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Digital Resources Integration & Data Literacy Perspectives Among LIS Professionals of University Libraries in Pakistan

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ABSTRACT

Purpose: The aim and crux of the study are to determine prospects of digital resources integration (DRI) and data literacy among Library & Information Science (LIS) professionals of university libraries of the province of the Punjab and Islamabad Capital Territory (ICT).

Methodology: An extensive survey research method was used to prospects about digital resources integrations (DRI) among university libraries' LIS professionals. This study comprised the LIS professionals working in university libraries of the province of the Punjab and Islamabad, Pakistan. A detailed questionnaire was used to collect the data for this significant study.

Findings: The findings highlight that LIS professionals understand data analytics tools, methods,s and frameworks about digital resources integrations (DRI). And whether LIS professionals in university libraries of the Punjab and ICT are able or unable to recognize the use of data misrepresenting or misleadingly and practice of DRI. This study emphasizes the lack of data literacy, digital resources integrations (DRI) proficiency, and university libraries' digital divide.

Practical and research implications: The study provides the scope of digital resources integration (DRI) proficiency and DRI skills among LIS professionals working in university libraries. The study enhances into consideration about the capability of university LIS professionals to practice the digital resources integrations (DRI) in their libraries.

Originality Value: This work is derived from my Ph.D research dissertation to study of prospects of digital resources integration and which will help fill the gap of literature in Pakistan's context.

Keywords- Digital Resources Integration, DRI proficiency, Data Literacy, Digital Divide

Introduction

Data literacy is “the ability to read, create and communicate data as information.” The ever increased role of a librarian in offering data literacy services, including discussion regarding the skills needed by researchers and students for data literacy and development of necessary instructional content, formats and methods — continues to increase. The important part about data literacy services is that it allows librarians to expand their reach and role in the university's research enterprise (Corrall, 2012).

In developed countries like the U.K., the U.S. and Canada the research funders are increasingly mandating open access to research data, which is effectively changing researchers’ responsibilities towards managing their data. Researchers are being required to enhance and improve their research data management practices and skills. By giving research data literacy services and other instructional programs, librarians can coordinate with their students in new ways (Tenopir, Sandusky, Allard, and Birch, 2014).

Research on data literacy suggests the importance of information literacy skills for all students. The skills are much more important for researchers and part-time learners, specifically those unfamiliar with the information systems. The crucial role of libraries and librarians in overcoming the digital divide is researched widely documented. Libraries have a big part in minimizing the shortcomings of digital divide. (Kranich, 2001) demonstrates in her research that librarians have a unique role to play in ensuring an equal playing field and minimizing the widening gap between the information have-nots and haves. She further states that libraries are very essential to the advancement of research and development, to the economic wellbeing of their communities, to handling the information overload and to minimize the digital divide.

The prominent role of the library in student learning are described by (Ojedokun, 2007), (Anunobi, 2013), (Naidoo and Raju, 2011). Cullen (2001) opines a different perspective that the internet is not an education, nor does it teach literacy. Further, he describes that accessing the internet

requires highly developed skills, and further high skilled is required to interpret the information found (Cullen, 2001: 312). He believes that the internet must access the more valuable information sources, journals, research, databases, and indexes without any cost, but this is not the case. The data is not freely available on the internet worldwide, leaving researchers, especially in developing countries, excluded and inaccessible from the valuable knowledge that may be very important in their subject areas (Cullen, 2001).

This is where the librarians' role comes in. They are the key to the practical and successful use of ICT, research and developments through their experience and learning of information literacy skills. On the matter of academic institutions playing prominent roles, (Anunobi, 2013) emphasizes that university libraries have a significant role in university education through the dissemination and processing of information. (Kranich, 2001) libraries offer access to networks and computers and the knowledge, content, expertise, and training valuable to ensure an equal playing field and widespread participation in the information society.

The libraries have undergone sizeable changes due to social and scientific development and due to the spread of information technology and systems. The need for information had altered over the period due to rapid growth in the knowledge-based economy. In the current era where data sources are spread and the contents get incorporated, users required timely, accurate and speedy access to require knowledge (Corrall, 2012).

