

DIGITAL REFERENCE SERVICE IN ACADEMIC LIBRARIES

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Abstract: Reference and information services have always been the main component of library services. They provide personalized assistance to library users in accessing suitable information resources to meet their needs. This chapter attempts to describe the paradigm of reference and information services in the digital library environment. It discusses about modes of digital reference services, major digital reference services projects, expert systems in reference service and future of digital reference service

Keywords: Reference services, Academic libraries, Expert systems, Collaborative Digital Reference Service, Real time digital reference service

1.0 Introduction

In this fast changing technology era, researchers need to find relevant, usable, authentic and verifiable information as quickly as possible. To meet this requirement, libraries and information centres need to augment their conventional reference service using ICT. Using these technologies, libraries maintain digital collections and also access digital or electronic information sources and provide information in digital/ electronic mode. With the emergence of digital libraries and Internet, the concept of traditional reference service has changed. Even many non-library commercial organisations now offering digital reference service to their clientele. While some are free, others need payment. In digital reference service, the web is used as a medium of communication for sending the questions and receiving answers, which is quite useful in providing fast answers to the questions. However, the reference librarian needs different skills for accessing digital information sources and communicating the information to the users.

In the process of providing digital reference service, the reference librarian receives questions via e-mail or web interface, identifies the query and then decides appropriate course of action. He analyses the request and gets the type of information required. The question may also be checked with the archive file, which is usually called Frequently Asked Questions (FAQ) File. The answer may be supplied to him through appropriate mode of communication.

1.1 Definition

Digital reference service may be defined as “the provision of reference services involving collaboration between library user and librarian, in a computer based medium. These services can utilize various media, including e-mail, web forms, chat, video, web customer call centre software, voice over internet protocol (VoIP), etc”.

According to Wikipedia, “Digital reference service is a service by which library reference service is conducted online and reference transaction is a computer mediated communication”.

According to Lankes, “Digital reference service refers to the provision of human intermediated service over digital network”

Hence we can conclude that Digital reference service requires computer communication with digital network, should have alliance between user and the librarian.

1.2 Modes of Digital Reference Service:

Based on the mode of receiving question and delivering information, the digital reference service can be broadly categorized into two groups:

1.3 E-Mail Reference Service

The e-Mail reference transaction involves back-and-forth exchange of information, users would not get any immediate answer. But users can ask a question when they think of it, at any time of the day or night. And they do not have to take time to make a special trip to the library. In other words, the users send e-mail to the library with a reference question, asking whatever information they feel necessary. The library sends reply by e-mail, fax, phone or letter as it finds convenient. In such a case, the controller of all questions initially receives and

examines and then routes them to appropriate staff. Technical questions are forwarded to technical staff, circulation related questions to the circulation staff, reference questions to the reference librarian, and so on.

Initially, this service was adapted by the health and engineering libraries, now it has established itself as a basic service in majority of libraries having Internet connectivity. This service has certain advantages to the users:

- Who feel shy and uneasy about asking questions in person, face-to-face or by telephone.
- Who are poor in oral communication
- Who may not be able to visit library due to certain difficulties in physical movement, living at a long distance from the library, and so on.

Besides above advantages, there are certain disadvantages also:

- Reference librarian cannot establish eye contact or conduct face-to-face reference interview to seek any clarification with the user.
- It is difficult to judge the urgency of the requirement of information.
- To know the degree of the user's satisfaction for further modification of search strategy for providing more relevant answer.
- Speed of asking a question and getting an answer depends upon the volume of email traffic and communication link over the Internet.
- Reference librarian needs to make more efforts in understanding the meaning of the asked question. Sometimes, he misses the focus of the asked question because users often do not clearly express the question.

E-mail reference service also offers the following advantages for the reference librarian as well:

- Reference librarian finds more time to think, plan, chalk out search strategy and finally search the answer.
- Simple or easy questions can also be answered by other staff.
- Reference librarian can devote more time on questions of complex nature.
- This way the workload of reference process can be distributed among other staff.
- Question can also be diverted to the experts, if required.
- There is no restriction on working time. Question can be answered any time after working hours.
- This mode of receiving and answering questions is very cost-effective.

