VIRTUAL REFERENCE SERVICES: TOOLS AND TECHNIQUES

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Abstract

Virtual reference service is an emerging trend of traditional reference service. This paper describes some of the rising trend in digital reference services, including e-mail and web forms, text-based chat services, web-camera based services, ask-a-librarian services, digital robots, and collaborative services. It's also discusses about basic concept, elements of Virtual reference service and give in detail modes, the advantages, disadvantages and limitations.

Keywords: *Virtual Reference Service (VRS), Digital Reference Service (DRS), Live reference, Real Reference service, Chat Reference, E-mail Reference, Collaborative Service, Ask-a-librarian, Digital robots, Quality of VRS, Providing modes.*

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Introduction

The present era is the era of information revolution. Many virtual resources are available in the library. The increase in information available on the Web has affected information providing methods.[1] VRS are important services as not only human mediate services in library but also a function of virtual library. It seems that VRS is the service which raise library's value, therefore VRS has strong points that is free from limitation of place and time in comparison with traditional reference service.[2]

The terms "virtual reference", "digital reference", "e-reference", "Internet information services", "live reference" and "real-time reference" are used interchangeably to describe reference services that utilize computer technology in some way. Whether it is email reference, chat reference or an automated routing system, virtual reference is significantly influencing the delivery of high-quality library services (Virtual Reference Canada). Digital reference techniques have been around, in one form or another, for almost a decade now. VRS or DRS are simply defined as the provision of real-time personal assistance to users via web-based interactive software. To satisfy the information need, the librarian can "chat" as a component of the software to answer a fairly specific or simple question, or deliver digital materials, or suggest relevant web resources to the user, and provide online bibliographic instruction. Questions submitted via email and linked web pages require attention from reference staff, and the virtual reference transaction can be more complex and time-consuming than traditional in-library service. Academic libraries started first offering e-mail reference where users could submit their questions via an e-mail address. Recently the adoption of Web forms not only changed the quality of the e-mail reference engagement for the better, but also challenged librarians

to develop effective means for managing questions and responses.

A digital reference transaction will usually include the following elements: the user, the interface (web form; e-mail; chat; video etc.), electronic resources (including electronic or CD-based resources; web resources; local digitised material etc), as well as print resources and the information professional.[3]

Libraries are trying to meet the needs of the academic and research community by improving their services and enhancing their resources. One of the means is the provision of an effective reference service. A successful strategy to enhance exploitation of resources is to ensure users' satisfaction through an efficient and effective reference service. The speed and accuracy in dealing with reader enquiries by reference librarians have a great bearing on user satisfaction. This paper describes the emergence, concept and practices of reference services in the virtual environment, with a focus on the providing methods of virtual reference services in libraries.[4]

Virtual Reference Service Definitions

The foundations of modern reference work were laid by Samuel Swett Green in 1876 in his seminal essay, "Personal Relations between Librarians and Readers". Since then, the practices involved in providing reference service have been refined, but there has never been much disagreement about the central purpose of reference service, which is to answer, and provide resources to enable patrons to answer their own questions. In a physical library, reference question-answering is most often performed face-to-face, at a reference desk. Telephone reference has been offered for decades by many desk reference services, so a tradition of providing reference service in the absence of a face-to-face interaction with a patron is well established. In digital reference services, face-to-face service is obviously unfeasible (at least until videoconferencing starts being used in reference). Early digital reference services discovered, however, as had telephone reference services, that face-to-face interaction is not necessary for answering patrons' questions; this function could be performed perfectly well in a mediated environment. Perhaps even more important than the existence of technological mediation, however, is the fact that many digital reference services utilize asynchronous communication media: early services were entirely email-based, while many services nowadays continue to utilize email, and additionally utilize the Web. Patrons may submit a question to an asynchronous service at any time, and that question can be answered when there is librarian available to answer it.[5]

Many Terms are used to express the study and practice of digital reference, for example digital reference, virtual reference, real-time reference, chat reference, real-time chat reference, live reference Ask a Librarian, Ask Us, Ask On, Ask Away are used interchangeably as terms with similar meaning [6] (Su, 2002). All terms given above have the same concept i.e. the use of software and the Internet to help human intermediation at a distance. We can see this similarity in the definitions of digital reference found within the papers presented at the digital reference research conference.[7] A few definitions of digital reference service are given below:

