

---

# UNIT 1 RESEARCH: MEANING, CONCEPT, NEED

---

## Structure

- 1.0 Objectives
- 1.1 Introduction
- 1.2 Definition of Research
- 1.3 Need for and Purpose of Research
- 1.4 Conceptual Framework of Research and Terminology
  - 1.4.1 Basic and Applied Research
  - 1.4.2 Conceptual Framework
- 1.5 General Characteristics of Modern Research
- 1.6 Criteria for a Topic to be Relevant for Research
- 1.7 Scientific Method
- 1.8 Research Design
- 1.9 Value of Studying Research Methodology for Library and Information Professionals
- 1.10 Summary
- 1.11 Answers to Self Check Exercises
- 1.12 Keywords
- 1.13 References and Further Reading

---

## 1.0 OBJECTIVES

---

After reading this Unit, you will be able to:

- perceive research methodology as a subject in its own right;
- grasp the essentials of the principles and methods of research in general;
- get an insight to apply the principles of research and its methods to problems of library and information science;
- pursue research as a means to extend the frontiers of knowledge in library and information science; and
- recognise the value of a full exposure to research methodology as a necessary preparation for information support services to research community in addition to pursuing research in library and information science.

---

## 1.1 INTRODUCTION

---

All societies from the primitive to the most modern sophisticated societies have progressed only on the acquisition of knowledge and its application, depending upon their capability to understand their environments and control them through concerted efforts. Initially knowledge acquisition was more on the basis of observation, experience, learning by trial and error, simple logics of deduction and inference, etc. But with the increasing ability to conduct research and getting positive results and the ability to apply them in solving problems, although confined to a few individuals, human societies were slowly advancing materially.

With science and technology opening up new directions of growth and development from the 15<sup>th</sup> century in Western Europe and its influence in other parts of the world, methods of research have become a mode of acquiring knowledge through scientific methods. It was largely an individual flair that pushed up the frontiers of knowledge albeit with very limited facilities for research. With the advent of universities, research became one of their important functions, besides their teaching, training, and publications functions. Increasing pursuit of research has resulted in the growth of a body of literature over the years on research methodology, which has now developed into a subject in its own right.

In the course of time, institutions, associations and cognate bodies, have been established to deal with various development problems through research, with financial aids from governments and industry. Today there are research institutions, which have been set up to deal exclusively with research in different subjects, including library and information science.

In this Unit, we are trying, in a general way, to study the subject of research methodology in all its dimensions. Formal definitions of research, need to pursue research to expand the horizons of knowledge, contours of research processes with an understanding of the conceptual framework model of research methodology, characteristics of research, scientific research, research design and other related aspects are discussed in this Unit. Another important point to be noted in a study of research methodology by students of library and information science is not only to get the necessary skills in doing research in their own field but also to be of assistance and help to the research community offering high quality information service. This aspect is also elaborated in this Unit.

There are likely to be some overlapping of ideas in discussing these aspects in the different sections of this unit. They are reiterations and should be understood in the contexts in which each of these ideas is discussed.

---

## 1.2 DEFINITION OF RESEARCH

---

Webster's Third International Dictionary of the English Language defines research as *"studious inquiry or examination, especially critical and exhaustive investigation or experimentation, having for its aim the discovery of new facts, and their correct interpretation, the revision of accepted conclusions, theories, or laws in the light of newly discovered facts, or practical applications of new or revised conclusions, theories, or laws."*

According to the Random House Dictionary of the English Language, *Research is a systematic inquiry into a subject in order to discover or revise facts, theories, etc.*

In the Encyclopaedia of Social Sciences, Research is defined as *"the manipulation of things, concepts or symbols for the purpose of generalization to extend, correct or verify knowledge whether that knowledge aids in the construction of a theory or in practice of an art."*

Best and Kahn, in their book **Research in Education** define research *"as the systematic and objective analysis and recording of controlled observations that may lead to the development of generalization, principles or theories, resulting in prediction and possibly ultimate control of events."*

Busha in his publication **Research Methods in Librarianship** says that Research is *"a systematic quest for knowledge that is characterized by disciplined enquiry. Efficient and effective approach to expand knowledge is the conduct of special, planned and structured investigations."*

Cook outlines research *as an honest, exhaustive, intelligent searching for facts and their meanings or implications, with reference to a problem*. He sees the word 'Research' as an acronym, each letter of the word, standing for a particular aspect as given below:

R = Rational way of thinking

E = Expert and Exhaustive treatment

S = Search and solution

E = Exactness

A = Analysis

R = Relationship of facts

C = Critical observation, Careful panning, Constructive attitude and Condensed generalisation

H = Honesty and Hard working

Ranganathan describes *research to represent a critical and exhaustive investigation to discover new facts, to interpret them in the light of known ideas, theories and laws, to revive the current laws and theories in the light of the newly discovered facts to apply the conclusion to practical purpose*.

The substance of all these samples of definitions of research can be broadly summed up. To restate, the substantive phrases that stand out in all these definitions of research are that research is an activity as characterised below:

- An intellectual activity of a high order;
- An investigation of a phenomenon, event or activity;
- Aims to discover data and facts and their interpretations;
- To arrive at conclusions to formulate new theories and laws or revise the already established theories and laws;
- To communicate the results for peer review; and
- To be accepted or rejected before adding this new knowledge to the already existing general pool of knowledge.

### Self Check Exercise

1) What constitutes research?

**Note:** i) Write your answer in the space given below.

ii) Check your answer with the answers given at the end of the Unit.

.....

.....

.....

.....

.....

.....

### 1.3 NEED FOR AND PURPOSE OF RESEARCH

As it has been mentioned earlier, knowledge is the primary and powerful resource that can provide scope for material prosperity of a society. New knowledge can be acquired only with the pursuit of research to extend the frontiers of knowledge. To accentuate the value of research, particularly with reference to scientific, technological and societal knowledge in the Indian context, Pandit Jawaharlal Nehru eloquently articulated the Scientific Policy Resolution (SPR) of the Government of India in 1958.

SPR states, "the dominating feature of the contemporary world is the intense cultivation of science on a large scale and its application to meet a country's requirements. It is this which for the first time in man's history, has given the common man, in countries advanced in science, a standard of living and social and cultural amenities which were confined to a very small and privileged minority of the population. It is only through scientific approach and method and use of scientific knowledge that reasonable material and cultural amenities and services can be provided for every member of the community and it is out of the recognition of this possibility that the idea of the welfare state has grown."

The implications and policy directions of this farsighted SPR are quite clear, namely:

Recognition of the vital role of science and technology for socio-economic development as a fundamental approach

Another important point of note, particularly beginning from the middle of the last century, is the increasing emphasis on the organising principle for all socio-economic development as a mix of science, technology and societal knowledge (STSK). This mix is a complex and multidimensional process, involving science, technology and societal knowledge. Societal knowledge combines political, economic, sociological, demographic, occupational, health, legal, regulatory and environment information and knowledge to comprise a complete knowledge universe. Again development is not merely cultivating physical resources, but also very much on building up human resources. Any imbalance in these development approaches weakens the overall capacity of a State to transform itself into a welfare state.

As a result of this policy direction in India, in the last half a decade, a number of R & D complexes have been set up in science, technology, social sciences, and humanities. Educational and training institutions of higher learning, centers of advanced studies in many disciplines, acquisition and cultivation of technological and management skills through institutions of technology and management have also been established. Creation of learned societies and professional associations, publication of primary and secondary sources for dissemination of information and knowledge, information systems and services through libraries and information centers, consultancy organisations to bridge research and industrial development, multimedia communication through Internet and websites, and many others are undoubtedly oriented towards building up our knowledge base. Research plays the vital role in this process.

For the business and industrial community world over, knowledge management has become a crucial area for combating competition. This is a big challenge, which has made them to invest very heavily on research on new knowledge creation. This trend is also visible in the Indian context although somewhat blurred at present.

Accessibility and availability of information and knowledge through Internet is another very important development, supporting research activities.

Thus the need for research is to build up an infrastructure for creating new knowledge to develop a knowledge reservoir. The application of this knowledge for socio-economic and cultural development of a country to provide material well being of societies, is the purpose.

### Self Check Exercise

2) What is the need and purpose of research?

**Note:** i) Write your answer in the space given below.

ii) Check your answer with the answers given at the end of the Unit.

.....

.....

.....

.....

.....

.....

## 1.4 CONCEPTUAL FRAMEWORK OF RESEARCH AND TERMINOLOGY

Belkin, a well-known information scientist, in dealing with information concepts for information science makes a distinction between definition and concept. The distinction is, while a definition presumably defines phenomena, the concept explains or interprets it. By accepting this approach, in our discussion here for concepts of research, it becomes easier to look for a set of useful concepts, which would help to provide a conceptual framework for operating the process of research.

We have already discussed a number of definitions of research in section 1.2. In this section, we shall examine the different concepts from the point of view of performing the different functions of research.

The general meaning of a concept is that it is an idea complex of something, formed up of its characteristics. It is a construct, putting together all parts of a thing.

We can perceive concepts of research in two sets. One, as their attributes for ensuring high quality of research, and another from the functional or operational point of view.

Generally a research topic is identified for study and research in a discipline, either to add further to the existing knowledge by creating new ideas or modifying existing knowledge by new findings. A research topic is always selected on the basis of the *theoretical knowledge* of a subject possibly to bridge up a gap or reinterpret a known finding or find new ideas to solve a new problem. To do this, a *hypothesis* is formulated, identifying *variables* to test the hypothesis. The process gets to the next step to find evidences by collecting appropriate *data or facts* by a suitable method, *analyse* the collected data systematically, *interpret* the results to arrive at *conclusions* and *generalise* the findings, possibly to be applied to an appropriate or a typical situation to *test* the result and its *validity* and finally add the validated findings to the already existing body of knowledge after peer review.

Each one of these words or phrases in italics in the sentence above can be deemed to be a functional concept and can be considered as a step-by-step procedure for a research activity. These concepts when integrated, serve as a general functional model of a research process.

### 1.4.1 Basic and Applied Research

Research is characterised by two types viz. Basic Research and Applied Research. Many or most of the concepts stated above are also associated with the process of research in both these types. Basic research — also referred to, as pure or fundamental research, — studies phenomena to get a fuller understanding of it. This is essentially to obtain knowledge of a natural phenomenon whose applications may or may not have any bearing on any application in the immediate future or even after a long time. Generally this type of research demands a very high order of intellectual calibre; intuition also plays an important role in this type of research. Those who are involved in basic research devote their efforts to the formulation or reformulation of theories and may not be concerned at all with their practical application. The knowledge obtained thus expands the theoretical base of a subject. Generally, basic research is conducted by intellectuals at academic institutions who are specially commissioned for this purpose.

Applied research on the other hand, is to acquire knowledge on the practical application of the theoretical base already built up which is expected to solve a critical problem. Applied Research is usually conducted for industries or governments by universities or by specialised research laboratories or institutions. Applied Research is always for development purposes. It is generally referred to as Research and Development (R& D)

The concepts stated earlier in this section can be used for planning a research process both in basic or applied research.

### 1.4.2 Conceptual Framework

To restate here, the functional concepts stated at the beginning of this section are: Theory, Hypothesis, Variables, Data/facts, Organisation of data/facts, Analysis, Interpretation, Conclusions, Generalisations, Tests for Validity of findings, Application to solve a problem, finally adding to the pool of knowledge.

A schematic diagram given below explains the step-by-step procedure of a research process:

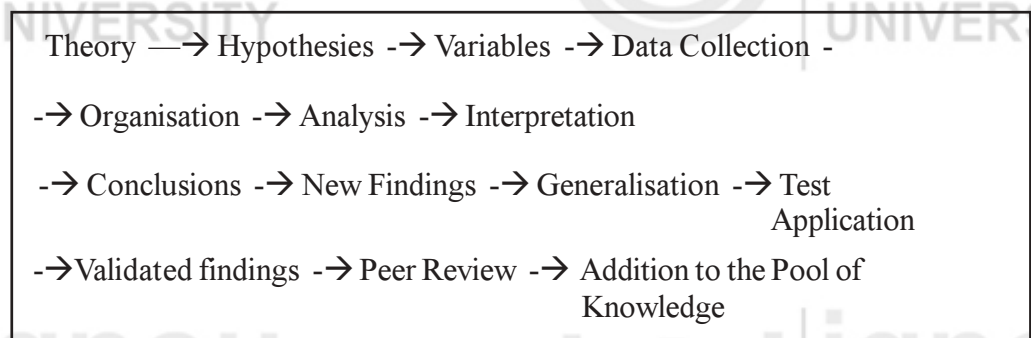


**Fig. 1.1: A Schematic Diagram of a Research Process Model**

To explain the above schematic diagram, a theory is a body of knowledge that establishes a cause and effect relationship between variables with the purpose of explaining and predicting a phenomenon. Theory of a subject is the source from which a topic for research is identified for research. A gap may exist in already established knowledge and this gap has to be bridged. Filling up this gap may need to be investigated through research. Once the topic for research is identified and taken up for investigation, the first step in research is to formulate hypothesis(es).

A hypothesis is a formal affirmative statement predicting a single research outcome, a tentative explanation of the relationship between two or more variables. To give an example, “SDI services of an Information Centre, are used by students of research and junior research scholars much more than senior researchers.” To test the hypothesis,

the variables must be identified and operationally defined. It must also be noted that all research efforts need not necessarily be started with a formulation of hypothesis. Sometimes a broad objective may be the starting point for research. For example, in the research project of the College of Aeronautics in Cranfield, England, (Cranfield I), and the general objective was to evaluate the relative performance of various indexing methods and systems.

Once the hypothesis(es) is formulated, the next step is to test the hypothesis(es) for its validity. This is done by identifying variables and collecting data or facts to assemble them systematically for analysis and study. A variable is an element, entity, or a factor of a research investigation, having varying quantitative and qualitative values. Sometimes, the values of variables change during the course of a research project. A major part of the research process consists of the measurement of changes or differences between or among the pertinent variables. For instance, in the Cranfield Project, the variables were Documents, Users, and Indexing Devices for storage and retrieval, etc.

Qualitative variables are those that cannot be measured in terms of quantity but can be seen only as shades of differences of qualitative attributes. Language factors in collection development would be only a qualitative measure, using an appropriate yardstick; whereas studying the users' age, department affiliations, etc. may be quantitatively measured in terms of numbers.

A dependent variable is users' needs which may have different values is a constant factor of investigation in an evaluative study of library and information services. An independent variable is manipulated by a researcher to examine its effects on the dependent variable during the course of an investigation. For instance, the types of documents retrieved in a search process can be manipulated in varying degrees by devices like recall or precision measures.

Once the data or facts are collected systematically and assembled in a form that could be studied, the investigation moves to the method of analysis. Several methods are available for studying both qualitative and quantitative data. The data is organised and presented to draw proper inferences and interpretations. This leads to some tentative findings that can be refined with appropriate logic to arrive at a conclusion. The conclusion may lead to a generalisation, which can be further tested in its applications to a problem.

### Self Check Exercise

- 3) Distinguish between basic and applied research.
- 4) What are the concepts that could be formed into a framework?

**Note:** i) Write your answers in the space given below.

- ii) Check your answers with the answers given at the end of the Unit.

.....

.....

.....

.....

.....

.....

## Concepts of Attributes

In all these steps, a number of special terms are employed whose characteristics are useful in research studies. This leads us to the discussion of attributive concepts whose use ensures the quality of research. Some of these concepts are discussed below.

*Reliability* is used to characterise stable, consistent, and dependable research methods, instruments, data or results. *Validity* is the essential characteristic of the entities, procedure, or devices to measure the dimensions that are used to measure. *Objectivity* and *subjectivity* are characteristics that affect the research results in the sense that any personal bias (that is subjective) may vitiate research results.

*Intuition* is an important element in research. A person who is involved in a research project is likely to be constantly thinking about the research process and its progress. An idea may suddenly flash in the mind of a researcher that could sort out a ticklish problem where the progress of work had got stuck up.

There are a number of similar other basic concepts that are associated with the various methods of research. It is not necessary to exhaust this list in the Unit, as they will be more appropriately discussed in units where the different research methods are discussed. Only a few general attributive concepts are discussed here to focus attention on them to comprehend the steps in research.

---

## 1.5 GENERAL CHARACTERISTICS OF MODERN RESEARCH

---

There are a number of general characteristics of research that help to get a total perspective of research. Some of the more important ones are discussed below:

**Research is a highly intellectual activity:** It is usually long drawn, painfully slow, tedious, sometimes frustrating, and rarely spectacular. Research work demands intensive study, dedication, devotion, patience, and continuous effort till the projected goal is reached.

**Knowledge growth and development:** Knowledge growth and development and their use and application to problems of sustenance is the only way to enhance human living standards. This idea has been already stated in this Unit. This is done only through R & D. But research is a never-ending process. No final word can ever be said on any aspect of our knowledge. Any research finding can become invalid with new advances in knowledge.

