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# Strength Weakness Opportunity and Challenge (SWOC) of Collaborative Virtual Reference Service (VRS): A feasibility study in consortia environment

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**Abstract**

Reference Service considered as the most essential service for academic and special libraries whether or not face-to-face communication is possible. While reference services differ from one library to the next, most libraries have an information or reference desk where a librarian can assist their users. Almost all libraries provide telephone information services, and many libraries also provide reference service through email, text or chat. The present study contains the universe of sample of 20 members of the CRIKC libraries was initially used in this analysis, but the number was later increased to 29. As a consequence, the research is restricted to understanding, knowledge, technical viability, and other similar variables. Virtual Reference Service (VRS) was not available in almost all CRIKC libraries, and Synchronous VRS (SVRS) was not available in any of them. The research sample was gathered using the questionnaire system, and the data was quantitatively analyzed using both descriptive and inferential statistics using the software IBM SPSS. Response of librarians revealed that regarding the suitability of VRS categories towards handling different types of reference queries '*email*' was the most viable tool for providing asynchronous VRS while in case of synchronous VRS '*instant messaging*' *(IM)* (42.2%) and '*mobile app*' (36.9%) were considered equally effective. '*Effective utilization of staff time*' and '*Optimum use of library collection & resources*' were considered as the most effective factors of web 2.0 enabled VRS for librarians and '*remote access to online assistance*' would be highly effective for users. The librarians believed that '*database and online searching skills*' was the most important competency for providing VRS. A majority of librarians opined that '*effective assistance or support for user satisfaction*' could be the most visible derivable of collaborative VRS. An overwhelming majority of librarians (89.5%) considered '*user demand*' as the most important factor for establishing collaborative VRS.

**Keywords:** Reference Service, Virtual Reference Service (VRS), Digital Reference Service

(DRS), Collaborative Virtual Reference Service (CVRS), CRIKC,

**Introduction:**

The word "reference service" refers to one-on-one assistance given to library patrons who are looking for information. "Mediators between the user and the information," "navigators of the information superhighway," and other terms have been used to describe reference librarians. Reference assistance has traditionally been provided in person at a designated desk within the library, over the phone, and by mail. Libraries have recently grown to include electronic reference services through the World Wide Web. Regardless of the mode of distribution, the value of reference service remains the same: to offer quality information to library users at the point of need through customized service. Human contact is a distinguishing feature of reference service. The assistance of users forms the kernel of reference service the essence of which was beautifully expressed by Padma Shri Dr. S. R. Ranganathan as the process of establishing "contact between the right reader and right book at the right time and in the right personal way" (Ranganathan, 1989). Ranganathan defines Reference Service as: "Personal Service to each reader in helping him to find the documents answering his interest at the moment pin-pointedly, exhaustively and expeditiously" (Ranganathan, 1961). He further said that the questions or queries which are answered by the library staff can be categorized as: "Ready reference queries, Short-range queries and Long-range queries".

Reference Service enables libraries to meet the information needs of the users (Chowdhury, 2002). Reference services arose in reaction to changes in culture and library use in the late 19th and early 20th centuries, when libraries began to see an increase in the number, range, and format of accessible information resources. As a result, library users found it difficult to locate the services they required and the information they needed inside those resources without the assistance of library staff in the form of reference service. It is one of the most demanding aspects of librarianship and its quality of performance may influence the library's image either positively or negatively (Adebayo, 2009). ALA Glossary states, "reference service is that phase of library work which is directly concerned with assistance to

readers in securing information and in using the resources of the library in study and research" (ALA Glossary of Library and Information Science, 1983).

Users' information seeking behaviour (ISB) and expectations from reference services have changed dramatically as a result of emerging technologies. Users of the present generation have a broader range of information needs and inquiries, and the sophistication in which they search for information has also risen dramatically. Libraries must extend their field of reference beyond using the postal, telephone, or fax machine with the aid of the computer and the Internet to satisfy those information needs and demands. The transition from in-person desk-based Traditional Reference Service (TRS) to Virtual Reference Service (VRS) was helped by technological innovation.

VRS/DRS expand reference services from the physical reference desk to a "virtual" reference desk where the patron could be writing from home, work or a variety of other locations. It encompasses both synchronous (i.e., instant messaging, video conferencing, and so on) and asynchronous modes of communication (i.e., texting, email, etc.). In this context any real-time computer-mediated contact between patron and information professional is referred to as "synchronous virtual reference". All computer-mediated correspondence that is sent and received at various times is referred to as asynchronous virtual reference. VRS responds to patrons' information needs through a variety of communication channels, including chat and video conferencing, Voice-over-IP (VoIP), co-browsing, e-mail, and instant messaging.

In view of the above, the present study entitled "Strength Weakness Opportunity and Challenge (SWOC) of Collaborative Virtual Reference Service (CVRS): A feasibility study in consortia environment" has been undertaken by the researcher is an attempt to examine the librarians' perception regarding VRS Collaborative VRS.

**Review of Related Literature:**

Literature reviews are systematic syntheses of previous work around a particular topic. Nearly all scholars write literature reviews at some point; such reviews are common requirements for academic writings, are often the first section of empirical papers, and are

sometimes written to summarize a field of study. Given the increasing amount of literature in many fields, reviews are critical in synthesizing scientific knowledge. A literature review is a systematic explicit and reproductive method for identifying, evaluating and interpreting the existing body of recorded work produced by researchers, scholars and practitioners (Fink, 1998, p.3). The review of the literature for this study focuses on VRS/DRS as discussed by different authors in their scholarly writings. The emphasis has been made to cover the scope, research methodology, major findings, and suggestions or recommendations put forward by the authors.

**Hanji, Hashemi and Farahani (2017)** in their article entitled "Implementing virtual reference services for children and young adults in the Iranian children National library website" described the significant role of modern technologies in library activities and services, including reference services. In order, the researchers employed analytical surveys approach comprising the uninstructed interview to better analyze the information needs and searching behaviours of children and young adults. It was observed that children and young adults were competent in using the Internet. The author also agreed to the findings of some studies indicating that children and young adults might not always be "successful in finding information or using online catalogues and they might get lost in the digital environment where a wide range of information is available." The majority of users claimed that an expert was needed to help them do their internet browsing. Therefore, an expert along with a virtual space for asking questions freely was required to help them in fulfilling their information need. Children and young adults could play a vital role in designing of such an environment. The authors discussed the launch of VRS by establishing a section called 'Ask the Librarian' in the Iranian Children National library Website based on the analysis of feedback received through uninstructed interviews. The authors mentioned that the users considered the implementation of VRS as a welcome move and Chat, email and Telegram messenger were found to be very useful.