Library can design a user-friendly request form, which can be filled up by the users through downloading from the library's web site. The user can send a completed request form to the library by clicking a button on the web labelled 'submit' or 'send'. A well-designed Request Form will eliminate problems and provide right framework for finding out what the user really wants to know. There should be a standard format for the Request Form for all types of questions. The Request Form should bear essential instructions and advice about how to complete it. It should be as short as possible so that it takes a little time to complete. Library can reply users by e-mail or in any other appropriate form, acceptable to the users.

1.4 Prominent E-Mail Reference Services

The following table gives a quick overview of some of the prominent e-mail reference services currently in operation:

Service	Subject	Payment	Organization
Askme	All	Free	Askme.com
AllExperts	All	Free	Allexperts.com
Inforocket	All	Fee-based	Inforocket.com
AskAuntieNolo	Law	Free	Nolo.com
Find/svp	Business	Fee	Findsvp.com
Professional City	Law	Fee	Professionalcity.com

Information is searched by experts and delivered to the users via e-mail. Besides the above, there are other services available where users need to conduct a search for a reference query.

Some of them are:

Internet Public Library	(http://www.ilp.org)
Infoplease	(http://www.infoplease.com)
Britannica	(http://www.britannica.com)
Bartleby Reference	(http://www.bartleby.com/reference/)
Internet Library for Librarians	(http://www.itcompany.com/inforetriever/)
Electric Library	(http://www.ask.elibrary.com.refdesk.asp)
Mediaeater Reference Desk	(http://www.mediaeater.com/easy-access/ref.html)
Reference Desk	(http://www.referencedesk.org)
Xrefer	(http://www.xrefer.com)

Although these services are available free of charge but some charge nominal fee. For example, Electric Library charges US\$ 80 as annual charge for unlimited access.

1.5 Real Time Digital Reference Service

In real time digital reference service, the exchange of information is live (it takes place in real time) between user and reference librarian. This service is still on experimental stage in developing countries because it requires advanced computer technology, faster and better communication connectivity, interactive audio and video capacity and availability of computers at home and work place. This service is not a replacement of conventional or e-mail reference service but a supplement to these services. This service is gaining popularity due to many advantages over the other two services. These include the following:

- This is a synchronous service in which reference librarian responds immediately in real time.
- Reference interview is conducted at a faster pace than e-mail.
- Clarification can be sought online.
- Reference librarian can demonstrate to the user about how to use reference sources,
- Web sites, expert or whom the user should contact. This allows user to walk through the reference source to find answer. In addition to this, Voice Over Internet Protocol (VOIP) allows reference librarian to talk to users and hear them while connected and while locating the sources.
- This service can be offered at any time, any day (24/7 basis).
- Reference librarian can chat with several persons simultaneously.

Against the above advantages, there are several disadvantages also as compared to email reference service.

- The technology is still at premature stage.
- It is a labour-intensive service.
- It makes reference librarian busy in answering the questions because it involves
- Several back-and-forth message transactions. He may not find time to answer the urgently needed questions.
- It is stressful for reference librarian as well as user because one is waiting for other's message.
- For every inquiry, user needs to type questions every time and reference librarian also need to answer in typed form.
- Typing speed and errors occurring during typing in the text cause, both reference
- Librarian and user, difficulties in communicating their messages because real time chatting demands fast and accurate typing speed.

In case the question is found complex in nature and requires more time for searching, the user should be requested to fill the proper form or visit the reference desk.

Real time digital reference service can be provided using chat software, live interactive communication utilities, call centre management software, interactive customer assistance system, bulletin board services software, customer interaction management software, web contact centre software and other Internet technologies. The following are some of the commonly available real time digital reference technologies and these have been used in academic and research libraries in the western countries.