According to Machine Assisted Reference Section (MARS) committee of the American Library Association (ALA) that is preparing guidelines for implementing and maintaining virtual reference services is used: Virtual Reference is reference service initiated electronically often in real-time, where users employ computers or other Internet technology to communi-

cate with librarians, without being physically present. Communication channels used frequently in virtual reference include chat videoconferencing, Voice over IP, e-mail and instant messaging. While online sources are often utilized in provision of virtual reference, use of electronic sources in seeking answers is not of itself virtual reference. Virtual reference queries are often followed-up by telephone, fax, and regular e-mail, even though these modes of communication are not considered virtual.[8]

The Reference and User Services Association (RUSA) of the American Library Association has been a leader in formulating standards for reference services. RUSA that has a responsibility for supporting the development of reference services for library users of all ages has issued guidelines for the development and delivery of such services[9]. The guidelines state that: 'Information services in libraries take a variety of forms including direct personal assistance, directories, signs, exchange of information culled from a reference source, reader's advisory service, dissemination of information in anticipation of user needs or interests, and access to electronic information'.[10]

"Digital Reference Services seek to enhance the ability of users to locate needed information through the work of reference librarians providing both direct and indirect services. While one aspect of digital reference services involves assisting users in accessing digital library resources, digital reference services encompass any reference service provided over the internet and can involve use of print as well as digital resources".[11]

"Digital Reference is a service that provides users with answers to questions in a computer mediated environment".[12]

"Digital reference refers to a network of expertise, intermediation and resources put at the disposal of a person seeking answers in an online environment".[13]

"Digital Reference Services are Internet based services that employ human experts or intermediaries to provide information to users".[14]

Jeans et al. developed its own definition of digital library as "a mechanism by which people can be submit their questions and have they answered by library staff member through some electronic means (e-mail, chat, web forms, etc) not in person over the phone".[15] The terms "electronic reference", and virtual reference are often used synonymously with "digital reference", although virtual reference unbounded by distance and physical space. [16]

In other words we can say "Contact between the right user and right information at the right time and in right personal way through electronic media". Virtual Reference work includes the direct, personal aid within a virtual library to persons in search of information for whatever purpose, and especially aimed at making information as easily available as possible.

Aims, scope & need of virtual reference service

To provide the tremendous services and to reach their goals digital reference services help the patrons with their information needs, and reference librarians provide the answers to reference questions of patrons, both the patrons in the library and distantly through email and online services. Current digital era's Libraries experienced the new and refreshed style.[17] The basic aims of VRS are follows:

- to provide the library information services for remote users,
- to improve library support for research and education,
- to help the collection of virtual reference resources are developed and maintained,

- to concert potential users to habitual users,
- to provide the help to the users in searching the best, complete and valid sources of information,
- to help the user in online searching,
- to save the time of users,
- to provide the service in different part of country so virtual reference service become public relation agent,
- to provide the user orientation program to remote users,
- to cultivate and make stronger relationships with the users,
- to improve promotion and delivery of library resources and services,
- to enable to achieve goal of organization,
- to enable to fulfill the five laws of library science.

Scope

The scope of virtual references services is following[18]:

- Literature searches,
- individual or group instruction in searching the literature or finding reference materials,
- identification of full-text resources, and
- other customized library information on request.
- Delivery of articles available online or e format through e media.
- Delivery of loaned books and print journal articles to and from the library was not included.

Need

As public access to the Internet increases, libraries will receive more and more information requests online, predominantly through email.[19] Digital reference cannot be regarded as 'extra' or a service that can be delivered only when there are enough staff and time. Proper planning not only ensures for a smoother

integration with more traditional information delivery, but also affords the requisite time for[20]:

- Staff training,
- User orientation,
- Development of appropriate use and service level agreements,
- Identification of target audience,
- Users and use evaluation.

Additionally, digital reference adds value overall to library service in that it supports the following key agendas for public libraries[21]:

Social Inclusion: email-based and especially chat-based reference extends library services to those users with physical challenges. Not only can those users access information, but can receive real-time guidance from librarians, thus facilitating the 'human interaction' so important in reference transactions.

E-government / modernizing government: The use of real-time technology increases accessibility to all types of government services. Libraries, experts in information delivery technologies, can provide the model in local authorities for reaching out to diverse user groups.

