Virtual Reference Services through Web Search Engines: Study of Academic Libraries in Pakistan

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Abstract: Web search engines (WSE) are powerful and popular tools in the field of information service management. This study is an attempt to examine the impact and usefulness of web search engines in providing virtual reference services (VRS) within academic libraries in Pakistan. The study also attempts to investigate the relevant expertise and skills of library professionals in providing digital reference services (DRS) efficiently using web search engines. Methodology used in this study is quantitative in nature. The data was collected from fifty public and private sector universities in Pakistan using a structured questionnaire. Microsoft Excel and SPSS were used for data analysis. The study concludes that web search engines are commonly used by librarians to help users (especially research scholars) by providing digital reference services. The study also finds a positive correlation between use of web search engines and quality of digital reference services provided to library users. It is concluded that although search engines have increased the expectations of users and are really big competitors to a library's reference desk, they are however not an alternative to reference service. Findings reveal that search engines pose numerous challenges for librarians and the study also attempts to bring together possible remedial measures. This study is useful for library professionals to understand the importance of search engines in providing VRS. The study also provides an intellectual comparison among different search engines, their capabilities, limitations, challenges and opportunities to provide VRS effectively in libraries.

Keywords: virtual reference; web search engines; digital reference; academic libraries

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1. Introduction

Search engines (SE) are one of the most remarkable innovations of the 20th century. Information and Communication Technology (ICT) has made it possible to get any information within milliseconds. Search engines have changed the world of information and are rightfully considered the foundation of the Internet. The abilities of search engines have tremendously improved in the last decade and people are found commenting that if you are not able to find anything on a SE, then it may not exist at all. A search engine, as defined by Dudek, Mastora [1] is "a web application that gathers information items from the web according to different strategies (using crawlers or spiders) and then performs the basic retrieval task, the acceptance of a query, a comparison of the query with each of the records in a database, and then the production of a retrieval set as output". Search engines are the most useful and high-profile resources on the Internet. At the same time, reference services are considered as the most vital service a library provides. With the advent of the Internet, visits to a library's reference desk have dropped almost 48 percent since 1991 [2]. In the modern times, a library's traditional reference desk is gradually becoming obsolete. Search engines undoubtedly have a wider impact on the information sector, and with the advent of novel algorithms, the efficiency of search engines has increased greatly. Accordingly, users tend to consult web search engines for reference material rather

than visiting the library. Libraries have started providing real-time digital reference services (DRS) to its patrons worldwide [3]. The Internet has established strong reference services such as Google, Ask Jeeves and other computer-mediated online reference services, which have seemed to supersede the library's reference staff via increased efficiently. However, these tools are not alternatives to a capable reference librarian. Library experts have repeatedly demanded the adoption of new technology and an increase in tech-savviness.

Although many libraries have started purchasing web-based programs that allow library staff to take control of the patrons' computer and guide them in real-time environment, a reference expert would still be needed to help a library patron in what he/she is exactly looking for.

Reference services are primarily meant to help users in determining which resource is best and how to use it. Information technology has brought about a paradigm shift in the provision of library services. Janes [4] not only expanded upon librarians' attitudes and experiences in the digital environment but also made a detailed report on digital reference services. In Pakistani academic libraries, digital reference services are provided in two different ways. The first is asynchronous digital reference (email and web forms), where the patron gets a reply after some time or even after some days. The second useful system is synchronous digital references (instant messaging and video conferencing), through which users get an instant reply to their query [5–8].

The literature on library services in Pakistan reveals that web-based library services (using the Internet as a medium and library website as a gateway) are spreading rapidly in Pakistan. These services include electronic document delivery, electronic current awareness services, and selective dissemination of information (SDI). However, the available literature is not enough to explain the current state of awareness and use of technology by academic librarians in Pakistan in providing reference services to patrons. We therefore hypothesized that virtual reference services (VRS) are rarely available in academic libraries in Pakistan. This study therefore examines the current status of VRS in Pakistani academic libraries.

Research Questions

Based on the reviewed literature, following research questions have been formulated to conduct this study

1. What is the current state of VRS in university libraries in Pakistan?
2. How far is web search engines (WSE) used to provide VRS in Pakistani libraries?
3. Which type of reference questions are generally dealt with by university librarians in Pakistan?
4. What channels are being used by library staff to provide VRS to its patrons?