Traditional libraries' literature reported extreme challenges in the primary function of library services. The libraries got significantly affected due to consistent change in environment and in reaction, the digital libraries came into being to adapt to this change. Digital Library is developed on the foundation of data technology, the know-how on using digital technology and computer system to access, store and distribute information (Koltay, 2017)

The dearth of traditional libraries is replaced with the digital libraries through the digitization of data resources, sharing of information resources, records transmission by a computer network,

distribution of records management and standardization of the business enterprise of information (Delaney and Bates, 2015).

Although digital libraries, electronic journals and library databases enhance the quantity of information to an enormous level. However, the assembly of data and system platforms of these digital sources vary due to its development by different agencies using various database systems that assist the development of lonely digital resources (Mischo, *et., al* 2006)

In short, the user will experience an entirely different search interface and retrieval methods. Such issues got worst with growth in resources and an increase in user demand for simple retrieval (Twidale and Nichols,1998). Considering this, the library community has proposed investigating the incorporation of digital catalogs.

Integration of Digital Resources of University Library

The proportion of digital resources in library resource collection is on the rise in this digital world age. Digital sources are categorized by convenient distribution and ease of recovery. However, the impact of the digital resource usage is found unsatisfactory due to the development of broad types of digital resources, overlapping of contents, variations between database utility systems, know-how with a weak relationship, range of records codecs and storage means, and the variances induced by way of recovery language and approaches (Mischo, *et., al* 2006).

The primary reasons for the ineffectiveness of digital resource are that when the handler is using diverse kind of network and database resources, they need to enter the same information in different system and database following the similar steps that result in a waste of time, reduce of service efficiency and over-consumption of gear resources. Considering this, developing a unified search platform through the integration of various digital resources has become a pressing issue in the assembly of digital libraries at university and colleges level (Borlund, 2003).

Presently the digital sources have become the most preferred sources of users. The University library plays a substantial role in meeting the needs of academia and students. Thus, using libraries can serve the student and teacher in the best manner and at minimum cost (Aslam, 2018).

Digital Divide

Minimizing the digital divide is directly dependent on developing data literacy instruction. While the discussion in the literature about the methods to build data services to reduce the digital divide in academic libraries is increasing, (Coates) states specific measurements and strategies for building relationships with researchers, demonstrating the effect of a librarian on the research team and recommendations for acceptable research practices.

It is high time to hand over defining and providing data information literacy services and programs to librarians. Helping students, researchers and other librarians in data literacy to minimize the digital divide is one emerging area where librarians can play a significant role. Librarians are in the most suitable position to expand their roles as providers of data information literacy further to develop a new data management curriculum (Carlson, *et., al* 2011).

Research Methodology

The purpose of this study is to identify the prospects of digital resource integration in university libraries of Punjab province and Islamabad (federal capital of Pakistan).”The literature review reveals that there is a lack in this area of research, specifically in the context of Punjab, Pakistan. It is, therefore, very essential to study the perceptions of library & information science professionals towards the development of digital resource integration and which will help to fill the gap of literature in the context of Pakistan in general and specifically in Punjab and (federal capital of Pakistan).”

The survey method is the most suitable technique and can be administered to the participants in various ways. The survey method is economical and ideal for collecting information from the population (Zikmund, 2000).

Through an extensive survey, detailed quantitative research was conducted to measure the perceived data literacy and digital resources integrations (DRI) proficiency among university libraries' LIS professionals. The study population comprised the LIS professionals working in university libraries of the province of the Punjab and Islamabad, Pakistan. A nine-part questionnaire was used to collect the data for this significant study. The questionnaire was pre-tested by university librarians from in the Punjab and ICT having experience more than ten years and pilot tested on a sample of twenty respondents. The recommended changes were amended in the questionnaire. The questionnaire was distributed to all LIS professionals working in participating universities through emails, What's App Groups, Twitter, Facebook and by hand. An online version of the questionnaire was also developed and distributed among participants. Two hundred and thirty-five respondents participated in the study and filled the questionnaire, of which 227 valid responses were selected for data analyses. The collected data analyzed using the statistical package for social sciences (SPSS) and presented using descriptive and inferential statistics.