1.6 Real Time Digital Reference Technologies:

- 24/7 Reference
- Anexa.com

- AOL Instant Messenger
- Conference Room
- Desktop Streaming
- Dig iChat
- e-Gain Live
- e-Gain Voice
- Group Board
- Human Click
- Live Assistance
- Live helper
- Live Person
- NetMeeting
- Netscape IRC
- On Demand
- Question Point
- Rakim
- Right Now Live
- Virtual Reference Software
- Virtual Reference Librarian
- Web Line

1.7 Examples of Real Time Digital Reference Services:

The following are some of the frequently used real time digital reference services available for providing reference services:

- Ask A Question
- Ask Now!
- Ask The Librarian
- Ask Us Now
- Ask-A-Librarian
- Chat Reference Assistance
- Chat With A Librarian
- Chat With Us
- Click For Live Help
- E-gateway
- Info chat
- Librarians Online
- Library Chat
- Live Assistance
- Live Library Reference
- Live Online Assistance
- Live Online Reference
- Live Reference Help
- Live help
- Need Help? Ask A Librarian
- Questions?
- Real Time Help
- Real Time Reference
- Real Time Reference Help
- Ref chat
- Ref Desk Live
- Reference Chat
- Reference Librarian Online
- Request It Online
- Talk To A Librarian
- Virtual Reference Desk

1.8 Evaluation of Digital Reference Service

Assessing the quality means judging the quality standard of services that should be provided to the users and how quickly and accurately. The degree of quality varies from library to library because it depends upon a number of internal and external factors directly affecting the library services.

Lankes has laid down the following measures/components for assessing the quality of digital reference services rendered by any library or information centre or organisation.

1.9 Outcome Measures (Quality of Answers): Accuracy of response, appropriateness to user audience, opportunities for interactivity, instructiveness, and impacts resulting from the digital reference process.

1.9.1 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).

1.9.2 Economic Measures (Costing and Cost-effectiveness): Cost to conduct a digital reference session, infrastructure needed to support quality digital reference service, and impact of these costs on other library expenditures.

1.9.3 User Satisfaction (Degree of Satisfaction): Satisfaction indicators, i.e., accuracy, behaviour of staff, facilities, etc.

1.9.4 Major Digital Reference Services Projects

Brief information about some of the prominent digital reference services projects being undertaken for providing reference services is presented in the following sections:

1.9.5 Collaborative Digital Reference Service (CDRS)

The Library of Congress launched the Collaborative Digital Reference Service in June 2000. At present, more than 100 libraries from various countries are participating in this collaborative venture. Some of the major libraries are Library of Congress, National Library of Australia, National Agricultural Library, National Library of Canada, Cornell University Library, University of Texas Library at Austin, University of Washington, University of Southern California, Metropolitan Cooperative Library System at Los Angeles, etc. The mission of this project is to provide professional reference service to the users at any time and any where through an international digital network of libraries and information centres.

It is a library to library network for asking and answering reference questions. It is an international web-based cooperative network of librarians and experts in various disciplines. It is a worldwide network of libraries in which OCLC builds and maintains a database of profiles of participating institutions, maintains a question - and-answer database system that enables participants to catalogue answers and store them in a searchable/browsable database and provides help in marketing, registration, training and user support.

There are three main components of CDRS:

- 1) Members Profiles (MP), which contain information on strengths and features of the members. It includes addresses (including e-mail), hours of services, collection strengths, staff strengths, what is out of scope, geographical locations of the users served, any special service, average number of questions received, etc.
- 2) Request Manager (RM), software for entering, routing and answering reference questions. It receives, sorts out routes and tracks down the incoming questions and delivers the credible answers to the end user.
- 3) Knowledge Base (KB), a searchable database for questions and answers sets. It is an archive of questions and answers for future use.

An end user can request information through CDRS member-library and then the member library sends question to the Reference Manager software for processing and routing. The Reference Manager will then search the database of CDRS member-libraries profiles looking for the member-libraries best suited to answer the question. The matches will be made on the basis of data elements as hours of service, including time zones, subject strengths, scope of collections, type of patron served, etc. The matching process will end within a fraction of second. Once the match on a member-library has been made, the question will be sent to that library for answering. Once the question has been answered, it is routed back to original CDRS requesting library via Reference Manager to allow for closing out the case and completing other administrative jobs. The response is sent to the requesting library by e-mail. Simultaneously, the question and answer are stored in the Knowledge base. The strength of the reference service lies in the strength of the member libraries, RM and KB.