**Modern Research and Development is multi-disciplinary:** It is becoming more or more team research, each member of the team, contributing to research with his/her expertise in a particular discipline. Research activities have, therefore, become highly professional. Industry and business organisations coordinate and operate in the most efficient manner by applying scientific methods and mathematical principles to organisational problems. Today corporate bodies are increasingly using Operations Research (OR) and techniques of management science to improve productivity and quality and to reduce costs. The problems they tackle involve strategy, forecasting, resource allocation, facilities layout, inventory control, personnel schedules and distribution systems.

**Modern research is, therefore, increasingly a corporate activity:** It is conducted by specialised research establishments, research projects getting sponsored by governments, industries, and other agencies involved in developmental work.

**Modern research is highly professional:** Research professionals with expertise in a particular discipline are employed for the purpose of investigative research. As said above, it is a team research. A particular aspect of the research problem is taken up by a researcher and the results of all the findings are properly correlated by the team head or the project manager and the research report is prepared for dissemination for peer review. Research now provides ample career opportunities

**University Research:** Expansion of knowledge horizon is one of the basic functions of universities. Conventionally universities are expected to work on the frontiers of knowledge and conduct fundamental research. Universities, however, do take up developmental research projects, engaging research professionals for the purpose.

In universities, generally, students who pursue higher studies and research are offered scholarships and fellowships, for the award of research degrees. Theses or dissertations of research studies are stocked in respective university libraries, which are available for use, by others. Some of them get published.

**Dissemination and publication activity:** Research results are always reported through appropriate channels such as research journals, specialized research reports, and such others. They are made public for peer review either for acceptance or rejection. Research journals have the refereeing system to ensure quality control of research done, before any research paper is submitted to the journal editorial office for publication.

**Citation Analysis:** This method of publication of research papers with citations of consulted references already published, has given rise to the system of citation analysis. Through citation studies, a research scientist's contribution is evaluated for its quality. This method of assessment is used for award or reward systems for meritorious work or even as promotional criteria for assessing researchers' performance in labs or institutions.

**Funding:** Another characteristic of modern research is financial support. Apart from the provision of scholarships and fellowships with financial supports for research students and scholars, governments allocate an exclusive and specific percentage of their budgets to research activities. Industries, in Western countries spend a great lot of money on research and development by sponsoring specific projects of their interest to research institutions or through their own R & D wings. International organisations are also allocating funds for research and give financial support to appropriate research institutions to pursue research on specific problems of global interest.

**Research Facilities:** Research facilities in the form of highly specialised libraries for information institutions have come up with all forms of computer based information systems and services. Internet is a major facility to accessing global information and to obtain hard copies of recorded information. E-mail, computer conferences, and other electronic information systems have become quite common providing for inter personal communication and exchange of ideas.

### Self Check Exercise

5) What are the characteristics of modern research?

**Note:** i) Write your answer in the space given below.

ii) Check your answer with the answers given at the end of the Unit.

.....

.....

.....

.....

.....

---

## 1.6 CRITERIA FOR A TOPIC TO BE RELEVANT FOR RESEARCH

---

One of the most difficult phases in research, particularly for students who wish to take up research for higher degrees is the selection of research topic. The choice and selection of a research topic is crucial because the topic should lend itself for investigative studies and promise some useful and tangible results. Busha and Harter say, researchers “have a responsibility to search for real solutions to both practical and theoretical problems. Productive research is the product of test of propositions or searches for answers to exploratory questions; however, these activities cannot be accomplished unless a need for specific information has been recognised and pertinent phenomena have been pinpointed that can be observed, interpreted and evaluated. Thus, the selection of a topic for a disciplined inquiry is a key element of the research process.” It is, therefore, worthwhile discussing here a few useful criteria or a set of guidelines for the selection of a topic for research. A few sources that might help identifying a field and a topic in it, are discussed below.

A fast developing field like computer software development wherein many applications are constantly in demand may pose problems, needing solutions. Similarly, biotechnology and genetic engineering are fields, students are likely to face challenging problems for research investigations of applied nature.

Confining ourselves to library and information field, the increasing application of computer and communication technologies to the different of information systems and services need a great deal of creative ideas. Information retrieval systems, library automation, institutional mechanism to deal with multi-disciplinary nature of the innovative services, are some of the fields demanding a lot of intense studies and investigations. So the field that lends itself for study and research to identify areas of research is the best source for taking suitable topics for investigation.

Besides, intensive surveys of literature in library and information science, computer and communication technology, management science, sociology of information, economics of information, are some of the other disciplines which may suggest new ideas for research investigation for solutions to be applied to information systems and services in the changing context of information.

As library and information studies are also very much inter-disciplinary, it is useful to attend professional seminars, conference forums and other such group meetings where different subject specialist gets involved to deal with information problems. Valuable inputs for research can be picked up from such meetings.

Senior professionals with a great deal of experience and expertise may be helpful to students in suggesting areas of research and selecting topics for research. They can also guide students at every stage of the research process.

Academic and professional institutions and cognate bodies, funding agencies may have lists of topics for study and investigation in library and information fields.

Combining all the sources mentioned above, a student may be able to identify a topic of research.

Research projects of industries or governments wherein information is a component for study and research may engage research professionals to investigate their problems for solutions. Lists of topics of these bodies, for investigations and research may also be useful for getting an idea of research areas for research students working for M.Phil or Ph.D in library and information science.

Apart from the selection of topics for research, a researcher must have certain quality and competence to take up research studies. In -depth knowledge of the subject with a research bent of mind, combined with practical experience in the field are essential requirements for research. Hard work, devotion, dedication, etc. are additional inputs that could enhance the capacity to think, systematically collect information and data, and record them accurately for easy retrieval when needed.

### Self Check Exercise

6) Mention some of the criteria for selection of topics for research.

**Note:** i) Write your answer in the space given below.

ii) Check your answer with the answers given at the end of the Unit.

.....

.....

.....

.....

.....

---

## 1.7 SCIENTIFIC METHOD

---

Science is defined as a body of knowledge of facts and truths of all systematised knowledge (subjects, disciplines) that show the operations of general laws and others appropriate to them. Library and information science is also considered to be slowly but surely emerging as a subject of systematised knowledge. Solutions to problems in this discipline also could be obtained through research applying the principles of scientific methods.

Scientific method is defined by Random House Dictionary as a method in which a problem is identified, relevant data is gathered, a hypothesis is formulated, which is empirically tested.

It can be discerned from the above definition, scientific method is a logical systematic process. Some steps in this logical procedure are:

- Identification of the research topic which would be a proper formal statement;

- Review of relevant literature to assess what has been already done in the topic taken for research;
- Collection of already established facts and figures on the topic of research;
- Formulation of carefully drafted hypothesis(es);
- Testing the hypothesis(es), on the basis of a thoughtful research design;
- Assembling and organising the data collected systematically for analysis;
- Arriving at inferences and conclusions;
- Generalisation, if the results are amenable for it;
- Preparation and presentation of the research results; and
- Dissemination for peer review.

Scientific method as described by Ranganathan provides a comprehensive view of all the principles involved. As research is a cyclic process, the procedures get repeated with each and every round of study.

### **Self Check Exercise**

7) State the logical processes of scientific method as applied to research.

**Note:** i) Write your answer in the space given below.

ii) Check your answer with the answers given at the end of the Unit.

.....

.....

.....

.....

.....

### **1.7.1 Ranganathan's Spiral of Scientific Method**

According to Ranganathan, "Scientific Method makes intellection pursue any discipline perpetually round and round a never-ending succession of cycles." Figure 1.2 represents the endless Spiral of Scientific Method propounded by Ranganathan.

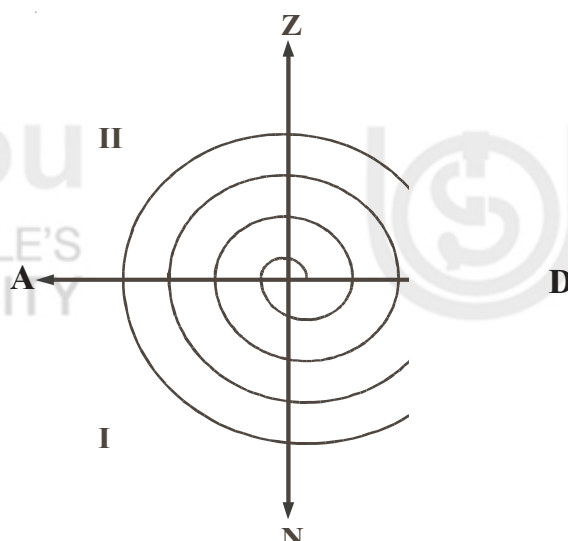


**Fig. 1.2: Spiral of Scientific Method**

## Types of Laws, Activity and Cardinal Stages

Research: Meaning,  
Concept, Need

The Spiral of Scientific Method comprises various types of laws, stages, and intellectual activities as given below:

### A) Types of Laws:

- i) Fundamental laws.
- ii) Deduced laws.
- iii) Nadir facts.
- iv) Empirical laws.

### B) Types of Activity

- i) Senses, experimentation, observation, concretisation, and particularisation.
- ii) Intellect, induction, abstraction and generalisation.
- iii) Generalisation, abstraction, sublimation, and intuition.
- iv) Particularisation, concretisation, deduction and intellect.

### C) Cardinal Stages in the Cycle

- i) Nadir.
- ii) Ascendent.
- iii) Zenith.
- iv) Descendent.

## Spiral and its Quadrants and their descriptions

Quadrant I is between nadir and ascendent.

Quadrant II is between ascendent and zenith.

Quadrant III is between zenith and descendent.

Quadrant IV is between descendent and nadir.

**Quadrant 1** corresponds to the stage in the development of a subject in the universe of subjects, conforming to scientific method, in which:

- 1) Primary senses are used to either in their native state or with the aid of instruments of various intensity of powerfulness;
- 2) Observation are made of knowees, either with or without experimental inference and conditioning; and
- 3) Facts are found.

**Quadrant 2** corresponds to the stage in which:

- 1) Intellect is used either by itself or aided by machinery constructed to speed up the work of the intellect and to give relief to it in some measure;
- 2) Reasoning is made with the aid of inductive logic, including normal equations and statistical and other calculations to boil down the numerous facts accumulated at the nadir to a small number of inducted or empirical laws; and
- 3) Inducted or empirical laws are formulated.

**Quadrant 3** corresponds to the stage in which involves:

- 1) Intuition of some intensity is used unmediated by the primary senses or the intellect;
- 2) The inducted or empirical laws stand boiled down to a very small number of fundamental laws;
- 3) Progression towards ultimate generalisation;
- 4) Progression towards ultimate abstractness; and
- 5) Seizing of fundamental laws and their recording.

**Quadrant 4** with the use of intellect to the formulation and recording of deduced laws involves:

- 1) Use of intellect by itself or aided by machinery;
- 2) Reasoning with the aid of deductive logic including mathematical and other classes;
- 3) Progression towards particularisation;
- 4) Progression towards concreteness;
- 5) Derivation of deduced laws and their recording;
- 6) Deduced laws must include one and all of the inducted empirical laws; and
- 7) The number of deduced exceeds that of the empirical laws if fundamental laws have been seized with intuition of adequate intensity.

Thus, we find the process of observation corresponds to Quadrants 1 and 2, the process of formations hypothesis to quadrant 2 and testing of hypothesis to quadrant 4 in the cycle.

### **Re-entering into the Spiral**

Two things happen in re-entering the spiral:

- 1) Observations and experiments are made to verify the validity of new deduced laws;
- 2) Further continuous observation and experiment lead to accumulation of new empirical facts. So long as the deduced laws are verified empirically to be true and the new empirical facts are found to be in conformity with the implication of the fundamental laws, there is no further movement in the spiral. As and when new empirical facts appear to contradict the new fundamental laws, scientific method is applied and new cycle get into full swing and carries the Spiral of Scientific Method further. The cycle is liable to be repeated without end. This method is easily applied to natural sciences because:
  - a) Observations can be impersonal;
  - b) Experiments can be made without hindrance; and
  - c) There has been continuous sharpening of mathematical calculation necessary to make induction and deduction.

Research in social sciences is subjective because of different factors. Social phenomena are not amenable to accurate observations as is possible in natural sciences. Yet with all the limitations, scientific method is applied to get results that could be approximately accurate.

Social sciences also aim to create new knowledge studying social phenomena through scientific enquiry. Social sciences study issues, which have a direct bearing on society.

Social research has been defined by Pauline V. Young in her book *Scientific Social Surveys and Research* as a “Scientific understanding which by means of logical and systematised techniques, aims to:

- 1) discover new facts or verify and test old facts;
- 2) analyse their sequences, interrelationships and causal explanations which were derived within an approximate frame of references;
- 3) develop new scientific tools, concepts, and theories which would facilitate a reliable and valid study of human behaviour. A researcher’s primary goal is to explore and gain an understanding of human behaviour *vis-a-vis* social life, and thereby gain a greater control over them. In other words, social research is a systematic method of exploring, analysing, and conceptualising social life in order to “extend, correct or verify knowledge, aid in the construction of a theory or in the practice of an art.” Social research seeks to find explanations to unexplained social phenomena, to clarify the doubtful and correct the misconceived facts about social life. Social research, too aims at discovering laws of human behaviour; but they are more tentative than scientific laws on account of their dependence on uncontrollable behavioural data.”

Research in library and information science also has the limitations as social sciences. Despite these limitations, a lot of good work has been done in classification, information storage and retrieval systems, indexing languages, expert system as applied to Information handling, library automation, and others. Further research needs to be done in the changing context information to seek solutions to a plethora of problems.

The spiral of scientific method is open-ended in nature, and has unlimited scope for hospitality of various rounds in any field of activity.

#### Self Check Exercise

- 8) What are the types of laws, activity and cardinal stages in Ranganathan’s Spiral of Scientific Method?
- 9) How does the cycle of spiral of scientific method function?

**Note:** i) Write your answers in the space given below.  
ii) Check your answers with the answers given at the end of the Unit.

.....

.....

.....

.....

.....

.....

---

## 1.8 RESEARCH DESIGN

---

Design, in general, means organising a structural form of elements of any activity, keeping the purpose in view. Research design “is a plan of the proposed research work.” (Ghosh, 1984) It provides guidelines and directions in research investigations.

Kerlinger defines research design as “the plan, structure, and strategy of investigation conceived so as to obtain answers to research questions and to control variance. The

Plan is the overall scheme or program of research. It prepares an outline of the investigations, formulating the hypothesis and to collect evidences for analysis for testing the hypothesis.

Research design provides a structure before data collection or analysis of data commences. In fact, research is not just a work plan which details what has to be done to complete the project but the work plan will flow from the project's research design. "The function of a research design is to ensure that the evidence obtained enables to answer the initial question as unambiguously as possible. Obtaining relevant evidence entails specifying the type of evidence needed to answer the research question, to test a theory, to evaluate a program or accurately describe some phenomenon. In other words, when designing research we need to ask: given this research question (or theory), what type of evidence is needed to answer the question (or test the theory) in a convincing way." It is emphasised that research design deals with a logical problem and not a logistical problem." (DeVaus, 2001,p, 9).

De Vaus also insists that research design is different from the method by which data are collected. He says that the way by which data is collected is irrelevant to the logic of the design.

Research design is prepared at the commencement of the research project to serve as a blueprint for execution of the research effort.

The purpose of research design is two fold: 1) to provide answers on research as objectively, validly, accurately and economically as possible; and 2) to bring empirical evidence (i.e. derived from or guided by experience or experiment) to bear on the research problem by controlling variance. Controlling the variables refers to collecting evidences on one variable keeping the other variables constant. This method of controlling the variables is likely to give acceptable data for analysis and interpretation.

### **1.8.1 Composition of a Research Design**

A research design generally comprises the following details:

- Statement of the problem of research;
- Specific questions to be answered or hypothesis to be tested;
- Significance of the problem;
- Objectives of research study;
- Assumptions, concepts and their operational definitions or variables;
- Kinds and sources of gathering data;
- Methods of gathering data;
- Data gathering instruments;
- Analysis and interpretations;
- Resources including personnel and budget; and
- Time scheme.

A simple and rather an unrefined example, to illustrate the above research design is given below. If the research effort is to find out the relatively sure method of building up a balanced collection for a research library, the steps are:

- Collection Building and Usage in Research Libraries;
- What methods of collection building would meet users' needs;

- A working hypothesis is that the professional staff of the library who has the maximum contact with the users, would select items that would circulate most frequently;
- The significance of this investigation is that it would give guidelines in building a most useful collection for the library;
- The objective is to identify the group that makes the best collection building among the three groups who get involved in this work viz. The heads of research project teams, the library professional staff and book vendors and jobbers who supply books on approval;
- The assumption underlying this research effort is that the purpose of a library is to develop the most useful collection possible, where useful is defined in terms of the circulation of the collection. Selection of materials is an independent variable in this project;
- The data to be collected are a selection of material items, their circulation over a period of time;
- Data to be collected by using library records of circulation in a matrix of tabular statements;
- Use of a computer if data is stored in a computer;
- Appropriate statistical analysis for interpreting the data;
- An appropriate budget to get the work done and optimum staff required; and
- A suitable time frame for the work.