Summary of Hypothesis

No.	***Hypothesis***	***Result***
1.	Perceived capability is positively associated with perceived ease fullness.	***Accepted***
2.	Perceived ease fullness is positively associated with perceived use fullness.	***Accepted***
3.	Perceived capabilities is positive relationship with attitude towards using.	***Accepted***
4.	Perceived ease fullness is positive relationship with attitude towards using.	***Accepted***
5.	Perceived capabilities is positively related with attitude towards using.	***Accepted***
6.	Perceived ease fullness is positively related with behavioral intention to use.	***Accepted***
7.	Attitude towards using is related to behavioral intention to use.	***Accepted***
8.	Behavioral towards to use is related to asked for system used.	***Rejected***
9.	Behavioral intentions to use mediates the relationship between perceived use fullness and actual system.	***Accepted***

10.	Attitude towards using mediate the relationship between perceived use fullness and behavioral intentions to use.	***Accepted***
11.	Attitude towards using mediates the relationship between perceived ease fullness and behavioral intentions to use.	***Accepted***
12.	Attitude towards using mediates the relationship between perceived capability and behavioral intentions to use.	***Rejected***
13.	Attitude towards using and behavioral intentions to use mediates the relationship between perceived use fullness and actual system use.	***Accepted***
14.	Attitude towards using and behavioral intentions mediate the relationship between perceived ease fullness and actual system use.	***Rejected***
15.	Attitude towards using and behavioral intentions mediate the relationship between perceived capability and actual system use.	***Accepted***

Results and discussion

Respondents were asked through 12 statements relating to their perceived data literacy skills. The mean value of all the 12 statements was between 3.65 to 4.30, indicating that they perceived their data literacy skills as useful. The majority of the respondents were often able to handle and analyze data (M= 4.30, SD= .752), to access data sources appropriate to the information needed (M= 4.26, SD= .916), to determine when data are required (M= 4.16, SD= .909), to define and use suitable research methods (M= 4.07, SD= .869), to plan, organize and self-assess throughout the process (M= 4.06, SD= .933), able to use data ethically, able to recognize source data value, types and formats (M= 4.02, SD= 1.118), able to apply results to learning, decision-making or problem-solving (M= 3.98, SD= .901), able to identify the context in which data are produced and reused (M= 3.69, SD= .972). They presented quantitative information (specific data, tables, graphs, reports) (M= 3.65, SD= 1.208).

The majority of the respondents reported that their institution/university/library supports them in data curation practices. The respondents answered that their university often helps them diagnose and resolve problems to ensure continuous accessibility of digital objects (M= 3.88, SD= 1.110), select digital documents for long-term presentation (M= 3.87, SD= .1.187), organize and manage the use of metadata standards, access controls and authentication procedures (M= 3.87, SD= .930), establish and maintain a collaborative relationship with various stakeholders (M= 3.69, SD= 1.155), plan, implement and monitor digital curation projects and services (M= 3.59, SD= 1.096), watch the obsolescence of file formats, hardware and software and the development of new ones, (M= 3.56, SD=

1.108), elaborate digital curation policies, procedures and practices, (M= 3.51, SD= 1.245), and

		1	2	3	4	5	6	7	8	9	10	11	12
1.	Gender	1											
2.	Age	.071	1										
3.	City	.071	.126	1									
4.	Designation	.027	-.203**	-.014	1								
5.	Experience	.035	.432**	.036	-.391**	1							
6.	University	.053	-.126	-.018	.070	-.082	1						
7.	PC	.047	.049	-.394**	.089	-.092	-.011	1					
8.	PEF	.058	.031	-.415**	-.008	.006	-.023	.253**	1				
9.	PUF	-.103	.003	-.175**	.068	.051	.025	.226**	.468**	1			
10.	ATU	.092	.036	-.353**	.021	.013	-.045	.274**	.699**	.390**	1		
11.	BITU	-.094	-.031	-.324**	.065	-.030	.024	.470**	.198**	.214**	.238**	1	
12.	ASU	.028	-.058	-.412**	-.006	.026	.051	.052	.295**	.091	.242**	.115	1

identify methods and tools that enable interoperability of different applications and preservation technologies (M= 3.48, SD= 1.147).

