Chapter 2

METHODS AND MATERIALS
# CONTENTS

## Chapter 2: METHODS AND MATERIALS

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CHAPTER 2
METHODS AND MATERIALS

2.1 INTRODUCTION

The *Oxford English Dictionary* defines *Method* as mode of investigation; a special form of procedure adopted in any branch of mental activity... for investigation and inquiry (OED, V. 6, 1978, p. 394) and *Methodology* as the study of the directions of empirical research (Supplement V. 2, p. 916). The *Webster's Third New International Dictionary of English Language* (1976) defines *Method* as a systematic procedure, technique or set of rules employed in philosophical inquiry to a particular discipline and *Methodology* as the processes, techniques or approaches employed in the solution of a problem (V. 2, p. 1422-23). In a broad sense methodology refers to the processes, principles and the procedures by which one approaches a problem to seek solutions. In social and behavioural sciences it applies to the procedure of conducting research. A researcher adopts certain techniques and procedures for studying a research problem which are enumerated in methodology.

Search for knowledge is the primary objective of research (Kothari, 1985, p. 1). Suitable plan of research is necessary, wherein the methodology to be followed and materials to be consulted for completing the research problem for bringing to its logical conclusion. The nature of the problem of study and the specific aims of the research topic determine the method adopted for the search of knowledge. The choice of a particular research methodology also depends upon the scope, the objectives, the depth of the problem on hand and the data to be collected. The studies in social and behavioural sciences can broadly be grouped in to exploratory (or formulatory) and descriptive studies. While the former aims to gain familiarity with a phenomenon or to achieve an insight into it, the latter aims at portraying the characteristics of a particular situation or a group. The present study relates to the exploratory study and tries to gain insight into the problem and as such two kinds of material were used : (a)
information available in open literature, and (b) data collected from the heads of librar­
ies and information centres on the extent of use of electronic media, concerns and issues.

2.2 RESEARCH DESIGN

The completion of research work is associated with a series of actions or steps. These include formulating the research problem; comprehensive review of the available literature; defining the scope of the study and limitations; development of a hypothesis: collection, processing and analysing of data; and finally enumerating inferences and conclusions (Kothari, 1985, p. 17). Formulating the problem facilitates discerning the data that is relevant and useful from the irrelevant and useless data. Data collection assumes greatest importance in the whole process since it deals with the collection of both qualitative and quantitative information about the research problem in terms of facts and figures. For this study data has been collected through various methods on different aspects of the subject including (a) historical analysis, (b) literature survey, and (c) questionnaire survey followed by personal interviews. The first two methods have been used to collect textual data from published and unpublished documents, the latter method has been used to solicit information from the heads of libraries. Thus the data collected includes both primary raw data as well as secondary data (facts and figures already recorded for other purposes but can also be used for the present research problem).

2.3 DATA COLLECTION

This section briefly discusses about the data collection methods used for the present study.

2.3.1 Historical Analysis

History is an account of some past events or a combination of events. Therefore, historical analysis is a method of finding what happened in the past from the records
and accounts (Marshall and Rossman, 1989, p. 95). This method is useful, particularly in evaluative and qualitative studies. This method has been used to trace the origin and development of computer and storage technologies, electronic media (e-media) tools, library automation, and information networks.

2.3.2 Literature Survey

An extensive survey of published literature in the field of Impact of Electronic Media on Library and Information Centres has been made both before and after the formulation of the research problem. This has facilitated in finding out the type of data available for undertaking the research problem and whether the scope of the problem be delimited keeping in view of the magnitude of the problem. Further, the review of literature has also helped in anticipating the difficulties that may be encountered during the course of the study.