2. Materials and Methods

The methodology used in this study is quantitative in nature where the data was collected from 50 public and private sector universities in Pakistan between June and August 2016 using a structured questionnaire (see Appendix A). Although the questionnaire was based on extensive literature review, some questions were adopted from two studies: Tenopir [9] and Numminen [5]. In order to verify internal consistency of questions adopted from different studies, the Cronbach's Coefficient Alpha value was calculated after administering the questionnaire to a random sample of 20 librarians initially and a value of 0.839 has been obtained considering 12 items. A final questionnaire was administered using Google Forms. Initially, the questionnaire was sent to 20 randomly selected university librarians (including top 10 universities of Pakistan) at their email addresses and they were asked to share the link with those whom they know are working as reference librarians. They were also requested to CC the researcher into every email they forward, to enable the researcher to keep track of the responses. After repeated email reminders, a total of 134 responses were collected from 50 different public and private sector universities in Pakistan. All respondents were qualified working librarians belonging to 50 different university libraries in Pakistan. Data was analyzed using Statistical Package for Social

Science version 16. (developed by SPSS. Inc., Chicago in 1975, later acquired by International Business Machines Corporation IBM in 2008)

3. Related Literature

There is an abundance of literature available on search engines and virtual reference services around the globe. An initial search on the words "search engine" and "virtual reference service" in Google Scholar yielded 3,710 results. Narrowing down these results by careful scrutiny, we are left with 617 studies where SE have been the central focus of research. All of these studies were diverse in nature, objectives, methodologies and outcome of research. However, looking into the topic of VRS in LISTA (Library & Information Science & Technology Abstract) database, we have found 164 research articles, including those which were extracted during a search on Google Scholar. Finally, we selected all those articles which had discussions on the issues related to SE and VRS together.

The introduction of so many search engines leads to another problem of knowing which to use when. In the case of many and different search engines, it is important to know which search engine is best; how to use it, and when it provides the best response [10]. According to Waller [11], use of search engines has become an important activity taken on the Internet, and it has become important to know for what purpose people are using search engines. The study further endorses that Google is dominating and is considered a reliable source of information in today's digital era.

Libraries are important but studies also revealed that their usage is dropping because search engines are easy for users to use, thus making life easier. Therefore, the Internet has a powerful impact on library services. Norris [12] proves in her study that Google has an influence on libraries, while a librarian is the secondary player when the user has access to Google and other search engines. A variety of studies from 2001 onwards such as [12–16] have been conducted which investigate and validate the use of Google as one of the favorite search engines among academia in general and among library professionals in particular. One aspect of Googlization is related to the declined usage of physical library material, which has also influenced the library's reference desk and caused swift modification of reference services from human to digital and from physical to virtual. Conventional reference services have entered a new area: digital reference services (DRS) or virtual reference services are provided through software and the Internet [17–20]. Virtual reference services have become an imperative component of libraries; we are challenged to evaluate some new emerging technologies. Akhigbe [21] argues that very few libraries are offering DRS through Skype and Twitter in the way that The Johns Hopkins University Sheridan Libraries adopt Twitter for the provision of reference services, and Ohio University's (OU) library is an early adopter of Skype for Skype-based reference services.

Digital reference service is corresponding and assisting with users by operating Internet and computer technology [22]. Many reference services are provided by email, but now the utilization of web has become an important part in the delivery of DRS [23]. The foundation of different types of DRS such as chat, IM, web forms and searchable Frequently Asked Questions (FAQs) has been the target for many academic libraries [24]. Malik and Mahmood [22] conducted a study to explore the current position of DRS in libraries in Punjab. They concluded that most libraries have a general and reference collection in e-format. Very few libraries have DRS; most are providing face-to-face services. Younus [25] explored the usage, level, and technologies required for it. He stated that libraries are at the early age of DRS, and those who are providing such services are fully equipped with the latest technologies. Liu [26] and Mirza, Mahmood [27] explored university libraries of Germany and Pakistan respectively. Both studies suggested that web-based reference services are at an early stage in their countries and only a few libraries are providing this virtual reference service. Janes [4] highlighted reference librarians' experience and attitude towards digital and other technologies in reference services. He found that email is mostly used by librarians to provide reference services to their users.