**Radford et al. (2016)** in their article titled "Shared Values, New Vision: Collaboration and Communities of Practice in Virtual Reference and SQA" explored new

approaches to improve collaboration, user/librarian experiences, and sustainability for VRS. The study involved in-depth telephone interviews with 50 VRS librarians including questions on collaboration, referral practices, and their attitudes toward Social Question and Answer (SQA) services using the Critical Incident Technique. Findings indicated that participants usually refer questions to other librarians from outside their field of expertise, but sometimes refer them to non-library experts. These referrals were made possible because participants believed that qualified and willing collaborators were other VRS librarians. Collaborative barriers included lack of knowledge of appropriate referral librarians/experts, inability to verify credentials, and perceived reluctance to collaborate. Collaboration facilitators included knowledge of qualified and willing collaborators. Answers from SQA services were perceived as fewer objectives and authoritative, but participants were open to working with non-library experts with professional expertise confirmation or extensive knowledge.

**Phoenix (2016)** in his paper titled "Virtual Reference Service: An Imperative for the Jamaica Social and Economic Information Network The Social and Economic Information Network (SECIN)" observed that the increase and dependence for access to information at their fingertips placed pressure on the information units within the "Jamaica Library and Information Network (JAMLIN)" as well as the Special library section of the "Library and Information Association of Jamaica (LIAJA)" to introduce the VRS Consortium. The author cited a previous study wherein it was found that "Jamaica was ready for a national VRS consortium." The article presented a case study of the adoption of Jamaica's VRS consortium and it depicted the readiness of Jamaica for a national VRS consortium between the "Special Libraries Section of the Library and Information Association of Jamaica (LIAJA)" and the "Social and Economic Information Network (SECIN)". The authors believed that the findings of this research would "help the organizations to successfully introduce a new technology that could approach 100% adoption and it would be used as the reliable source of best practices for the implementation of VRS in Jamaica.

**Khan and Khan (2014)** discussed the difference between traditional library reference service

and digital reference service in their work "Implementation of Digital Reference Services in Pakistani Libraries: A Descriptive and Critical Annotated Bibliographic Guide." They opined that "a digital reference service, unlike the traditional library reference service, allows users to submit questions and receive responses via the Internet and other electronic communication methods." In this paper, the authors discussed the history of DRS, explained various forms of DRS/VRS and/or media. Also discussed the concept and issues related to the use of digital reference in academic libraries. The authors explained the working of VRS along with its implications for users and libraries and speculated on its future.

**Wang and Tang (2014)** in their research paper entitled "A Case Study of a Joint Virtual Reference Network in Jiangsu Province, China" discussed the development of a collaborative DRS in Jiangsu Province, China. 13 city and 6 county libraries participated in the Joint Reference Network of Public Libraries in Jiangsu Province hosted by Nanjing Library. The findings of the study revealed that with inadequate collections, especially digital collections, libraries were unable to meet their patrons' demands. The authors observed that in spite of good initial response much is needed to be done and developing collaborative DRS will be a long-term task. The authors felt the requirement of the utilization of network technologies and marketing is essential to make the digital resources more accessible to the wider user community. Other factors to make the service more beneficial as pointed out by the authors included - the speed of access, affordability and convenience. The authors argued that improvements in those factors would facilitate a greater impact on the socio-economic development of the society.

**Chow and Croxton (2014)** in their study titled "A Usability Evaluation of Academic Virtual Reference Services," examined the usability of five virtual reference services, including - "instant messenger, chat, e-mail, telephone, text messaging, and Skype video-conferencing"-through 31 undergraduate and graduate students to assess the usability of VRS of two different universities. The findings revealed that user preference and satisfaction were highly correlated with the service's overall usability in terms of

effectiveness and efficiency. In all measures, including satisfaction and seven different usability factors, online chat was rated highest. The study's major implications suggested that online chat was the virtual reference of choice for university students and that usability metrics were a good predictor of user preferences centered on high investment return, transaction speed, convenience, and minimal effort.

**Yang and Dalal (2014)** conducted research on web-based reference facilities in scholarly libraries in their paper "Delivering Web-based Virtual Reference Services: An Investigation into Current Practice by Academic Libraries." In 2013, Peterson's Four-Year Colleges took a random sample of 362 organizations. The writers checked the website of each library for reference-related operations, specifically where library: 1) supplied or stated reference on the primary page and terminology used to advertise the reference service; 2) supplied an interview and associated data such as the place of the chatbox, the supplier (in-house vs. consortia) and the product or program used; and 3) supplied other virtual reference types. The findings indicated that approximately 68.00 percent of the libraries in the sample stated reference services on the main web page. About 74.00 percent of the libraries used at least one of the following technologies for virtual reference: email, phone, chat, IM, text, and video chat. The chat-based reference service is provided by exactly 47.50 percent of libraries. Institutions offering more sophisticated degrees and having more learners were more probable than those offering low-level degrees and fewer teachers to give chat-based reference service. This was the only large-scale research with information of the scholarly library digital reference.

**Tang and Tseng (2014)** examined the attitude of distance students towards seeking library assistance through a web-based survey in their research paper entitled "Distance Students' Attitude towards Library Help-Seeking." A campus radius of 30 miles was used to distinguish arbitrarily between near-campus and far-off campus groups. The study concluded that distance students visiting libraries were looking for more help. The study findings revealed that LibGuides was the most widely used among all types of library help sources.

Near campus, students preferred more face-to-face consultation than virtual service and tended to seek help from peers as well. However, with a distance librarian, far-off campus students were more likely to seek help. The email was still the most common way to distribute and receive libraries. The authors noted that there was no one model that fits all the reference services. They said a library should identify the best reference service that met the changes in their communities and the function of the library over time.

**Luo (2011)** presented a detailed description of the text reference environment and its affordability in her research paper entitled "Text Reference Service: Delivery, Characteristics and Best Practices". The author undertook the qualitative and quantitative analysis of the available literature pertaining to text-reference provided by My Info Quest, the first collaborative text reference service in the United States. The study findings revealed that two types of text reference service models were prevalent, namely mobile device-based and computer-based. Considerations related primarily to budget, staffing, and usability were defined for developing a service. Text reference, primarily dealing with short, straightforward questions and answers, was fit-in somewhere between synchronous and asynchronous VRS. All those factors influenced adherence to RUSA guidelines for behavioural performance of reference librarians and may help in effectively establishing text reference service. The author suggested strategies to help librarians adhere to the Reference and User Services Association (RUSA) behavioural guidelines in the text reference service.

**Dollah and Diljit (2010)** in their case study titled "Determining the Effectiveness of Digital Reference Services in Malaysian Academic Libraries" determined the VRS effectiveness in academic libraries in Malaysia by considering factors like awareness, usage, users' perception, library's performance, perceived needs, issues, and problems faced by students. The data was collected by combining 3 data collection methods: viz., questionnaires, interviews, and content analysis. This study revealed that the majority of respondents (67.30%) were aware of their university library offering DRS. Face-to-face consultations emerged as major communication mode (56.20%), telephone consultations (6.30%), and correspondence by

(6.00%). Approximately 20 percent used e-mail reference, 28.20% used web forms, 26.80% used Ask-A-Librarian, and 4.90% used online chat reference. In terms of users' perception, the study found that majority of the respondents (54.50%) regard the service as of somewhat high quality, 38.50% high quality, and 4.70% as very high quality. It was also found that 1.70% of the respondents regard the service as poor quality and 0.70% as very poor quality. The researchers argued that the findings of this study would have wider implications for the academic libraries of Malaysia and the world towards adoption, implementation and development of VRS.