### **1.8.2 Attributes of a Research Design**

It must be noted that the research hinges heavily on the steps 6 to 9 which deal with the collection of data for getting the right evidences and the subsequent operations of assembling them in a logical way, and organising the data for analysis and interpretation.

A research design should have the attributes like objectivity, reliability, validity and generalisation to ensure a reasonable quality in the collection of data and recording them.

Objectivity refers to the method of collection of data to obtain accuracy in recording the scores. The measuring instrument should also measure accurately without any subjectivity.

Reliability is the attribute of consistency in measurement. “A respondent is expected to give the same response to a particular item every time he is asked about it. In case, a respondent keeps on changing his response, then it would be difficult to decide as to which of the responses should be considered a genuine response.

There are different methods of determining reliability of responses given by a respondent. These include use of (a) check items (b) administering the same test repeatedly and (c) series of parallel forms.” (Krishan Kumar, 1999)

Validity pertains to the appropriate measuring instrument, it is taken to measure. For instance, a job satisfaction test should only measure job satisfaction and nothing else. There are different procedures adopted for establishing the validity of a test. These include validating the present data against ‘concurrent’ criterion of a future principle or a theory etc.

From the application of the above attributes, a research design should use appropriate measuring instruments to yield objective, reliable and valid data. The data analysis

should lead to generalisation, which may permit application with reference to a larger group of data and thus lead to some generalisation.

**Self Check Exercise**

10) What is Research design? State its function and purpose.

**Note:** i) Write your answer in the space given below.

ii) Check your answer with the answers given at the end of the Unit.

.....

.....

.....

.....

.....

---

## **1.9 VALUE OF STUDYING RESEARCH METHODOLOGY FOR LIBRARY AND INFORMATION PROFESSIONALS**

---

The value of studying research methodology for students of library and information science is not only to conduct research in their professional field to contribute new knowledge but also be of great help and assistance to researchers in general.

Clifford Hawkins and Marco Sorgi list a series of values from research as given below:

- A critical or scientific attitude is likely to be developed;
- Research gives the chance to study a subject in depth;
- A researcher gets to know how to use a library and its resources; and also effectively exploit all the secondary and tertiary resources in general, using the Internet facilities and other database networks;
- A researcher knows to assess critically the literature in the subject of his study;
- Research helps to develop special interests and skills in the researcher; and
- Helps in understanding the attitude of others whether in routine interactions or research laboratories.

Specifically for a library and information professional, research would enable them to offer a higher degree of efficient and thoughtful services to users in general and more particularly to fellow researchers.

Research studies are pursued by students in most cases to earn higher academic degrees to enhance their chances to move to higher professional positions in their careers. In addition, it also prepares them to partake in research projects of research institutions where team research is carried out. Studies in research methodology would give opportunities to take part in discussions of research problems and to suggest appropriate methods to find solution to them. They are likely to get opportunities to help the research team in report writing, evaluate other research reports and suggest new problems for research in light of the experiences obtained in the course of time.

## Self Check Exercise

11) What are the values of studying research methodology?

**Note:** i) Write your answer in the space given below.

ii) Check your answer with the answers given at the end of the Unit.

.....

.....

.....

.....

.....

.....

## 1.10 SUMMARY

This Unit gives an overview of research methodology that includes all the procedural efforts to conduct a research program. Beginning from identifying a problem of research through extensive studies of the literature, to select a problem for research investigations to the final effort of preparing a blue print for operating the research program, every process of research is described. Wherever possible illustrations are given to explain a particular point. The value of specialising in research methodology not only for taking research problems in library and information science, this exposure would enable information professionals to offer quality information support service to users in general and to researchers in particular. Research today is more and more team research and hence most research projects are operated by specialised institutions or departments of universities or research wings of industrial and business organisations. Those specialising in research methodologies would fit in these projects to gain valuable opportunities to enhance their professional competence and expertise.

## 1.11 ANSWERS TO SELF CHECK EXERCISES

- 1) Research is a conscious and planned, critical and exhaustive intellectual activity, devoted to investigation of a phenomenon with the objective of expanding the frontiers of existing stock of knowledge. Such a process of investigation becomes scientific when a designated set of methods or techniques are applied to secure, measure, analyse and interpret data in a cycle of research ranging from the choice of a problem to the writing of the final report.
- 2) The need for research is to build up an infrastructure for creating new knowledge to develop a knowledge reservoir. The application of this knowledge for socio-economic and cultural development of a country to provide material well being of societies, is the purpose.
- 3) Basic research studies a phenomena, essentially to obtain knowledge of it whose applications may or may not have any bearing on any application in the immediate future or even after a long time. Generally this type of research demands a very high order of intellectual caliber; intuition also plays an important role in this type of research. Those who are involved in basic research devote their efforts to the formulation or reformulation of theories and may not be concerned at all with their application.

Applied research on the other hand, is to acquire knowledge on the practical application of the theoretical base already built up which is expected to solve a critical problem.

- 4) The concepts that could form a framework are: Theory, Hypothesis, Variables, Data/facts, Organisation of data/facts, Analysis, Interpretation, Conclusions, Generalisations, Tests for Validity of findings, Application to solve a problem, finally adding to the pool of knowledge.
- 5) The general characteristics of modern research are:
  - Research is the only way by which new knowledge can be created.
  - It is highly intellectual, time consuming, long drawn, slow, sometimes frustrating and rarely spectacular.
  - It is multi disciplinary and multidimensional.
  - Most research is team effort, mostly undertaken corporate bodies.
  - Modern Research is highly professional.
  - Research funding is a very characteristic of modern research.
  - Dissemination of results of research is systematically organised in modern research for peer review.
  - Information Support services are also highly organised.
- 6) Some of the sources for selecting a research are:
  - The field that lends itself for study and research to identify areas of research is one of the best sources for taking suitable topics for investigation.
  - The application of Information Technology to library and information science is a fertile area for research.
  - Literature surveys in library and information studies are also a good source.
  - Since Library and Information studies are increasingly multidisciplinary, attending such multidisciplinary conferences could throw light on the selection of a research topic.
  - Senior professionals experts and academic leaders could suggest topics for research.
  - Lists of topics of research university departments in Library and Information Science, Industries and Governments are also useful sources.
- 7) Some of the logical processes of scientific method are:
  - Identification of the research topic which would a proper formal statement;
  - Review of relevant literature to assess what has been already done in the topic taken for research;
  - Collection of already established facts and figures on the topic of research;
  - Formulation of a carefully drafted hypothesis;
  - Testing the hypothesis, on the basis of a thoughtful research design;
  - Assembling and organising the data collected systematically for analysis;
  - Arriving at inferences and conclusions;
  - Generalisation, if the results amenable for it;
  - Preparation and presentation of the Research results; and
  - Dissemination for peer review.

8) The types of laws, activity and cardinal stages in Ranganathan's Spiral of Scientific Method are:

A) Types of Laws:

- i) Fundamental laws
- ii) Deduced laws
- iii) Nadir facts, and
- iv) Empirical laws.

B) Types of Activity

- i) Senses, experimentation, observation, concretisation, and particularisation;
- ii) Intellect, induction, abstraction and generalisation;
- iii) Generalisation, abstraction, sublimation, and intuition; and
- v) Particularisation, concretisation, deduction and intellect.

C) Cardinal Stages in the Cycle:

- i) Nadir
- ii) Ascendent
- iii) Zenith
- iv) Descendent

9) Two things happen in re-entering the spiral:

- Observation and experiments are made to verify the validity of new deduced laws;
- Further continuous observation and experiment lead to accumulation of new empirical facts. So long as the deduced laws are verified empirically to be true and the new empirical facts are found to be in conformity with the implication of the fundamental laws, there is no further movement in the spiral. As and when new empirical facts appear to contradict the new fundamental laws, scientific method is applied and new cycle get into full swing and carries the Spiral of Scientific Method further. The cycle is liable to be repeated without end. This method is easily applied to natural sciences.

10) "Research Design is "the plan, structure, and strategy of investigation conceived so as to obtain answers to research questions and to control variance."

"The function of a research design is to ensure that the evidence obtained enables to answer the initial question as unambiguously as possible."

The purpose of research design is two fold: 1) to provide answers on research as objectively, validly, accurately and economically as possible; and 2) to bring empirical evidence (i.e. derived from or guided by experience or experiment) to bear on the research problem by controlling variance.

11) The values of studying methodology are: To gain knowledge of the methods of research for pursuing research studies in library and information science.

A good exposure to research methodology will enable professionals offer very effective to the research community in their needs for information in their research work. It can facilitate organizing thoughtful information services in general.

---

## 1.12 KEYWORDS

---

- Ascendant** : A position of dominance, controlling influence, superiority or preeminence.
- Concept** : A general notion or idea of something formed by mentally combining all its characteristics or particulars.
- Descendant** : Something that is going down.
- Hypothesis** : A proposition or set of propositions set forth as an explanation for the occurrence of some specified group of phenomena.
- Nadir** : The lowest point in an activity.
- Research** : Systematic inquiry into a subject in order to discover or revise facts, theories, etc.
- Research Design** : It is an arrangement of conditions for collection and analysis of data in a manner that aims to combine relevance to the research purpose with economy in procedure.
- Scientific Method** : A method of research in which a problem is identified, relevant data gathered, hypothesis(es) formulated and the hypothesis(es) empirically tested.
- Spiral** : Winding and advancing like a coil continuously
- Theory** : A coherent group of general propositions used as principles of explanation for a class of phenomena.
- Variable** : The quality or quantity of a thing (abstract or concrete) that takes different values.
- Zenith** : The highest point of an activity.

---

## 1.13 REFERENCES AND FURTHER READING

---

- Best, John W and Kahn James, V. (1999). *Research in Education*. 2<sup>nd</sup> ed. New Delhi: Prentice Hall of India.
- Busha, Charles H and Harter, Stephen H (1988). *Research Methods in Librarianship: Techniques and Interpretations*. New York: Academic Press.
- De Vaus, David (2001). *Research Design in Social Research*. New Delhi: Sage Publications.
- Encyclopedia of Library and Information Science (1978). Ed. by Allen Kent [et al.] *Research Methodology*. V. 25. New York: Marcell Dekker.
- Ghosh B N (1984). *Scientific Method and Social Research*. 2<sup>nd</sup> ed. Delhi: Sterling.
- Goode, William J and Hart, Paul K (1981). *Methods of Social Research*. London: McGraw Hill.
- Kerlington, Fred. Ed. (1964). *Foundations of Behavioural Research, Educational and Psychological Inquiry*. New York: Rinehart and Winston.
- Hawkins, Clifford and Sorgi, Marco. *How to Plan, Speak and Write about it?*
- Krishan Kumar (1999). *Research Methods in Library and Information Science*. Edn.2 New Delhi: Har-Anand Publications.
- Thakur, Devendra (1988). *Research Methodology in Social Sciences*. New Delhi: Deep and Deep Publications.
- Trochim, William M (2003). 2<sup>nd</sup> ed. *Research Methods*. New Delhi: Biztantra.
- Young, P V (1984). *Scientific Social Surveys and Research*. New Delhi: Prentice Hall of India Ltd.

---

## UNIT 2 HISTORICAL RESEARCH

---

### Structure

- 2.0 Objectives
- 2.1 Introduction
- 2.2 Historical Research
  - 2.2.1 Definitions
  - 2.2.2 What is Not Historical Research?
  - 2.2.3 What Constitutes Historical Research?
  - 2.2.4 Advantages
  - 2.2.5 Limitations
  - 2.2.6 Purposes
- 2.3 Scope of Application
  - 2.3.1 Applications in LIS
- 2.4 Types
- 2.5 Importance in LIS
- 2.6 Process of Conducting Research
  - 2.6.1 Identification of Research Topic and Formulation of Research Problem
  - 2.6.2 Collection of Background Information or Contextual Information
  - 2.6.3 Formulation of Hypothesis (es)
  - 2.6.4 Systematic Collection of Evidence or Data or Literature Review
  - 2.6.5 Rigorous Evaluation of Historical Resources
  - 2.6.6 Data Interpretation and Synthesis into a Narrative Account
- 2.7 Internet
- 2.8 Scientific Research
- 2.9 Problems
- 2.10 Summary
- 2.11 Answers to Self Check Exercises
- 2.12 Keywords
- 2.13 References and Further Reading

---

### 2.0 OBJECTIVES

---

After reading this Unit, you will be able to:

- describe as to what is history and who is a historian;
- explain what is historical research and scope of its application in library and information science;
- understand its purposes and advantages;
- identify the research situations appropriate for application of historical research;
- explain the process of conducting historical research;
- describe the kinds of information sources available for research;
- follow the criteria for the evaluation of information sources and data; and
- identify the problems faced in conducting historical research.

## 2.1 INTRODUCTION

### What is History?

People constituting a society are the makers of history as well as the products that are the result of history. In a modern society, howsoever we may try we cannot escape history. It forms an integral part of life. It affects our day-to-day living at all times. In taking a decision in daily life, we often base it on our past experiences.

History, “as commonly understood, may refer to events themselves or the record of events” (Partner, 1997, vol 12, p.147). She further adds, “History may be interpreted very broadly, to include nature as well as man. There is a history of the process of evolution, as Darwin made clear, but in general usage history refers to the study of man and what happened to him” (p147).

History is “the past experience of mankind. More exactly, history is the memory of that past experience as it has been preserved, largely in written records” (Daniels, 1996, p.226). Thus, it is the product of historians’ work in reconstructing the flow of events derived from the sources of information putting it into a narrative account.

### Scope

Subject matter of history constitutes “the significant past, meaning the institutions and individual actions that affect the experience and development of whole communities” (Daniels, 1996, p. 226). Traditionally, it focused in the action of governments, their leaders, and the conflicts among them (named political and diplomatic history). However, during the past one hundred years or so, scope of history has widened to also include history of ideas, the patterns and trends in economic and social life, that influence our society as a whole as well as characterise it.

### Dimensions of History

History has two dimensions (Powell, 1991, p. 137-38) that are important for interpretation of historical data. One dimension is *historical time* or chronology. It takes into account the spacing of events and/ patterns. It is sometimes referred to as a time line. The second dimension is *historical space* or geographical location of where the events took place.

### Historians

Historians are researchers who focus on study of individuals and societies regarding their behaviours, motives, fears, hopes, aspirations, experiences etc. They carry out their study on the basis of the close examination of information sources. They record their observations and generate records that they pass on to future generations for further research and record. They try to update history on continuous basis. Historians provide systematic description and recording of events and trends, giving a narrative account in a flowing and interesting style.

Historians record their observations on the basis of a large variety of data available to them. From the large data, they select that data which is genuine and reliable. In spite of their best efforts to achieve objectivity, bias creeps in their selection as well as in his interpretation of data. This happens due to conditioning of their life and thinking being exposed to a variety of influences consciously or unconsciously, from their nationality, religion, beliefs, traditions, education, status (social, economic and political), environment etc. However, a good historian reveals his biases in his narrative to bring objectivity in his writings. This is always expected from an intellectually honest researcher.

## 2.2 HISTORICAL RESEARCH

### 2.2.1 Definitions

Historical research is “the systematic collection and objective evaluation of data related to past occurrences in order to test hypotheses concerning causes, effects, or trends of those events which may help to explain present events and anticipate future events” (Gay, 1981, p. 432).

According to Isaac and Michael, historical research involves reconstructing “the past systematically and objectively by collecting, evaluating, verifying, and synthesizing evidence to establish facts and reach defensible conclusions, often in relation to particular hypotheses” (1981, p.44).

“True historical research, or historiography, is concerned with analyzing and interpreting the meanings of historical events. It is the process by which a researcher is able to reach a conclusion as to probable truth of an event in the past by studying objects available for observation in the present” (Goldhor, 1972, p.98).

It may be considered, “as a scholarly attempt to discover what has happened” (Mouly, 1978, p.157).

Historical research is “the process of systematically examining past events to give an account of what has happened in the past” (Johnson, chapter 12, p.1).

The above definitions are certainly useful ones. Gay points out the role of hypotheses. Isaac and Michael emphasise the establishing of facts systematically and objectively. Goldhor uses the term ‘true historical research’ and refers to probable truth of an event in the past. Mouly gives a very simple definition, stressing on ‘a scholarly attempt’.

Thus, we may conclude from above that true historical research is a process of reconstructing the past through systematically and objectively collecting, evaluating, verifying and synthesising evidence relating to the past events to establish facts and defensible conclusions, often in relation to particular hypotheses (if appropriate), to arrive at a scholarly account of what happened in the past.

### 2.2.2 What is not Historical Research?

True historical research must be distinguished from chronology. Chronology is defined as “simply the setting down of events in the order of their occurrence, a process similar to the older concept of historical research” (Powell, 1991, p. 137). Chronology of events is merely a first step in the process of historical research, providing data or material for latter steps.

A description of past events is not considered historical research. It serves as background for the researcher. It can be starting point for him.

A mere collection of facts including their description, does not constitute historical research. Facts can serve as a base. Facts have to be related and a total picture drawn, to become meaningful and contiguous one.