The role of the librarian is continuing to grow with the adoption of the Internet and world wide web into the profession of librarianship. Many studies [22,25,28,29] have highlighted major hurdles

towards the adoption of DRS such as lack of capital, lack of experienced staff and professionals, technical resources, lack of ICT professionals and marketing of such services in Pakistani libraries. Nicholas [28] pointed out lack of hardware, software, training and partnership in providing such services. Rusuli, Saufi [30] identified several factors such as lack of planning, means of service delivery (synchronous, asynchronous), cost, language barrier, lack of knowledge about communication skills, IT skills and literacy, collaborative reference services etc. in South Asian countries. Bakar [31] concludes that a major problem in providing VRS is the lack of ICT in public libraries of Muslim countries.

4. Findings and Discussion

The data was collected from the central and departmental libraries of 50 public and private sector universities in Pakistan. The respondents of this study were 134 graduate library professionals. The majority of respondents of this study (67%) were male. All participants had a masters qualification, while 37% of them had graduated from 2002 onward. Only eight participants had recently graduated within last 2 years i.e., 2013–2015.

4.1. Current State of Affairs of Providing VRS in Pakistani University Libraries

Some of the major facts found during the study are that the majority of university libraries do not have trained staff dedicated to providing virtual reference services in libraries in Pakistan. Only 17 libraries out of 50 have staff whose assignments include provision of virtual reference services to library users. Similarly, 15 libraries have written VRS policy, which is implemented and being followed when providing these services to their users. No formal collaborative action exists between university libraries in terms of providing virtual reference services to its users. However, exactly half of the responding librarians (45 males and 22 females) have declared that they preferably use known listservs and social media connections to request reading material for their potential users. Finally, we asked if currently the virtual reference service is not being provided formally then do they plan to start it in future? Half of the respondents answered positively, while the other half responded that they do not have any plans to start such a service formally. Responses are summed up in Figure 1 (below).
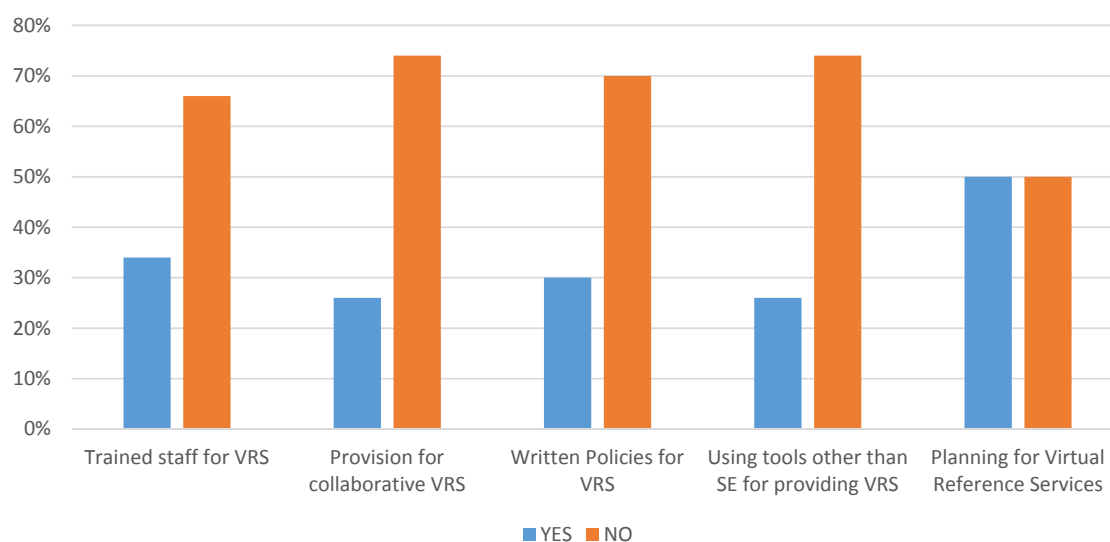

Figure 1. Current situation of provision of virtual reference service (VRS) in Pakistani university libraries.

4.2. Virtual Reference Services in Pakistani Libraries

Before analyzing the connection between search engines and provision of VRS in university libraries of Pakistan, the researchers have attempted to find out if there are dedicated personnel in university libraries providing VRS to library patrons or otherwise. The answer to this question was

important in order to get richer feedback from those who are the actual service providers of reference services within libraries. It is found that reference services are mainly provided by the librarian and there are no special staff recruited for the purpose. Mostly, the head librarian himself provides virtual reference services to library users and in a few cases professional or paraprofessional staff are deputed among the existing staff of the library. However, data analysis shows that 62% of librarians (83 out of 134) have been providing VRS for the past 5 years whereas the rest (38%) have either recently started providing VRS to library users or are still at the stage of planning to offer reference services using the Internet and world wide web. However, it is important to notice that provision of VRS in university libraries of Pakistan is still in its infancy.