**Olszewski and Rumbaugh (2010)** in their paper entitled "An International Comparison of Virtual Reference Services" performed a comparative analysis of the nature of VRS in 23 libraries of 10 countries. The data compiled from web-form transactions e-mailed to and from libraries via the QuestionPoint VRS were analyzed. The transactions were analyzed by language, type of institution (public or academic), question type (access, bibliographic, or subject), answer type, subject, and response time, pertaining to two years. The study findings revealed that English was the language of choice. Slightly more than one-third of all questions posed in academic libraries were about subjects of the Humanities, but at second the Sciences and Social Sciences were tied. Two-thirds of all questions asked about humanities-related topics in case of public libraries. The study results gave insight into how students and the public used virtual reference services in different countries and how service efficiency differed between countries and types of libraries.

**De Groote, Dorsch, Collard, and Scherrer (2005)** in their article titled "Quantifying Cooperation: Collaborative Digital Reference Service in the Large Academic Library" examined the success of establishing an integrated single-window VRS platform for a big academic library with multiple departments and subject specialists. The findings of the study revealed that the majority of questions originated from within the university, a significant proportion of questions belong to the category of ready reference and directional. The authors also observed that the users were assisted quite successfully while questions demanding

subject-expertise were addressed by appropriate subject specialists. The authors acknowledged that further and deeper analysis of the questions types would facilitate decisions regarding library website redesign, online instruction needs, and more useful FAQs database.

**Broughton (2003)** in his research article entitled "Usage and User Analysis of a Real-Time Digital Reference Service" presented the results of use analysis and user survey of Bowling Green State University Libraries' "Chat with a Librarian" service for the academic year 2001-2002. The study explored reasons for users preferring DRS over in-person TRS even when they were present in the library. The findings revealed that DRS was "appreciated by the users and that many of them found reference transactions to be highly satisfactory."

**Statement of the problem    and Rationale of the Study:**

Though libraries in many countries have been able to adopt digital reference services (DRS) or virtual reference services (VRS), VRS adoption in India is rare, with the exception of a few cases where libraries provide reference services through email or web-form (asynchronous). The advantages of VRS are now well known, and its high time libraries in our countries should adopt the synchronous mode of VRS for its inherited benefits. The literature revealed that there are few cases in India where libraries provide VRS. In theory, this discrepancy may be a result of real VRS implementations.

More and more library resources are now available in electronic format with users accessing e-resources online. The users heavily relying on the e-resources may access them from anywhere and at any time. The study of the related literature does not indicate the prevalence of VRS in Indian libraries.

The demand for online information services is rising day by day in today's e-centric environment, with changing user information needs and information seeking actions (ISB). The most pressing concern is how libraries will react to this paradigm change. It is now necessary to objectively evaluate library and information professionals' perceptions, perspectives, and attitudes toward VRS.

The present research will be a useful study and is likely to bring fruitful results in terms

of information connected with synchronous virtual reference (SVR). It is also hoped that the present research work will motivate further researches in this field and will contribute to Indian libraries as a whole.

Thus, in the light of the above facts the present study titled "Strength Weakness Opportunity and Challenge (SWOC) of Collaborative Virtual Reference Service (CVRS):   A feasibility study in consortia environment" has been planned by the researcher as a meaningful understanding and deliberate investigation pertaining to the domain of VRS.

**Significance of the study**

The findings and suggestions of the study will benefit the libraries, library users who want online assistance to be provided, and the institutions engaged in teaching, learning and research. The study will provide a simple, effective and reliable approach to enable the libraries to implement VRS in standalone libraries that would be equally sustainable for VRS collaboration in a "Reference Consortia". The study will contribute significantly to the field of research undertaken by addressing the statement of the problem.

The results of the study will provide the libraries with information on how improvements and advancements can be brought in the current status of TRS and VRS. This study will foster new ways of enhancing knowledge, skills and attitude, thus preparing globally competitive libraries in the future. Information collected will help in enriching and extending the current/existing literature in the field of VRS. The study will help in understanding librarians' perception regarding Virtual Reference Service (VRS).

**Research Questions:**

The present study revolves around and attempts to investigate the following research questions:

RQ1:   What perception librarians' have regarding Asynchronous and Synchronous Virtual Reference Service (AVRS and SVRS)?

RQ2:   What are the Perception of librarians regarding the use of web 2.0 enabled  VRS    for librarians as well as for users?

RQ3: What are the Perception of librarians regarding Core Training Areas to Librarians for providing effective VRS ?

RQ4: What are the Librarians' Perception Regarding Need and Purpose of Collaborative VRS?

RQ5: What are the Librarians' perception regarding Determinants of Collaborative VRS ?

**Objectives of the Study**

1.  To know the perception of librarians regarding Asynchronous and Synchronous Virtual Reference Service (AVRS and SVRS).

2.  To ascertain the perception of librarians regarding the use of web 2.0 enabled VRS for librarians as well as for users.

3.  To investigate the librarians' perception regarding core training areas to librarians for providing effective VRS.

4.  To assess the librarians' perception regarding Need and Purpose of Collaborative VRS.

5.  To assess the librarians' perception regarding determinants of Collaborative VRS. suitable free VRS tool.

**Scope:**

The scope of the study comprises various facets pertaining to virtual reference service (VRS) including technological innovations, assessment of their suitability, and current status of reference service in CRIKC (Chandigarh Region Innovation & Knowledge Cluster) institutions. CRIKC was established on 24th November 2012 and constituted as a cluster of Chandigarh region institutions to promote and sustain excellence in research. CRIKC aims to foster and sustain close academic alliances between institutions of higher education and research in the Chandigarh region. It aims to facilitate innovation and knowledge creation and for achieving excellence in all academic spheres without compromising in any manner the autonomy of the participating institutions.

Various aspects of VRS Web-tool including chat, integrated file sharing, FAQs database, and co-browsing, etc., perceptions of Librarians' regarding the VRS as-well-as, users' awareness and value judgement regarding the same constituted a major study component and provided valuable inputs for devising a realistic framework of VRS implementation and its sustainability. Table 1 provided the list of CRIKC member institutions

**Universe of the study and Sampling:**

The universe consists of all survey elements that qualify for inclusion in the research study. The universe may be individuals, groups of people, organizations, or even objects. In the present study, the universe of the study comprises libraries of select member institutions of Chandigarh Region Innovation & Knowledge Cluster (CRIKC). At the initial stages of my study, there were 20 members of CRIKC. Later, as of June 2019, the number rose to 29 with new members joining the cluster. The population of the present study comprises librarians of select CRIKC institutions. The present study focussed on ascertaining the current status of VRS, the reason for not providing VRS and feasibility of VRS. However, it is also pertinent to know the opinion of users regarding the need for VRS. For this purpose, twenty users from each institution were interviewed to supplement information for the need of VRS.

