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Effectiveness of Digital Reference Services in University Libraries in Punjab, Pakistan: Users' Perceptions

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Abstract

This study aimed to analyze the effectiveness of digital reference services in university libraries in the Punjab, Pakistan. The study employed the quantitative research method to achieve its objectives. The quantitative data were collected from users of four selected university libraries which offered digital reference services through the questionnaire.

The findings of the study suggest that more than half of the respondents were aware of digital reference services offered by their libraries. Amongst the respondents who were aware of the service, most of the respondents came to know about it through the library websites. The majority of respondents used the service at different intervals, while nearly one-third of the respondents had never used the service. The majority of the respondents were of the view that library reference staff is helpful and courteous to help the users with DRS, and understands the users' information needs. Most of the participants informed that the libraries provide access to sufficient online/electronic information resources, the Web OPAC and DRS through websites. The libraries provide DRS 24/7 and have placed the link to DRS at a visible place on the website. The respondents were also of the opinion that the DRS offered by the libraries is easy to use, and the libraries market and publicize the service effectively. The libraries need to provide current information and prompt response to users, and enhance the library / reference staff's competencies to handle the service efficiently. The findings of the study will help the university libraries' administration to improve their DRS in accordance with users' needs.

Keywords: Effectiveness, reference services, digital reference services, users' perceptions, academic libraries, Punjab, Pakistan

1. Introduction

Reference services were traditionally offered by a reference librarian at the reference desk within the library building during a face-to face meetings between the user and the librarian, over the telephone, by fax and through mail. The selection of suitable and sufficient reference material, and its arrangement and maintenance were the major responsibility of the reference librarian, so that the users can use it easily and conveniently (Smith (2010).

The development in information and communication technologies has had a great impact on both the reference sources and the reference work. Web resources and databases have supplemented print reference sources available in reference sections of libraries (Smith (2010). The introduction of the Internet and its associated Web technologies have changed both the way libraries provide information services to their users and the way the users prefer to access information (Chowdhury and Margariti, 2004). With the development of the Internet and the World Wide Web, and the introduction of interactive technologies, the way the reference service was provided has drastically changed. Today, besides helping the users at the reference desk, the reference librarian provides them reference services in cyberspace by employing Web technologies. This new service, known as digital reference service (DRS), is ‘‘a mechanism by which people can submit their questions and have them answered by a library staff member through some electronic means (e-mail, chat, Web forms, etc.), not in person or over the phone’’ (Janes, Carter and Memmott ,1999).

Digital reference service has had a great impact on all kinds of libraries. It has substituted the physical reference desk with the virtual reference desk. Now, users can submit their queries online and can receive their required information from anywhere

at any time. Academic libraries play an important role to support instructional, learning and research activities of academic institutions. They need to meet information needs of the academic community effectively by improving their services and enhancing their resources. The provision of an effective reference service helps to enhance exploitation of resources. The speed, convenience and accessibility have a great bearing on users' satisfaction. As new technologies have been introduced, the academic libraries need to redesign their reference services by applying the technological innovations in order to provide efficient reference services and meet users' expectations.

2. Literature review

2.1 Concept of DRS

Library reference services that are offered electrically or through Internet are known as DRS (LIS Wiki, 2014). Shaw (2009) stated that the Virtual reference is also known as digital reference, live reference, Internet information service, electronic reference, remote reference, and real time reference.

Zanin-Yost (2004) described DRS as services provided through various channels, such as chat, Voice over Internet Protocol, Web forms, e-mail, Video, and Web customer call center software. It involves interaction between the user and the librarian via said channels.

Glace et al. (2004) described the virtual reference service as a service where a patron employs digital technology, Internet technology and computers to communicate with reference staff without physical visit to the library. These reference services are initiated electronically in real time, and online means, such as chat, Voice over Internet protocol, instant messaging and e-mails are utilized to provide the

virtual reference. Glace et al. (2004) has noted that the online sources are frequently utilized in the provision of digital reference (virtual reference), usage of electronic sources in searching for answers is not itself digital reference (virtual reference).

Wasik (1999) has stated that “Digital reference services (also known as Ask-A Services) provide subject expertise and information referral over the Internet to their users”.

2.2 Development of DRS

Online searching in libraries was introduced in early 1970s (Neufeld, 1986). Han and Goulding (2003) described that DRS began in the mid of 1980s but have developed rapidly in recent years. As with the evolving names of electronic library, virtual library and digital library, DRS were once, and sometimes still are, termed electronic reference and virtual reference.

Pomerantz (2003) noted that from the early to the mid of 1990s, reference service started to appear on the Internet that was not associated with a library either electronically or physically. Ask-A Services were to desk reference services what digital libraries are to physical libraries, they more or less re-created the services offered by their physically constrained cousins, but those services were offered primarily electronically.

In the early 1990s, a number of academic and public libraries started to provide reference services via e-mail. With the introduction of the World Wide Web, libraries began to use the web form for submitting users’ reference queries (Kresh, 2003). Singh (2004) noted that in the early 1990s, Ask-A Librarian services were common. By the mid of 1990s, 75% of 122 Association of Research Libraries (ARL) member libraries, and 45% of academic libraries in the USA offered digital reference services

by web form or an electronic mail. DRS had become an effective and important service for meeting users' information needs and the users' demand for this service continued to increase. Pomerantz (2003) noted that since the mid of 1990s, a new type of reference service started to appear online called "real-time reference service". Chat technology, that enables the reference librarian to communicate with the user in real time, was first introduced by the Internet Public Library in 1995 (Kasowitz, 2001).

While traditional digital reference makes the use of asynchronous methods of communication, real-time reference makes the use of synchronous methods of communication i.e. instant messaging, graphical co-browsing and chat. Prior to the development of these technologies, synchronous computer mediated reference had been experimented within MOO and MUD environments (Pomerantz, 2003). Till the end of 1990s, 99% of 70 academic libraries in the USA provided email reference and 29% offered real time reference service. The year 2000 brought the initiation of live reference in academic libraries with the use of commercial call center software to communicate with users in real time (Singh, 2004). Now-a-days, a number of technologies, such as chat, instant messaging, Voice over Internet Protocol, video-conferencing are used to provide real time reference services.