4.3. Time Spent on Providing VRS

There are 54 out of 134 (40%) library professionals who reported that they spend 6–8 hour daily on providing reference services to users. This ratio is in fact encouraging, as most of the libraries do not have sufficient resources to support reference desk staff for provision of prompt and quality reference services. The rest of the respondents either spend 4–6, 2–4 or less than 2 hour for providing reference services.

4.4. Search Engines as Threat for Libraries

Responses were collected about how librarians perceive capabilities, acceptability and applicability of search engines in providing virtual reference services. We have found that majority of librarians (87%) do not consider search engines a threat to the reference desk in the library. Rather, only 16 out of 134 have responded that search engines are big competitors to the library's reference service desk. Getting acquaintance with and harnessing this tool is crucial for survival of library professionals. Huge differences in response show that lack of awareness is one of the main causes of not using SE to provide VRS in academic libraries. On the other hand, 80% of respondents were agreed that the Internet has made the job of reference services more challenging and demanding, which requires appropriate training of relevant staff. These two responses are inconsistent with each other e.g., acknowledging that SEs are a competitor of LRS (library reference services) but still considering that VRS is not an alternative to LRS.

4.5. Use of SE in Providing VRS

Google is found to be the most used (61%) SE followed by (15%) Yahoo. Alta Vista and Ask Jeeves are also used by a few librarians. Almost 62% of respondents rated Google as the most useful search engine in providing VRS, followed by Yahoo, which is found useful by 15% respondents. The rest of participants found other SEs useful such as Ask.com, Alta Vista, and Blekko.com. As shown in Figure 2 (below), 92% of respondents use search engines for providing SDI (Selective Dissemination of Information) and 76% of respondents use search engines to provide orientation services to library users in university libraries.

4.6. Channels of Providing VRS

We have investigated different forms of VRS being used by librarians for providing reference services to library patrons. As shown in Figure 3 (below), instant messaging is the most prominent form of virtual reference services being used by the librarians in Pakistani university libraries. Among other forms of VRS, only a few, i.e., chatting, Skype, and web forms, are noticeably used among Pakistani LIS (Library & Information Science) professionals.
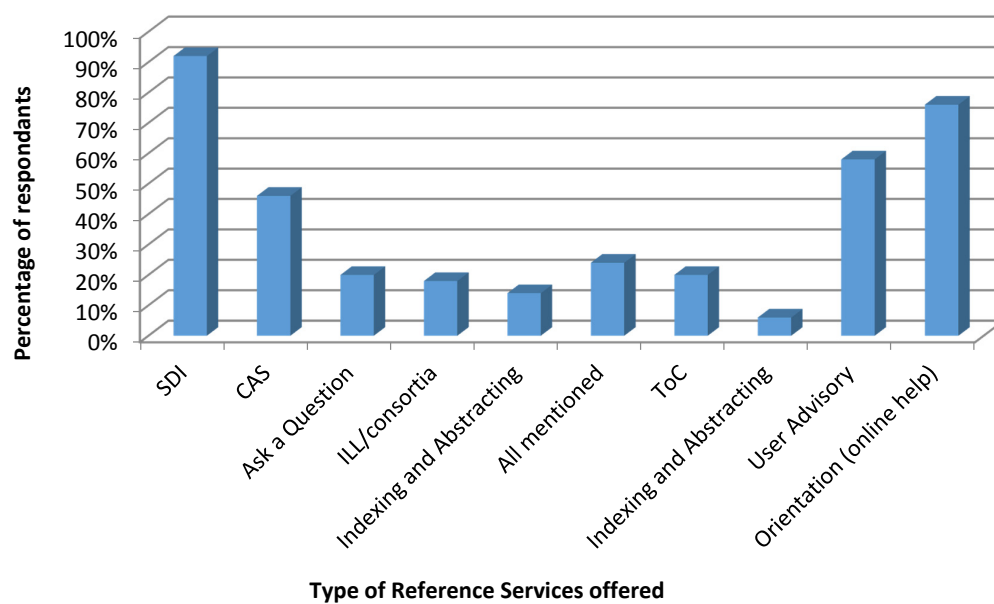
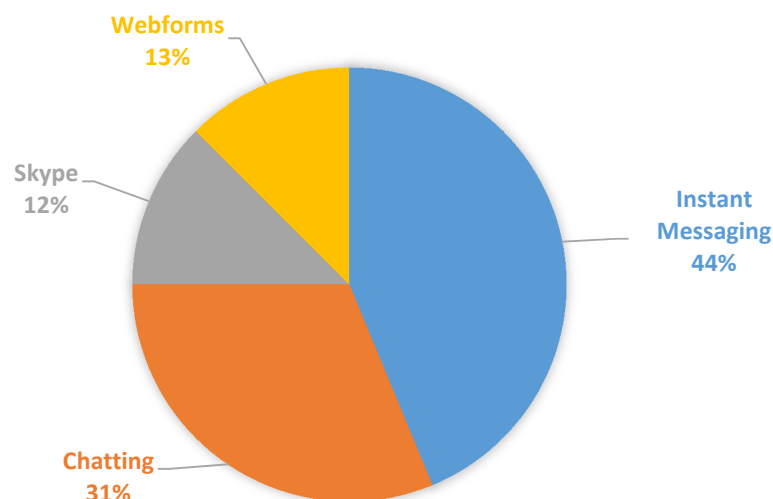**Figure 2.** Reference services offered using search engines in university libraries of Pakistan.