**Table 1: Select CRIKC member institutions under study**

| SN | Institution | Place |
|---|---|---|
| 1. | Panjab University (PU) http://puchd.ac.in/ | Chandigarh |
| 2. | Postgraduate Institute of Medical Education & Research (PGIMER) http://pgimer.edu.in/PGIMER_PORTAL/PGIMERPORTAL/home.jsp | Chandigarh |
| 3. | PEC University of Technology http://pec.ac.in/~pecac/new/ | Chandigarh |
| 4. | Indian Institute of Science Education & Research (IISER) http://www.iisermohali.ac.in/ | Mohali Punjab |
| 5. | Indian Institute of Technology Ropar (IIT Ropar) http://www.iitrpr.ac.in/ | Rupnagar Punjab |
| 6. | Institute of Microbial Technology (IMTECH) http://www.imtech.res.in/index.php?option=com_content&view=frontpage&Itemid=1 | Chandigarh |

| 7. | National Institute of Pharmaceutical Education and Research (NIPER) http://www.niper.ac.in/ | Mohali Punjab |
|---|---|---|
| 8. | CSIR-Central Scientific Instruments Organization (CSIR-CSIO) http://www.csio.res.in/ | Chandigarh |
| 9. | Institute of Nano Science and Technology (INST) http://www.inst.ac.in/ | Mohali, Punjab |
| 10. | Indian School of Business (ISB) http://www.isb.edu/pgp/campuses/Mohali | Mohali, Punjab |
| 11. | National Agri-Food Biotechnology Institute (NABI) http://www.nabi.res.in/ | Mohali, Punjab |
| 12. | National Institute of Technical Teachers Training & Research (NITTR) http://www.nitttrchd.ac.in/sitenew1/ | Chandigarh |
| 13. | Terminal Ballistics Research Laboratory (TBRL) Defense Research and Development Organization (DRDO), http://www.drdo.gov.in/drdo/labs/TBRL/English/index.jsp?pg=homebody.jsp | Chandigarh |
| 14. | Government Medical College & Hospital (GMCH) http://gmch.gov.in/ | Chandigarh |
| 15. | Chandigarh College Of Engineering & Technology (CCET) http://www.ccet.ac.in/ | Chandigarh |
| 16. | Punjab State Council for Science & Technology (PSCST) http://pscst.gov.in/Default.aspx?pagesPSCST=home&mainMenu=Home | Chandigarh |
| 17. | Centre for Development of Advanced Computing (C-DAC) http://www.cdac.in/ | Mohali |
| 18. | Institute of Development and Communication (IDC) http://www.idcindia.org/ | Chandigarh |
| 19. | Centre for Research in Rural and Industrial Development (CRRID) http://www.crrid.res.in/ | Chandigarh |
| 20. | Punjabi University, Patiala http://www.punjabiuniversity.ac.in | Patiala Punjab |

**Research Methodology:**

The research problem investigated by the study was the culmination of several factors including the absence of actual VRS implementation in Indian libraries, especially SVRS, lack of studies discussing any free VRS software. The research questions of the present study composed of aspects including the perception of librarians regarding Asynchronous and

Synchronous Virtual Reference Service (AVRS and SVRS), use of web 2.0 enabled VRS, core training areas to librarians for providing effective VRS, need and purpose of collaborative VRS and determinants of collaborative VRS.

To gather data for addressing these issues, the quantitative method was found to be appropriate as it facilitates measuring, ranking, categorizing, identifying patterns and making generalizations. The survey method of research was adopted to conduct the study. To conduct the survey, questionnaire method was employed to collect data from librarian/reference librarian/library professionals from the libraries of the select CRIKC institutions. To supplement information the interview method was also employed to collect data as and whenever required.

Owing to the fact that several CRIKC institutions, considered for the study were R&D organizations including a few, from the defence sector, the necessary permission to collect data was obtained from the Director, CRIKC. The questionnaire was administered to the library users on the library/institution premises. Except for IIT Ropar and Panjabi University Patiala, all other CRIKC institutions were located at nearby places in Panjab and Chandigarh. The data collection process took around one year. The data obtained (through the questionnaire and interview schedule) were later coded into the spreadsheet program. The data was then analyzed using statistical software IBM SPSS.

**Data analysis**

Data analysis is a process of assigning meaning to collected data. It aims to organize, classify and summarize the data being collected for better comprehension and interpretation leading to understand and explore answers or solutions to the research problem which originally triggered the research. Interpretation deals with the broader meaning and relevance of the findings in a given context. Analysis and interpretation complements and supplements each other and none of them is complete without each other and is interdependent. The data analysis for the present research was done quantitatively with the help of both descriptive statistics and inferential statistics using the software IBM SPSS.

**Table: 2     Suitability of VRS formats regarding answering different**

**types of reference questions**

| VRS Formats | Lowest Degree | Preference | | | Highest Degree | Total | Mean | Rank |
|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | | | |
| **Asynchronous VRS** | | | | | | | | |
| E-mail reference | 3 (15.8) | 0 (0) | 0 (0) | 4 (21.1) | 12 (63.2) | 19 (100) | 4.0 | R1 |
| Web form | 6 (31.6) | 1 (5.3) | 3 (15.8) | 4 (21.1) | 5 (26.3) | 19 (100) | 3.3 | R2 |
| Short Messaging Service (SMS) | 6 (31.6) | 0 (0) | 5 (26.3) | 3 (15.8) | 5 (26.3) | 19 (100) | 2.7 | R3 |
| **Synchronous VRS** | | | | | | | | |
| Web chat | 9 (47.4) | 1 (5.3) | 4 (21.1) | 5 (26.3) | 0 (0) | 19 (100) | 2.6 | R3 |
| Instant Messaging (IM) | 5 (26.3) | 2 (10.5) | 4 (21.1) | 4 (21.1) | 4 (21.1) | 19 (100) | 3.6 | R1 |
| Mobile App | 7 (36.8) | 2 (10.5) | 3 (15.8) | 4 (21.1) | 3 (15.8) | 19 (100) | 3.6 | R1 |
| Voice over Internet Protocol(VoIP) like Skype | 14 (73.7) | 0 (0) | 2 (10.5) | 3 (15.8) | 0 (0) | 19 (100) | 0.9 | R5 |
| Video-conferencing | 13 (68.4) | 1 (5.3) | 3 (15.8) | 2 (10.5) | 0 (0) | 19 (100) | 2.3 | R4 |