Review of Literature

Scientific research is cumulative in nature and analogous to brick laying on the foundation in construction. It is an established convention to build the base of a research/study on the scholarly literature already published in that field there by laying foundation for the proposed study. Review of literature

(a) Provides a general understanding of the subject,

(b) Facilitates a clear understanding of the work done by others in a specific field,

(b) Enables to know if a research topic is current and active,

(d) Helps in finding out if research is being carried out and if so, who are working, where the research is being carried out and on what facets,

(e) Enables knowing successfully tested methods, materials and procedures on similar problems elsewhere,

(f) Avoids duplication of research and promotes relay research as against parallel
(f) Avoids duplication of research and promotes relay research as against parallel research,

(g) Facilitates narrowing down or broadening the research topic to achieve the required depth, and

(h) Provides insight to the researcher in terms of the current status of the research at a particular time.

The number of science and technology documents published the world over each year runs to a few millions. This is further supplemented by the electronic publications (e-publications) over Internet. The problem of information abundance created by the information explosion calls for efficient tools for information retrieval. E-media offers itself as the best media for efficient retrieval of information. However, as observed by Weiss (1967), caution is to be maintained, for the enormous quantum of documents published does not necessarily reflect a knowledge explosion but may reflect only a large amount of redundancy, super determination, over sophistication and just plain bulk.

The review of literature on the theme and its various facets include research articles, review papers, technical reports, books and monographs, annual reviews, reports of committees constituted for the purpose, proceedings of conferences on the topic and its sub-topics organised by national and international bodies; pamphlets, brochures and annual reports of various societies, associations and organisations; newspaper reports and surveys; and e-publications including CD-ROM databases, and electronic/online information resources on Internet. The existing networks such as NICNET, DELNET and Internet have also been utilised for the study. The open, unbiased and original mode of thinking, and impartial analysis and interpretation of the available data have resulted in new insights to the problem.

Thus, besides evaluated information, the study covered sources of information which are not evaluated including information meant for public relations and publicity. This called for filtering and critical examination of the material before taking
authenticity of the contents and the integrity of the Web site have been taken into consideration.

Content analysis has also been used in conjunction with literature survey to assess the qualitative aspects of data collected from news items, government's policies, opinions expressed by people who matter in the field, etc. It has helped in determining whether or not the data support the hypothesis and in obtaining an objective and qualitative description of the contents of the documents.

**Literature Search**

Although quite a number of papers have been published on the impact or influence of different technologies and components of e-media on various spheres of library management, very few have dealt the impact of e-media on libraries. The scope of such papers, again, is limited and does not include all the constituent technologies or components as applicable to this study. Literature searches were made on LISA, and INSPEC databases but hits were few and in many cases misleading. In view of this, the relevant literature pertaining to various technologies has been reviewed in the respective chapters, i.e., Chapters 3-6. Here some of the general aspects of e-media have been dealt.

The use of e-media generally is understood to improve user satisfaction, as it facilitates effective and efficient dissemination of information. Even in the public library environment, deployment of e-media such as e-publications, multimedia and Internet, was one of the factors which enhanced the use of the library (Svedberg, 1996). The migration from print to e-media and the impact of Internet access have been the subject of quite a number of articles. Of particular importance here is the problems which libraries face when operating within restricted budgets and having to choose a suitable mode of information retrieval. Some developments include reduction in book and journal acquisitions (to offset the costs of electronic services) and
restructuring traditional activities like cataloguing (by outsourcing), acquisitions (by providing access to information), etc (Martin, 1996).

For quite some time now, big libraries, especially academic libraries, have been resorting to rationalise periodical titles or sacrifice space for stacking back volumes. King and Griffiths (1995) estimated the storage and maintenance related costs of journals to be around 50 per cent. In addition to this, the growth of literature, increases in subscription costs, and declining purchase powers of libraries made librarians to look for alternatives to the traditional practices. Resource sharing and cooperative acquisitions through consortium approach have become essential. Libraries are compelled to choose various options including access to electronic information held in databases through networks followed by supply of relevant documents by document supply centres.