Currently, this is a free service and it delivers reference assistance to researchers any time and any place. It supports reference efforts by combining the power of resources and manpower with the diversity and availability of libraries and librarians everywhere. Using advanced technology that directs questions to the

appropriate library based on the subject profiles, this digital network pools librarians' expertise to bring quality and professionalism in on-line reference service. The following are some of the advantages of this service:

- One library is linked to the other libraries for subjects, languages and collections outside its scope and coverage.
- Experienced reference librarians are always available to provide access to collections and resources available in more than hundred libraries and information centres worldwide.
- Librarians and information scientists can add value to reference interactions by obtaining answers to difficult questions from expert librarians at other institutions and organisations.
- Librarian can improve his library's ability to respond more quickly and accurately on a broader spectrum of research.
- Reference service is available beyond normal working hours of the library, i.e., 24 hours a day and 7 days a week.
- Reference transactions are stored in a question-answer knowledge database that can be accessed for ready reference.
- Reference questions can be answered from books, monographs, journals, magazines, citations from online catalogues and licensed databases and references to web sites. The requesting library is notified by e-mail to retrieve the answer from the server.
- This service provides opportunity to highlight the strength of the collections of participating libraries.
- Virtually, an information seeker can access not only his library where he is a bonafide member but also a union of libraries, which has many, times bigger collection than his library.

2.0 Automatic Reference Librarians for the World Wide Web

This project was sponsored by the University of Washington to create software agents that possess reference intelligence – a limited understanding of complex technical topics, but a very sophisticated understanding of how and where to find high quality information on the World Wide Web. It works on the basis of wrapper technology. Wrapper technology is a data that precedes or frames the main data or a program that sets up another program so that it can run successfully. This service involves the following steps:

- The user asks a question.
- The Query Router assigns a topic to the query.
- The topic maps to a number of relevant wrappers.
- The parallel web search module sends request via wrappers to the sites.
- Responses from the sites are obtained and sent to the fusion engine for collation.
- User gets the response.

It explores web directories such as YAHOO to find out searchable sites. It queries each searchable site and obtains responses from them. The responses and other information about a given site are used to assign topics to that site. Thus, each searchable site gets a wrapper containing some assigned topics, which are used for matching the topics of the users queries.

2.1 Virtual Reference Desk (VRD)

This project is sponsored by the US Department of Education. It is dedicated to the advancement of digital reference and the successful creation and operation of human mediated, Internet-based information service. The VRD project organizes and provides conferences on digital reference issues for information professionals in libraries and other contexts. The VRD does not actually answer questions, but provides resources and links to experts that offer these services. The basic idea of VRD is that when a user asks a question and that cannot be answered by a participating library then it is forwarded to the VRD network for assistance. This service includes:

- Collaborative Ask A Service: A network of Ask A Services and volunteer information professionals that ensure users' questions are addressed by the most appropriate experts.
- The Learning Centre: A web site for the K-12 community with curriculum-related websites, frequently asked questions, and other previously asked questions.
- Ask A+ Locator: A searchable database of high quality K-12 Ask A Services.

The following are some of the Ask A Services, which are Internet based question and answer services that connect users with experts and subject expertise.

- Ask a Hydrologist
- Ask a Linguist

- Ask a Parenting Expert
- Ask a Question
- Ask a Reporter
- Ask a Scientist
- Ask an Archaeologist
- Ask Dr Math
- Ask Mr Calculus
- Ask the Dentist
- Ask the Space Scientist

2.2 24/7 Reference

A pilot network established in the California, Los Angeles and Orange County areas to provide real time reference services directly to the library patrons over the Internet. To avail this service a librarian needs a computer with Windows 98, NT or 2000 and a direct Internet connection. This service can be used to:

- Guide the user's browser to the best resources on the Internet with collaborative
- Browsing.
- Communicate with users real time chat.
- Send files, images, power point presentations, etc. to the patron's computer.
- Conduct meetings with up to 20 participants, while sharing web pages.
- Network with others by transferring complex questions to a local or remote expert.
- Access reports, transcripts of sessions with users, and a wide variety of usage
- Statistics on demand.
- Customise the software to integrate with user's website.