*Results*

The table above reflects the perception of librarians regarding the suitability of VRS categories towards handling different types of reference queries. As per the responses received

it was found that '*email*' was the most viable tool for providing asynchronous VRS (μ=4.0, R=1) as 63.2% believed it as a highly suitable channel for providing VRS. '*webform*' was the second most preferred mode as perceived by 47.4% librarians with mean score 3.3 and '*SMS*' was the least preferred Asynchronous mode with mean score 2.7 (R3). While in case of synchronous VRS '*instant messaging*' *(IM)* (42.2%) and '*mobile app*'(36.9%) were considered equally effective (μ=3.6 and R1) as per the perception of librarians. '*webchat*' (26.3%) considered as the second most effective tool (μ=2.6, R3). None of the librarians has given highest preference to '*video conferencing*' as a medium of synchronous VRS. As perceived by the librarians, '*VOIP*' did not consider as a suitable tool.
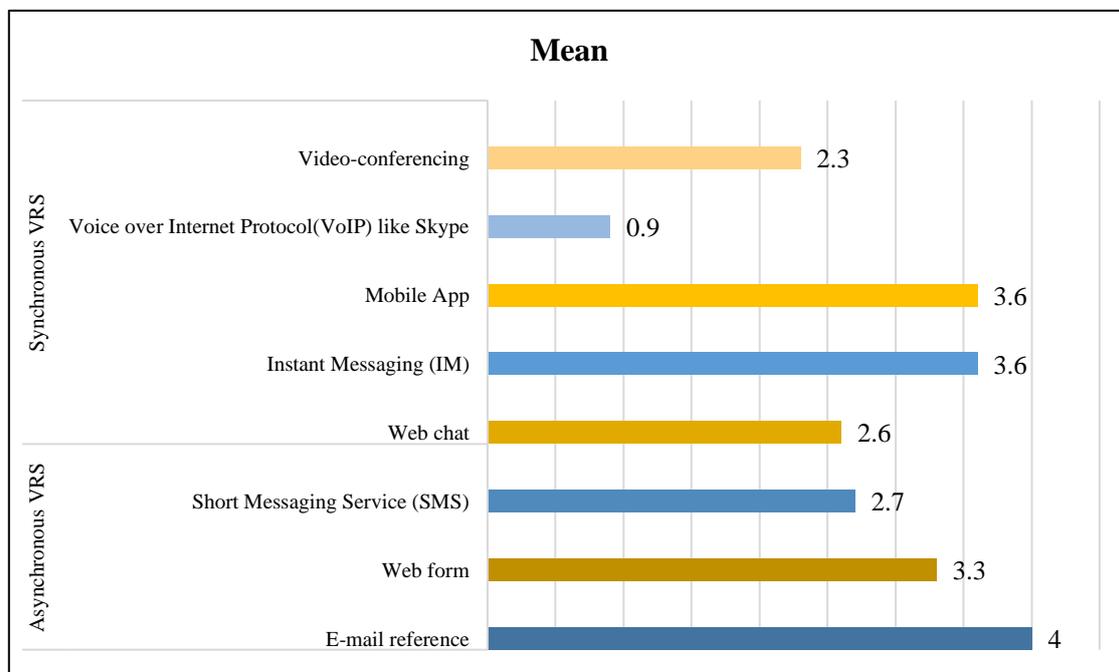


**Figure 1:   Suitability of VRS formats regarding answering different types of reference questions**

*Discussion:*

In the asynchronous mode of VRS, the information seeker gets the answer to his or her queries at a later stage with some time gap as the reference librarian may not respond instantly. The email was to be the most preferred method for Asynchronous VRS (as per the perception of the librarians). In the synchronous mode of VRS, the communication (query response)

occurs in real-time without any time lag. Librarians of the CRIKC Institutions perceived IM as the most appropriate method for synchronous VRS. It is pertinent to mention that why library use official email ID for Email-based reference service (asynchronous), IM still remains a personal means of communication unless a professional VRS solution is used with an additional feature of IM. Also, none of the CRIKC libraries had their mobile app. Still, libraries believe that mobile apps are useful when it comes to providing synchronous VRS. VoIP and video conferencing which facilitates synchronous communications had not been perceived as appropriate tools of VRS. This can be attributed to the fact that they require dedicated space and library professionals apart from the requirement of high-speed Internet connectivity for high-quality voice and video communications. Chat-based VRS via the embedded chat widget on the library website homepage, the most popular synchronous VRS method amongst the libraries world over offering VRS had been appreciated by only 5, out of 19 librarians of the CRIKC libraries with 4 being neutral and 10 considering it be less effective/ suitable than IM and mobile app. The Technology Acceptance Model (TAM) and Unified Theory of Acceptance and Use of Technology (UTAUT) are reflected in the various modes of VRS.

**Table: 3      Perception regarding the use of web 2.0 enabled VRS for librarians**

|  | Ineffective n(%) | Somewhat Effective n(%) | Moderately Effective n(%) | Effective n(%) | Very effective n(%) | Total | Mean | Rank |
|---|---|---|---|---|---|---|---|---|
| Library Advocacy and Publicity | 3 (15.8) | 2 (10.5) | 3 (15.8) | 8 (42.1) | 3 (15.8) | 19 (100) | 3.3 | R15 |
| More efficient and cost-effective than traditional reference service | 1 (5.3) | 3 (15.8) | 3 (15.8) | 6 (31.6) | 6 (31.6) | 19 (100) | 3.7 | R10 |
| Convenient to offer | 1 (5.3) | 4 (21.1) | 4 (21.1) | 9 (47.4) | 1 (5.3) | 19 (100) | 3.3 | R15 |
| Motivates users to use library and its resources more effectively and efficiently | 0 (0) | 3 (15.8) | 2 (10.5) | 6 (31.6) | 8 (42.1) | 19 (100) | 4.0 | R5 |
| Gives more time for thought and reflectionon part of librarian | 0 (0) | 3 (15.8) | 1 (5.3) | 11 (57.9) | 4 (21.1) | 19 (100) | 3.8 | R7 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Staff mobility as theycan answer queries from anywhere | 1 (5.3) | 0 (0) | 5 (26.3) | 8 (42.1) | 5 (26.3) | 19 (100) | 3.8 | R7 |
| Provides new options for answeringreference questions | 2 (10.5) | 0 (0) | 4 (21.1) | 7 (36.8) | 6 (31.6) | 19 (100) | 3.8 | R7 |
| Distribute/share workload amongstaff | 2 (10.5) | 3 (15.8) | 3 (15.8) | 5 (26.3) | 6 (31.6) | 19 (100) | 3.5 | R13 |
| To promote Information Literacy | 1 (5.3) | 1 (5.3) | 2 (10.5) | 6 (31.6) | 9 (47.4) | 19 (100) | 4.1 | R3 |
| Increase students engagement | 2 (10.5) | 1 (5.3) | 3 (15.8) | 8 (42.1) | 5 (26.3) | 19 (100) | 3.7 | R10 |
| Service Quality improvement. | 1 (5.3) | 5 (26.3) | 1(5.3) | 8 (42.1) | 4 (21.1) | 19 (100) | 3.5 | R13 |
| Increased usage/volume of reference service | 2 (10.5) | 1 (5.3) | 3 (15.8) | 7 (36.8) | 6 (31.6) | 19 (100) | 3.7 | R10 |
| Effective utilization of staff time. | 0 (0) | 0 (0) | 5 (26.3) | 6 (31.6) | 8 (42.1) | 19 (100) | 4.2 | R1 |
| Improve organizational knowledge through knowledge sharing and management | 0 (0) | 4 (21.1) | 2 (10.5) | 5 (26.3) | 8 (42.1) | 19 (100) | 3.9 | R6 |
| Optimum use of library collection & resources | 1 (5.3) | 1 (5.3) | 2 (10.5) | 5 (26.3) | 10 (52.6) | 19 (100) | 4.2 | R1 |
| May attract non-users | 0 (0) | 0 (0) | 4 (21.1) | 10 (52.6) | 5 (26.3) | 19 (100) | 4.1 | R3 |