2.3 Types of DRS

Han and Goulding (2003) have noted that DRS is delivered via electronic means using both asynchronous (e-mail, Web-forms, chatterbots, SMS etc.) and synchronous (Web chat, Instant messaging, Video-conferencing, VoIP etc.) media. In its narrowest sense, digital reference is often used as a synonym for real time electronic reference.

Dollah, Kadir and Singh (2012) have stated that DRS exists in various forms. The two broad categories of digital reference service models are as follows:

i) Asynchronous Transactions

ii) Synchronous Transactions

2.3.1 Asynchronous Transactions

It involves time delay between the question and the answer. It is a service characterized by communication in one direction at a time. Asynchronous transactions encompass a time delay between the question asked and the provision of the answer. These reference services allow librarians to answer question in their own time after having conducted all necessary research, which might enhance the accuracy and completeness of replies.

Younus (2014) described the asynchronous reference transaction as a transaction where a question is submitted in some forms and its answer is provided later on. During the communication between a user and an information professional, there is no immediate response to the question asked. An asynchronous DRS can be offered via following means.

2.3.1.1E-mail

This is a major format used for online information delivery. The user sends the library an e-mail with a reference query, supplying whatever information user feels is necessary and the library replies the user's query by e-mail.

E-mail is considered to be the most common form of communication as it is used widely. Users can send their questions through e-mail available on the library website. This web page activates software for e-mail or user can send their queries to

library's email address through their own e-mail software (Berbue, 2003). Roesch (2006) noted that email reference service is easy to access and to implement, and is cheap. It reduces the barrier that the users face for asking assistance in the library physically.

2.3.1.2 Web Forms

A Web form generated through a designated web site can be used by users for asking their reference questions. Users need to respond to specific queries in addition to asking their questions. In order to send the form, which is usually received by the library in the form of e-mail, users need to click on a button specifically designated for that purpose.

Usually, Web forms contain some fields (i.e. contact details and personal information) which are necessary to be filled out by the user to receive / get answers to their questions. Some additional / optional information may be asked which are to be provided by the users through these forms. They are needed to identify users' information needs accurately (Roesch, 2006). Berube (2003) noted that since the Web forms are provided to the users (a structured format is provided for asking questions), these forms guide them to frame questions in a better way.

2.3.1.3 Chatterbots

Chatterbots are just like full text search engines and they are represented by pictures, which are so called avatars. Users fill their queries in relevant fields and receive an immediate response. These Chatterbots provide answers to particular questions. They are developed through computer-based software which analyze the question with the help of keywords. It matches keywords with particular information stored in the database and provides answer to the users. In this form of transaction,

users communicate with pre-arranged information contained by interactive database instead of a reference librarian (Roesch, 2006).

2.3.1.4 SMS / Text Reference

By using mobile phone technology, SMS (short messaging service) can be utilized for DRS. Several software companies, for example, OmniReference, Mosio for Libraries, provide the software that can be utilized for SMS reference service with the help of mobile phone technology (Younus, 2014).

2.3.2 Synchronous Transactions

Reference transaction which occurs in real-time with a prompt response to the query is called the synchronous transaction. It is a two-way communication between a library user and a librarian over the Internet. During the synchronous transaction, real time communication between the library user and the librarian takes place by using interactive technologies. It is also called real-time reference, or live reference (Younus 2014). Roesch (2006) noted that this reference transaction occurs at one time of period. Synchronous DRS may be provided with the help of following channels.

2.3.2.1 Text-based chat / Web Chat

Meola and Stormont (2001) viewed the Web chat as a valuable service as it assists remote users to interact with the reference librarian in real-time. User needs to visit the library Website and type the message to ask the query from the reference librarian. It helps to conduct the reference interview. A copy of the whole interview is provided to the user and the other copy can be stored in database for processing and for statistical information, such as topics, duration of chat, and location of users. Both the users and the librarian stay online simultaneously and can interact with each other during the chat (Roesch, 2006).

2.3.2.2 Instant Messaging

Instant messaging (IM) is a tool of communication. It is useful for offering DRS as it has been very famous among library users. It provides an opportunity to the user and the reference librarian to interact with each other through the Internet by making use of some special text based software.

Instant messaging involves a split web screen. In one screen, the user types the question and can instantly see the librarian's response. In the second screen, the librarian can call up web pages or other electronic resources where the required information can be found. Although chat reference is associated with the 24/7 service model, this level of service is often impossible for a single library to implement. (Roesch, 2006 and Berube, 2003)

Some specific software packages designed for DRS, such as QuestionPoint, VRLplus contain some special features, such as Web page pushing and co-browsing which have been used for IM. Co-browsing involves both the user and the reference librarian in the searching process simultaneously. It provides the facility to control navigation of Web pages. Both the user and the librarian can see the activities performed by each other (Roesch, 2006).

2.3.2.3 Video-conferencing or Web-cam reference

This form of digital reference includes the visual element which may be an antidote to the communication problems inherent in the text-based services. Librarians and users are able to use both text and speech for reference transactions. Instead of a window for the textual exchange, there is a window in which librarians and users can see each other while conducting a face-to-face interview. Through

video conferencing both text and speech can be used for reference transactions. It helps to provide reference services, research and distance education (Berube, 2003).

2.3.2.4 Voice-Over Internet Protocol (VoIP)

Voice over Internet Protocol (VoIP) has become a distinct medium to communicate the information among people. It is the technology that transfers voice and other information at the same time by using standardized Internet protocol. In addition to special hardware equipment, both users of this service require the speakers and microphones installed on their PCs to communicate with each other (Younus, 2014).

2.4 DRS in Academic Libraries

Academic libraries were the first to provide DRS in the early 1980s. One of the first services to go online was the Electronic Access to Reference Services (EARS) launched by the University of Maryland Health Services Library in Baltimore in 1984. Since that time, the number of academic and public libraries offering e-mail reference service continued to grow making e-mail the most common vehicle for providing DRS. However, experience has shown that there are several limitations inherent in providing service in this way. The major drawback of accepting reference queries by e-mail or Web page is the asynchronous nature of the interaction: library staff cannot interview the user in real time (Wasik, 1999)

Janes, Carter and Memmott (1999) investigated the status of DRS and its features in academic libraries in the USA through a survey of library Web sites. They found that 45 percent of the surveyed libraries offered DRS.