The electronic information market is growing steadily. As the online databases and other e-media are used via public telecommunication networks, the future market growth will be dependent on the development of such networks. The growth of the electronic information market is also expected to result in the enhancement of electronic information services. In UK, the Joint Academic Network (JANET) provides unlimited access to 23 databases held by the Bath Information and Data Service (BIDS). For getting the required documents, the British Library Document Supply Centre (BLDSC) can be approached. Access to information similar to JANET is also provided by the Integrated Academic Information Management System—IAIMS—of the National Library of Medicine, USA, and the Australian Academic Research Network — AARNet (Johnston, 1998, p. 9). Publishers such as Blackwell, Elsevier Science and services like SwetsNet also provide such services. For example, SwetsNet is a single source for many titles providing a single index offering three levels of access, viz. contents, abstracts and full text; Internet access, crossover searching between titles, etc (Rustenburg, 1997, p.154-5). OCLC also provides a similar facility through its FirstSearch, ContentsFirst, ArticlesFirst, and FastDoc services.
2.3.3 Questionnaire Survey

A definite technique is to be used for the collection of data from respondents by means of surveys in any branch of human knowledge. Various options available for the researcher for collection of data in library and information science include the questionnaire survey, personal interview, telephone interview and diary methods; observation by self; analysis of library records; and citation analysis methods. Sometimes a combination of these techniques such as questionnaire method followed by telephonic or personal interview, may also be employed (Voos, 1969).

Among all these techniques, the questionnaire and interview methods are more popular and are being used more frequently than other methods (Gay, 1981). Of these, the personal interview method is very expensive and time consuming (Backstorm and Hursch, 1963) and makes the study less functional in the field of library and information science. The same is true with telephonic interview method also. When the sample is spread over a large geographical area (such as the present study), these problems become more acute. The availability of the respondent at the time of contact and lack of direct telephone lines to many libraries make the interview method further difficult. In comparison, the questionnaire method is less time consuming, saves money, efforts and energy at the same time reaching a large number of respondents scattered over a vastly distributed locations. And questionnaire survey method is being widely used for data collection on a particular topic or issue. In this method the questionnaires are administered to a sample population to know about their opinions, experiences and attitudes. The primary advantage of this method is that one can make broad generalisations from the relatively small number of observations (Hursh-Cesar and Roy, 1976, p. 49). The researchers make an assumption, while conducting the survey, that the attitudes and opinions of the respondents can be measured accurately through self report. Also, the researchers heavily rely on the honesty and accuracy of the opinions of the respondents (Marshall and Rossman, 1989, p. 83). In questionnaire surveys, both open as well as closed questions are asked and are
normally examined for bias, clarity and validity.

In view of the foregoing, the questionnaire method was adopted for the collection of data for this study, despite the above mentioned drawbacks, by taking necessary steps to overcome. Further the enormous time, energy and money involved in both personal and telephonic interview method made this as ideal choice for the present study. The questionnaire method was supplemented by telephonic and personal interviews in situations such as

(a) Where the feedback was not received from the respondents,

(b) Where the data furnished is misinterpreted or ambiguous,

(c) Where ideal answers were given by concealing facts, and

(d) When the researcher met the respondents falling under the above mentioned points during official visits to the places or during informal meetings like seminars, conferences, etc.

As observed by Gay (1981) and Erdos (1970) the anonymity and confidentiality was assured to increase the truthfulness of responses and the percentage of questionnaires received. If the nature of information solicited from respondents is purely for academic and research purposes, and the survey does not probe personal and controversial matters which may cause embarrassment and indignation, then one is sure to get factual answers and increased response.

Measures taken by the researcher in the present study for achieving better response from the respondents are:

(a) Mailing a covering letter on a coloured paper making it distinct and attract the attention of the respondent,

(b) Enclosing a self-addressed stamped envelope, to enable the respondent to dispose the questionnaire quickly,
(c) Sending follow-up letters or reminders at regular intervals,
(d) Contacting the respondents by phone or in person on various occasions like visits, seminars, conferences etc., and
(e) Mailing again the questionnaire when its non-receipt was reported.

