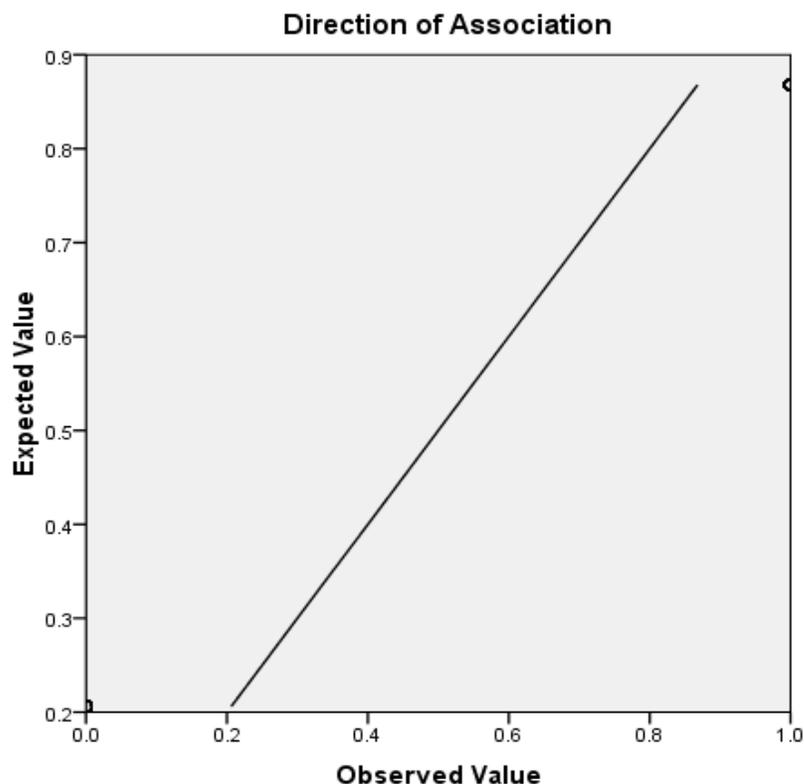


Figure 6

Results of the Chi-square Test to Determine the Relationship between Professional Experience of Respondents and their level of Digital Skills

A Chi-square test has been applied to analyze the impact of the professional experience of the respondents in developing their digital skills. The result showed that no significant relationship exists between the ‘professional experience’ of respondents and the level of their digital skills (Chi-square value $\chi^2 = 15.130$, Sig. = .442). This result is interesting in a sense that only based on ‘professional experience’ it cannot be expected that a professional also possesses a good level of digital skills. Respondents of the study despite having good professional experience were not good in their digital skills. (Table VII)

Table VII

Results of Chi-square Test to Measure Relationship between Professional Experience of Respondents and their Digital Skills

Statement	Chi-square value	df	Sig.
Relationship between ‘Professional experience of the respondents and their digital skills’	15.130	15	.442 ^{NS}

Note: *Significant difference (at the 0.05 alpha level), NS (Not significant)

Role of Library Schools in Developing Digital Skills among their Graduates

Respondents were asked to provide their opinion about the role of their LIS education provided by library schools in developing their digital skills. They 'agreed' that library schools in Pakistan are developing knowledge about computer hardware and software (mean= 3.54). The respondents' opinion about the remaining skills mentioned in the given table does not show impressive results. These skills are also important for a librarian to work in a digital library environment. Library schools in Pakistan should do the needful to develop these skills among their graduates by providing practice-based training to use digital library software and library automation software. (Table VIII). A research study conducted by Baro (2010) also supports this result.

Table VIII
Descriptive Statistics of Respondents' Opinion
about Role of LIS Education in Developing their Digital Skills

Role of LIS Education	Mean	St. Deviation
Skills and knowledge of computer hardware and software	3.54	.993
Skills to create network among computers	2.63	.900
Skills to utilize library automation software	3.27	1.097
Skills to use digital library software	3.00	1.085
Skills regarding digitization process	2.88	2.59
Skills to develop database management systems	2.59	1.012
Skills to utilize different storage devices	2.88	1.055
Skills to develop library website	2.61	1.071
Online information searching skills	3.01	1.168