NOF Training Expected Outcomes 2-8: Services, such as Ask A Librarian (Ask-a- librarian) and chat reference, provide excellent training for staff in simple Internet searching to more complex user interaction with state-of-the art technologies. All staff, from professional to clerical, have the opportunity to become conversant in different types of technologies while delivering real-time service.

With enough planning to allow for the scheduling of services, libraries can provide a range of points of access to information guidance[22]:

- Traditional reference desk staffing,
- E-mail,
- Telephone,
- Chat (including video, audio).

Elements of Virtual Reference Service

A virtual reference service usually includes the following elements:

- The user,
- The interface (web form; e-mail; chat; video etc.),
- Electronic resources (including electronic or CD-based resources; web resources; local digitised material etc), as well as print resources,
- The information professional.

Digital Reference Service: Models

In the setting up a virtual reference service a number of decisions must be made, including the method or mechanism for receiving questions and delivering information in other words, the service model. While it is crucial that these decisions be user-driven, with the newer delivery models libraries often find themselves in the position of introducing a completely new means of access, requiring instruction in and promotion of the new technology. Offering an integrated service to users provides the support of more traditional forms of access (telephone, walk in, e-mail) with the trail the newer forms (chat, video-conference). There are generally four different types of service models for virtual reference[24]:

- Asynchronous (e-mail-based),
- Synchronous (real-time, text-based, chat),
- Video reference (synchronous, audio-visual-based, using webcam and video-conference equipment),
- Robots (knowledge databases combined with sophisticated search engines).

Quality Assessment for Digital Reference

Quality assessment for digital reference can be divided into a number of measurement components. For this study, however, we will concentrate on the following[25]:

- **Outcome Measures** (quality of answers): accuracy of responses, appropriateness to user audience, opportunities for interactivity, instructiveness, and impacts resulting from the digital reference process.
- **Process Measures** (effectiveness and efficiency of process): service accessibility, timeliness of response, clarity of service procedures, service extensiveness (percentage of questions answered), staff training and review, service review and evaluation, privacy of user information, user awareness (publicity).
- **Economic Measures** (costing and cost effectiveness of digital reference): the cost to conduct a digital reference session, infrastructure needed to support quality digital reference services, and impact of these costs on other library expenditures.
- **User Satisfaction** (degree to which users engaged in digital reference services are satisfied with the process and the results): satisfaction indicators can include accuracy, timeliness, and behavior of the staff, technical considerations, physical facilities, and others. These categories can overlap since measures can describe multiple components. While the study will emphasize measures and quality standards in these areas, the specific measures and quality standards that are ultimately proposed will depend on field-testing and the investigators' abilities to proceduralize the method to produce the measures and standards in a practical and reliable manner.[26]

User Transaction

Accessible: Digital reference services should be easily reachable and navigable by any Internet user regardless of equip-

ment sophistication, physical disability or language barrier.

Prompt Turnaround: Questions should be addressed as quickly as possible. Actual turnaround time depends on a service's question-answer policy and available resources (e.g., staffing, funds, technology, etc.).

Clear Response Policy: Clear communication should occur either before or at the start of every digital reference transaction in order to reduce opportunities for user confusion and inappropriate inquiries.

Interactive: Digital reference services should provide opportunities for an effective reference interview, so that users can communicate necessary information to experts and to clarify vague user questions.

Instructive: Digital reference services provide access to current information and expertise. Quality digital reference services offer more to users than straight, factual answers; they guide them in how to formulate questions, subject knowledge, and information literacy[27].

Service Development and Management

Authoritative: Experts of a digital reference service should have the necessary knowledge and educational background in the services given subject area or skill in order to qualify as an expert. Specific levels of knowledge, skill and experience are determined by each service and its related discipline or field.

Trained Experts: Services should offer effective orientation or training processes to prepare experts to respond to inquiries using clear and effective language and following service response policies and procedures. Training of information specialists is one of the most important aspects of planning and operating a digital reference service.

Private: All communications between users and experts should be held in complete privacy.

Reviewed: Digital reference services should regularly evaluate their processes and services. Ongoing review and assessment help ensure quality, efficiency, and reliability of transactions as well as overall user satisfaction.