Besides the above, there are other projects like, AskERIC, the Internet Public Library, the MAD Scientist Network, etc., which are also in operation.

2.3 Expert Systems in Reference Service

One of the most promising artificial intelligence technology for libraries and information centres is an expert system. An expert system is a knowledge-based computerized system, which plays a role of intelligent interface for providing access to databases and to obtain relevant information. An expert system contains knowledge about a specialized area, which enables the specialist to formulate search profiles and obtain relevant solutions for various problems. The key feature of an expert system is that it involves modeling the thought processes of human experts who are familiar with the domain of a given problem.

2.4 Expert System Design

In reference service it has been observed that a large number of reference queries repeat themselves. Majority of the questions are of ready reference types and these can be answered by directing the user or through available reference sources. User may ask location of source, contact person for a particular type of service, procedure for borrowing and lending of documents, filling up of photocopying requisition form or interlibrary loan request form, etc. Providing reference service is an area, which can largely be benefited by introducing an expert system because it functions like a human expert and it does the same thing what a human expert is supposed to do. It performs question-negotiation process with the user and provides solution by analysing the question, identifying the sources that are likely to answer the question. While designing models of such system, at the broadest level, focus or emphasis is given to four main components: actors, objects, actions, and relationship.

- **Actors:** Actors are entities that act. Actors are most often people, but in the context of a model, a machine could also be an actor. An information seeker, a computer are all categories of actors. An on-line searcher who sends messages is also an actor.
- **Objects:** Objects are things, which are acted upon. Information-seeking models include a variety of different types of objects. Best examples of objects are information
- **sources** - the most common types of objects. There are other types of objects – a reference book, an index in a reference book, a database of reference books, a query, a record in a database, a field in a record, etc.
- **Actions:** Models of reference and search processes often describe actions. To raise a query, recommend, reformulate, look up, explain, evaluate, all are action words that appear frequently in search models. The reference process is often described in terms of the actions that are performed by the reference librarian and the user.

- Relationships: Finally, information seeking models are concerned with relationships. A correlation is made among the actors, objects, and actions to get the desired output in an expert system.

2.5 Advantages of Using Expert System

Applying an expert system for providing reference service has a number of advantages. These include the following:

- An expert system can be designed to store complete library collections and their locations, which may be difficult for any reference librarian to remember and locate physically.
- A multi-user expert system can serve more users at a time.
- Expert system can work round the clock even when library is closed or reference librarian is on leave.
- Interactive expert system can be used by the user more frequently than to a reference librarian.
- User may ask questions from a long distance rather than approaching to reference desk.
- Expert system in one library can be linked with other libraries which may create a network of libraries thus providing much scope of availability of source to answer the question.

2.6 Future of Reference Service

It may be very difficult to make certain predictions about the future of reference services. Earlier, the mode of providing reference service was quite different from what libraries and information centres are providing after the advent of Internet. Electronic databases, and particularly on-line databases have replaced printed reference works. A good number of reference sources, i.e., encyclopedias, dictionaries, thesauri, handbooks, directories, etc. is available on Internet. Similarly, major abstracting services like, Chemical Abstracts, Physics Abstracts, Engineering Abstracts, etc. are also available on Internet. Thus, in the future users will be less dependent on library and more on the online sources and service agencies providing real time reference services. Users may also tap required information at home by means of a computer. At the same time, the cost of the services will be quite high to afford by the users. And users will continue to get the information at less cost from the library. Also specific and accurate information will be on great demand. Since users often may not be able to find specific information, they have to depend on trained reference specialists. So more expert reference librarians will be needed in the future. For researchers to be productive and to be able to use information round the clock on 24/7 basis, from any location, the information has to be organised accordingly and made available to the users by the reference librarian. No library can provide reference service entirely based on its own collections, on all types of queries. Therefore, there will be a need to have collaborative ventures for reference service, in which location of reference