The questionnaire (Appendix A) was designed as a mix of closed and open-ended type questions. A majority of the questions were structured with multiple choices to tick appropriate answers. Blank columns were also included where necessary to record any other answer not provided in the questionnaire. Such questionnaires enhance the response as they are easy to fill-in, consume less time, and also facilitate efficient, objective and easy analysis of data, tabulations and scoring (Best and Kahn, 1989; Gay, 1981). In addition, in certain cases, interviews with the heads of libraries were conducted to collect the data. In agreement with the observations made by Goode and Hatt (1952) and Miller and Erdos (1970), these measures have resulted in better response rate.

Above all these measures, care was taken to include as simple and clear questions as possible, avoiding ambiguity to get maximum response. Further, personal contact and rapport with professionals was maintained.

2.4 CONTENTS OF THE QUESTIONNAIRE

The forwarding letter (Appendix B) attached to the questionnaire (Appendix A) briefly introduced the research topic and explained the objectives and value of the study. It assured respondents that the data furnished by them will be kept confidential and will be used for research purposes only and also that their names will be kept anonymous. Thirty main questions with about 95 supplementaries have been included in questionnaire which is divided into three parts.

Part A of the questionnaire contains seven questions soliciting background information such as the name of the library; the institution to which it belongs and the
year of establishment; the name of the parent body/organisation and the nature of work carried out; mailing address; the name of the library in-charge, designation, academic qualifications and training courses attended in the field of information technology in the past five years; and the number of the library users including local as well as outstation users, if any. Due to the type of information solicited, all the questions in this section, except one, are open-ended (enumerative) in nature. This conforms, by and large, with other questionnaires in social sciences where the first part predominantly contains open-ended questions.

Part B consists of 13 questions of which two are open-ended and five are structured (i.e., multiple choice) questions requiring the respondent to choose one appropriate answer. The remaining six questions are of mixed type where first part contains multiple choices and the answer to the second part depends upon the answer to the first part of the question.

This part is meant to collect information regarding the use of computers for library work, hardware and software including application software being used; for how long they are being used, and so on. Questions also cover the usage of fax, e-mail, online searching, CD-ROM databases, Internet; library automation software used, whether it is developed in-house or purchased, and the various activities covered under library automation. Efforts were made to collect data about the creation of database of library holdings like books and reports and the number of records in the database; participation in any network; whether the library has a local area network (LAN) and if so, the nature of services offered over LAN; infrastructure available for dissemination of information; and Internet connectivity. Realising the importance of and the penetration of CD-ROM databases and electronic journals, as many as five questions were included to know if the libraries are providing CD-ROM-based services to their users, the number of CD-ROM titles subscribed, their subject fields of coverage, whether they are full text or bibliographic in nature, their level of usage, number of searches made per day, and if the library is subscribing electronic/online journals and
their usefulness. One specific question was asked about the availability of Internet connectivity and its usage for providing services to users.

Part C of the questionnaire contains ten questions of which six are meant for collecting information on the financial and human resources of the library including budget spent on IT-related products and if the staff are trained in the IT-related areas. Five questions are open-ended and five others structured (including one mixed type). One of the enumerative questions deals with budget of the library and would need for time and data. Four questions are meant to find out if the library head is aware of the electronic digital library concept and its impact if any. The questions aim to find out the level of understanding and the positive or negative impact of digital libraries. All the four questions are of multiple choice type to be answered yes or no.

Of the 30 questions included in the questionnaire, a majority have multiple choices for choosing and marking the right answer. Further, seven questions are of mixed type, where depending upon the positive answer to the first part, enumerative answer is to be provided to the following part. Of the 13 open-ended questions, many are to be answered like objective questions where the answers are fixed. These include the questions concerning the name of the library, institution, organisation, address, etc. Some of these have numeric answers like the number of library users, staff and the training programmes attended by them etc, most of which will be known to the respondent. Exception is only in the case of three (one mixed and two open-ended) questions, which need time for the respondent to fill in. These deal with the library budget for the previous years and the opinion/view of the respondent on the online electronic journals and advantages or disadvantages in using them. Efforts were taken to make the questions as simple as possible so that the respondents could answer them easily. Emphasis was given to pretesting and modifying the questionnaire before the original study was undertaken (Haskins and Fineberg, 1968). During the pilot study it took 25 minutes to furnish the answers to all the questions of the questionnaire except the budgetary details.
2.5 SAMPLE POPULATION