### 2.2.3 What Constitutes Historical Research?

“True historical research, or historiography, is concerned with analyzing and interpreting the meaning of historical events. It is a process by which a researcher is able to reach a conclusion as to the probable truth of an event in the past studying objects available for observation in the present” (Goldhor, 1972, p.98).

It is a flowing, dynamic account of past events, which involves an interpretation of these events in an attempt to recapture the nuances, personalities, and ideas that influenced these events. (Johnson lectures, Chap. 1)

From above, it follows that historical research constitutes of a narrative account of the past events written on the basis of interpretation of those events, to recapture personalities, ideas and environment of those times that shaped the events.

#### **2.2.4 Advantages**

There are some advantages of historical research as given below:

- The research is not physically involved in the situation under study;
- No danger of experimenter-subject interaction;
- Documents are located by the researcher, data is gathered, and conclusions are drawn out of sight (Key, 1997, p.2-3);
- “Historical method is much more synthetic and eclectic in its approach than other research methods, using concepts and conclusions from many other disciplines to explore the historical record and to test the conclusions arrived at by other methodologies” (Shiflett, 1984, p. 385). The author further adds, “Many methods used alone or in conjunction with other supporting techniques of data collection and analysis can adequately demonstrate that some particular situation or relationship between variables exist in the present. But the persistence and permanence of these conclusions will always be questionable without historical verification” (shifted, 1984, p. 385-6); and
- Perhaps more than any other research method, historical research provides librarians with a context. It helps to establish the context in which librarians carry out their work. Understanding the context can enable them to fulfil their functions in the society. The study of status of women in librarianship would require understanding their historical roots in society as well as in the establishment of librarianship as a profession. Similarly, investigation into the status of university librarians in India would require establishing the context. It is only through the understanding of the history that one can appreciate the environment in which librarians take decisions or carry out their professional work. In case, we want to find answers to questions like, why a particular service was started by a library or why the library reclassified its collection from Colon classification to Dewey decimal classification, then historical research can enable us to find the answers.

#### **2.2.5 Limitations**

The human past is the subject matter of historical research. It is to be noted that the past can only be known through the relics that become available to the researcher. Thus, the past can no longer be examined directly by him.

A researcher cannot re-enact the past but can only interpret it unlike experimental research.

“Since history contains an inherent element of subjectivity, the final truth on any important subject can never be written. Later historians will work with different frames of reference, new interests, and new conjectures. They will ask new questions and often discover new source material. Finally, because of the defects of the sources themselves, the total truth of an important event can never be completely established. New generations and

other nationalities will always be ready to offer new insights and new interpretations of the past” (Daniels, 1996, p. 229). In ultimate analysis, one may conclude that there is no possibility of final truth to be written.

### 2.2.6 Purposes

Historical research is carried out to serve the following purposes:

#### **To reconstruct the past**

A historian reconstructs the past systematically and objectively, reaching at conclusions that can be defended.

#### **To discover unknown events**

There are some historical events that occurred in the past that are not known. A historian seeks to discover these unknown events.

#### **To understand significance of events**

There may be significant events that may be responsible for shaping an organisation/a movement/a situation/an individual being studied by a historian

#### **To discover the context of an organisation/movement/the situation**

In order to explore and explain the past, a historian aims to seek the context of an organisation/a movement/ the situation being studied.

#### **To find answers to questions about the past**

There are many questions about the past, to which we would like to find answers. Knowing the answers can enlighten us to develop an understanding of the past events.

#### **To study cause – and effect relationship**

There is a cause-and effect relationship between two events. A historian would like to determine such a relationship.

#### **To study relationship between the past and the present**

The past can often help us to get a better perspective about current events. Thus, a researcher aims to identify the relationship between the past and the present, whereby; we can get a clear perspective of the present (Mouly, 1978, p.158).

#### **To record and evaluate the accomplishments of individuals, institutions and other kinds of organisations.**

Historians are greatly interested in recording and evaluation of the accomplishments of leading individuals and different kinds of organisations including institutions and agencies because these influence historical events.

#### **To provide understanding of the immediate phenomenon of concern**

A researcher may be investigating a phenomenon. Historical perspective can enable him to get a good understanding of the immediate phenomenon of concern.

#### **To understand the cultural context of libraries**

Libraries as institutions form an important part of culture. Study of libraries enables us to understand the culture responsible for the growth and development of libraries.

**Self Check Exercise**

- 1) Discuss what is historical research.
- 2) Enumerate the purposes of historical research.

**Note:** i) Write your answers in the space given below.

ii) Check your answers with the answers given at the end of the Unit.

.....

.....

.....

.....

.....

---

## **2.3 SCOPE OF APPLICATION**

---

The historical method of research is applicable to all fields of study, including science and technology, social sciences, the humanities etc. In any field, where the study involves its origins, growth, development, impact, use, theories, personalities, crisis, etc, the historical method is found to be applicable.

### **2.3.1 Application in Library and Information Service (LIS)**

Historical research is very popular in the field of library and information science (L&IS). At the same time, it is least understood. Often, it is considered less significant, compared with other types of researches as the latter deal with issues directly related to practical problems faced by librarians. Librarians give greater importance to practical problems of their direct concern.

A researcher can apply historical method of research to a vast range of topics such as:

#### **Origins**

Origins of public library movement in the princely State of Baroda (India)

Delhi Public Library: Origins and background

Origins of public library movement in Tamil Nadu

The Delhi University Library: A history of its beginnings, 1925-1947

#### **Growth**

Growth of college libraries in Punjab (India)

Growth of library profession in India

#### **Development**

Growth and development of reference librarianship in USA

Development of public libraries in South India

Development of library standards at the international level

Development of library equipment in USA during the last two decades

Development of methods for preservation of library resources

Study of development of university library buildings in India

Indian library development, 1947-1999

## Impact

Impact of technology on library services in UK during the last fifty years  
 Impact of information technology on cataloguing practices  
 Impact of information technology on acquisition of periodical publications

## Use

Use of equipment in public libraries in Australia from 1991 to the present  
 Use of storage media for storing of pamphlets in special libraries

## Personalities

Contribution of leading personalities to the development of library profession in USA during twentieth century

S. R. Ranganathan: Father of Indian librarianship

## Theory

From descriptive theory to dynamic theory of library classification  
 History of reference theories

## Crisis

Decline of Sapru House Library: Story of rise and fall of a great institution  
 Indian librarianship on the crossroads: Root cause of the situation of crisis

## History

History of information systems  
 History of libraries in India during nineteenth century  
 History of Delhi University Library  
 History of Indian Library Association, 1933- 1983  
 American library history, 1876-2000  
 History of Indian public library movement through 1947  
 University libraries in South Africa: Their history, condition and management

## REPRESENTATIVE EXAMPLES

Dale, Doris C. (1968). The origins and development of the United Nations Library, New York, Columbia University.

Hanson, E. R (1974). Cataloging and the American Library Association, 1876-1956, University of Pittsburgh.

Holley, Edward G (1961). Charles Evans: American bibliographer, Urbana, University of Illinois.

Mahajan, S. G. (1984). History of public library movement in Maharashtra (erstwhile Bombay Presidency), Pune, Shubhada-Saraswat Publications.

Nagar, Murari Lal (1983). Foundation of library movement in India, Ludhiana, Indian Library Institute and Bibliographical Centre.

Ohdedar, A. K. (1966). Growth of libraries in India; 1498-1836, Calcutta, World Press.

Paterson, Kenneth G (1968). The history of the University of California Library at Berkeley, 1900-1945, Berkeley, University of California.

Taher, Mohamed(2001). Libraries in India's national developmental perspectives: A saga of fifty years since independence, New Delhi, Concept Publishing

Whitehill, Walter M. (1956). Boston public library: A centennial history, Cambridge, Mass., Harvard University Press.

---

## **2.4 TYPES**

---

According to Hillway (1964, p.159), there are six types of historical research as given below:

- Biographical research;
- Histories of institutions and organisations;
- The investigation of sources and influences;
- Editing and translating historical documents;
- Studying the history of ideas; and
- Compiling bibliographies.

The use of a particular type of research would depend upon the subject field of study and the nature of inquiry being pursued. In actual practice, historians are adopting a variety of approaches.

The approach of a researcher to collection and interpretation of data is influenced by the fact as to which school of thought he belongs to, such as providential perspective, new social history, narrative mode, etc. In new social history, social science-type analysis is used. In narrative mode, emphasis is on how account is written.

---

## **2.5 IMPORTANCE IN LIS**

---

It has contributed to the body of knowledge constituting library and information science.

According to Michael Harris, "a clear understanding of the historical definition of the functions of libraries may well contribute to increased communication between libraries" (1971, p.1)

History teaches us many lessons. It would contain description of many mistakes made in different periods, in different libraries or library schools or by professional bodies. It can help librarians, library educators and leaders of the profession to learn from the past, so as not to repeat the mistakes of the past. Similarly, successes of the past have many lessons to teach us.

Library history enables librarians to understand the present in the proper perspective. This will help us to understand and appreciate the present situation.

The history of libraries produced by historians provides significant details about libraries, how these originated and developed over a period of time. It also indicates the significance of libraries. A study on building a great collection on organic chemistry, would provide an understanding of the collection, its purpose and special features, and how it was developed over a period of time. It will enable the library professionals working in the library to realise a better appreciation of history of their own library.

Librarian historians through research make a great contribution to our understanding of the development of the profession. Thus, fulfilling their professional commitment.

"History is a major research methodology in library and information science as measured by the amount written, but its popularity has dramatically decreased in recent years. This is evident in the types of research projects that are being accepted by doctoral

committees... There are undoubtedly many possible reasons for this, but the major one seems to be the pervasive belief of some doctoral committees and dissertation advisors that historical research represents wasted effort. Research using methods adopted from the more rigorous social sciences has become the modality of research in library and information science” (Shiflett, 1984, p.387). This situation is true even today. Survey method predominates in researches being carried out at Indian library schools. There is no doubt that over a period of time, the quality of historical research in library and information science has improved a great deal. It has become more rigorous than before, involving scientific method at different stages of research. Depending upon research questions to which the answers can be found in the past only or need arises for historical verification of conclusions arrived at by other methodologies, then historical research is found appropriate.

### Library History

Often, historical research conducted in the field of library and information science is called library history. It is a label “commonly applied to an account of events that have affected any library or group of libraries, as well as to the social and economic impacts of libraries on their communities” (Busha and Harter, 1980, p.93).

According to Shiflett, “Library history” is a rubric that covers a myriad of topics associated with libraries and other information systems. Its major form consists of the history of traditional library, but it also includes the history of any activity or event that might be part of the domain of library and information science. The use and the users of materials, the problems of governance and employment, the production of resources collected and organized by the librarians, and the role of governments in support of information activities are all legitimate concerns of library history- just as they are valid objects of other forms of research” (1984, p. 388). It is an enumeration of a wide range of the topics that are covered under library history.

At one time, library history was too often considered in a narrow sense just confined to history of libraries. As it is apparent from the definitions given above that now its scope has increased a great deal going beyond history of libraries, as well as history of books (other media as well) and printing, history of the library as a social institution, history of the use of documents of various types and libraries etc.

There is no doubt that in recent years, the quality of historical research in library and information science has improved.

## 2.6 PROCESS OF CONDUCTING RESEARCH

The process of conducting historical research is the same as for other kinds of researches. The process involves the following steps:

- Identification of research topic and formulation of the research problem;
- Collection of background information or contextual information about the research topic;
- Formulation of the questions to be answered or formulation of hypothesis(es) (if appropriate) to explain causal relationships between historical variables;
- Systematic collection of evidence or data or literature review;
- Rigorous evaluation of historical resources (the authenticity of the resources and validity of their contents);
- Interpretation; and
- Synthesis into a narrative account.

### 2.6.1 Identification of Research Topic and Formulation of Research Problem

The researcher must first of all identify (define) a historical problem of significance that needs to be solved or he can identify an area of knowledge that needs to be developed. It may be a study of the present situation of a university library where understanding of the past will enable the authorities to plan for the future.

In order to identify a historical problem, the researcher must have thorough knowledge about the concerned library and also he needs to be interested in this area. In selecting a topic, he must see to it that there should be a reasonable amount of evidence that is readily available. He should also know how and where to access it. Availability of adequate sources of information is a must for producing a good narrative.

Ideas for a historical research topic can be picked by a researcher from a variety of sources of information such as:

- A report on library and information science education dealing with current issues;
- Review of national policy for library and information science (India);
- Impact of information technology on growth and development of university libraries in UK; and
- Development of college libraries in Canada: A report along with a proposal for their modernisation.

### 2.6.2 Collection of Background Information or Contextual Information

After identification of a research topic (defining the topic) and formulation of the problem, carry out survey of the available literature. This step deals with identifying, locating and gathering information regarding the research topic, the kind of data to be gathered, the procedure to be followed and where it is to be gathered, would depend upon the type of the topic being investigated.

To gather enough background information or contextual information, generally start with secondary sources, to find out how the previous researchers have done similar research, what sources and research methodology they adopted. Every secondary source of historical data would suggest other sources including bibliographic tools as given below:

- Monographs, journal articles;
- Bibliographic tools: Library catalogues, bibliographies, indexing and abstracting services, research guides, bibliography of bibliographies, etc.; and
- Reference sources: Encyclopedias, dictionaries, yearbooks and annuals, etc.

History is primarily based on the study of written or printed sources, now there is a flood of electronic sources, many of them available on the Internet. Typically, these are classified as primary, secondary and tertiary sources. These may be published sources, manuscripts (handwritten) or nonprint materials.

#### Primary Sources

A primary source is a document that contains the original statement on the topic being investigated by the researcher. These contain evidence that is closest to the event under investigation as recounted by observers and participants. Primary sources represent “the data which lie closest to the historical event. They are considered to include the testimony of eye-witnesses, or observations made with one or the other senses or by

some mechanical device. In most cases, primary sources are the written record of what the writer actually observed or the first-hand expression of his or her thoughts” (Powell, 1991, p. 139). Thus, it is the direct outcome of the event or the record of eyewitnesses. It bears direct involvement with the event being studied, such as diaries, letters, speeches, and an interview with the person who personally experienced the event, original map, etc. It is not a copy, a repackaging or summary of the original. The basic criteria to identify a particular source as a primary document is, just ask, “Is it a firsthand account?”

These include the following:

- Documents generated by the events themselves such as archival records (governmental, institutional, commercial, ecclesiastical, etc), internal letters and memoranda (memos), speeches, summaries or minutes of conferences and meetings, photographs of people, buildings and equipment, statistical information (such as tally sheets and surveys), lists of holdings (goods, equipment, etc), and reports and statements (mission statements, employees guidelines, rules and regulations etc);
- Documents produced to record events immediately such as chronicles, diaries, reports produced by journalists and interviews conducted by them, drawings and photographs, motion picture films, tape recordings and video recordings;
- Documents in supplementary forms produced much later in the form of oral sources, oral traditions and folklores, languages themselves, say fables, folktales, folklore etc are a good source; and
- Artifacts or realia such as inscriptions, seals, coins, medals, drawings, pictures, ruins of monuments.

### Secondary Sources

A secondary source is the one derived or created from a primary source (that first reported the event being studied). It reports events based on use of primary and other secondary sources as bases of data collection. It contains information reported by a person who did not directly observe the event, object, or condition (Key, 1997, p.1). Thus, these report events by a person other than a direct observer or a participant in the events. These are considered less useful than primary sources.

A secondary source may be one or more steps removed from the primary source in terms of time, place or authorship. A source becomes a primary or secondary source depending upon its proximity to the actual event under investigation (Powell, 1991, p.140).

Examples of secondary sources are given below:

- Textbooks
- Encyclopaedias
- Monographs
- Articles in magazines.

A copy of an original document is a secondary source as it may not be an authentic one. In copying from the original document, certain errors or omissions can occur intentionally or unintentionally. The original might get modified at the stage of copying through editing or interpretation.

### Tertiary Sources

These sources include bibliographies, catalogues and indexes that guide a researcher to primary and secondary sources.

### *Significance of Primary Sources*

Researchers consider primary sources more useful than secondary and tertiary sources and they prefer to use these.

The use of primary sources:

Allows use of data based on testimony of eye-witnesses, or observations made with human senses or by a mechanical device. Thus, these are original sources representing firsthand account. These contain the original statement on the topic being investigated by the researcher. These are sources that first reported the event being studied.

- Strengthens the reliability of the study.
- Provides a solid base for arriving at valid conclusions.
- Provides historical data that serves as raw material for historical interpretation.
- Ensures the integrity of the study.

Experience shows that most often, a historian cannot base his research entirely on primary sources. According to Powell, “In fact, secondary sources may provide important information and conceptual development not available elsewhere. But as secondary sources do not represent “eye-witness” accounts, the researcher should keep in mind their limitations and avoid an overreliance on such materials. Secondary sources are perhaps best used for rounding out the setting or filling in the gaps between primary sources of information” (Powell, 1991, p. 140).

A secondary source may be one or more steps removed from the primary source in terms of place, time or authorship. Just possible, a secondary source (a copy produced from an original document) may not be an authentic one. In copying from the original documents, certain errors can creep in through omission or commission. The original may have been modified, through editing or interpretation.