Tenopir and Ennis (2002) investigated the changes that had occurred in academic library reference services due to new and rapidly growing technologies.

They conducted surveys in academic members of the Association of Research Libraries in 1991, 1995, 1997 and 2000. The researcher found that the digital information sources had profound effects on the service. Libraries had added new media options as they became available.

Darries (2004) examined the impact of internet on reference services in libraries of 36 higher education institutes in South Africa. He found that the majority of librarians attended formal internet training programs and the majority of libraries had their Web sites. The majority of libraries provided electronic reference via e-mail with a low rate of usage.

Chowdhury and Margariti (2004) examined the current practices followed by academic libraries and the National library in Scotland. They found that the DRS was an effective form of service delivery in Scotland's academic, National libraries. E-mail was considered to be the main technology for providing DRS in these libraries. The majority of enquiries handled by the libraries were relatively low-level rather than concerning specific knowledge domains.

Ozkaramanli (2005) investigated the chat reference services in ten academic libraries in Ohio and Pennsylvania. Nearly 40 librarians were questioned in order to explore various issues relating to the service. This study provided practical evaluation criteria for providing successful chat reference services in three categories i.e. marketing, librarians' performance and chat software.

Maharana and Panda (2005) investigated the status of DRS in the libraries of two premier institutes i.e. the IIMs and IITs in India. They concluded that DRS were being developed and implemented in these libraries. They emphasized on developing assessment techniques and standards to measure quality of DRS. They indicated a

long way ahead to march to the establishment of DRS at par with similar institutions in developed countries.

Hodges (2006) explored information seekers interaction with a digital reference environment affiliated with a large university library in the United States. He identified users' needs, benefits and barriers pertaining to seeking information in the digital chat environment. His study suggested that digital reference process was less abstract and more easily followed, Web pages were interactive, users could send URLs for full citation to librarians and could understand the digital reference process easily.

Dollah, Kadir and Singh (2007) explored the existing status of DRS in university libraries of Malaysia. They focused on the usage and effectiveness of the services, needs, issues and problems faced by the librarians. They concluded that DRS are effective forms of service delivery in the libraries. They found that asynchronous DRS was a main format used to provide DRS and academic libraries were planning to implement synchronous DRS and collaborative DRS.

Dollah and Singh (2010) conducted a study to explore the usefulness of DRS in university libraries in Malaysia. They study focused on the usage of email reference, web forms and chat reference, which were used in these libraries to ask the questions by users. The majority of users viewed the DRS provided by the university libraries as of high quality.

Barry et al. (2010) undertook a study to present a snapshot of digital reference services in academic libraries of UK and software used by academic libraries for delivering the service. They discovered that digital reference services were not extensively offered in the UK educational libraries. However, existed service

providers were intending to continue the service and most of the educational libraries surveyed were planning to start the service.

Sekyere (2011) undertook a study to explore the DRS status in academic libraries of ten West African countries. They found that DRS was in infancy in these academic libraries. Out of sixty academic libraries, only eleven libraries had implemented DRS. Out of eleven academic libraries, only one library had implemented synchronous services, while other ten offered asynchronous DRS via email.

Rehman, Shafique and Mahmood (2011) conducted a study to explore users' perceptions about reference services and how far users were satisfied with reference services in university libraries of the Punjab. They examined users' satisfaction with different aspects of reference services in libraries included in the study and suggested that DRS should be introduced by the libraries.

Malik and Mahmood (2013) investigated the status of ICT infrastructure required for offering DRS in the university libraries of the Punjab. They found that the ICT infrastructure required for planning and implementing DRS in the libraries was better than that it was before but it required a further development. A few libraries had started DRS, while most of them were still offering face-to-face reference.

Younus (2014) investigated and analyzed DRS in university libraries of Pakistan, focusing on the nature and level of DRS, tools adopted for providing the service, its usage, staffing, promotion, funding, ICT facilities available for offering the service, and the problems facing university libraries for developing and managing the service.

Malik and Mahmood (2014) explored the readiness of DRS of university libraries in the Punjab. They investigated willingness, organizational awareness, strength and planning of resources for implementing DRS in these libraries. It was revealed that a few libraries were at the readiness level of DRS, while others were adopting this system at a slow pace.

Ali and Haider, (2016) explored the existing functions of DRS tools and their usage by the university librarians in Karachi. The study highlighted the potential of DRS and implementation stage of the service in academic libraries in Karachi and how this service would be more effective for university students, faculty members and other researchers.

3. Objectives

The objectives of the study are:

- To gain an overview of users' perceptions about DRS in university libraries in the Punjab, Pakistan.
- To explore the usage and the perceived needs of DRS in university libraries in the Punjab, Pakistan.
- To analyze the effectiveness of DRS in meeting users' reference needs in university libraries in the Punjab, Pakistan.
- To make recommendations for managing and developing DRS effectively in university libraries in the Punjab, Pakistan.

4. Methodology

The quantitative research method was employed to achieve objectives of the study. Based on the literature review, a questionnaire was developed to collect the quantitative data from users of four leading university libraries (two each from public

and private sector) in the Punjab, Pakistan by adopting a convenience sampling technique. The selected libraries were providing DRS, which included University of the Punjab library, Lahore, University of Engineering and Technology library, Lahore, University of Management and Technology library, Lahore, Forman Christian College University library, Lahore.

5. Data analysis

In order to achieve objectives of the study, descriptive statistics (i.e. frequency, percentages, mean and standard deviation) have been used to analyze the quantitative data collected through the questionnaire. The data are analyzed and presented in the following sections.