Figure 3. Major channels of providing VRS in Pakistani university libraries.

4.7. Reference Service Question Types

We enquired about the type of reference questions being dealt with by library staff at university libraries in order to assess whether these questions can be answered using online tools and channels or otherwise. Based on the collected data, we found that topical research questions, ready reference questions and subject-based research questions are normally dealt with by the concerned staff at the reference desk section in university libraries in Pakistan. Figure 4 (below) shows the responses in percentages against each type of question being answered by library staff on monthly basis in university libraries. For example, directional questions can be general information to seek the location of nearby places, programs, etc., whereas, "questions pertaining to the policies and procedures within the library system" [32] is a procedural question.
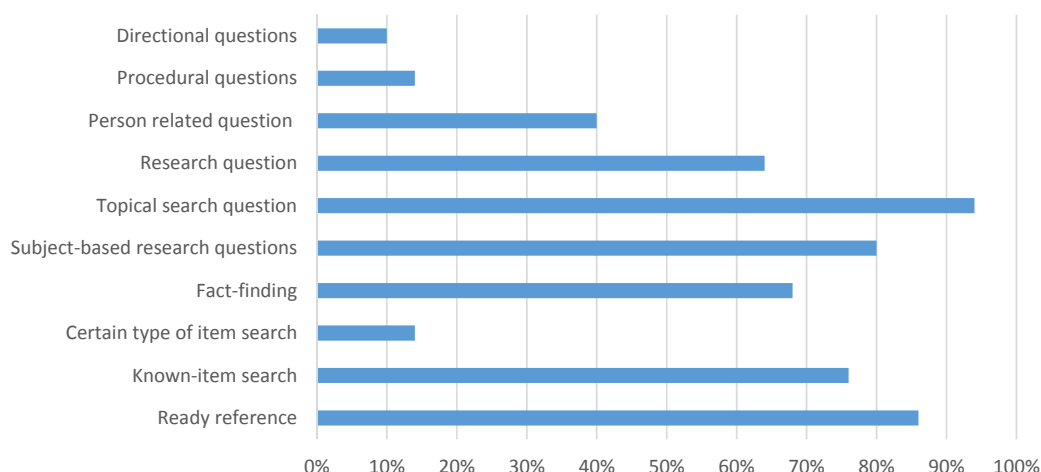
Figure 4. Major types of reference questions being dealt with by reference staff at university libraries.

5. Discussion

Academic libraries are more cognizant about their services, and reference services are considered as the primary purpose of a library that serves the research community. Previous literature (although small) on the topic suggests that VRS is at a development stage in Pakistan. Looking specifically at university libraries, previous studies show that only six university libraries were providing digital reference services in 2009, and in 2013 it was 10 universities in Pakistan, see Mirza [27] and Malik [22] respectively. The most recent study, conducted by Younus [25] in 2014, reveals that 18 university libraries were providing digital reference services. The findings of the current study are completely in line with previous findings and depict that VRS is still in its development stage in Pakistani university libraries. Currently, there are 179 recognized universities and degree-awarding institutes (DAIs) in Pakistan, out of which we could get responses from only 50 public and private sector universities—including top 10 universities as ranked by Higher Education Commission of Pakistan. The findings reveal that only 17 university libraries are currently providing VRS using world wide web (one is providing digital reference services using channels other than world wide web). These findings are in line with earlier studies and shows that there has been no improvement over the past seven years i.e., 2009–2016.