### **Self Check Exercise**

- 3) What are the steps involved in conducting historical research?
- 4) Why does a researcher not prefer secondary sources to primary sources of information?

**Note:** i) Write your answers in the space given below.

ii) Check your answers with the answers given at the end of the Unit.

.....

.....

.....

.....

.....

### **2.6.3 Formulation of Hypothesis(es)**

In the study of a historical event, there may be many questions that may arise about it, to which we would like to find answers. Knowing the answers to these can enlighten us.

The event to be studied may be, “Public library movement in the State of Tamil Nadu (India)”. The movement started around 1950. Why it got delayed? Was it due to lack of political will? Was it due to lack of philanthropy? Was it due to lack of sufficient literate population? Was it due to lack of sufficient published literature in the languages

predominantly used by the public? Was it due to lack of financial resources? Was it due to lack of awareness on the part of the public about their right to have access to free public libraries?

Dr. S R Ranganathan was librarian, Madras University Library for over two decades. He succeeded in building a great library. However, due to power politics, he was forced to resign before his retirement. In a historical study of the contribution of Ranganathan, some of the questions would arise.

These are given below:

- Why was he selected as a librarian over other candidates?
- What was the role of the then Vice-Chancellor of the University and the Chairman of the library committee in his selection?
- What were his major contributions to the development of the University Library?
- How did he succeed in spite of dirty politics based on caste lines dominating the academic environment?
- What were his major successes and failures?
- What were the events in the power politics that led to the resignation of Ranganathan?

Use of hypotheses serves useful purposes as given below:

- It increases the objectivity of the investigation.
- It minimises researcher bias.
- A historian, often would have access to a large amount of data that may prove to be difficult to handle unless he is able to decide which is relevant or which is not relevant to his research. Hypotheses provide him guidelines for deciding which data is relevant or not at each stage of collection, analysis and interpretation of data. Thus, one can evolve strategies to collect data.
- It provides him a basis to identify various factors in relation to one another and also to synthesise them into generalisations or conclusions (Mouly, 1978, p.160).
- It serves a useful purpose as an aid to conduct rigorous studies.
- The formulation (when appropriate) of hypothesis(es) to be tested to explain the relationships among historical variables, is the central question(s) around which the evidence is organised and also presented, to prove or disprove the hypothesis (es). A researcher should not merely select and present only that kind of information, which can prove the hypothesis(es), but rather make a conscious effort to examine the total information available to him covering all aspects of the problem being investigated.

Keep in mind that the hypothesis (es) will enable to draw the lines along which the researcher needs to gather information, so as to avoid wasting efforts collecting information that has no relevance to hypothesis (es). In case the formulation of hypothesis (es) is not appropriate, then, one should formulate questions. The guidelines mentioned above are equally applicable in case the questions instead of hypothesis (es) are formulated.

There is no doubt that it is more difficult to test a historical hypothesis than in other types of researches. This is due to the reason that historical research is considered *ex post facto* in nature. The events being investigated have already taken place. Therefore,

the researcher has no control over the variables. He cannot manipulate them. It is also not possible for him to repeat or re-enact the event. He can merely interpret the available data related to the event that occurred in the past. As a consequence, study of the phenomenon of causality, though important becomes complex and difficult to deal with. Consideration of causality forces takes the researcher forward beyond descriptive study to consideration of as to why certain relationships between variables seem to be there.

#### **2.6.4 Systematic Collection of Evidence or Data or Literature Review**

In order to produce a work of history, a historian undertakes steps consisting of selection, evaluation, interpretation and synthesis of data into a narrative exposition. Here we are concerned with collection of evidence or data. The gathering of primary-source (first hand) evidence is the most difficult task.

Selection of sources is an essential step especially for recent history. Selection is done taking into consideration, “the nature of the researcher’s particular problem and the criteria of relevance and significance that drive from his hypotheses. Selection is facilitated by the use of bibliographic aids and existing secondary works but the historian of a recent topic must nevertheless be prepared to sift and digest masses of material, most of which will not directly appear in the final work” (Daniels, 1996, p. 228).

Libraries are good at collecting and maintaining records of housekeeping statistics but those records that are required to make library history meaningful and interesting are often lacking. If a historian were looking for records for biographical treatment of Dr S R Ranganathan at Madras University Library, where he was librarian for more than two decades, then he would only find sketchy archives on him. Same is the case with other libraries, especially with regard to archives of interest to library historians. Records of such nature are either lost or not well maintained. Producing oral history interviews of librarians and teachers of library and information science on topics of recent origin can go a long way to fill up the gaps.

#### **2.6.5 Rigorous Evaluation of Historical Sources**

Data used by a historian is usually called evidence. Historical research is totally based on evidence, which is always of the past. It is complex in nature and usually vast in quantity. A historian spends tremendous amount of time in sifting relevant evidence. He narrows it down, choosing it very carefully. Often, evidence presents surprises at each stage of sifting.

The quality of historical sources varies a great deal, especially Internet sources. Every information source must be evaluated for authenticity and accuracy before being used for evidence as these are affected by a variety of factors like economic, political, ethical and social environment as well as personal likes and dislikes, prejudices. The published sources like books and periodicals usually go through filtering process. This may involve peer review and editing. However, most of the information available on the Internet is unfiltered. This poses a danger. The question arises as to whether or not the information source being used by him is appropriate for his research work. Before using sources, he must evaluate these irrespective of whether the resource is Internet source or any other one.

A researcher would like to know if the sources being used by him are:

- Relevant to his research (that is appropriate for his research work),
- Worthwhile (substantial enough to serve his purpose), and
- Competent (genuine, accurate and trustworthy).

***Approach 1***

For evaluation, one may use the following criteria:

- Authority,
- Scope,
- Uptodateness,
- Reliability, and
- Objectivity.

***Authority***

Who is the author or developer of the source? What are his qualifications and experience in the field concerned?

Who is the publisher or producer of the site? What is his reputation?

Find out how the information has been documented, giving footnotes and / or a bibliography? Examine the documentation, to determine the quality of sources covered.

***Scope***

What topics have been covered? What is the extent of coverage of topics (in depth or broadly)?

***Uptodateness***

How up to date is the content of the source? Has the date of publication been given clearly?

In case of an Internet source, it may indicate, the date of writing or when it was updated last or when the database was activated.

***Reliability***

How far information is reliable and free from errors? Internet sources are not usually verified by editors or evaluated by referees. Thus, there is a great possibility of inaccuracies taking place.

***Objectivity***

Find out, if there is bias in the presentation of information? Is there an attempt to influence the opinion of the readers towards certain ideology or school of thought?

***Conclusion***

A researcher must use a variety of sources, including traditional printed resources as well as Internet ones. However, he must apply the criteria described above to all kinds of sources used by him.

***Approach 2***

As mentioned above, in the process of gathering historical evidence, a researcher is required to continually evaluate documents being used for their authenticity and accuracy.

Another approach used by historians for determining the authenticity and accuracy of historical documents constitutes of textual criticism. Textual criticism consists broadly of two groups, namely external criticism and internal criticism. Any document used for historical research must pass tests of both external and internal criticism. Historical criticism enables a historian to expose forgeries, identify inherent defects (such as deliberate bias or deception, errors of judgment or memory, incompleteness of evidence) in historical sources.

### *External Criticism*

This involves determination of “validity, trustworthiness, or authenticity of the source” (Johnson lectures, chap12, p.5). This is concerned with examining the historical document from outside, so as to establish its authenticity. The question to be asked, “Is it what it purports to be?” At times, this can be done through analysis of handwriting or carrying out carbon 14 test used for determining the age of the paper. Carbon 14 test is not applicable for Internet resources.

In order to establish the authenticity of the evidence, the researcher checks the genuineness or validity of the source. The question to be asked is it really, what it appears to be or claims to be? Can we use it as evidence?

To establish the genuineness of a document or relic, the following questions may be asked (Key, 1997, p.2):

- Does the language and writing style conform to the period in question and is it typical of other works done by the author?
- Is there evidence that the author exhibits ignorance of things or events that man of his training and time should have known?
- Did he report about things, events, or places that could not have been known during that period?
- Has the original manuscript been altered either intentionally or unintentionally by copying?
- Is the document an original draft or a copy? If it is a copy, was it reproduced in the exact words of the original?
- If manuscript is undated or the author unknown, are there any clues internally as to its origin?

To assess the authenticity of a source, a researcher may use the following techniques:

- Bibliographical technique (bibliographical analysis),
- Techniques taken from auxiliary disciplines such as linguistics, epigraphy (textual analysis), these can help trace the origin of the document.
- Techniques of physical sciences, such as chemistry (chemical analysis of paper and ink). Carbon 14 test is used on paper to determine the age of paper used in the source. Chemical analysis is not applicable for Internet sources.

The use of above techniques would indicate to the researcher with a reasonable degree of confidence whether or not a particular source is authentic. However, one may be unable to prove its authenticity.

### *Internal Criticism*

After the source has been authenticated, then it is tested for accuracy (in other words plausibility and consistency). Internal criticism involves determination of reliability or accuracy of the information contained in the resource. It is concerned with accuracy of the document involving “the competence and integrity of the author, and the occasion of origin of the document” (Goldhor, 1969, p. 103). The purpose being to determine whether or not the author was competent, honest, and objective(unbiased). How long after the event happened, it was reported? Does the account reported by the witness of the event agree with accounts given by other witnesses?

Internal criticism is carried out using positive and negative criticism. Positive criticism consists of assuring that statements made or meaning conveyed in the sources is clear

enough to be understood. There may uncertainty in the words and phrases employed in the source. Sometimes, connotation of terms can change over time. On the other hand negative criticism refers to the process of establishing the reliability or authenticity and accuracy of the contents of the sources (Johnson lectures, chap 12, p.5) this involves judgment on the part of the investigator which is quite difficult. The primary sources containing firsthand accounts by witnesses of an event are considered reliable and accurate.

To determine the accuracy of a document, a historian should ask the following questions (Goldhor, 1969, p.103-104):

- What do you know about the author?
- Was he generally sincere or was he biased?
- Was he knowledgeable and competent?
- Was he even in a position to know the truth, and did he have access to reliable sources of information?
- Does he demonstrate ability to report accurately, clearly, and dispassionately?
- What was the purpose or reason for the preparation of the document?
- Is there any basis for believing that the record was influenced by public opinion, literacy motives, bias, prejudice, vanity, or other such factors?

The above test is very strict. Not many documents concerning library history will pass the above test in a satisfactory manner. However, the document must indicate no bias, no ignorance, and no personal motive (self-interest) of the author.

In the process of gathering historical evidence, a researcher may ask the following questions to evaluate the sources for their authenticity and accuracy (Losee and Worley, 1993, p.157):

- Did the person claimed, produce at the time and the document, and was it distributed and used as claimed?
- Did any person who produced data (written and spoken) have any possible motive or bias in choosing what to communicate and what not to communicate?
- How reliable is an informant?
- Is information complete, and if not is there a possible reason for what is present and what is missing?

### ***Approach 3***

Very often, historians employ three heuristics for establishing authenticity and accuracy of information sources, namely corroboration, sourcing and contextualisation. Corroboration involves comparing documents on the same events to find out whether or not they provide the same information. Sourcing consists of identifying the author (full name, dates of birth and death, status, etc), place and date of creation of the source. Contextualisation refers to identifying of the place and date or period when the event of concern took place. Using these three techniques together can help a historian to establish authenticity and accuracy of an information source.

### **2.6.6 Data Interpretation and Synthesis into a Narrative Account**

Data synthesis includes selecting, organising, and analysing the data in terms of topical themes and central ideas or concepts. Then, these themes and central ideas are put together to form a narrative account that is contiguous and meaningful whole.

“Synthesis of historical data is the most difficult step of all. A conceptual scheme must be developed around which the facts are to be organised, with an appropriate logical sequence of topics and points. Then a detailed outline is prepared. Finally, the narrative is composed with due concern for balanced presentation and the leavening of generalization with illustration” (Daniels, 1996, p.228).

A good historian makes an effort to:

- give the most meaningful representation of reality,
- fill up gaps wherever those exist, giving necessary explanations,
- reconcile inconsistencies in the data,
- carefully conjure up an intelligent guess, where facts are lacking but admits honestly that he is using an intelligent and educated guess, and
- provide footnotes and bibliography, citing original sources and scholarly authorities, used by him to arrive at the conclusions.

A good historian employs lucid and logical expression to present his findings along with supporting evidence to his intended audience consisting of knowledgeable critics and scholars. In presenting a report, the following guidelines should be kept in view:

- The evidence and conclusions should be presented (written) in a way whereby these can be communicated to the concerned readers effectively.
- The researcher should use his intelligence, imagination and sense of discrimination just like a good detective, to provide a narrative exposition that is both contiguous and meaningful.
- The write up should be interesting, graceful and flowing narrative using readable but scholarly style, with emphasis on clarity and continuity of thought.
- All aspects of the topic as well as the problem must be covered.
- He must accurately describe the past, incorporating historical evidence, blending it into the account. He must be careful to not to simplify or misrepresent.
- Historical research due to its very nature often is subjective in nature. Thus, relatively speaking, it is susceptible to researcher bias. In any case, he must avoid bias or misjudgment. However, a historian should follow a style of presentation that is objective but not lacking in feeling or colour. In case a researcher feels that he has a known bias, as an honest researcher, he must state the same clearly, so that the reader can form his or her own judgment regarding the interpretations and conclusions drawn by the author.
- The evidence must be analysed and interpreted so that it supports the hypotheses (if any) and conclusions.
- The conclusions arrived at and the supporting evidence should be presented in a clear and unambiguous prose.
- Complex ideas need to be explained in a simple style without being simplified.
- A good historian is one who accepts the fact that his conclusions are tentative and should always be willing to revise or reject his conclusions in the light of new data that may become available later on. At times, skepticism is necessary and serves a useful purpose.
- Facts and interpretation should be presented along with documented evidence:  
(a) whereby the readers can evaluate the conclusions reached at by the researcher.  
In other words, readers can critically examine the documented sources to find out

whether or not, they would have arrived at the same conclusions as drawn by the researcher, (b) documented evidence can also enable other researchers to replicate the study, resulting in greater scientific accuracy, This is how knowledge advances.

- Above all, a researcher must display intellectual honesty.

## 2.7 INTERNET

In recent years, Internet has become a significant resource for research, a revolutionary communications delivery system. This is due to the growth of World Wide Web, an Internet interface having sound, graphical and video facilities. Many academic, professional, commercial and government organisations have established their web sites providing valuable data and information. There are libraries that have set up digital libraries, such as National Digital Library of Library of Congress, New York Library Digital Library etc. Lot of useful data is available along with trash and propaganda material.

A historian should know how to sift through data to cull out useful data. Subject directories and search engines are useful in finding history sources. There are thousands of primary sources relating to history available on the web and gopher FTP files. The problem with many of these web sites is that often the basic information required by a historian to evaluate the accuracy, completeness and genuineness of the sources is missing, such as purpose of the website, the location of the manuscript or printed source used for preparing the online document. Sometimes, the material is written from a particular point of view, or the facts may be misinterpreted to serve a particular end. More often, web sites set up by academic bodies and governments are considered more authoritative. Very often, it takes too much time to load the page. To have a fast search, one would require a computer with a fast processor and a modem. It is much more difficult to search Internet for secondary sources than primary ones.

Searching is full of problems. Each search engine uses its own methodology for searching. On a particular topic (based on search of words and phrases), it may provide such a large number of documents that the searcher may have to spend too much of time to select the relevant ones, thereby losing patience, However, one must remember that more time is consumed, if one were to go to a library personally to locate the required document. It may or may not be available on the shelf. It could be in the hands of a reader or borrowed out. In case, the library has to get a document on inter- library loan, then it would take a few days or weeks to get it.

In searching information, one comes across some serious problems as given below (Griffin, 1999, chap 12, p.2):

“One very frustrating problem: sometimes when you select a link, a message informs you that the server (computer) on which the material resides somewhere in the world is not accepting your request and suggests that you try again later. (An immediate retry sometimes gets results, sometimes not.) At times you will get a message stating that the site does not have a DNS number. (Sometimes an immediate retry proves the message wrong!) From time to time you will find that the material you want is available but, for one or more reasons, you have to wait a long time for it to load”. “A related problem, and one far more serious, is that links lead one to messages stating that the material requested is “not found,” meaning probably that, the link, when created, was good, but the document or directory is no longer on the Internet or has a different address. Sometimes this difficulty can be overcome by using a search engine to do a title search, sometimes not”.

A historian must keep in view that Internet is an additional resource beside the libraries. At present, only few sources of information of interest to a library historian are available on the Internet. But increasingly more sources are becoming available, thanks to digitization projects undertaken by various agencies including libraries as well as individuals. A great benefit of Internet is that it provides tons of information and also guidelines about how to carry out historical research effectively and efficiently.