5.1 Response rate

In this study, the questionnaire was distributed to 400 library users in four university libraries (two each in public and private sector) in the Punjab. Out of 400 respondents, 371 respondents filled and returned the questionnaire with a response rate of 92.75%. Amongst 371 respondents, the majority of the respondents (100, 27%) belonged to University of Management & Technology, Lahore, while the least number of respondents (86, 23.30%) came from University of the Punjab, Lahore (Table 1). Of the respondents, the majority of the respondents (187, 50.40%) came from the private sector university libraries and 184 (49.60%) belonged to the public sector university libraries (Table 2).

Table 1

Response rate by university (N=371)

Name of University	Frequency	%
University of the Punjab, Lahore	86	23.20%

University of Engineering & Technology, Lahore	98	26.40%
University of Management & Technology, Lahore	100	27.00%
Forman Christian College University, Lahore	87	23.50%
G. Total	**371**	**100%**

Table 2

Response rate by sector (N=371)

Sector	Frequency	%
Public	184	49.60%
Private	187	50.40%
Total	371	100%

5.2 Demographic information

5.2.1 Respondents' gender

Of the 371 respondents, the majority of the respondents (265, 71.43%) were male and 106 (28.57%) were female. Amongst 184 respondents of public sector university libraries, 132 (71.73%) respondents were male and 52 (28.27%) were female, whereas amongst 187 respondents of private sector university libraries, 133 (71.12%) were male and 54 (28.88%) were female (Table 3).

Table 3

Respondents' gender (N=371)

University Sector	Male		Female		Total	
	N	%	N	%	N	%
Public Sector	132	71.73	52	28.27	184	100
Private Sector	133	71.12	54	28.88	187	100

Total	265	71.43	106	28.57	371	100

Chi-square test was performed to determine the significant association between the respondents' gender and the sector of university libraries. Finding indicates no significance relationship between the respondents' gender and the sector of university libraries, where chi-square has a value of 0.896.

5.2.2 Respondents' age group

Most of the respondents (309, 83.29%) were between 18 to 25 years of age and 3 (0.81%) were between 31 to 35 years of age. Whereas, among respondents of public and private sector university libraries, the majority of the respondents (160, 86.95%; 149, 79.68%) were between 18 to 25 years of age (Table 4).

Table 4

Respondents' age group (N=371)

University Sector	Below 18		18-25		26-30		31-35		Total	
	N	%	N	%	N	%	N	%	N	%
Public Sector	2	1.09	160	86.95	19	10.33	3	1.63	184	100
Private Sector	9	4.81	149	79.68	29	15.51	0	0	187	100
Total	11	2.96	309	83.29	48	12.94	3	0.81	371	100

5.2.3 Respondents' level of study

As presented in Table 5, the largest group of the respondents (225, 60.65%) was undergraduate students, 84 (22.64%) respondents were master's students, 55 (14.82%) were M. Phil researchers, 3 (0.81%) were Ph. D researchers and 4 (1.08%) participants had some other levels of study.

The majority of respondents both in public and private sector university libraries (89, 48.37%; 136, 72.73%) were undergraduate students (Table 5).

Table 5

Respondents' level of study (N=371)

University Sector	Under Graduates		Masters		M.Phil		Ph.D		Other		Total	
	N	%	N	%	N	%	N	%	N	%	N	%
Public Sector	89	48.37	63	34.24	29	15.76	3	1.63	0	0	184	100
Private Sector	136	72.73	21	11.23	26	13.90	0	0	4	2.14	187	100
Total	225	60.65	84	22.64	55	14.82	3	0.81	4	1.08	371	100

5.4 Users' perceptions about DRS

5.4.1 Awareness about DRS

Participants were required to inform whether they were aware of DRS offered by their university libraries. As shown in Table 6, most of the respondents (193, 52.02%) were aware of DRS offered by their university library, while 178 (48.98%) respondents were not aware about it.

Amongst 184 respondents of the public sector university libraries, the majority of respondents (98, 53.26%) were not aware of DRS offered their academic libraries, whereas the majority of the respondents in private sector university libraries (107, 57.22%) knew about DRS provided by their libraries (Table 6).

Table 6

Respondents' awareness about DRS (N=371)

University Sector	Yes		No.		Total	
	N	%	N	%	N	%
Public Sector	86	46.74	98	53.26	184	100
Private Sector	107	57.22	80	42.78	187	100
Total	193	52.02	178	47.98	371	100

Chi-square test was performed to determine the significant association between users' awareness about DRS and the sector of university libraries. Chi-square value 0.043 indicates a significant relationship between users' awareness of DRS, and sector of academic libraries.

5.4.2 Source of awareness about DRS

The respondents were asked to indicate how they knew about DRS provided by their university libraries. As shown in Table 7, most of the participants (112, 45.71%) found DRS on library Websites, 63 (25.72%) heard about it from friends, 27 (11.02%) learnt about it through information literacy sessions, 27 (11.02%) through library promotion activities, and 16 (6.53%) from other sources**.**

The majority of respondents both in public and private sector university libraries (52, 52.53%; 60, 41.11%) informed that they learnt about DRS offered by their university libraries through the library Websites (Table 7).

Table 7

*Source of respondents' awareness about DRS (N=245)**

University Sector	Library Websites		Friends		Information Literacy Sessions		Library Promotion System		Others		Total	
	N	%	N	%	N	%	N	%	N	%	N	%
Public-Sector	52	52.53	22	22.22	6	6.06	12	12.12	7	7.07	99	100
Private Sector	60	41.11	41	28.08	21	14.38	15	10.27	9	6.16	146	100
Total	112	45.71	63	25.72	27	11.02	27	11.02	16	6.53	245	100

* Multiple responses

5.4.3 Usage of DRS

The respondents were asked to indicate how often they used DRS offered by their academic libraries. Out of total 371 respondents, 193 informed that they were aware of DRS offered by their university libraries (Table 6). Amongst 193 respondents who informed that they were aware of DRS, most of the participants (66, 34.20%) sometimes used DRS, followed by 32 (16.58%) rarely, 23 (11.92%) frequently, and 15 (7.77%) always. Whereas, 57 (29.53%) respondents informed that they never used the DRS (Table 8).