## *Results*

CRIKC librarians were questioned to mention their perception regarding various web 2.0 enabled VRS on a five-point scale. The Table 3 makes it clear that the highest response (52.6%) for '*optimum use of library collection and resources*' was in 'Very Effective' category while 26.3% of the librarians found it 'Effective' with mean score 4.2 and Rank one, '*efficiency/better use of staff time*' was mentioned as 'Very Effective' by 42.1% and 'Effective' by 31.6% of the librarian with equal mean score 4.2 and Rank one. '*to promote information literacy*' (79%), '*may attract non users*' (78.9%) '*motivates users to use library and its resources more effectively and efficiently*' (73.7%) and '*improve organizational knowledge*' (68.4) were at least found effective ('Highly effective' and 'Effective') by majority of CRIKC

institutional librarians with mean score ranging from 4.1 (R3) to 3.9 ( R6). It can be observed from the table *'gives more time for thought and reflection on part of librarian'* (78.7%) and *'staff mobility as they can answer queries from anywhere'* (68.4%) were given importance (Very effective and Effective) by majority of librarians with equal mean score 3.8 and Rank seven. About 70% of the librarians had a positive perception (Very effective and Effective) towards *'provides new options for answering reference questions'* ($\mu$=3.8, R7)*, 'increased usage/volume of reference service'* ($\mu$=3.7, R10) and *'increase students engagement'* ($\mu$=3.7, R10). Other enhancement of VRS as perceived by the librarians included *'more efficient and cost-effective than traditional reference service'* ($\mu$=3.7, R10) to *'convenient to offer'* ($\mu$=3.3, R15) as mentioned in the table above

### *Discussion*

Early and wider adoption of Virtual Reference (VRS) service as an extension and companion of Traditional Reference Service (TRS) have yielded commendable benefits as reported in the literature. VRS has proven useful and productive not only for standalone libraries but achieve remarkable success in the field of cooperative reference. Its utility is specifically visible in the effectiveness of the factors including *'provides new options for answering reference questions'*, *'distribute/share workload among staff, increase students engagement'*, *'service quality improvement', 'increased usage/volume of reference service'*, *'effective utilization of staff time', 'improve organizational knowledge through knowledge sharing and management', 'optimum use of library collection & resources'*. *'staff mobility as they can answer queries from anywhere'* exemplifies the principle of Task-Technology Fit Model (TTF) and *'convenient to offer'* exhibits to the principles of The Principle of Least Effort (PLE) Libraries of the 21st century have to remodel and re-engineer themselves as "learning organisations" through effective knowledge management strategies. The Knowledge Base (KB), one of the crucial components of VRS, structured in the form of Frequently Asked Question (FAQs) does exactly the same. VRS opens a new avenue for a group of libraries to engage in a consortia model through collaborative VRS. It has the ability to make the reference service more exciting, more happening, lively, value-added, multi-pronged, creative and innovative wherein the staff user combo participate with greater enthusiasm and a greater sense

of satisfaction. The application of conversational AI Chatbots makes the arena of VRS even more thrilling and promising saving the time of the staff and reader outstandingly.

**Table 4:** **Perception regarding the use of web 2.0 enabled VRS to enhance the effectiveness of reference service for users**

| | Very effective n(%) | Effective n(%) | Moderately Effective n(%) | Somewhat Effective n(%) | Ineffective n(%) | Total | Mean | Rank |
|---|---|---|---|---|---|---|---|---|
| More personalized service & problem solving | 6 (31.6) | 7 (36.8) | 2 (10.5) | 3 (15.8) | 1 (5.3) | 19 (100) | 3.7 | R4 |
| Better assist the users | 2(10.5) | 10(52.6) | 3(15.8) | 2(10.5) | 2(10.5) | 19 (100) | 3.4 | R7 |
| Provides faster access to information | 6 (31.6) | 6 (31.6) | 5 (26.3) | 1 (5.3) | 1 (5.3) | 19 (100) | 3.8 | R2 |
| 24/7 service availability | 7 (36.8) | 6 (31.6) | 1 (5.3) | 3 (15.8) | 2 (10.5) | 19 (100) | 3.7 | R4 |
| Helps to provide a more complete answerto users | 8 (42.1) | 4 (21.1) | 4 (21.1) | 2 (10.5) | 1 (5.3) | 19 (100) | 3.8 | R2 |
| Remote access to online assistance | 8 (42.1) | 7 (36.8) | 3 (15.8) | 0 (0) | 1 (5.3) | 19 (100) | 4.1 | R1 |
| Helps to save chat session text which can be used later by both librarian and users | 5 (26.3) | 4 (21.1) | 6 (31.6) | 3 (15.8) | 1 (5.3) | 19 (100) | 3.5 | R6 |

*Results*

The table above depicts the usefulness of VRS from the users' perspective. It was found that a little more than 40% librarians found '*remote access to online assistance*' highly effective while 36.8% found it effective for users with mean score 4.1 and rank 1. It can be noted from the table that 63.2% of the librarians found '*provides faster access to information*'

and '*helps to provide a more complete answer to users'* at least effective (Very effective and effective) with equal mean and rank (μ=3.8, R2). Two of the features of VRS namely '*more personalised service and problem-solving'* and '*24/7 service availability'* had been given equal importance by 68.4% of the CRIKC librarians and both the web 2.0 enabled VRS placed at rank 4 with μ= 3.7. Another two features were' *helps to save chat session text which can be used later by both librarian and users'* (μ=3.5, R6) and '*better user assistance'* (μ=3.4, R7).

## Discussion

There are several areas where VRS can score over TRS. Users can be immensely benefited through VRS as they can get anywhere, any time and quick access to timely assistance to their queries and information need. They can get their query resolved more comprehensively in a more personalized manner. Many a time's users need to refer to the information provided by the library staff in a previous chat session. VRS makes this possible as the chat transcript is mailed to the users which they can use any time.