## **2.8 SCIENTIFIC RESEARCH**

According to Busha and Harter, “application of scientific method to the conduct of inquiry is not limited to experimental and survey research. The scientific approach can also be used in historical inquiries. History is both a science and an art. Good historians make use of scientific methods when they collect, verify, and analyze information; the art of writing creative and interesting prose for historical narrative reports complements the scientific approach.” (1980, p.91). They further point out that some historians believe that scientific method can not be applied to historical research due to lack of “rigorous analytical precision and precise explanations” (1980, p.91). A similar view has been put forward by Powell, who mentions, “a number of researchers, including some historians, have argued that historical research cannot be considered true scientific research because it does not permit enough precision and objectivity.” (1991, p.137).

This is not exactly true. The fact of the matter is that it is difficult to apply it. It does not have the rigour of research methods like experimental and survey methods as it is not able to meet the standards of enquiry laid down in other methods. Historical research is ex post facto in its nature and usually; historical events are complex phenomena, where it becomes difficult to arrive at conclusions that can meet high level of confidence.

There are others who argue that historical research can meet the same standards of inquiry as do other methods (Mouly, 1978, p.157) A good historian always tries to adapt scientific approach to the best of his ability. He uses scientific method of inquiry at different stages of research process, such as, formulation and testing of hypothesis, collection, analysis, interpretation and synthesis of data, writing of the narrative. He adopts systematic approach at all stages. Systematic (that is systematic way or approach) is the key word in his investigation of the historical event of his concern. These are the distinguishing features of true historical research. However, there is no doubt that in spite of its limitations, historical research has made an important contribution in the field of library and information science. Historical knowledge has helped in the advancement of this area of study.

### **Self Check Exercise**

- 5) Describe the process of data synthesis in historical research.
- 6) Why is scientific method difficult to apply in historical research?

**Note:** i) Write your answers in the space given below.

ii) Check your answers with the answers given at the end of the Unit.

.....

.....

.....

.....

.....

## 2.9 PROBLEMS

### Data

*Amount of Data:* Often, it is difficult to decide as to how much data is sufficient to reach meaningful conclusions.

*Selection of Data:* A historian must avoid improper or faulty selection of data. This may happen due to relying too heavily on some data, ignoring some data, etc. This can result in a bias in the study.

*Evaluation of Historical Data and their Sources:* Inadequate evaluation of data and their sources, can lead to misleading results.

*Synthesis of Data into a Narrative Account:* Due to the very nature of historical research, it becomes most fruitful, if a researcher is able to successfully synthesize or integrate the facts into meaningful generalizations. Thus, a failure on the part of a researcher to interpret data adequately is considered a serious setback.

There are four problems at the stage of synthesis and in report preparation as given below:

- 1) Trying to infer causation from correlated events is the first problem. Just because two events occurred together does not necessarily mean that one event was the cause of the other.
- 2) A second problem is defining and interpreting key words so as to avoid ambiguity and to insure that they have the correct connotation.
- 3) A third problem is differentiating between evidence indicating how people should behave and how they in fact did behave.
- 4) A fourth problem is maintaining a distinction between intent and consequences. In other words, educational historians must make sure that the consequences that were observed from some activity or policy were the intended consequences. (Johnson lectures, chap 12, p.8)

Historical synthesis and interpretation are considered an art, which is subjective in nature. This raises a serious problem of subjectivity. "Historical synthesis is necessarily a highly subjective art. It involves the intuitive perception of patterns and relationships in the complex web of events, as well as the art of narrative writing. Explanations and judgments may be called for that will involve the historian's own personality, experience, assumptions, and moral values. Inevitably there are personal differences among historians in this respect, and prolonged academic disputes among historians of different schools or nationalities have arisen over practically every event. The initial reduction of complex events of the recent past to comprehensible pattern is particularly difficult and subjective..." (Daniels, 1996, p.228). Since the very process of writing a narrative is a human one, therefore, total objectivity is almost impossible. As a consequence, bias, distorting of facts to fit preconceived notions or ideas are not unusual. It may also be kept in mind that historical conclusions are conditioned by place, time and as to who is the author. In order to overcome, some of these inherent weaknesses, the writer must clearly indicate, the underlying assumptions in his approach. In case, he belongs to a particular school of thought, the same must be stated clearly.

### Sources

*Heavy Use of Secondary Sources of Information:* In case of research into events that occurred in a period earlier than the recent ones, a researcher often has to depend heavily on secondary sources due to lack of primary sources.

## Broad Area or Problem

*Broad Problem:* In case one is concerned with a broad area of study or problem, then very often the historical issues involved become too complex to study.

## Presentation

*Style:* The writing style should be attractive and also aim to inform the reader. This is not an easy task.

*Scholarship:* It should make a significant contribution to new knowledge and reflect scholarship.

---

## 2.10 SUMMARY

---

True historical research employs application of scientific research at all stages of the research process including formulation and testing of hypothesis (es), collection, analysis, interpretation and synthesis of data and writing of the narrative. Systematic (that is systematic way) is the key word used at all steps. Thus, historical conclusions arrived at by the historian can rightly claim to have logical validity that is somewhat comparable to those in other social sciences. However, true historical research must be distinguished from chronology or just description of events. These merely constitute steps in the research process. It is to be noted that, it is the application of scientific research that distinguishes true historical research from mere chronology or just description of events.

A good historian always tries to adapt scientific approach to the best of his ability

One must admit that there are certain limitations of historical research. These include ex-post facto nature of historical research, where the historian works from available evidence back to the event, complexity of the phenomenon being investigated, problems in studying causality within a relationship of factors involved and impossibility of replicating the past events. Besides, historical research is a highly subjective art. The process of writing a meaningful narrative is a human one, where total objectivity can never be achieved. There is always a possibility of a researcher bias, leading to distortion or suppressing of facts to serve preconceived notions, affecting the objectivity of the conclusions. Thus, it becomes difficult to arrive at conclusions with any high degree of confidence.

The job of a historian is quite difficult. Often, he has to deal with events, for which there may be only very few primary sources of information. Thus, he is forced to rely more on secondary sources. At times, the problem being investigated may be too broad, where the environment for the historical event may be too complex, involving a large number of factors or variables. In some studies, the data gathered by the researcher may be too vast, requiring a great deal of sifting. This can be a big headache for him. Here deciding what is relevant and what is not relevant can be really difficult.

There is no doubt that in spite of its limitations, historical research has made an important contribution in the field of library and information science. Library history (historical research done in library and information science) has grown as a separate area of study generating its own literature. Those who specialize in this area are called library historians. Library history is growing day by day. There are separate organizations to serve the cause of library historians. IFLA (International Federation of Library Associations and Institutions) has a separate section on Library History. American Library Association has created Library History Round Table.

A good library history cannot be written without adequate sources of information. Library history not only lacks adequate records but those available in libraries are not always easily accessible. Therefore, librarians must give a high priority to acquiring, organizing and making them accessible. Through oral history projects, based on interviews of leading library educators and librarians, records can be generated to serve the purpose.

## 2.11 ANSWERS TO SELF CHECK EXERCISES

- 1) Historical research is a study and analysis of the past events to predict the future. It involves systematic collection and objective evaluation of data related to past events. Merely collecting data related to the past events and presenting a chronology is not historical research.
- 2) The purposes of historical research are:
  - To reconstruct the past;
  - To discover unknown events;
  - To understand significance of events;
  - To discover the context of an organization /movement/the situation;
  - To find answers to questions about the past;
  - To study cause – and effect relationship;
  - To study relationship between the past and the present; and
  - To record and evaluate the accomplishments of individuals, institutions and other kinds of organizations
  - To provide understanding of the immediate phenomenon of concern
  - To understand the cultural context of libraries
- 3) The steps involved in conducting historical research are:
  - Identification of research topic and formulation of the research problem
  - Collection of background information or contextual information about the research topic
  - Formulation of the questions to be answered or formulation of hypothesis (es) (if appropriate) to explain causal relationships between historical variables
  - Systematic collection of evidence or data or literature review
  - Rigorous evaluation of historical resources (the authenticity of the resources and validity of their contents)
  - Interpretation
  - Synthesis into a narrative account
- 4) A researcher does not prefer secondary to primary sources of information because these report information concerning an event, object, or phenomena not directly observed by the author/ compiler. As a result, the authority of these sources is less compared to those of primary sources.

- 5) Data synthesis involves collecting, organizing, analyzing and presenting the data systematically. It is important that the presentation is coherent. Therefore the researcher should plan the presentation regarding how the topics have to be sequenced from general to specific. There should be adequate diagrams supporting the narrative.
- 6) It is difficult to apply scientific method to historical research due to lack of precision and objectivity. Historical method of research lacks the rigour of survey and experimental methods. It is post- facto in nature handling complex phenomena where it becomes difficult to apply scientific method.

---

## 2.12 KEYWORDS

---

- |                            |                                                                                                                                                                                           |
|----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Historical Research</b> | : Systematic collection and objective evaluation of data relating to past events concerning causes, effects or trends of those events to explain present events and predict future events |
| <b>Library History</b>     | : Historical research conducted in the field of library and information science                                                                                                           |

---

## 2.13 REFERENCES AND FURTHER READING

---

Busha, Charles H. and Harter, Stephen P. (1980). *Research Methods in Librarianship*. New York: Academic Press.

Daniels, Robert V. (1996). History. In *Encyclopedia Americana*. Vol 14. Danbury, Connecticut: Grolier.

Gay, L. R. (1981). *Educational Research: Competencies for Analysis and Application*. 2nd ed. Columbus, OH: Charles E. Merrill.

Goldhor, Herbert (1972). *An Introduction to Scientific Research in Librarianship*. Urbana, IL: University of Illinois, Graduate School of Library Science.

Griffin, Roger A. (1999). *Using the Internet as a Resource for Historical Research: Prospects and Problems*. (available at <http://www.austin.cc.tx.us/history/inres00title.html>) (accessed on Dec 10, 2004).

Harris, Michael H., (ed). *Reader in American Library History*. Washington, D.C.: NCR Microcard Editions.

Hillway, Tyrus (1964). *Introduction to Research*. 2nd ed. Boston, MA: Houghton, Mifflin.

Isaac, Stephen and William B. Michael (1981). *Handbook in Research and Evaluation*, 2nd ed. San Diego: CA, Edits Publishers.

Johnson lectures, chapter 12 (available at <http://www.southalabama.edu/coe/bset/johnson/lectures/ch12.PDF>) (accessed on Dec 10, 2004).

Key, James P. (1997). *Research Design in Occupational Education: Module R 11*. (available at [www.okstate.edu/org](http://www.okstate.edu/org)) (accessed on Nov 26, 2004).

Losee, Robert M. and Worley, Karen A. (1993). *Research and Evaluation for Information Professionals*. San Diego: Academic Press.

Mouly, George J. (1978). *Educational Research: The Art and Science of Investigation*. Boston, MA: Allyn and Bacon.

Partner, Nancy F. (1997), History. *In Collier's Encyclopedia*. New York: Collier's.

Powell, Ronald R. (1991). *Basic Research Methods for Librarians*. 2nd ed. Norwood, NJ: Ablex.

Shiflett, Orvin Lee (1984). Clio's Claim: The Role of Historical Research in Library and Information Science. *Library Trends*. 32(4), 385-406.



---

## UNIT 3 SURVEY RESEARCH

---

### Structure

- 3.0 Objectives
- 3.1 Introduction
  - 3.1.1 Library Survey
- 3.2 Data Collection
  - 3.2.1 Sampling
- 3.3 How to Conduct a Survey
- 3.4 Problems
- 3.5 Instruments of Survey Research
  - 3.5.1 Observation
  - 3.5.2 Questionnaire
  - 3.5.3 Telephonic Surveys
  - 3.5.4 Electronic Surveys
- 3.6 Some Exercises for Survey Research
- 3.7 Summary
- 3.8 Answers to Self Check Exercises
- 3.9 Keywords
- 3.10 References and Further Reading

---

### 3.0 OBJECTIVES

---

After reading this Unit, you will be able to:

- define and understand the nature of survey research;
- identify situations where it is suited; and know the research areas which can be answered by survey research;
- know the various techniques and instruments of survey research with advantages and disadvantages of each; and
- prepare a survey research design.

---

### 3.1 INTRODUCTION

---

A survey research is undertaken to study and describe the ground realities or current state-of-the art of a situation, group of persons or institutions. The answers sought are what, when and where by gathering the facts and verbal data. Descriptive surveys pertain both to qualitative and quantitative research. It may also be used to collect huge data to be used later for multiple purposes. Decennial census of India is one such example. It requires collection of primary data from the whole field. It could also be collection of data by a sample survey to solve a research problem, study relations between two variables by statistical methods, or to provide scientifically collected

facts and figures to draw theory based conclusions. Trend started with long and vast social surveys to collect data for planning policies and actions.

### 3.1.1 Library Survey

A library survey is interpreted as a systematic collection of data concerning libraries, their activities, operations, services, staff, use, and users at a given time or over a given period. Surveys are by nature large, over-viewing and spread over to a sizeable population/subjects or area. For example, study of a circulation system of a library is not a survey, but if extended to all the libraries of a whole city or region will by definition constitute a survey. A survey of public libraries in Haryana is another such example.

In library and information management survey method has been quite popular due to its suitability. It can be easily applied to many library procedures, services and use. Surveys are simple, easy to conduct though time taking.

## 3.2 DATA COLLECTION

Survey basically involves data, facts or textual/verbal information or opinion gathering by formal and systematic method. There are many techniques and instruments to do so:

- by direct but stand aside observation.
- by observing as one of the participant of the activities.
- by making door to door survey or meeting individual informants for asking specific questions.

**This individual survey could be done by:**

- by a formal and structured printed questionnaire.
- by telephone, or through email or website.

### 3.2.1 Sampling

Universe of entities is a set of whole gamut covering the whole field under study, e.g.: University libraries in India; Post-graduate library users; A survey of reading habits of non-working married women in Mumbai, etc. If the population under study is small or manageable then the data should be collected of each item or entity under study. But this is rarely the situation in a survey research. Sampling is required if the universe of population under study is too large. A sample may be defined as a representative subset or cross section of the population in miniature. It should homogeneously represent the entire field. Validity of research results much depends upon the quality of the sample drawn. There are scientific, logical or statistical techniques for formulating a sample. Some of the techniques are common sense methods to ensure that the sample is homogenous and a true and fair miniature of the entire population under study. If the sample is biased or lopsided then the results cannot be trusted or generalised. It can be formulated by the following two methods:

#### Probability Sampling

It is a random sampling which defines the chances of every element to be included in the sample. For example, if we decide to include one entity out of every one thousand then the chance of every entity to be included in the sample is 1/1000. For random collection first of all the researchers will divide the whole population into groups of 1000 each as they occur in the natural state. Then from each group the researcher may pick up, say, every 5<sup>th</sup> member or for that say ever 20<sup>th</sup> member. This is random

sampling, and sample-formed will be a correct one. But still some error, technically known as “Margin of Error”, cannot be avoided. It can be calculated statistically and accounted for in the results.

### **Non-Probability Sampling**

It is a non-structured sample and items are included in the study due to some convenience of the researcher, or as the researcher simply stumbles upon them. This sampling is convenient, takes less time and is handy. But it may be lopsided, loaded with biases, and has higher margin of error. Sampling is discussed in detail in Unit 6, Measurement of Variables.

### **Self Check Exercise**

- 1) What is a library survey?
- 2) Discuss the purpose of a library survey.

**Note:** i) Write your answers in the space given below.

ii) Check your answers with the answers given at the end of the Unit.

.....

.....

.....

.....

.....

---

## **3.3 HOW TO CONDUCT A SURVEY**

---

To begin with, the problem must be clearly and strictly formulated by defining its inclusion and exclusion parameters. The geographical area or conceptual constituency of the survey must be focused. Research question should be clearly defined.

- Target population should be demarcated and must be accessible in case of human beings, and measurable in other cases.
- Types of scales and instruments to be used and mode of survey should be determined depending upon the kind of study and nature of population.
- Questionnaire should be carefully prepared and pretested on a small population.
- Respondents should be approached with due tact, courtesy, humility, and should be fully explained the aim and purpose of research. No embarrassing questions should be asked. Give them free hand to answer pre-set questions.
- In case of verbal answers or interviews the information should be faithfully recorded, howsoever contrary it may be to the researcher’s wishes or expectations. Views of the respondents must be respected. Accept the opinions of others in too. Researcher should be neutral, detached or disinterested in the outcome of the research.
- Respondents must be thanked for the cooperation and valuable time they gave.

---

## **3.4 PROBLEMS**

---

Survey research though easy to design is difficult to conduct due to many factors ranging from non-cooperation, no-response to deliberate wrong information. Some of these are explained below.

## Non-cooperation

Many persons are not interested in filling the questionnaire or giving time to the researcher for a meeting or interview. It may be due to many personal or administrative reasons due to:

- lack of time;
- lack of interest due to many such requests from all types of academic and market researchers;
- fear of divulging such information which may not make the respondent or the institution any proud of achievements; or
- a political, tactical or business necessity to not to reveal some information asked for.