As shown in Table 8, most of the respondents both in public and private sector university libraries (57, 66.28%; 79, 73.84%) used DRS at different intervals, however 29 (33.72%) respondents in the public sector university libraries and 28 (26.16%) participants in private sector university libraries reported that they never used DRS.

Table 8

Usage of DRS (N=193)

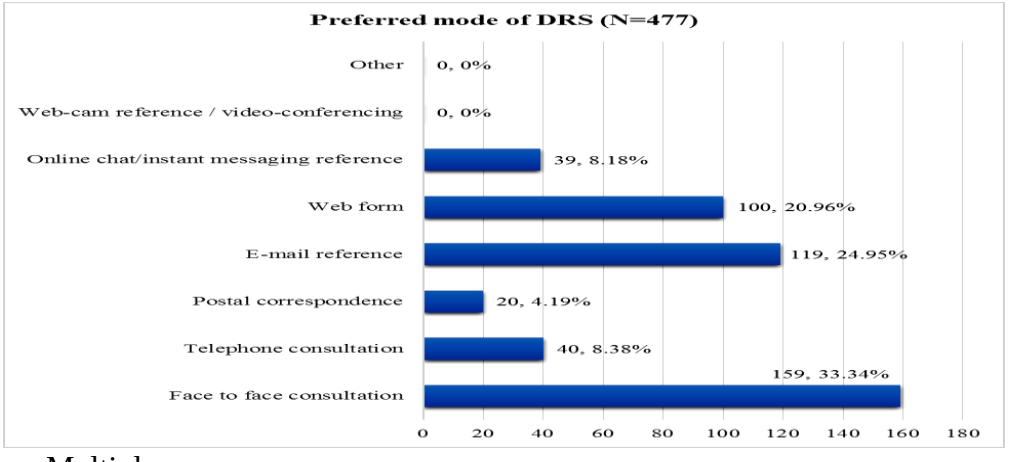
University Sector	Always		Frequently		Sometimes		Rarely		Never		Total	
	N	%	N	%	N	%	N	%	N	%	N	%
Public Sector	9	10.47	8	9.30	23	26.74	17	19.77	29	33.72	86	100
Private Sector	6	5.61	15	14.02	43	40.19	15	14.02	28	26.16	107	100
Total	15	7.77	23	11.92	66	34.20	32	16.58	57	29.53	193	100

Chi-square test was performed to determine the significant relationship between the usage of DRS by respondents and the sector of university libraries.

Results show no significance relationship between the usage of DRS and the sector of university libraries with the chi-square value of 0.124.

5.4.4 Preferred mode of DRS / reference service

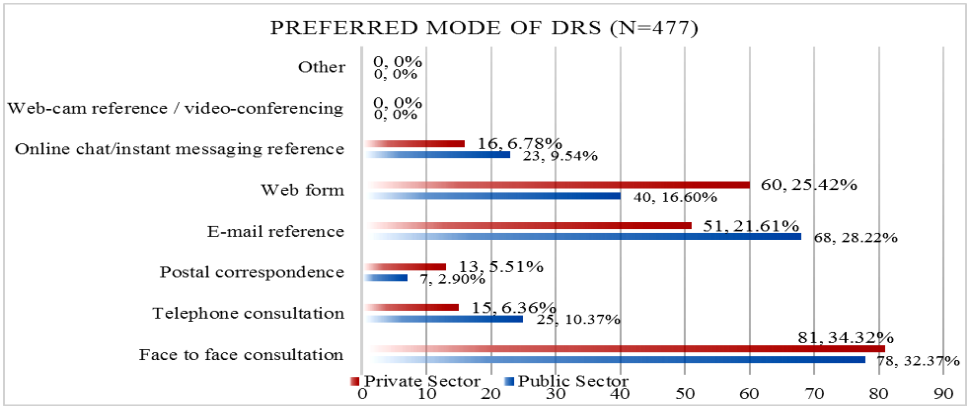
Respondents were asked to indicate the mode of DRS / reference service that they usually preferred to ask their reference queries. As presented in figure 1, the majority of the respondents (159, 33.34%) preferred to pose reference queries through face-to-face consultation, followed by 119 (24.95%) through E-mail, 100 (20.96%) through Web form, 40 (8.38%) through telephone consultation, 39 (8.18%) through online chat/instant messaging, and 20 (4.19%) through postal correspondence



* Multiple responses

Figure 1. Preferred mode of DRS (N=477)*

The majority of respondents both in public and private sector university libraries (78, 32.37%; 81, 34.32%) informed that they usually preferred face-to-face consultations to ask their reference questions (Figure 2).



* Multiple responses

Figure 2. Preferred mode of DRS (Cross tabulation) (N=501)*

5.4.5 Suitability of DRS formats

Participants were asked to provide their opinions about suitability of different formats of DRS for asking reference questions. Different formats are ranked on the basis of participants' opinions with regard to their suitability in Table 9.

Table 9

Suitability of DRS formats

Statements		Most suitable	Suitable	Somewhat suitable	Not suitable	Not suitable at all	No Opinion	Rank
E-mail reference	N	57	49	18	0	0	6	1
	%	43.80	37.70	13.90	0	0	4.60	
Web form	N	26	49	41	6	0	8	2
	%	20.00	37.70	31.50	4.60	0	6.20	
Web chat/ instant messaging	N	30	38	27	15	3	17	3
	%	23.10	29.20	20.80	11.50	2.30	13.10	
Web-cam reference / video-conferencing	N	27	25	41	12	4	20	4
	%	20.90	19.40	31.80	9.30	3.10	15.50	

5.5 Effectiveness of DRS

In order to analyze the effectiveness of DRS offered by the academic libraries, participants were required to provide their opinions about different aspects of the service by using a five - point Likert scale (1 = strongly disagree, 2 = disagree, 3 = no opinion, 4 = agree, and 5 = strongly agree). 131 respondents provided their opinions about different aspects of DRS which are described under the following headings.

5.5.1 Library / reference staff

Respondents perceived that their university library reference staff is very helpful and courteous to help the users with DRS (mean=3.63). As the DRS is beyond the library walls service, responsibilities of reference staff may increase. They must be able to know about remote users' needs. Respondents agreed that their library reference staff is aware of, and understands their information needs (mean=3.56). Whereas, most of the respondents did not provide their opinions about the library / reference staff's ability to provide answers to their reference questions efficiently through DRS (mean=3.47), and the reference / library staff's competency and knowledgeability to deliver the quality DRS (mean=3.46) (Table 10).