**Table: 5    Perception regarding Core Training Areas to Librarians for providing effective VRS**

|  | Very Important n(%) | Importance n(%) | Moderately Important n(%) | Off little Important n(%) | Not Important n(%) | Total | Mean | Rank |
|---|---|---|---|---|---|---|---|---|
| Conduct effective reference interview online | 5 (26.3) | 2 (10.5) | 9 (47.4) | 0 (0) | 3 (15.8) | 19 (100) | 3.3 | R8 |
| Clear communication skills, especially in writing | 5 (26.3) | 7 (36.8) | 5 (26.3) | 1 (5.3) | 1 (5.3) | 19 (100) | 3.7 | R3 |
| Database and online searching skills | 9 (47.4) | 4 (21.1) | 4 (21.1) | 1 (5.3) | 1 (5.3) | 19 (100) | 4.0 | R1 |
| Understand | 6 | 5 | 3 | 4 | 1 | 19 | 3.6 | R6 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| and apply VRS policies and procedures | (31.6) | (26.3) | (15.8) | (21.1) | (5.3) | (100) | | |
| Knowledge of reference & information sources | 7 (36.8) | 5 (26.3) | 4 (21.1) | 2 (10.5) | 1 (5.3) | 19 (100) | 3.8 | R2 |
| Multi-tasking | 5 (26.3) | 6 (31.6) | 3 (15.8) | 1 (5.3) | 4 (21.1) | 19 (100) | 3.4 | R7 |
| Professional relationship with the online user | 6 (31.6) | 3 (15.8) | 2 (10.5) | 3 (15.8) | 5 (26.3) | 19 (100) | 3.1 | R12 |
| Work with multiple users | 5 (26.3) | 4 (21.1) | 3 (15.8) | 3 (15.8) | 4 (21.1) | 19 (100) | 3.2 | R11 |
| Lucid explanations | 8 (42.1) | 2 (10.5) | 5 (26.3) | 4 (21.1) | 0 (0) | 19 (100) | 3.7 | R3 |
| Knowing when to refer to another librarian | 4 (21.1) | 4 (21.1) | 5 (26.3) | 5 (26.3) | 1 (5.3) | 19 (100) | 3.3 | R8 |
| Understand the patrons' actual information need | 5 (26.3) | 5(26.3) | 3(15.8) | 2 (10.5) | 4 (21.1) | 19 (100) | 3.3 | R8 |
| Reference transactions evaluation | 5 (26.3) | 7 (36.8) | 5 (26.3) | 1 (5.3) | 1 (5.3) | 19 (100) | 3.7 | R3 |

*Results*

Table 5 represents the perception of library staff regarding various professional competencies for providing VRS. As opined by 47.4% respondents 'database and online searching skills' was the most important competency while 21.1% felt it as important (μ=4.0, R1). A little more than sixty percent (63.1%) of the librarian felt 'knowledge of reference and information sources' (μ=3.8, R2), 'clear communication skills, especially in writing' (μ=3.7, R3) and 'reference transaction evaluation' (μ=3.7, R3) were important ('Important' and 'Very important'). 'Lucid explanation' was also given equal weightage (μ=3.7, R3). Other

competencies mentioned in the table above ranked between R6 to R12 (μ=3.8 to μ=3.1). A few of these competencies included *'understand and apply VRS policies and procedures'*; *'multitasking', 'understand the patrons' actual need',* etc. However, *'professional relationship with the online user'* was given the least importance.

## *Discussion*

Database and online searching skills are essential for the VRS staff for two reasons firstly they may be required to provide relevant bibliographic or full-text information as demanded by the user in the least possible time without making them wait. Secondly, they are supposed to impart these skills to the users for making them, independent learners. Knowledge of reference and information sources is essential for providing a quick and accurate response as in VRS face to face conversation does not occur, clear and prompt written communication with lucid explanation in virtual space resumes prime importance to make the reference interview successful. Evaluation of previous reference transaction between the staff and user provides useful insight to enhance service quality in future as the evaluation may help understand the strengths and weaknesses of the service. It is important for the libraries to frame well-defined policies and procedures for the effective provision of VRS. As it will guide and provide direction for the staff engaged in providing VRS it becomes all the more important in a collaborative model of VRS wherein the participating Institutions are supposed to develop well-articulated common VRS policies and procedures for equal adherence. This will ensure uniformity and standardization while equipping the participating libraries in cases of complex situation and confusion. Conducting reference interview online may require additional skills to understand the user needs completely and provide the user with desired information readily. Multitasking is an important aspect of VRS as the staff may be involved in handling queries via chat, database searching and file sharing, attaching a file, co-browsing etc. Another competency accepted in collaborative environment out of VRS staff is working with more than one user simultaneously. As per RUSA & IFLA VRS guidelines maintaining a healthy professional relationship with the online user is very crucial for gaining patron loyalty and

frequent revisit leading to rising in the utilization of library holdings. The VRS staffs are expected to perform the role of a trustworthy companion of the library patrons, ever ready to provide help pro-actively.

**Table: 6    Librarians' Perception Regarding Need and Purpose of Collaborative VRS**

| Collaborative VRS | Not Important n(%) | Off little Important n(%) | Moderately Important n(%) | Important n(%) | Very Important n(%) | Total | Mean | Rank |
|---|---|---|---|---|---|---|---|---|
| Facilitates collaboration/cross-training | 2 (10.5) | 1 (5.3) | 3 (15.8) | 9 (47.4) | 4 (21.1) | 19 (100) | 3.6 | R6 |
| Interdisciplinary research | 1 (5.3) | 2 (10.5) | 1 (5.3) | 7 (36.8) | 8 (42.1) | 19 (100) | 4.0 | R3 |
| Effective assistance or support for user satisfaction | 1 (5.3) | 0 (0) | 3 (15.8) | 4 (21.1) | 11 (57.9) | 19 (100) | 4.3 | R1 |
| Extended hours of operationfor increased availability | 2 (10.5) | 1 (5.3) | 2 (10.5) | 7 (36.8) | 7 (36.8) | 19 (100) | 3.8 | R5 |
| Distributed staffing across multiple libraries for enhanced effectiveness and efficiency | 2 (10.5) | 2 (10.5) | 6 (31.6) | 4 (21.1) | 5 (26.3) | 19 (100) | 3.4 | R9 |
| Save the time of the users as well as staff | 1 (5.3) | 3 (15.8) | 2 (10.5) | 3 (15.8) | 10 (52.6) | 19 (100) | 3.9 | R4 |
| Adequate staff with diverse subject specialisation | 3 (15.8) | 2 (10.5) | 2 (10.5) | 5 (26.3) | 7 (36.8) | 19 (100) | 3.6 | R6 |
| Achieve economy including cost savings | 3 (15.8) | 2 (10.5) | 3 (15.8) | 4 (21.1) | 7 (36.8) | 19 (100) | 3.5 | R8 |
| Access to a broader range of resources | 2 (10.5) | 0 (0) | 1 (5.3) | 7 (36.8) | 9 (47.4) | 19 (100) | 4.1 | R2 |