Provides access to related information: Besides offering direct response to user's questions, digital reference services should offer access to supporting resources and information. Services can reuse results from question-answer exchanges in resources such as archives and frequently asked questions (FAQs).

Publicize: Services should inform potential users of the value that can be gained from use of the service. A well-defined public relations plan can ensure that services are well-publicized and promoted on a regular basis. Publicity should not create more demand than the service handle capacity to handle.[28]

Planning for Digital Reference Service

Although there are various models of digital reference, they share common elements. In adopting any one of the service options, planning should include consideration of the following[29]:

- Physical service location (in a public service area; in a special collections area; in an office; proximity to print resources etc.),
- Virtual service location (server space; Internet Service Provider etc.),
- Training in advanced web skills, reference interview and procedure,
- Programming and web expertise (web design skills; database management etc.),
- Management and co-ordination of the service (who does what when),
- Completion time for transactions (questions will be answered in a day/two days/a week etc.),
- Quality control (basic standard for researching questions; types of

sources used; structured response; referrals to other resources or services etc.),
- Service population (whether service is available for local library users or anyone),
- Data collection for evaluation,
- Promotion of the service,
- Hardware and software (PC/Workstation; printer; scanner; mail client; web-form; chat software; authentication software; etc.),
- Additional equipment (web cam; video equipment etc.),
- Furniture.

The staff necessary to run such a service includes[30]:
- Researchers (librarians; library assistants) to gather the information to answer questions,
- A coordinator to assign questions and to monitor answers; to schedule staff,
- IT support for running networks, maintaining web pages and scripts,

- Data entry staff to input and send responses.

These days, most libraries in the developed world are automated libraries; more and more libraries are utilizing computing to perform technical services functions, but the primary collection of most libraries is still a print collection. Indeed, the paper library may be on its way to extinction in the developed world: few libraries these days do not offer at least electronic access to their catalog, and many libraries maintain digital collections – or at least access to others' digital collections – in addition to their physical collections. On the other hand, the electronic library is yet to come: many libraries maintain digital collections, but there are few entirely-digital libraries, with no physical counterpart.[31]

Table 1 presents the issues involved in integrating digital reference service into a digital environment, along the four dimensions presented above. The issues in the four shaded cells has been discussed in this section. These issues are important

Table 1: **Changing Technological Bases of Library Operations, Materials and Reference Service**

	Technical Operations	Library Materials	Reference Service	Media
Ancient Library (Pre paper Library)	Tree leaves	Papyrus, tree leaves, parchment, clay tablets	-	-
Traditional Library (Paper Library)	Paper	Paper, Manuscript, incunabula,	Traditional (Manual)	Personal or By post
Automated Library or Hybrid Library	Computer	Paper, micro and electronic documents	Hybrid (Electronic media & Manual)	Personal, By post and By Phone
Virtual Library	Computer	Electronic material	Electronic media	By Phone, E mail, chat reference, VOIP, Video chat, Video conference, FAQ Etc.

in the integration of digital reference service into a digital environment, as well as to the operation of a digital reference service in general, regardless of its affiliation with a virtual library.

The quality of the virtual reference services was evaluated along three dimensions:

1. **Timely Response:** acknowledging user email questions in a timely manner, providing patrons with responses as quickly as possible, and adhering to stated turnaround policy.
2. **Reliability:** answering the query efficiently and correctly and providing a signature that contains the librarian's name or initials, title, and institution.
3. **Courtesy**: approachability, friendliness, politeness, and professional courtesy.

This conceptual model of Virtual Reference Service evaluation, as demonstrated in Fig. 1, is intended to capture major essentials and constituents when VRS tools are introduced into libraries. Even though the model was visualized three dimensionally, the actual relationships among what is involved in VRS evaluation, we can use physically. On the other hand, the VRS evaluation model we proposed is only an initial step towards our efforts to fully explore the applications and implications when VRS and the library interact.

Approaches for Integrating Virtual Reference Services in the Virtual Library

There are several ways of integration of digital reference services into digital libraries each method has its own advantages and benefits. Find out the following ways of integration of virtual reference service into virtual libraries.