5.5.2 Accuracy

Users expect the reference staff to provide accurate answers to their reference questions. If users are not satisfied with the answer provided to their questions, there will be a question mark on quality of the service. Majority of the respondents did not gave their opinions about accuracy of answers to reference queries provided by library / reference staff through DRS (mean=3.49) (Table 10).

5.5.3 Promptness

Response time has a great importance in the provision of DRS. Users want a quick response to their queries asked through DRS. Majority of the respondents did not gave their opinions regarding the library / reference staff's ability to provide prompt response to their digital reference queries (mean=3.43) (Table 10).

5.5.4 Currency & up-to-dateness of information

It is necessary for library / reference staff to provide current and up-to-date information to users. Majority of the respondents did not provide their opinions about the currency and up-to-dateness of information provided by the library / reference staff through DRS (mean=3.42) (Table 10).

5.5.5 Accessibility

Academic libraries are required to provide an easy access to digital resources and services including DRS, so that users can benefit from them easily. Respondents agreed that their university libraries provide access to sufficient online / electronic information resources (mean=3.69). They were of the opinion that their university libraries provide access to Web OPAC through Websites (mean=3.68). They agreed that their university libraries provide fast access to DRS (mean=3.60) and have placed the link to DRS at a visible place on the Website (mean=3.59). They were of the opinion that libraries provide DRS 24 hours a day and 7 days of a week (mean=3.52). However, the majority of the respondents did not provide their opinions about the accessibility of DRS offered by the libraries on-campus and off- campus (mean=3.49) (Table 10).

5.5.6 Usability

Libraries need to provide such services that are easy to use. The respondents agreed that the DRS provided by their university libraries is easy to use (mean=3.64) (Table 10).

5.5.7 Promotion

Libraries are required to market and publicize their resources and services effectively, so that the user become aware of them and gain benefits from them. As regards marketing of DRS, the respondents were of the opinion that their university libraries publicize and promote DRS effectively (mean=3.56) (Table 10).

5.5.8 Training

In order to enable users to use different services and resources effectively, academic libraries are required to provide training to users. The majority of the respondents did not provide their opinions about the provision of adequate training to use the DRS effectively by their university libraries (mean=3.40) (Table 10).

5.5.9 Overall effectiveness

The respondents were of the view that DRS provided by their university libraries was overall effective in meeting their reference and information needs (mean=3.51) (Table 10).

Table 10

Effectiveness of DRS (N=131)

Statements	Mean	SD
Library / reference Staff		

Statements	Mean	SD
Library/reference staff is always courteous and helpful to handle my digital reference queries.	3.63	1.131
Library/reference staff understands my information needs.	3.56	1.131
Library/reference staff efficiently answers my reference questions through DRS.	3.47	1.223
Library/reference staff is knowledgeable and competent enough to deliver quality DRS.	3.46	1.156
Accuracy		
Library/reference staff provides accurate answers to my queries through DRS	3.49	1.051
Promptness		
Library/reference staff provides prompt response to my digital reference queries.	3.43	1.067
Currency & up-to-dateness of information		
Library/reference staff provides current and up to date information through DRS.	3.42	1.088
Accessibility		
Library provides access to sufficient online/electronic information resources.	3.69	1.066
Library provides access to its Web OPAC through its website.	3.68	1.062
Library provides fast access to its DRS.	3.60	1.065
Library has placed the link to DRS at a prominent location on its website.	3.59	1.059
Library provides DRS 24-hours a day, 7-days a week.	3.52	1.129
Library provides access to its DRS both on-campus and off-campus.	3.49	1.146
Usability		
It is easy to use DRS provided by the library.	3.64	1.157
Promotion		
Library publicizes and promotes its DRS effectively.	3.56	1.137
Training		
Library provides adequate training/ guidance / information literacy skills to use DRS.	3.40	1.208

Statements	Mean	SD
Overall effectiveness		
DRS offered by the library is overall effective to meet users' needs.	3.51	1.236

T-test was performed to determine the difference between opinions of participants of public and private sector university libraries with respect to the effectiveness of DRS. A significant difference was found between the opinions of participants of public and private sector university libraries regarding the effectiveness of DRS with the significance value of 0.001.

5.6 Quality of DRS

Participants were required to rate the quality of DRS and information provided through DRS by their respective libraries. The majority of the respondents (62, 47.70%) regarded the service as of somewhat high quality, followed by 42 (32.30%) of high quality, and 13 (10.00%) of very high quality. 11 (8.50%) respondents regarded the service as of poor quality and 2 (1.50%) as of very poor quality (Table 11).

As shown in Table 11, most of the participants both in public and private sector university libraries (23, 45.11%; 39, 49.37%) viewed DRS provided by their libraries as of somewhat high quality. 5 (9.80%) respondents in public sector university libraries and 6 (7.59%) in private sector university libraries regarded DRS as of poor quality, while only 2 (3.92%) respondents from public sector university libraries considered DRS to be of very poor quality.