The reviewed literature reveals that academic libraries face a lack of resources and trained professionals along with financial constraints to provide VRS. We discovered similar findings, such as very few libraries having trained and skilled staff, and mostly the head librarian being responsible for answering the reference questions himself. It was found by Younus (p. 143 [25]) that specific research, ready-reference and directional questions are the most common type of reference questions dealt with by university libraries. Findings in this study show that topical search questions and ready-reference questions are the major types of reference queries fielded by the reference staff (Figure 4).

The major part of the current study was to focus on how far web search engines are being used to provide VRS in university libraries in Pakistan. Previous literature i.e., Younus (p. 136 [25]) revealed that the majority of libraries are using email as a channel for providing virtual reference services in Pakistani university libraries. We found that instant messaging, Skype and web forms are currently being used by librarians (see Figure 3). This means that the trend is now shifting from adoption of asynchronous channels to synchronous channels among Pakistani librarians to provide VRS. Moreover, the use of modern forms of reference services among Pakistani university libraries is quite better as compared to other developing countries, see for example Sajjad [33]; Ramos and Abrigo [24]; Maharana and Panda [34]; and Sekyere [35]. In fact, the scenario in developed countries is completely changed. For example, there were 42% academic libraries providing reference services via email in the United States in 1999.

Realizing the importance of VRS in the electronic age, the current situation is alarming, in the sense that online searching has been the first and foremost service being provided by the reference section in most developed countries. Based on the findings of this study, future research may be directed to carry out more in-depth analysis of the requirements of reference services by library users also. Also, similar research may be expanded to cover other universities in order to get a more precise picture of the current situation. Moreover, research in the area of virtual reference services in Pakistani academic, public, and special libraries may be conducted in order to come up with more concrete suggestions and recommendations to improve the situation.

6. Conclusions

Library and information science in Pakistan is growing rapidly. ICT and professional associations are playing an important role in the advancement of this profession. Here we have presented the current status of provision of reference services through digital means and also explored how far the world-wide web is used to provide reference services in university libraries of Pakistan. The results show that provision of VRS in university libraries of Pakistan are in their initial stages, but professionals are ready to accept positive change and development. At the moment, only 17 out of 50 university libraries have deputed special staff to provide VRS through online channels to its patrons, and only a few of them have a written VRS policy. No formal collaboration exists between university libraries in terms of providing virtual reference services to its users. However, exactly half of the respondents (45 males and 22 females) have declared that they prefer to use known listservs and social media connections to request reading material for their potential users. Most the responding librarians were of the viewpoint that merely the use of search engines cannot be an alternative to reference services being provided at the library's reference desk. However, Google is found to be the most used SE, followed by Yahoo, in different university libraries. Instant messaging is normally used by library staff to provide reference services to users, whereas chatting, Skype, and web forms were not popular among university librarians for providing VRS.

7. Recommendations

After examining the current situation of VRS, some recommendations have been framed for Pakistani university libraries to improve the situation.

(a)   The libraries that are not providing virtual reference services at the moment should adopt such services to attract users.

(b)   University libraries should depute competent and technically sound staff to the reference section, especially for digital reference services, and such staff should be compensated accordingly. Such staff should also be trained and equipped with use of new tools and technologies in providing VRS.

(c)   Online chatting tools are very popular in providing VRS in libraries. These should also be adopted in university libraries in Pakistan.

(d)   Libraries should plan their activities and they should focus on user needs, their education and information on digital literacy.

(e)   University libraries should have a written policy to set SOPs (standard operating procedure) for provision of digital reference services within the university and to collaborate with other university libraries.

(f)   Libraries should market their reference service section/desk in order to attract users and make research students and the faculty more familiar with such services.

(g)   Resource mobilization of trained VRS staff is also recommended among university libraries in Pakistan.

Appendix A. Virtual Reference Services in University Libraries of Pakistan

Many libraries are using digital technologies worldwide to provide reference services to its patrons. This survey is designed to help us better understand the experiences that reference librarians have gone through, using digital tools and resources, in providing reference services. We intend to investigate the current status of digital/virtual reference services (VRS) being provided in university libraries in Pakistan. Your valued opinion about VRS will increase our understanding on the issue. We assure you of the confidentiality of data and your valued opinion.