Getting information from the target population has become a matter of personal obligation. Every survey researcher has a bagful of woeful tales to tell. Usually it requires lot of patience, persuasion and skill to motivate the respondents to make them give the requested information or opinions. Therefore, persons who are not very social or do not have persistent attitude even in face of humiliation are not very suitable for this kind of research.

## Outsourcing data collection

If it is vast field to be surveyed then some commercial but professional agency may be employed to collect data on your behalf. This is called outsourcing data. But it has its own problems.

- Data collected may not be reliable even could be cooked.
- You are deprived of the experience of ground realities. In the field apart from collecting raw data the researcher self experiences and learns many more extraneous realities that helps him/her to see the problems in many unimagined perspectives. Personally meeting and talking to the respondents is an invaluable experience. It may even change attitude and pre-conceived notions of the researcher.

## Low response rate

Apart from delays, excuses, despite many reminders it is always time taking to get and collect data. Often the researchers have to advance deadlines – as these are not met. Return or response rate may be low. It has obvious negative impact on the validity of the research findings. Forty percent return rate is sufficient, though not high.

## Deliberate wrong information

Most of the respondents usually do not give true and frank information. This could be on two accounts:

- Question put may be ambiguous or wrongly interpreted by the respondents. For example, to the question “Is your library automated”, many librarians says “yes” even if their computer is being used for clerical purpose only. As another example, many librarians answer it in affirmative that they provide “CAS” services, when in reality they publish a list of new arrivals. Wrong answer may be deliberate though appearing innocent.
- It is a natural human weakness or tendency to show only the ideal or bright side of one self. Many university teachers do not visit the library regularly, but when asked they answer that visit is “often”. Some may be more diplomatic. Some may even lie blatantly. They seem to say proverbially “Ask me no questions, I will tell you no lies”. It requires a very aware, experienced and mature person to dig out the realities from such wrong or ambiguous answers.

### Unclear answer

If the question is open ended then human beings have the habit of answering in an ambiguous way – which may have double meaning. Qualitative answers are always a source of ambiguous results.

### Cooked up data

Official record is often manipulated or cooked up. It is to show high performance than the actual one. Performance is sexed up, they say. For example a library under threat of closure due to low readership may fabricate data and manipulate to show more number of users than the real numbers. When officials manipulate record for the media, authorities or the researchers, the researcher using this data uncritically or unchallenged will not reach the right conclusions. Results will be far from reality. Making practical use of such findings will be harmful. However, questioning or cross verification may somewhat correct the situation – one should not be pessimistic about the false or half answers. You need to be alert.

### Self Check Exercise

- 3) List the steps involved in data collection.
- 4) Enumerate the problems of survey research regarding data.

**Note:** i) Write your answers in the space given below.  
ii) Check your answers with the answers given at the end of the Unit.

.....

.....

.....

.....

## 3.5 INSTRUMENTS OF SURVEY RESEARCH

As said in section 3.2, core work in a survey research is data collection by direct method. Data should be primary and obtained by direct observation or from original and reliable sources. For this major methods are:

- Observation
- Interview
- Questionnaire or
- Any combination of these.

These jobs may be done by manual methods, or electronic instruments may be used. For example, we may use cameras or tape recorders openly or hiddenly; questionnaires may be served personally or through email or website.

Observation: Every mode of data collection in a survey research reduces to observation. It is the most obvious and reliable method of data collection. This again can be divided into two categories

### 3.5.1 Observation

In this method the researcher observes an activity and notes down the information/data standing from a close distance. This could be done again in two ways:

- a) by informing the informants.
- b) in a hidden or secret way.

The observer could use notebooks, pre-designed proformas cameras or tape recorders in both the cases. First category is an easy method and the people under observation are cooperative, even sometime enthusiastic. But problem is that people are not really natural when being observed. Their behaviour could be a self distorted or manipulated for good or bad. People are not natural when conscious of being observed by outsiders.

To avoid the above situation the observer may observe the participants in a secret manner without their information. To some extent it is possible. For example, you may sit in a corner of a library and see what reference sources the library users consult or how they use the catalogue. It also involves, in some cases, the question of ethics and legality. Also distant observation may not be correct.

### **Participant observer**

To avoid the above problem of unnatural behaviour or ethical question the researcher may become a member of the group under observation. This method is useful when observations required are multiple, minute and for a long time. This method has worked wonders in anthropological studies when the researchers have actually joined and lived with a commune as an ordinary member sharing their routine tasks, joys and sorrows. This method has given birth to many classic studies. But this method is applicable in limited fields of social, cultural and anthropological studies.

### **3.5.2 Questionnaire**

It is a traditional and all pervasive instrument to collect and record data. It is structured and formally written list of questions to be put to the respondents en mass. It is easy and handy, and can be administrated in many ways depending upon the convenience of the researcher and respondent.

#### *Qualities of a Questionnaire:*

To facilitate response it should have the following qualities:

- Questions whether close or open ended, should be brief, clear, and to the point.
- Irrelevant or unnecessary questions which may irritate the respondent, or may not be of any relevance to your research should be avoided.
- Questionnaire should not be too lengthy. Return rate of lengthy questionnaire is low; and respondents always take more time in filling them. Length repels the respondents.
- Anonymity should be promised and honoured, if desired by the respondent. They should also be assured that information will not be used for any other purpose than the declared one.
- Copy of the research results/report should be promised to the respondents, if asked for.

### **3.5.3 Telephonic Surveys**

Now a days due to fast and cheaper telecommunication services telephones are being increasingly used to get data and opinions for social surveys from the willing respondents. These are ultimately economic in terms of time and money. If the field of survey is vast and respondents are scattered geographically or live in remote or inaccessible areas, then the telephone has hardly any substitute.

#### **Advantages**

- It is interactive, and not frozen like a printed questionnaire.
- Clarifications can be sought and given in case a question is not clear.

- Many people prefer to speak out than give something in writing.
- Interviews can be conducted at a mutually convenient time.
- Response rate is high.

#### **Problems**

There cannot be detailed discussions, as in a face-to-face meeting. These have to be concise. There is no check if later the respondent denies having said so. For the latter problem telephonic conversation may also be tape-recorded.

#### **3.5.4 Electronic Surveys**

New technology affords to solve problems of conventional instruments of survey research. The Internet and emails have advantages of both the conventional (print) and telephonic surveys. It is still more economic. Above all these can be interactive; detailed and yet very economic. As said earlier the answered data may be easily downloaded into a data process software package (say in SPSS) and processed directly. Even otherwise electronic data is easily collected, classified without any clerical errors in transferring data and information.

Advantages and limitations: Due to convenience both for the researchers and the respondents web-based surveys are getting popular. These almost cost nothing and can be answered by the respondents at any convenient time. Whereas in case of telephone the time should be convenient to both the researcher and the information. There can be mass or bulk emailing of a questionnaire. These are extremely economic and convenient.

Digital divide comes in the way of the use of email or web-web based surveys. Older generation or laypersons have difficulty using the Internet or have no access to it even in advanced countries. Digital divide is wide and deep. Email ids of the respondents may be difficult to procure, as no such directories are available. This problem, however, can be solved with the help of newsgroup, or list serves – this is a group of professionals sharing a common interest and interacting primarily through emails.

#### **Self Check Exercise**

5) Discuss the advantages of electronic surveys.

**Note:** i) Write your answer in the space given below.

ii) Check your answer with the answers given at the end of the Unit.

.....

.....

.....

.....

.....

.....

---

### **3.6 SOME EXERCISES FOR SURVEY RESEARCH**

---

Survey research does not require any laboratory or high setting. If it is small and local, it may not even cost anything to the researcher. For the students following research exercises are suggested:

Make a survey of the buildings of the government secondary school libraries of your town.

Prepare a survey report of the reading habits of children upto 18 years where one of the parent is graduate at least.

Make a survey of the information needs and sources of male villagers engaged in modern farming.

Study the use of non-book print literature by mathematics scholar in a university.

Make a survey of the circulation methods of books and other documents in special libraries in Delhi.

Similarly, there can be many other such topics that may strike you while reading this unit, and other related literature. However, work experience is the best and reliable source for research problems.

### 3.7 SUMMARY

Most of the research in social sciences is a survey research. Results of social surveys have amply demonstrated the validity of scientific method of research to study social problems. Survey research mostly implies inductive logic for results and conclusions. This can also be used to study the relations between two variables. Survey data collection may be complete in itself to be later used by other researchers, business decision makers, planners, policy makers to take high decisions. For academic purpose, it is a complete research process in itself. In library and information management most of the on-going and past research has used survey method. For example, A survey of public library services in Tamil Nadu, A survey of the information needs of soil scientists; A survey of the use of IT in academic libraries in North India. Basic work in a survey research is data collection by direct method. It can be carried out by observation of or by participation in the event. Questionnaire is an all pervasive instrument. Telephonic and electronic surveys are also handy tools to collect data or elicit opinions of the population. Electronic data collection has an additional advantage of directly downloading and processing the data in a computer. Questionnaire should be brief and simple; and no too personal or irrelevant questions should be asked. Data should be collected, classified, statistically processed to draw inferences, as done in other methods such as experimental or historical research. For social sciences computer package SPSS (Software Package for Social Sciences) is available.

### 3.8 ANSWERS TO SELF CHECK EXERCISES

- 1) Library survey is the process of collecting information concerning the collection, processes, services, staff or users of libraries. It is done in a systematic way using standard techniques and tools.
- 2) The purpose of a library survey is to know and present such information about libraries of certain types or in certain regions. It helps in knowing the state of development of libraries as well as to evaluate them for further improvement.
- 3) The steps involved in data collection are:
  - 1 Size and the nature of population must be clearly known;
  - 1 Deciding the sampling techniques to be used and the sample size;
  - 1 Deciding about the tools for data collection to be used;
  - 1 Selecting scales for measurement;
  - 1 Properly framing the questionnaire/ interview schedule taking care of the validity and reliability;

- 1 Conducting a pilot survey and improving the questionnaire/ interview schedule based on the feedback; and
  - 1 Administering the data collection tool to the population.
- 4) The problems of survey research regarding data are:
- 1 Non- cooperation from respondents;
  - 1 Low response rate;
  - 1 Deliberate wrong information;
  - 1 Unclear answers; and
  - 1 Cooked up data provided by respondents.
- 5) Electronic surveys are useful in that they are economic. Any number of questionnaires can be mailed. The analysis is also simple as it saves on coding, tabulation and further testing of data.

---

### 3.9 KEYWORDS

---

|                            |                                                                                                                                                                                                                                                                                                                                                         |
|----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Inductive Reasoning</b> | : Logical reasoning based on long drawn facts and observations. Sun will rise from the east tomorrow is inductive reasoning.                                                                                                                                                                                                                            |
| <b>Informant</b>           | : A person part of the population under study, who gives information or opinion to the researchers.                                                                                                                                                                                                                                                     |
| <b>Margin of Error</b>     | : Degree of deviation of sample from being a true representative of a population drawn by random sampling. In practice 0.5% Margin of Error is acceptable or normal. It means the sample is 95% approximation of the whole population.                                                                                                                  |
| <b>Questionnaire</b>       | : A formal and structured list of questions prepared by the researcher to be asked.                                                                                                                                                                                                                                                                     |
| <b>Random Sample</b>       | : A sample drawn by probability technique in which every element of population has equal and independent chance of inclusion in the sample.                                                                                                                                                                                                             |
| <b>Sample</b>              | : A formulated subset of population to represent in miniature the whole population to be researched.                                                                                                                                                                                                                                                    |
| <b>Survey Research</b>     | : It is a type of descriptive research to study a particular situation, or setting, to know its whole state of the art condition or any particular aspect to answer what, where when and who types of questions. Some times a huge databank creation is the only immediate motive of survey research. In social sciences it is the most popular method. |
| <b>Validity</b>            | : It means either accuracy of observation and measurement; and the correctness of generalization of research results for other situations.                                                                                                                                                                                                              |

---

### 3.10 REFERENCES AND FURTHER READING

---

Krishan Kumar: *Research Methods in Library and Information Science*, New Delhi: Vikas, 1992. Pp. 39-51.

Kumar, P.S.G. *Research Methods and Statistical Techniques* Delhi: B.R. Publishing, 2004. Pp. 243-248.

Sharma, Pandey S.K. *University of Knowledge and Research Methodology*. Delhi: Ken Publication, 1990. Pp. 103-107.

Singh, S.P. *Research Methods in Social Sciences : A Manual for Designing Questionnaires*. New Delhi: Kanishka Publishers. Pp. 268.

Williamson, Kristy: *Research Methods for Students and Profesionds: Information Management Systems*. Wagga Wagga, Australia: Centre for Information Studies, Charles Sturt University, 2000. Pp. 71-92.

---

## UNIT 4 EXPERIMENTAL RESEARCH

---

### Structure

#### 4.0 Objectives

#### 4.1 Introduction

#### 4.2 Experimentation

##### 4.2.1 Concept and Definition

#### 4.3 Hypothesis

#### 4.4 Research Procedure

##### 4.4.1 Sampling

##### 4.4.2 Experimental and Control Groups

#### 4.5 Example

#### 4.6 Validity

##### 4.6.1 Internal Validity

##### 4.6.2 External Validity

#### 4.7 Design of the Experiment

##### 4.7.1 Randomisation

#### 4.8 Another Example

#### 4.9 Limitations of Experimental Method

#### 4.10 Ethics of Research

#### 4.11 Some Problems for Research

#### 4.12 Summary

#### 4.13 Answers to Self Check Exercises

#### 4.14 Keywords

#### 4.15 References and Further Reading

---

### 4.0 OBJECTIVES

---

After reading this Unit, you will be able to:

- define experimental research and explain key concepts associated with it, such as variables, experimental group, cause-effect relation, validity;
- formulate a research design for experimental method and chalk out its various stages, and know its various methods;
- data generation and collection, data analysis; interpolation and drawing inference to prove, disprove or modify a hypothesis; and
- Identify situations where it is applicable in social sciences with special focus as library and information sciences.

---

## 4.1 INTRODUCTION

---

There was a time when research connoted only experimental research in a laboratory. Indeed the first impression of a scientific method is somewhat laboratory work or trial. Scientific method of research itself is synonymous with experimental work. Though scientific method has wide range and includes many other methods such as survey, or historical methods, but still many students and researchers confuse it with only the experimental and laboratory methods.

Scientific method of research was first advanced by the English philosopher and statesman Francis Bacon (1561-1626) in his book *Novum Organum* (1620). This consists in direct and systematic observation, interpolation of facts and generalization to formulate theories by deductive logic. His emphasis was on direct observation and verification rather than to accept without questioning prevailing views of religion or secular (e.g. of Aristotle) authorities.

---

## 4.2 EXPERIMENTATION

---

The literal meaning of experiment is to do sometime new or first time, to test something or put something on trail. For example, a government may start a scheme on experimental basis to know its viability. We do many things first on experimental basis to study their effectiveness and defects.

But strictly speaking the experimental method is central to scientific method or positivist approach to discovery of knowledge. It is to study cause-effect relation between two entities (called variables) by direct observation and measurement. The cause - effect relation can be studied under controlled conditions, so a laboratory provides an ideal place for such studies. It is not to say that experimental work cannot be carried out outside a laboratory in natural situations. For example, a chemist may work in a laboratory, but an astronomer will have to observe natural and uncontrolled phenomena when it occurs while sitting in his observatory.

### 4.2.1 Concept and Definition

Experimental method of research is employed to establish and quantify cause-effect relationship between two known variables. Variable is an element, which is under study in phenomena. Broadly speaking these is of two types: independent (casual) and dependent (effected) variables.

Types of Experimental design: In fact there are three stages of experimental research design:

- Pre-experimental design
- Quasi-experimental design
- True experimental design

Most appropriate type of research design depends upon the type of problem under investigation; how much it is liable to be kept under control by the experimenter; and whether the phenomena can be simulated or replicated with due authenticity.

In nutshell experimental method allows hypothesis formulation on the basis of long observation and literature survey (inductive logic), and then to use deductive logic to apply to particular instances.

### Self Check Exercise

- 1) Define experimental method. Explain what do you understand by a variable.

**Note:** i) Write your answer in the space given below.  
ii) Check your answer with the answers given at the end of the Unit.

.....

.....

.....

.....

---

## 4.3 HYPOTHESIS

It is an informal or educated guess or a hunch on relation between two variables conceived on the basis of sufficient knowledge of ground reality i.e. by some long observation of a phenomena whether social or natural, i.e., by inductive logic.

### Null Hypothesis

To empirically study correlation between two variables a null hypothesis is formed. A null hypothesis is an assumption that no difference exists between two variables. In other words there is no statistically difference between experimental and control groups.

### Self Check Exercise

- 2) What is hypothesis? Describe null hypothesis.

**Note:** i) Write your answer in the space given below.  
ii) Check your answer with the answers given at the end of the Unit.

.....

.....

.....

.....

---

## 4.4 RESEARCH PROCEDURE

To study the co-relation between two variables in an observed phenomena, a sample is formulated of the population/entities or situation under study.

### 4.4.1 Sampling

Sampling is necessary if the population under study is too large to be experimented upon. A sample is a homogenous and representative of this population under study. It has to be formed carefully by a statistical method. If the sample is not homogeneously representative of this population with an error margin of 5%. It is an acceptable margin.