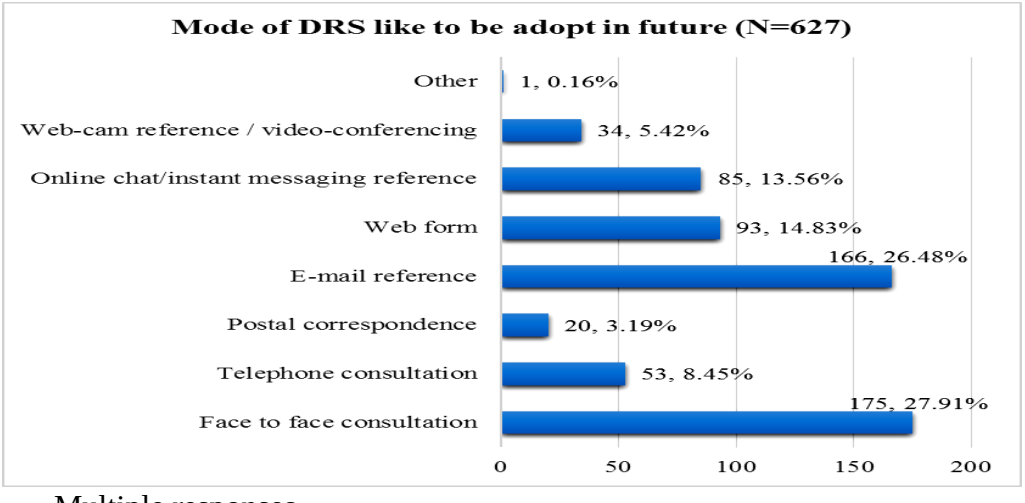
Table 11

Quality of DRS (N=130)

University Sector	Very High quality		High quality		Somewhat high quality		Poor quality		Very Poor quality		Total	
	%	N	%	N	%	N	%	N	%	N	%	N
Public Sector	9.80	5	31.37	16	45.11	23	9.80	5	3.92	2	100	51
Private Sector	10.13	8	32.91	26	49.37	39	7.59	6	0	0	100	79
Total	10.00	13	32.30	42	47.70	62	8.50	11	1.50	2	100	130

5.7 Format of DRS / reference service to be used in future

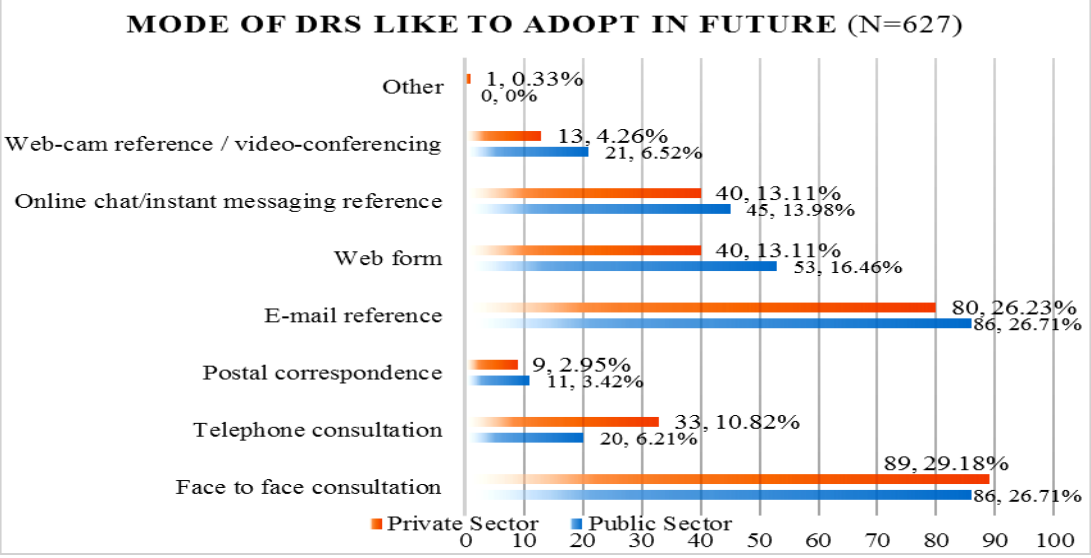
Respondents were asked to indicate the mode of DRS / reference service that they would like to opt for getting assistance from their academic libraries in the future. The majority of the respondents (175, 27.91%) informed that they would prefer to use face-to-face consultation, 166 (26.48%) respondents informed that they would like to use E-mail reference, 93 (14.83%) would prefer Web forms, 85 (13.56%) online chat/instant messaging reference, 53 (8.45%) telephone consultation, 34 (5.42%) Web-cam reference / video-conferencing, 20 (3.19%) postal correspondence, and 1 (0.16%) some other format to obtain reference assistance from their libraries (Fig 3).



* Multiple responses

Figure 3. Format of DRS / reference service to be used in future (N=627)*

The majority of respondents both in public and private sector university libraries reported that they would prefer to use face-to-face consultation (89, 29.18%; 86, 26.71%) and e-mail reference (80, 26.23%; 86, 26.71%) for seeking reference assistance (fig 4).



* Multiple responses

Figure 4. Format of DRS / reference services to be used in future (Cross tabulation) (N=627)*

6. Discussion

6.1 Awareness about DRS

The library website provides an interface to interact with DRS. Users must know about the library website. Awareness about the library website enables users to know about different services including DRS offered by the library. A specific link to DRS must be provided at the prominent place on the library website, which helps the users to find the service. This study shows that most of the participants were aware of

the DRS provided by their university libraries. Most of the respondents came to know about DRS through their university library websites.

6.2 Usage of DRS

More than half of the respondents were aware of DRS offered by their libraries. Among the respondents who were aware of the service, two-thirds of the respondents used the service at different intervals (always, frequently, sometimes, and rarely), while one-third of the respondents did not use the service. Traditional reference service is offered through face-to-face consultation, telephone and postal correspondence, whereas DRS is offered through e-mail, Web form, online chat / instant messaging, and Web-cam / video-conferencing. The findings of this research reveal that most of the participants preferred to pose reference questions through face-to-face-consultation, while all the respondents preferred to ask their queries via different formats (email, Web form and Online chat / instant messaging) of DRS. Whereas, amongst different formats of DRS, e-mail reference was viewed as the suitable channel for asking queries by most of the participants.

6.3 Effectiveness of DRS

6.3.1 Library / reference staff

The findings of the study suggest that library reference staff in university libraries included in the study is helpful and courteous to help the users with DRS and understands users' information needs. Library / reference staff needs to be competent to communicate effectively with their users. Reference staff should also realize that answering the user's query has gone beyond directing the user where to get the information to helping him in getting the actual information. The results show that

respondents had no opinion about reference staff's efficiency, knowledgeability and competence to answer reference questions and deliver the quality DRS.