Correlation analysis

PUF - Perceived use fullness, PEF - Perceived ease fullness, PC- Perceived capability, ATU - Attitude toward using, BITU - Behavioral intension to use, ASU - Actual system use

The above table shows correlation analysis with hypothesized directions as well. The Correlation Analysis depicts the direction of relation (either positive or negative) among variables.

Similarly, gender has a positively dimensional with designation and experience (.178**,-.178**). The designation has been negatively associated with expertise (-.391**). Likewise, the Perceived capability has a positively associated dimension with PE, PUF, ATU, BITU (.0253**, .226**, .274**, 470**). In the same vein, PEF has the positively associated dimensional path with PUF, ATU, BITU, ASU (.468*, .699**, .198**, .295**). PUF has a positively associated structure with ATU, BITU, ASU (.390**, .214**, .091). ATU has positively associated with BITU, ASU (.238**, .242**).

In the above table, the correlation analysis reveals the same hypothesized direction of the relationships among variables. Perceived capability hypothesis perceived capability is positively associated with perceived" ease fullness is accepted having (β =.088). Perceived capabilities

dimension is positively associated with the attitude towards" using (β =.053) is accepted. perceived capability dimension has a significant positive association with an attitude towards using.((β =0.42) is accepted.

The perceived ease fullness dimension positively correlates with behavioral intentions to use((β =0.48) is accepted. THE hypothesis BITU is positively associated with ASU is accepted. Hence BITU has significant positive dimensional with ASU (β =.062).

Discussion:

The analysis of respondents' demographic characteristics found that 83.5% of respondents were male while 86.59% of respondents fall under two age group choices, i.e., 31-40 and 41-50 years. The dominance of males in the LIS profession in the education sector is evident and seeks women empowerment organizations' attention to work for gender balance in this domain. Further, the universities are in the practice of hiring experienced staff for their libraries. Accordingly, mid-career level professionals aged from 31 to 50 are working in the libraries of public and private sector institutions in Islamabad/Rawalpindi. Moreover, two-third of the respondents are working in the public sector.

Results revealed that the librarian gets support from their institution in data curation practices. On the five-point scale from Never to Always, the central tendency of reported responses for institutions' help in diagnosing and resolving issues; selection of digital documents; organizing and managing metadata; access controls and authentication procedures; collaborative relationship; planning and implementation of activities; monitoring obsoleteness; elaboration of policies; and methods to enable interoperability of technologies to show mean value ranging between 3 to 4 and reflects the assistance received by respondents from their institution.

The results reported a better level of awareness regarding data fit, data purposes, data collection, data sources, and appropriation of data. The library staff's data literacy level in the

education sector has a central tendency that exhibits the right awareness level. Results also reflected the ability of librarians in academic institutions to handle and understand statistical concepts and data. The majority of respondents are equipped with the ability to analyze, interpret and evaluate statistical information.

Respondents can communicate their understanding of statistical information. However, librarians face challenges to data literacy skills as the insufficient emphasis is being laid on data literacy practices in academic libraries. Other challenges include lack of interest, inability to interpret data visualization and data handling, lack of data reuse skills, and low ability to appraise the data critically. Understanding of statistical terms used in research articles is also limited. They are unable to use data to help make decisions. Insufficient resources are also causing hurdles in data literacy practices. Librarians are also observed to believe that such practices have limited utility. The majority of the respondents reported that data literacy helps them make decisions about making library services and resources user-centered, which seems encouraging.

Library professionals perceive that their institutions support data literacy practices and librarians are also interested in learning and improving the relevant skills. A common perception recorded in this study revealed that library professionals in academic institutions believe that libraries' data literacy practices could improve the quality of overall library services.

Conclusion

The study results concluded that the majority of LIS professionals perceived their data literacy and digital resources integration skills as useful. They were able to identify the context in which data are produced, reused and integrated the resources. Furthermore, it is observed that concerned are ready to adopt the digital integration of libraries and harness the knowledge through this resource to make the research sounder with the knowledge and techniques from the already placed expertise and techniques. The modern era needs that digitization and integrated expertise pave the way for more

advanced and speed research on any topic to strengthen the different areas of life, from economy to political system stability. Most of the researchers can't find useful information via digitization and integrated system in the universities. It is a cost-effective and mostly one-time expenditure but has more benefits than a conventional method of maintaining the book knowledge.

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