Rubaia Khan, M.Phil Scholar, University of Sargodha

Table A1. General Information.

Name of University	
Designation	
Department/Section	
Gender	
Qualification	
Which library you are currently working at? Main Library ☐ Departmental/Seminar Library ☐	

Table A2. Only for library professional staff.

Q.1	What is the current status of digital/virtual reference services (VRS) at your library.		
	Do you:	YES	NO
	Have trained staff to provide VRS		
	Collaborate with other libraries in providing VRS		
	Have written policy or statement for VRS		
	Use digital tools to provide VRS		
	Have planning to start/strengthen VRS at your library		
Q.	In which year did you receive your MLIS degree or equivalent professional degree?		

Q.3	In which of the following settings have you received formal training on the Internet or its uses?
	    In your professional degree program
	    In your current position
	    In previous professional position		

Q.4	Do you think search engines are threats for libraries?
	    Yes
	    No
	    Don't know		

Q.5	Do you think that search engines can be used to provide reference services to users?
	    Yes
	    No
	    May be		

Q.6	Rate the following search engines to be used effectively in providing better reference services		
	Ask Jeeves	1	very useful
		2	somewhat useful
		3	not very useful
		4	not at all useful
	Alta Vista	1	very useful
		2	somewhat useful
		3	not very useful
		4	not at all useful
	Excite	1	very useful
		2	somewhat useful

Table A2. *Cont.*

		3	not very useful
		4	not at all useful
	Yahoo	1	very useful
		2	somewhat useful
		3	not very useful
		4	not at all useful
	Google	1	very useful
		2	somewhat useful
		3	not very useful
		4	not at all useful

Q.7	Do you feel that library users are more inclined towards use of search engines rather than consulting the library's reference desk/section?
	    Yes
	    No
	    Don't know		

Q.8	Has the availability of Internet-based resources made reference services more challenging
	    Yes
	    No
	    Don't know		

Q.9	What percentage of total library visitors do you think are consulting your library's Reference Desk daily
	    20%
	    40%
	    60%
	    80%		

Q.10	Which of the following services are currently offered by your library to its patrons? Please tick as much as apply to your library
	    SDI
	    Interlibrary Loan
	    CAS
	    Professional Communication
	    Receiving and Answering questions
	    All of above
	    Any other (Please mention)
	    _____		

Q.11	What are the delivery channels/tools you prefer to use for providing reference services		
	Telephone	often	
		sometimes	
		seldom	
		never	
	Fax	often	
		sometimes	
		seldom	
		never	
	Email	often	
		sometimes	
		seldom	
		never	
	Instant Messaging	often	
		sometimes	
		seldom	

Table A2. *Cont.*

		never
	Chatting	often
		sometimes
		seldom
		never
	Facebook	often
		sometimes
		seldom
		never
Q.12	For how long have these services been offered? 　3–6 months 　1–2 years 　2–5 years 　Don't know	
Q.13	How many hours do you work on reference desk/section on a daily basis? 　1–2 h 　2–4 h 　4–6 h 　6–8 h 　never worked	
Q.17	Which of the following types of reference questions do you get at your reference desk/section? Please read the sample question in parenthesis if you're not aware of the given choices. 　Directional Questions………...　　(What is the web link for the library OPAC?) 　Procedural Questions ………..　　(Do you have circulation policy for outsiders?) 　Person-related questions ……　　(Do you have any books on the poems of Ahmad Faraz?) 　Research question …………...　　(I am looking for information on honor killing cases reported in newspaper in the last month) 　Topical research question …….　　(I am looking for review studies on information management) 　Subject-based question ……...　　(Where can I find information about gender equality?) 　Ready reference question ……　　(How do I cite an online video in APA format?) 　Certain type of item searching　　(Do you have Pakistan Economic Survey 1999) 　Fact finding …………………….　　(Where can I have latest census report on education in Pakistan) 　Known item searching ……….　　(I need dictionary of idioms)	
Q.18	Which of the following channels are being used by you to provide reference services to the user? 　Skype 　Web Forms/Emailing 　Instant Messaging 　SMS 　Web Chatting 　Window Live Messenger 　Any Other (please mention) 　_____	
Q.19	Please provide your feedback on how the current situation of providing digital/virtual reference services in university libraries can be improved? 　_____ 　_____ 　_____	

Thanks for your cooperation

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