6.3.2 Accuracy

For an effective service, it is necessary to provide an accurate and relevant answer to a query submitted through DRS. The main objective of DRS is to deliver accurate information. DRS is meant to save the time of users by delivering them the accurate answer within the possible shortest time period. The results show that the majority of the respondents gave no opinion about accuracy of answers provided by the library / reference staff to their queries through DRS.

6.3.3 Promptness

To answer the users' query through DRS, it is important that response time be taken into consideration. A prompt response to the query submitted through DRS has great importance. If a prompt response is not given, the basic purpose of the service is not achieved. Libraries need to indicate response time on their webpages, so that users become aware about how much time is required to respond to their queries. The results show that the majority of respondents had no opinion about promptness of response to their queries provided by the library / reference staff through DRS.

6.3.4 Currency & up-to-dateness of information

Users expect librarians to provide current and up-to-date information through DRS. Libraries should provide current and up-to-date information through the service. The results of the study indicate that most of the participants had no opinion about the currency and up-to-dateness of information provided by the library / reference staff through DRS.

6.3.5 Accessibility

In order to use DRS effectively, libraries must provide a convenient access to the service and other electronic resources to meet users' information needs efficiently. It was found that most of the respondents were of the view that their libraries provided fast and easy access to sufficient online/electronic information resources, Web OPAC, and DRS. Moreover, most of them informed that their libraries had placed the link to DRS at a visible place on the Website and provided DRS 24/7. Whereas, most of the respondents had no opinion about the provision of access to DRS both on-campus and off-campus.

6.3.6 Usability

The basic aim of DRS is to help the users to access their needed information from anywhere at any time. DRS provides an easy way to access the information as users are not needed to visit the library physically as well as physical availability of the reference staff at the reference desk is also not required to provide help to users as they can provide information online from anywhere with the help of the Internet. DRS helps to reduce the psychological barrier which prevents some users from seeking help physically in the library. It also saves the time. It was revealed that most of the respondents were of the view that the DRS offered by their libraries was easy to use.

6.3.7 Promotion

Promotion is to inform users about the benefits they gain from using the service. DRS should be promoted and publicized effectively. It is necessary to inform the users about DRS and its potential benefits. Most of the respondents informed that their libraries marketed and publicized the DRS and its benefits effectively.

6.3.8 Training

Users need to possess some specific skills to use DRS effectively. Libraries offering DRS should provide training to their users to utilize the service, so that users can gain benefits from the service. Libraries can arrange workshops, seminars and information literacy sessions to train the users. It was found that most of the participants did not give opinions about the provision of adequate training / guidance / information literacy sessions on DRS by their libraries.

6.3.9 Quality of service

A quality standard defines the level of performance that is to be accepted for a particular service. This standard is the desired or expected level of performance that should be observed while offering a service. A quality standard can be measured to determine the degree to which that standard is met. The success of a library depends on the quality of services including DRS rendered to the users. The findings of the study show that most of the participants viewed the DRS provided by their libraries as of somewhat high quality.

6.4 Format of DRS / reference service to be used in future

Reference service / DRS offers various options that the users can select while seeking assistance. The majority of the respondents reported that they would prefer to ask their reference queries through DRS using different formats i.e. e-mail, Web forms and online chat/instant messaging in the future, whereas 39.55% informed that they would prefer to ask their queries through traditional methods of reference service (i.e. face-to-face-consultation,-telephone, postal correspondence etc.). It implies that DRS will be most widely used by the users for seeking reference assistance in academic libraries in the future. Therefore, academic libraries need to enhance the

service, so that they can meet users' reference and information needs in the cyberspace effectively.

7. Conclusion

The present study analyzed the effectiveness of DRS in meeting users' reference needs in university libraries in the Punjab, Pakistan. The findings suggest that although the library / reference staff handling DRS is helpful and courteous, and able to understand users' information needs, they need to enhance their knowledgeability and skills to handle the service effectively. The libraries provide access to sufficient electronic/online resources, Web OPAC, DRS through their Websites. The DRS offered by the libraries is easy to access and use. The libraries market and publicize the service effectively as most of the users are aware of it. As the usage of DRS is expected to increase in future, the libraries need to improve the service by taking some necessary measures, such as the provision of up-to-date information and the prompt response to users, introducing real time/ synchronous DRS, developing electronic reference collection, providing access to the service both on-campus and off-campus, arranging users' training programs and enhancing reference staff's skills to handle the service effectively.

8. Recommendations

The following recommendations are made:

1. Library / reference staff's efficiency, knowledgeability and competency should be enhanced to operate DRS effectively. Academic libraries should arrange in-house training sessions for staff handling DRS. LIS schools and library associations should organize workshops and seminars to provide training in DRS to LIS professionals working in academic libraries. LIS

schools should incorporate a separate module on DRS in their curricula to equip future information professionals with essential skills to develop and operate DRS effectively.

2. Academic libraries should build current and up-to-date in-house electronic reference collections and online reference collections so that reference staff can provide accurate, current and up-to-date information / answers to users through DRS.
3. Libraries should provide answers to reference queries asked through asynchronous DRS as early as possible. The library should indicate response time at their Webpages so that users become aware of how much time is taken to respond to their queries. Libraries should increase timings for the provision of synchronous DRS (preferably 24/7) so that users can get reference assistance whenever they need. Libraries can develop a network / consortium by sharing their resources to provide synchronous DRS to users 24/7.
4. Academic libraries should provide access to DRS both on-campus and off-campus so that user can access the service from anywhere.
5. Academic libraries should arrange information literacy / training sessions to train the users for using DRS effectively.
6. Libraries should allocate a distinct fund in their periodic budgets to meet running expenditure of DRS. University authorities should enhance academic libraries' budgets for meeting expenditure of the service.
7. Libraries should devise a digital reference policy which should clarify the parameters of the service, response time, standards, guidelines, service behavior and benchmarks for quality of the service.

8. Libraries should follow IFLA guidelines for DRS which provide effective recommendations and directions for all types of libraries for designing and implementing the service across the world.
9. Libraries should market and publicize the DRS using some effective marketing strategies so that users can be informed about the service and its potential benefits they can gain from the service.
10. Academic libraries should develop essential ICT infrastructure including hardware and software for managing DRS effectively.

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