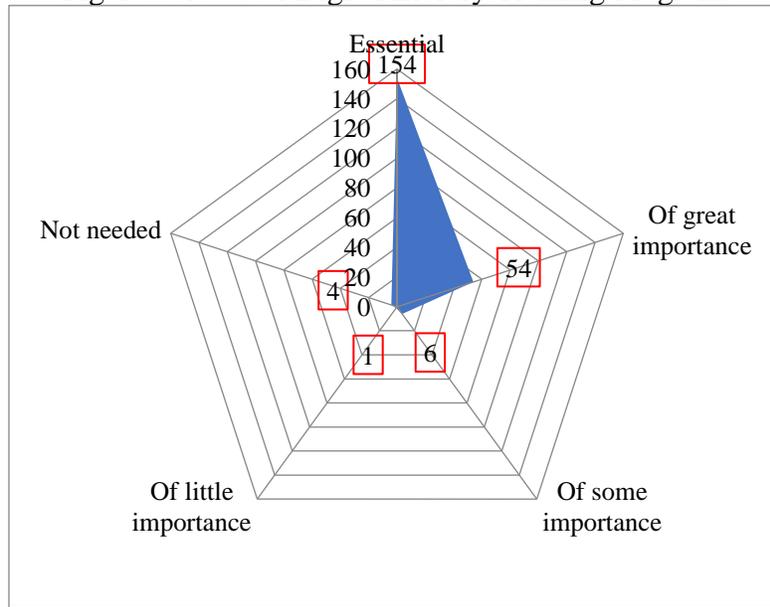
Note: Strongly agree = 5, Agree = 4, Neutral= 3, Disagree= 2, Strongly disagree= 1

Need of Digital Library Training Programs for Librarians working in universities

The need for digital library training to develop digital skills was inquired from respondents. A big segment of the participants (n= 154) mentioned that it is 'essential' to offer digital library training programs so that they get digital skills and may start digital library development projects in their libraries and prepare themselves for future challenges.

This result invites different training groups, library associations, and library schools to offer adequate training opportunities regularly. (Figure 7)

Figure 7: Need of Digital Library Training Programs



Based on quantitative results, it can be observed that digital skills of librarians working in universities are influenced by their digital library education, the role of library schools in developing digital skills among their graduates, and the availability of digital library training programs.

Figure 8 presents detailed descriptions of key factors that are affecting the digital skills of librarians working in universities.

Digital Skills of Librarians Working in Universities to Create Digital Library

Respondents were asked to evaluate their digital skills for creating a digital library. Results showed that they rated their digital skills in various categories of skill-sets for creating a digital library as ‘neutral’. It shows that they possess a very basic level of digital skills for creating a digital library. Table IX presents a detailed description of the digital skills of respondents.

Table IX
Respondents’ Self-evaluation of their Digital Skills to Create Digital Libraries

Digital Skills for Developing Digital Library	Mean	St. Deviation
Skills to select appropriate scanner and standards to digitize print document and develop digital contents	3.36	1.029
Skills to use OCR software to convert image into PDF format	3.09	1.066
Skills to use digital library software for creating digital library	3.33	1.071
Skills to assign metadata and related standards to develop searchable digital contents	2.88	1.035
Skills to select appropriate indexing level in digital library software for developing digital contents	2.18	1.033
Skills to use different storage devices to preserve digital	3.68	.985

contents (DVDs, CD-ROM, Hard-disk, library server etc.)		
Skills to tackle intellectual property rights/copy right of digital material and licensing issues	2.82	.996
Skills to design user-friendly interface of digital library according to your own searching preferences	2.71	1.015

Note: Very good = 5, Somewhat good = 4, Neutral= 3, Not good= 2, Not good at all= 1

Digital Skills of Librarians Working in Universities to Manage Digital Libraries

Digital skills of librarians working in universities to manage digital libraries were also measured. According to results, respondents rated their digital skills to manage the digital library as ‘neutral’ in all categories of skill-sets given in the table. Almost similar results were observed regarding their digital skills for ‘creating digital library’. However, they did not rate their skills as ‘not good’ or ‘not good at all’. It implies that they may possess a certain level of digital skills in both areas. Table X presents a detailed description of digital skills for managing a digital library.