The term **Survey** denotes planned collection for the purpose of description or for analysing the relationship between certain variables (Oppenheim, 1966, p.1). This requires proper planning by the researcher. As the population for the present study are the librarians, a list of institutions was prepared with the help of the Directory of the R&D Institutions 1996 (New Delhi, Dept. of Science and Technology, 1996). Opinions of experts have also been taken in to consideration while finalising the list. Since the objective of the study is to find out the Impact of Electronic Media on Library and Information Centres, it is futile to approach libraries of those R&D institutions in the field of science and technology and state universities which do not receive adequate financial support and are not backed by electronic media infrastructure. Further, the infrastructure needed for utilising the electronic media is not available in many libraries and so these were eliminated from the purview of the study. Public libraries and libraries of state and local governments have not been included in the survey, as in general, these do not get sufficient funds to acquire infrastructure, equipment, etc.

Although, the libraries taken for the current survey are mostly from the academic and R&D institutions, to cover the entire gamut of the libraries in science, technology, and engineering institutions is too huge to be adequately dealt by a single survey. Also, due to the above mentioned limitations, the study was restricted to the R&D institutions in the field of science and technology and the academic institutions (universities), which owing to the compulsions of providing better service to their users/researchers, generally adopt new technologies including electronic media at the first opportunity.

2.6 PRETESTING OF QUESTIONNAIRE

It is important to pretest the questionnaire before the actual study is carried out to overcome the ambiguities associated with the design of the questionnaire and the difficulties faced in the translating the objectives of the survey into a set of simple
queries. Accordingly the questionnaire was pretested against a small group of sample population consisting of librarians. This exercise was done mainly for identifying the pitfalls, if any, or for finding out deficiencies inherent in the design of the questionnaire, and for improving it to obtain relevant data for achieving desired results. The respondents in the pilot study were encouraged to freely comment upon deficiencies or flaws, if any, make suggestions regarding modifications, and also comment upon the recording procedures, etc.

A few suggestions and comments were received from the respondents of the pilot study. The questionnaire was revised taking them into consideration. Based on the feedback, five questions were modified to avoid ambiguity, two specific questions were added and a couple of questions were reframed.

2.7 QUESTIONNAIRE CANVASSING

Once multiple copies of the questionnaire were produced and the mailing list was finalised, the actual work of soliciting information from the librarians/heads of libraries started. Since the sample population is spread all over the country, the questionnaires were largely sent by post. However, data were also collected through personal visits to the libraries in Delhi. As a follow up measure, reminders were sent at regular intervals. When the investigator visited cities like Hyderabad and Bangalore on certain occasions such as attending meetings, conferences, seminars etc., personal contacts, visits and/or telephonic contacts were also made to collect the questionnaires.

2.8 ANALYSIS OF DATA

Analysis in research work is the process of bringing order, structure and meaning to the raw data collected. The research work usually starts with certain concepts, assumptions and hypotheses. However, the analysis of data helps in either accepting or rejecting them. In this study, the data from published sources and the raw data collected from the respondents through questionnaire survey and interviews
have been evaluated and analysed to find the results. In accordance with the procedures followed for qualitative research, the textual data has been analysed by organising the data, generating themes and patterns, testing the hypothesis against the data, searching for alternative explanation, and writing the report. Each of these steps has lead to the reduction of the large volume of data to a manageable form by means of inferences and interpretation.

The data collected through questionnaires have been coded using a coding structure developed for data processing. Later the coded data have been entered on to input sheets with utmost care. The data were fed to computer using dBase software and the print outs were checked to rectify the typographical as well as other errors. Statistical analysis was made with the help of the Statistical Package for Social Sciences (SPSS) software for presenting frequency distribution tables and other tables of variables to establish relationship between them.

2.9 REFERENCES


Miller, D and Erdos, P. Handbook of research design and social measurement, Ed. 2. New York, David McKay, 1970.