Sources, location of users, time, etc., will not be the constraints. Survivability of reference professionals and existence of libraries and information centres will depend upon the quality and efficiency of reference services provided by them. The future of reference service will also be based on the digital collections and communication links through web, because digital technology has opened new ways of storing and accessing information. Whatever direction and which shape the new technology is going to take in future; it will always help the reference librarian. In the coming era, the reference librarian will need the ability to read the situation in which a user will be able to find the right information on his own, as and when he requires. Since many non-library organizations have started providing digital reference services to their clientele, libraries and information centres should turn their attention and to compete in the new environment to provide e-reference services and real time reference services. For users, the reference librarian is going to act as a hub if the library is well equipped with computer, Internet and CD-ROMs. Reference librarian and reference service will be a centre of the universe of information in the future.

3.0 Conclusion

There is no doubt that digital reference is a powerful method of delivering reference service. However, many libraries are still experimenting with digital reference service. Libraries that have been providing digital reference services for a few years should move on from experimenting to defining new services. Using digital reference services could be a time saver for users, and using the Internet is generally cheaper than using telephone. Digital reference services provide an extra choice for users, and may take some of the load of a busy reference desk, although it does not lessen the overall workload of the library.

The efforts of the entire library's technical, clerical, administrative, and professional staff are needed to support and promote the service. However, in many cases, effective digital reference operations will be contingent upon the development of new models to deal with staffing issues. Digital reference lends itself to a tiered staffing structure, with trained para-professional staff receiving all enquiries and referring to subject specialist for those questions that are not well defined or cannot be quickly and easily answered.

4.0 References

1. Chowdhury, G.G. (2002). Digital Libraries and Reference Services: Present and Future. *Journal of Documentation*, 58(3), 258-283.
2. Coffman, S. and Saxton, M.L. (1999). Staffing the Reference Desk in the Largely Digital Library. *Reference Librarian*. 66, 141-161.
3. Collaborative Digital Reference Service. <www.loc.gov/cdrs>; <www.oclc.org/services/reference/cdrs.htm>
4. Gray, S.M. (2000). Virtual Reference Services: Directions and Agendas. *Reference & Users Services Quarterly*. 39(4), 365-375.
5. Hutchins, Margaret. (1944). *Introduction to Reference Work*. Chicago: American Library Association.
6. Katz, William A. (1997). *Introduction to Reference Work*. New York: McGraw-Hill.
7. Kresh, D.N. (2000). Offering High Quality Reference Service on the Web: The Collaborative Digital Reference Service (CDRS). *D-Lib Magazine*, 6(6).
8. Krishan Kumar. (1996). *Reference Service*. 5th rev.ed. New Delhi: Vikas Publishing.
9. Lankes, R.D. [et al.] (ed.). (2000). *Digital Reference Service in New Millennium: Planning, Management and Evaluation*. New York: Neal-Schuman.
10. Morris, A. (1991). Expert Systems for Library and Information Services: A Review. *Information Processing and Management*, 2(6), 713-724.
11. Parrott, J.R. (1986). Expert System for Reference Work. *Micro-computers for Information Management*. 3(3), 155-171.
12. Ranganathan, S.R. (1989). *Reference Service*. 2nd ed. Bangalore: Sarada Ranganathan Endowment for Library Science.
13. Tenopir, C. (2001). Virtual Reference Services in a Real World. *Library Journal*. 126 (12), 38-40.
14. Vickery, A. and Brooks, H.M. (1987). PLEXUS: The Expert System for Referral. *Information Processing and Management*. 23(2), 99-117.
15. Virtual Reference Desk. (2000). Facets of Quality for Digital Reference Services. <<http://www.vrd.org/training/facets10-00.htm>>
16. 24/7Reference. (2005). <<http://www.247ref.org/products.htm>>