Table X

Respondents’ Self-evaluation of their Digital Skills to Manage Digital Library

Skills for Managing Digital Library	Mean	St. Deviation
Ability to manage over all digital library services and infrastructure	3.21	.996
Ability to plan cost for managing digital library	3.30	.915
Ability to define criteria for selecting new digital contents	3.19	.931
Ability to define policies and standards for digitizing print material	3.04	1.021
Ability to define strategies to ensure the quality of digital contents	3.01	.990
Ability to cope all type of technical issues for managing digital infrastructure	2.58	1.021
Ability to design system for obtaining digital library usage statistics and feedback from the users	2.62	1.020
Ability to conduct digital library evaluation	2.89	1.045
Ability to plan long term funding to sustain digital library	3.13	.949

Note: Very good = 5, Somewhat good = 4, Neutral= 3, Not good= 2, Not good at all= 1

Qualitative Data Analysis

Practical Solutions Recommended by Experts

Experts recommended practical solutions to overcome the factors/issues affecting the digital skills of respondents. They identified that in-house training programs are highly important to acquire digital skills (n= 27). They pointed out that the role of library schools and library associations is highly important to offer short-courses and training programs for librarians (n= 32). Experts emphasized that the Higher Education Commission (HEC) digital library team should come forward and train librarians by sharing their practical experiences and expertise in developing and managing HEC digital repository (n= 28). They also suggested developing ‘master trainers’ in each university library for practical training of librarians (n= 21). The

majority of experts mentioned that librarians should be self-interested and self-motivated in acquiring digital skills (n= 45). Table XI

Table XI
Practical Solutions to Overcome the Identified
Issues/Factors (N= 50)

Opinion from Experts	Frequency
In-house training programs are useful to develop digital skills among librarians working in universities	27
Library schools and library associations should offer short courses to enhance digital skills of librarians	32
HEC digital library team should offer practice-based training programs for developing digital library	28
Master trainers should be developed and they should train others	21
Librarians should themselves take interest in acquiring digital skills on the basis of self-motivation	45

Discussion of Findings

The interview respondents/experts recommended practical solutions for a librarian to develop digital skills. Analysis of interview data presented that in-house training programs are highly useful for a librarian to get on-job training.

Interview respondents pointed out that ‘training via library schools and library associations’ are also suitable to enhance the digital skills of the librarian. They pointed out that library schools should offer short courses for working librarians to develop their digital skills. They suggested that library associations should play their active role in this regard and offer regular training opportunities.

One expert explained that:

“Instead of providing morning and evening programs in library schools, there should be short courses and evening classes for working librarians to develop their digital skills. Summer courses should be offered for their skills development. There is also a need for skilled faculty in library schools to offer comprehensive digital library education.”

Experts indicated that the Higher Education Commission (HEC) has a very crucial role to provide training for librarians to develop their digital skills. They described that HEC digital library team should offer practical training for librarians working in universities. They should share their practical experience of developing the “Pakistan Research Repository” with librarians working in universities. They should provide training and orientation programs to train librarians in using digital library software, applying OCR, assigning metadata, and developing digital content. The quote of one expert is as follow:

HEC should develop a unit of all university libraries and provide a central point for the training of librarians working in universities. Training groups such as PASTIC and Science Foundation should work for developing digital skills among librarians. Master trainers in each university library should be appointed for training purposes.

Informal discussions with working librarians and academicians were also carried out throughout the study to explore the real factors and related issues to better understand the situation and produce more comprehensive results. These discussions significantly contributed to produce coherent results and identify the hidden issues which were inherent to the research problem.

Librarians working in different libraries indicated that they are not provided practical training during their course of study in library schools. They pointed out that their library science education has developed only theoretical knowledge of the digital library and they need practice-based training to develop digital skills. They also highlighted that they do not get encouragement from their library administration to participate in training workshops and conferences. They described that there are meager opportunities for training and workshops on developing and managing digital libraries. They also highlighted that they do not possess adequate IT equipment in their libraries to start the digitization of library resources.

On the other hand, academicians pointed out that library schools are also facing certain problems in providing digital library education. They do not have computer labs, adequate IT infrastructure, and experienced faculty members having adequate practical skills to create and manage the digital library. Due to this, most of the library schools are not offering comprehensive digital library education.

Findings from the results show that all stakeholders including library schools, library associations, concerned libraries for practicum training, and librarians themselves should equally perform their responsibilities to bring positive change. Library schools should be provided necessary IT infrastructure and experienced faculty having IT background to incorporate necessary contents in the curriculum and offer project-based training to train the librarians. This result is in line with the findings of Baro (2010), Bawden et al. (2005).

Based on quantitative/qualitative results and informal discussions with librarians and academicians, the given figure 8 highlights the key factors that are affecting digital skills of librarians working in university libraries of Pakistan.