*Results*

Table 6 represents the opinion of CRIKC member librarians regarding the need and purpose of collaborative VRS. A majority of librarians opined that *'effective assistance or support for user satisfaction'* could be the most visible derivable of collaborative VRS with mean score 4.3 (R1), as 79% of the libraries (n=15) have attached importance to the collaborative model of VRS. *'Access to the broader range of resources'* considered as the second most achievable outcome of collaborative VRS model. The third need and purpose of this model was *'interdisciplinary research'* as opined by the librarians. *'Save the time of the users as well as staff'* came at Rank 4, followed by *'extended hours of operation for increased availability'* (R5), *'facilitates collaboration/cross-training'* (R6), and *'adequate staff with diverse subject specialization'* (R7). However, more than 45% of the respondents believed *'distributed staffing across multiple libraries for enhanced effectiveness and efficiency'* and *'achieve economy including cost savings'* were important or very important factors of collaborative VRS.

***Discussion***

Collaboration is the essence of resource sharing and networking on a deeper look. On the above results, it can be observed that not only the fourth law of library science that is 'save the time of reader' but all the laws of library science can be considered as the direct or indirect benefits of VRS. Thus it can be said that collaborative VRS emerged as a strong implication of the five laws of library science propounded by Dr S R Ranganathan, the father of library science. Therefore, the benefits derived out of collaborative VRS may resonate with the vision and mission and facilitates innovation and knowledge building.

**Table: 7    Determinants of Collaborative VRS**

| | Strongly agree n(%) | Agree n(%) | Neutral n(%) | Disagree n(%) | Strongly disagree n(%) | Total | Mean | Rank |
|---|---|---|---|---|---|---|---|---|
| Common vision and guidelines To be adopted | 10 (52.6) | 4 (21.1) | 2 (10.5) | 1 (5.3) | 2 (10.5) | 19 (100) | 4.0 | R5 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Accountability and Responsibility for centrally Administering and coordinating the service. | 9 (47.4) | 5 (26.3) | 1 (5.3) | 3 (15.8) | 1 (5.3) | 19 (100) | 3.9 | R7 |
| Communications procedures and Interoperability of VRS platforms | 9 (47.4) | 4 (21.1) | 4 (21.1) | 2 (10.5) | 0 (0) | 19 (100) | 4.1 | R2 |
| User Demand | 8 (42.1) | 9 (47.4) | 1 (5.3) | 0 (0) | 1 (5.3) | 19 (100) | 4.2 | R1 |
| Usefulness | 9 (47.4) | 5 (26.3) | 4 (21.1) | 0 (0) | 1 (5.3) | 19 (100) | 4.1 | R2 |
| Set a minimum number of service hours | 10 (52.6) | 4 (21.1) | 3 (15.8) | 1 (5.3) | 1 (5.3) | 19 (100) | 4.1 | R2 |
| Size of library, staff & patron | 7 (36.8) | 7 (36.8) | 3 (15.8) | 2 (10.5) | 0 (0) | 19 (100) | 4.0 | R5 |
| Budget availability & ICT infrastructure | 5 (26.3) | 4 (21.1) | 8 (42.1) | 1 (5.3) | 1 (5.3) | 19 (100) | 3.6 | R9 |
| Sharing policy of locally subscribed e-resources | 9 (47.4) | 2 (10.5) | 3 (15.8) | 2 (10.5) | 3 (15.8) | 19 (100) | 3.6 | R9 |
| Lack of institutional support | 9 (47.4) | 4 (21.1) | 2 (10.5) | 1 (5.3) | 3 (15.8) | 19 (100) | 3.8 | R8 |

## *Results*

The previous table i.e. Table 6 dealt with the need and purpose of collaborative VRS model. Table 7 reflects the perception of the CRIKC librarians regarding the parameters and factors based on which the collaborative model would work. An overwhelming majority of librarians (89.5%) considered '*user demand*' as the most important factor for establishing collaborative VRS (R1) with mean score 4.2 closely followed by '*usefulness*' and '*prefixed minimum service hours*' with mean score 4.1 (R2), with equal emphasis on '*communication procedures*'(R2). '*Common vision and guidelines*' ranked 5 along with the '*size of library staff*

*and patrons'. 'Administration and coordination of collaborative VRS centrally'* ranked 7 followed by *'Extent of assistance', 'sharing policy of locally subscribed e-resources', 'availability of budget & ICT infrastructure'* and *'institutional support'.*

## *Discussion*

Demand and perceived usefulness played a vital role in the establishment of CRIKC for enhancing the quality and pace of research through collaboration. The best way to assess the demand and usefulness of collaborative VRS is to initiate a pilot program on a trial basis with select users of different CRIKC institutions followed by the analysis of the feedback received. Communication procedures here indicate the communication method adopted by the library staff for providing online assistance and information service to the patron. It also includes any communication initiated by the users seeking assistance. Communication procedure in a collaborative VRS model involves communication between staff and patrons and staff to staff within an organization or across the participating institutions. As communication is the core of reference service, lack of uniformity in a standard communication procedure may disrupt its flow. Uniformity in communication procedure primarily depends on the interoperability of VRS platforms. Users requiring to register in different communication medium for seeking assistance may discourage them, causing a negative impact on the overall service. What is desired is a single, common, versatile flexible platform which the patron can use without registration or sign up. Feature-rich and multifunctional chat widget embedded in the library website can be the suitable mode of communication channel which can be adopted by all the CRIKC libraries. Size of the participating libraries, the number of dedicated staff and population to be served are also the important determinants for collaborative VRS. All these three factors will have a direct impact on the extent of the online reference service. Sharing of subscription-based e-resources by the individual library will also encourage the usage of VRS in a collaborative environment. However, sharing of library resources amongst the participating institutions must adhere to fair use clause. As per the respondents, budget and ICT infrastructure should not be a constraint in conceptualizing collaborative VRS, as it will utilize

the existing infrastructure available with the individual library. CRIKC institutions share a common vision to a large extent. However, for collaborative VRS, developing common VRS guidelines would also be an important factor which will also incorporate the accountability and responsibility for centrally administering and coordinating the service.

**Conclusion:**

Traditional and digital reference services are not mutually exclusive. Librarians are needed in each setting to assist users in defining queries and translating them into searchable words. Whether or not a patron is communicating, when there's an unidentified person miles away or right in front of the reference desk, the reference experience includes a strong sense of being present with another being. It should be a top priority to build a customised climate. A community of people can be used to give the reference department a face on the website.

The value of VRS in collaborative and consortia environment was endorsed by the librarians of CRIKC. They also agreed to the benefits of Synchronous Reference Service (SVRS) being facilitated by Web 2.0 apps.

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