- Virtual reference service in to virtual library is using the human intermediation as guide.
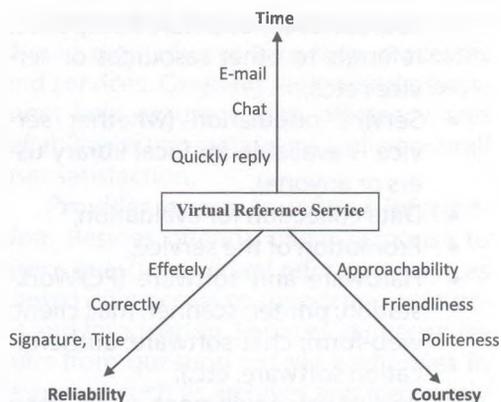

Fig. 1: Virtual Reference Service 3D Model for Evaluation

- Virtual reference service in to virtual library is using human intermediation as pathfinder.
- Virtual reference as a collection developer in the virtual library.
- Virtual reference as a resource originator in digital library.

Rising Mode of Digital Reference

Digital reference services can take many forms, but they can be divided into followed two broad categories:

1. **Asynchronous Transactions,** where the there is a time delay between the question being posed and the answer being given. Asynchronous transactions generally take the form of

a. **E-mail**, whereby a user sends a question or a request to the librarian or a specifically designated reference service section (e.g. libref@libraryname...) via regular e-mail. The user supplies whatever information he or she feels is necessary. The librarian may ask for clarification if necessary, and sends the answer in a return e-mail, or through telephone or fax. E-mail reference service is popular from the users' perspective because it is widely avail-

able, it does not require additional software, it is non-threatening and nonintrusive, and the question can be stated in the user's own style of language. From the librarians' perspective, e-mail-based reference is easy to implement, and no extra training is required.

Advantages:

- Psychological barrier that stops shy users asking questions face to face is removed.
- Useful for the users who are poor in oral communication.
- Physical boundaries are removed.
- It does not require extra software and no extra training.
- Reference librarian find more time to think, chalk and plan out a strategy and finally search and give the answer.
- No restrictions of working time, user can ask query any time.
- This mode of receiving and answering questions is cost-effective.

Disadvantages:

- As face to face interaction is not possible, reference librarian not able to get clarification about his doubts arising in his mind after receiving the query.
- Speed of receiving and answering questions depends on the volume of e-mail traffic and communications link over the internet.
- It is difficult for reference librarian to judge the urgency of information.

b. **Web forms,** where users click on a button on the library's web site, which pops up a form where the question can be typed in. Other specific information (e.g. name, email address) must also be filled in together with the question. The completed form is then sent to the library by clicking

on a "send" (or "submit" or something similar) button. The library may replay by e-mail, telephone, fax or letter. Web forms provide a structured format, and facilitate the framing of a question.

c. **Ask a service,** which are usually corporate-sponsored web sites that allow users to ask questions and receive answers for free from public information located mainly on the World Wide Web or from proprietary databases and networks of field experts. A variety of Ask a services exist, Ask-An-Antarctic Expert to Ask-a-Reporter. A list of current Ask a services is available at http://www.vrd.org/locator/subject.shtml.

Limitations of the Ask a Service:

Ask a Librarian will provide certain services but there are limitations to the service. The service does not provide:

- Answers to contests, puzzles, or games,
- Answers to student assignments,
- Detailed bibliographies,
- Prices for old books,
- Heraldry and genealogy research,
- Translations.

2. **Synchronous Transactions,** which take place in real-time with an almost immediate response to a query or a request. Synchronous transactions generally take the form of:

a. **Chat reference, using simple technologies,** where the reference librarian and the user can communicate with each other using short text messages in real time using normal chat software. The service may be using free instant messaging software (e.g. ICQ or AOL Instant Messenger), web-based chat rooms (e.g. Anexa.com), or chat software (e.g. Conference Room from Web Master). This form of reference is easy to use and allows basic commu-

nication. The user begins by typing in an opening query or question. The librarian may negotiate the query if necessary, before leading the user to the information source.

This service is gaining more importance due to several features such as (Chandwani, 2010).

- User query is solved in real-time i. e. interaction between the user and the reference librarian is live.
- Speed of this service is faster than e-mail service, so user does not have to wait for the response.
- Clarification can be sought online.
- This service can be offered any time (24/7 basis).
- Reference librarian can attend multiple users simultaneously.
- Voice over Internet Protocol (VoIP) can be used by reference librarian to talk to users and hear them while connected and while locating the resources.
- If the user finds difficulty in finding information from any particular resource,
- Reference librarian can demonstrate, how to use the particular resource.
- Instant messaging needs software products such as AOL Instant Messenger and ICQ which must be downloaded on both librarians and patrons computer. These products allow librarians to communicate with the patrons in real time.