Factors Affecting Digital Skills of University Librarians

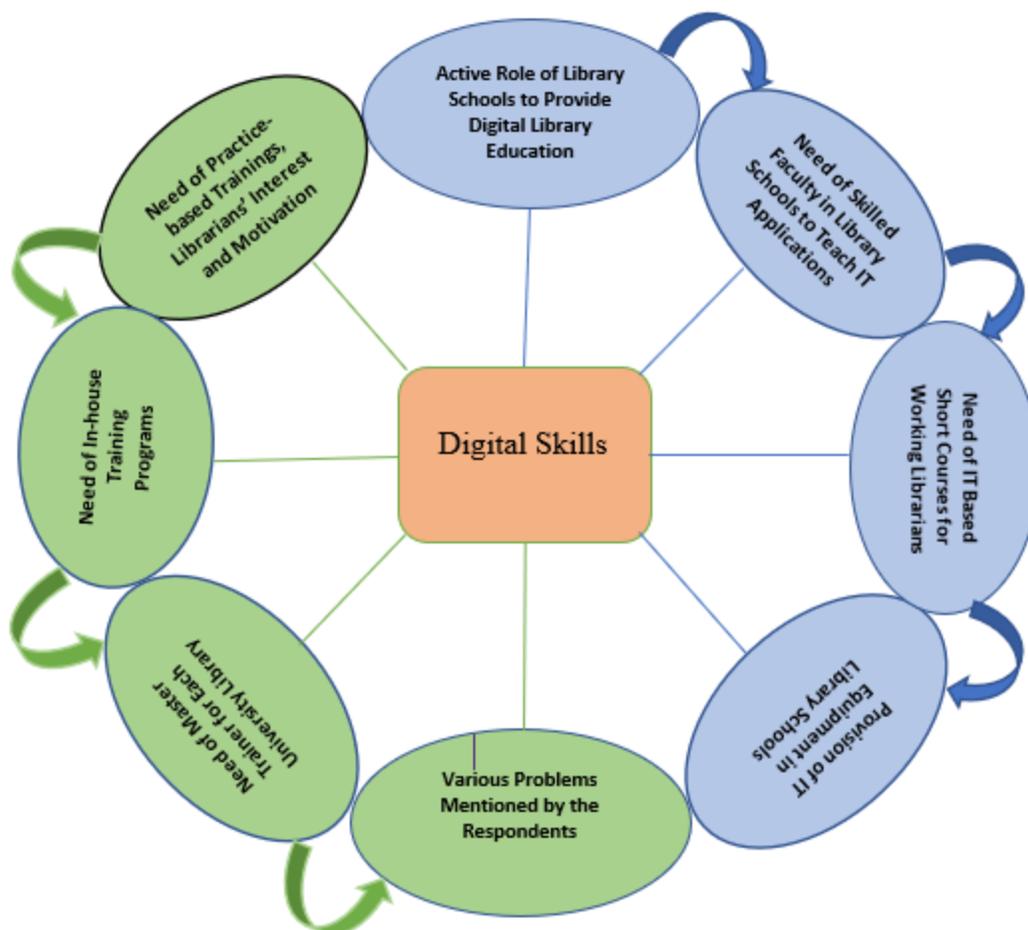


Figure 8

Conclusion

The current status of digital skills of librarians working in university libraries of Pakistan shows that most of them possess a basic level of digital skills to create and manage the digital library. Inadequate IT infrastructure in library schools, lack of faculty having IT skills, inadequate training programs, lack of self-interest, and self-motivation among librarians are the key factors in this regard.

It is recommended that following practical solutions may be observed to develop digital skills of librarians working in university libraries of Pakistan:

- Practice-based training and short courses should be offered
- Seek guidance from the Higher Education Commission(HEC) digital library team to conduct training programs for librarians
- The hiring of master trainers for each university library to train library professionals
- Offering in-house training programs for librarians
- Encourage librarians to attend training and acquire digital skills based on self-motivation and self-interest

Practical Implications

This study has practical implications for librarians, library schools, library associations, and library administrators to take necessary measures. The study can help library schools and librarians designing training programs to know the necessary areas to include in the curriculum.

Suggestions for Future Studies

This study opens up avenues for future research to measure/develop digital skills of librarians in creating Semantic digital libraries, use of ontology-based programs to structure digital contents in a meaningful way, use of reboot technologies and artificial intelligence in libraries, use of different digital library software to create digital libraries and open access repositories, etc.

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