Disadvantages:
- Typing speed and errors occurring during typing text may cause difficulty in communicating proper massage between user and the reference librarian.
- User needs to type the complete question and reference librarian need to answer in typed format (de-

pends on the speed and efficiency of both in typing).
- May be stressful for the user to wait for the answer every time.
- Reference librarian while busy answering several questions at a time, may not attend urgently needed questions.
- In developing countries technology is at premature stage, therefore need of this service is yet to be recognized.
- It is a labour-intensive service.

b. ***Chat reference, using web contact software,*** where the software allows for instant messaging, and also allows collaborative browsing between the librarian and the user. The system usually consists of a split screen where in one screen the librarian and users can see each other's typed questions and responses, with the other screen showing web pages, or other electronic information resources, or a library's catalog screen. The librarian can show the user particular pages or screens, while carrying out a text-based conversation with him or her. This has the advantage that the user is actually able to see what the librarian was referring to, instead of just a text-based description. Individual libraries usually offer this service at specific times of the day. In some systems, the text transactions can be recorded and e-mailed to the user as notes to refer, and for the librarian to keep for records. Some products are designed specifically for use in library settings, including Virtual Reference Software from LSSI, and 24/7 Reference from the Metropolitan Cooperative Library System, while some commercial products, such as LivePerson, may be adapted for use in library settings.

c. **Video-conferencing or web-camera services**, where librarians and users are able to see each other in one window of the monitor through a camera. Web sites or other electronic resources can be displayed in another window on the monitor.

d. **Digital reference robots,** use principles of artificial intelligence to respond to questions. A user types in a question, and the system interprets it by asking the user to choose from a set of differently worded questions. Based on the choice, an answer is then provided. The best known of these systems is Ask Jeeves available on the Internet.

3. **Collaborative Digital Reference Services**, where two or more libraries team up to offer reference services using any of the above formats. The user would send a request to a member library, which would be forwarded to the member library best able to answer the question. The library may receive the question because it has the domain strength, or that it may be located in another time zone that was open when the user posed the question. Many libraries have recognized the benefits of providing collaborative digital reference service. Existing library consortia are adding digital reference to current shared services, and networks of libraries in different locations are getting together to share question loads and expertise. Collaborative digital reference encounter is reference to collaborative activities between the user and librarian that extend beyond the reference interview. Such tools include Co-browsing, escorting, and Web page pushing activities between the user and librarian during collaborative digital reference,

enable the user and librarian to jointly view resources such as the OPAC, on-line database and related resource.

a. **Co-browsing / escorting**, is an application sharing feature in web contact centers such as Question point, tutor. com, convey and like. C-browsing is sometimes referred to as collaborative browsing, follow-me, or escorting, and it typically involves remote features that web. Everywhere the librarian goes the user goes, thus allowing the user to see the librarian's to desktop.

b. **Web page pushing**, also a form of co-browsing, allow librarians to sent live web page to user's desktop (with active link) as opposed the screen shot (with dead link), which are copies of window from the librarian's desktop. Web page opens in users' browser with new page replacing old ones.

Conclusion

Technological development that have enable to users to access electronic resources and conduct library research remotely have also enabled and necessitated corresponding development in library services to support the emerging virtual community. VRS is one area which is being actively explored by many libraries to support remote users in their access to and use of virtual library resources. Virtual reference holds enormous potential for revolutionizing the way users find and use reference services. By adding interactive help to their online information services, libraries can reach users who may never have sought out the traditional reference desk. Reference service moving from the desk to the desktop, however, can be a intimidating viewpoint. In fact, the Internet skills are becoming very important for all library professionals as more and more library operations can be performed more effectively by using the Internet. There-

fore libraries, particularly in developing countries, need to look into this matter and should make concerted efforts for enhancing the Internet skills of their professionals. In India several libraries have started online reference services using e-mail and "Ask a Librarian" services, web forms but real virtual reference services should be the focus of us to reach out to the millions of users outside the library walls and serve the community at large.

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