### 4.4.2 Experimental and Control Groups

The sample is divided into two randomly formed groups as follows:

#### Experimental Group

Group or entity which is exposed or treated to study and subsequently to measure changes in the dependent variable.

It is a similar group which is left in natural condition. It is not given any treatment or exposure. Changes in the experimental group are compared and contrasted with the static or controlled group. Diagrammatically we can put it as:

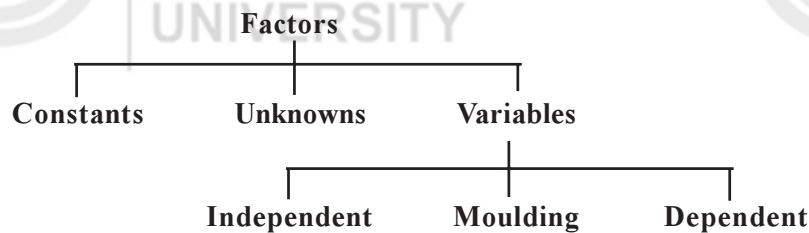


Fig. 4.1: Factors affecting Research

## 4.5 EXAMPLE

Let us take the example “Impact of weather on the use of the traditional (print) library”.

In this case weather is the independent variable, and library use is a dependent variable. Null hypothesis is “weather has no effect on the library use”. Independent variable is weather as it cannot be manipulated but the researcher chooses the days with varying weather conditions. Equal number of normal weather days is taken to form a control group. Number of users is dependent variable. Dependent variable is the factor that is effected and measured to draw inference.

There may be unknown variables, which may effect the dependent variables. This hidden or intervening element is not measured but does effect the dependent variable. That is to say in real situation and complex phenomena there cannot be one to one relation. In our case it could be a day of a festival or some other attractive event in the town where people are likely to throng and thus may cause a low attendance on the library. Thus varying weather conditions may not be all which account for the variation in the number of library users. In a laboratory setting or controlled condition these is high possibility of minimizing this confounding or intervening variable. In natural setting it cannot be controlled. In our case due care will have to be taken to eliminate this variable and select the days of otherwise having equal chances of being visited by the users.

## 4.6 VALIDITY

Literally it refers to logical soundness and consequent acceptability of an entity or research results. In experimental research it is of two types:

### 4.6.1 Internal Validity

It refers to the accuracy of observation and measurement of the dependent variable only under the impact of independent variable. Internal validity is high when all the confounding variables are identified and kept under control. Laboratory research is high in internal validity as the independent variables can be controlled effectively while changes in the dependent variable can be measured minutely; and intervening variables can be kept under check.

### 4.6.2 External Validity

It refers to use generalisability of the results i.e. the degree of their universality. Laboratory experiments are low in external validity whereas field experiments are high in external validity.

### Self Check Exercise

3) Define validity. What are its different types?

- Note:** i) Write your answer in the space given below.  
ii) Check your answer with the answers given at the end of the Unit.

.....

.....

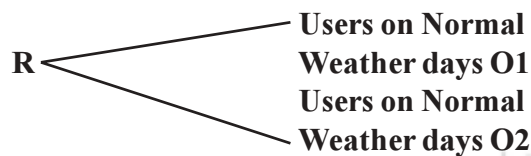
.....

.....

## 4.7 DESIGN OF THE EXPERIMENT

In any experimental research the independent variable is divided into two groups refer back to the example “on the impact of the weather on the use of library” as given in section 4.6.

This observation or experiment may be repeated on different days to collect more data. O1 and O2 are number of visitors on these days.

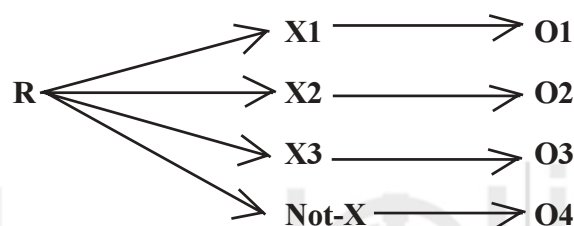


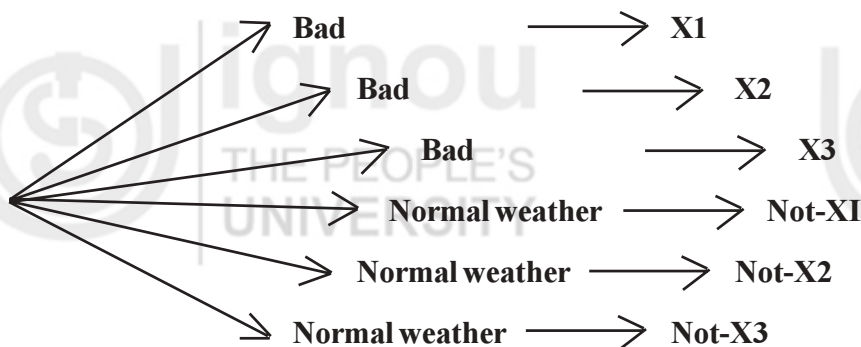
### 4.7.1 Randomisation

It refers to the sample selection as a pure chance. As a necessary precondition, both the good and bad weather days should be selected randomly to ensure that both these days should be selected and otherwise are at equal footing to attract users. It is to provide level ground to both the groups i.e. experimental and control.

The whole population or the sample is divided into two equivalent groups to study the difference in the conditions of the two equivalent groups: that is one put to experiment and the other control group left free or in natural state.

To get valid results the experiment may be repeated with different groups (in our case different libraries of the city or in different cities), or on different days in a same library. This will ensure better external validity of results. For each experiment observations are recorded and compared; and inference is drawn of the relation between cause (weather condition) and effect (number of users). This way causal relation between two variables can be studied. Statistical tests are applied to results, and conclusions are drawn regarding the effect of bad weather on the number of users visiting the library. To make the results generalizable we should have more than one experimental groups and, control group or we can have repeated or different control groups as follows:





In this case bad weather days should be of equally bad weather.

## 4.8 ANOTHER EXAMPLE

In library situation we can study the comparative retrieval power of different classification systems say CC and DDC as applied to a given collection, say sociology. In this case we will classify this collection both by CC and DDC and will try retrieving documents on randomly selected topics of sociology. Retrieval is dependent variable while classifications are independent variables. Hidden variable may be the efficiency of the classifier in correct classification of documents.

## 4.9 LIMITATIONS OF EXPERIMENTAL METHOD

An experiment conducted in a laboratory under artificial conditions may not truly represent a situation. It is too simplistic to consider that there are only two variables. In natural sciences it works where other variables can be kept under control. In behavioural or social sciences the situation is too complex as best put by John W. Best (p. 92).

Despite its appealing simplicity and apparent logic, it did not provide an adequate method for studying complex problem. It assumed a highly artificial and restricted relationship between single variables. Rarely, if ever, are human events the result of single causes. They are usually the result of the interaction of many variables, and an attempt to limit variables so that one can be isolated and observed proves impossible.

Hence, there are many limitations and suppositions when applied to social situations including library and information management. Human beings cannot be put to experimentation on many psychological and ethical grounds. Human beings when under a test or observation can easily manipulate their natural behaviour. They cannot be put in test tubes and titrated like chemicals. Then a human being experimenter has naturally inherent biases (likings and dislikings) when other humans are concerned. They tend to take sides in heart of hearts. Hence observations and conclusions may not reflect the objective reality.

## 4.10 ETHICS OF RESEARCH

A researcher has to observe some cautions, courtesies and moralities when human beings and animals are under study:

- It is necessary to take prior permission from them when an individual human being is under study. Purpose and aim of research must be further explained to them, along with any risk factor involved.

- Their right to privacy must be respected. Information collected from them should be used only for the purpose of research. It must not be passed on to someone else.
- Animals should not be subjected to any cruelty.
- As per his/her own conduct is involved, the researcher must not manipulate data to prove some thing. Objectivity and selflessness must be above all. Data may be made available to peers and reviewers, if under any suspicion or question.

### **Self Check Exercise**

4) Enumerate the limitations of experimental method.

**Note:** i) Write your answer in the space given below.

ii) Check your answer with the answers given at the end of the Unit.

.....

.....

.....

.....

.....

---

## **4.11 SOME PROBLEMS FOR RESEARCH**

---

You could do research on the following problems by experimental method in the area of library and information management.

- 1) Investigate the relation between retrieval of information on the Internet and level of IT training of the researchers.
- 2) Study the correlation between library orientation course and effective use of the library.

In this case parameters of “effective library use” must be defined. To design this research, make two groups of users formed randomly. One group may be given a library orientation course of stipulated duration, and other group of freshers is not subjected to any such training. Design a scale to measure effectiveness of the library and see if there is any difference between the two groups.

---

## **4.12 SUMMARY**

---

Experimental method of research is to study the correlation between two variables under controlled conditions. It investigates how one variable (independent) effects the other (dependent) variable. This is known as hypo-deductive method which is a classic method of research. On the basis of some observation and literature survey a hypothesis is formed. In testing the hypothesis under controlled conditions and observation of data the thesis is supported or not supported i.e. decision are based probability rather than certainty. However this method has limitations in social sciences as in such situations there is a highly complex interplay of multiplicity of tangled variables. Two social variables cannot be easily isolated and studied. Human biases cannot be avoided; nor humans can be titrated like chemically in a lab. Emotions are always overriding and results can be easily manipulated by the investigators.

A researcher has to observe some ethics. Objectivity of data collection and true publication of results is foremost. If human beings are under study their prior and explicit permission must be taken. No body should be intimidated, bribed or exploited to get their consent. Animals should not be but to physical cruelty or mental harassment. Sources of data must be made to others when asked or questioned.

### 4.13 ANSWERS TO SELF CHECK EXERCISES

- 1) Experimental method is central to scientific method or positivist approach to discovery of knowledge. It is to study cause-effect relation between two entities (called variables) by direct observation and measurement under controlled conditions generally in a laboratory. It can also be carried out outside the laboratory also.
- 2) A hypothesis is a formal affirmative statement predicting a single research outcome, a tentative explanation of the relationship between two or more variables. Null hypothesis states a relationship between two variables where there is no significant difference between the experimental and control groups.
- 3) Literally it refers to logical soundness and consequent acceptability of an entity or research results. In experimental research it is of two types viz. internal and external validity. It refers to the accuracy of observation and measurement of the dependent variable only under the impact of independent variable. Internal validity is high when all the confounding variables are identified and kept under control. Laboratory research is high in internal validity as the independent variables can be controlled effectively while changes in the dependent variable can be measured minutely; and intervening variables can be kept under check. It refers to use generalisability of the results i.e. the degree of their universality. Laboratory experiments are low in external validity whereas field experiments are high in external validity.
- 4) Limitations of experimental method are in creating a control group. This is particularly true of social sciences where the population is human beings. Other limitation lies in validity of the observations in social sciences as human beings may not be observed exactly.

### 4.14 KEYWORDS

- Control Group** : Group/population/subjects not exposed to any treatment. It also forms independent variable.
- Experimental Group** : Group of population/subjects exposed to treatment and observation to measure the change. It is dependent variable.
- Empirical Knowledge** : Knowledge based on objective observation and experience as contrasted from intuitive or authority centered knowledge.
- Hypothesis** : A statement, based on an informed guess, predicting relations between two or more variables. Every experimental research starts with a hypothesis to prove or disprove it.
- Randomisation** : It is a statistical process of sample formation to ensure natural and representative membership in a sample of the whole population. Generalization of results depends much upon the randomization.

- Sample** : A representative population under study formed in case the field of research is too vast to be studied wholly.
- Validity** : A measure of accuracy of results and their generalization to other situations.

---

## 4.15 REFERENCES AND FURTHER READING

---

Best, John W. (1978). *Research in Education*. 3<sup>rd</sup> ed. New Delhi: Prentice-Hall of India. Pp. 1-17; 90-115.

Busha, Charles H. and Harter, Stephen P. (1980). *Research Methods in Librarianship: Techniques and Interpretation*. Orlando, N.Y.: Academic Press.

Goldhor, Herbert (1972). *An Introduction to Scientific Research in Librarianship*. Urbana Champaign, IL : University of Illinois Graduate School Library Science.

Gorman, G.E. and Clayton, Peter (1997). *Qualitative Research for Information Professionals: A Practical Handbook*. London: Library Association Publishing.

Krishan, Kumar (1992). *Research Methods in Library and Information Science*. New Delhi: Vikas Publishing House.

Lynch, Mary Jo (ed.) (1990). *Academic Libraries: Research Perspectives*. Chicago: ALA.

McClure, Charles R. and Harnon Peter (1991). *Library and Information Science Research: Perspectives and Strategies for Improvement*. Norwood, N.J.: Ablex Publishing.

Sharma, Pandey S.K. (1990). *Universe of Knowledge and Research Methodology*. Delhi: Ken Publications.

William, Kristy (2000). *Research Methods for Students and Professionals. Information Management System*. Wagga, NSW, Australia; Charles Strut University.

---

## UNIT 5 FUNDAMENTAL, APPLIED AND ACTION RESEARCH

---

### Structure

- 5.0 Objectives
- 5.1 Introduction
- 5.2 Scientific Method
- 5.3 S. R. Ranganathan's Spiral of Scientific Method
  - 5.3.1 Structure of the Spiral
  - 5.3.2 Working of the Spiral
- 5.4 Types of Research
  - 5.4.1 Basic Research
  - 5.4.2 Applied Research
  - 5.4.3 Action Research
- 5.5 Approaches to Research
  - 5.5.1 Descriptive Research
  - 5.5.2 Comparative Research
  - 5.5.3 Exploratory Research
  - 5.5.4 Diagnostic Research
  - 5.5.5 Social Research
- 5.6 Summary
- 5.7 Answers to Self Check Exercises
- 5.8 Keywords
- 5.9 References and Further Reading

---

### 5.0 OBJECTIVES

---

After reading this Unit you will know:

- the essentials of scientific methods of research;
- theory, terminology and working of the spiral of scientific method as proposed by S.R. Ranganathan;
- about the two main streams of research: basic and applied research;
- the definition, purpose and technique of action research;
- what is social (survey) research and what is its importance; and
- different approaches to some research methods, namely, descriptive, comparative, exploratory and diagnostic.

---

### 5.1 INTRODUCTION

---

This is a composite Unit to cover and explain different aspects and methods of research. These are some assorted topics not necessarily having any common thread running through them. Some methods, such as spiral of scientific method are purely theoretical while others such as action research come from other fields but have the possibility of their applications to library and information systems.

---

## 5.2 SCIENTIFIC METHOD

---

The term seems misleading as every objective and verifiable method to discover new knowledge is always scientific in nature. Any new knowledge is valid only if it is discovered by scientific method. Commonly it means the methods used by the (pure and applied) scientists in their research, laboratory work and writings. Essentially any method of objective research, which attempts to investigate cause-effect relations between two entities, is scientific one. Research methodology, if it does not use the scientific method is not research at all. It means the other methods of research namely, survey, descriptive, case study, historical and of course the experimental method, are essentially scientific methods. Methods of research in social sciences and humanities are also scientific. Commonsense but rational approach used by a layperson in solving day-to-day problems is research. This could be best-applied scientific method to life and society. That is why it is rightly said by a philosopher that every man is a scientist. A crime investigator getting clues from the crime sites coupled with circumstantial evidence can easily reach the criminals. So a systematically and rigorously organised objective method of observation and co-relation of cause-effect between two entities is a scientific method. It is a standardised procedure for generalisation of data to formulate theories or to solve a problem.

### Steps in Scientific Method

- Identification and formulation of the problem based on preliminary observations or data; or by doing an exhaustive literature survey on a topic.
- Formation of hypothesis, which requires lot of imagination and fertility of mind. (If it is a status or descriptive research then there is no need of any hypothesis).
- Collection of data, information or verbal opinions by any means (described in survey research)
- Collation, tabulation and classification of data and drawing of inferences in light of the general theory.
- Generalisation of facts and testing of hypothesis, and formulation of a further theory.

Objectivity or verifiability of the data or method is the rule of the game. Everything is transparent and open to questioning. The aim is to discover or create new knowledge, or to correct the existing facts or theories; or to generate a theory of cause-effect relation between two variables. Research may also be undertaken to generate information for decision making or solving a local problem. It may be warned that on the surface research, which seems a mechanical and straight process, in reality is complex, complicated and confusing requiring lot of hard work and ingenuity.

---

## 5.3 S.R. RANGANATHAN'S SPIRAL OF SCIENTIFIC METHOD

---

To demonstrate that librarianship is a science S.R. Ranganathan (1892-1972) in the second edition of his classic *Five laws of library science* (1957) added a chapter entitled "Spiral of Scientific Method" to silence or convince the skeptics of the scientific nature of library science discipline. It is an overview and visual presentation of the method of science, which he says, moves like a spiral. That is it moves clockwise in a circle yet keeps moving onto new places. It means science is always progressive scaling new heights and discovering new knowledge. It accounts for the continuous growth of knowledge.

### 5.3.1 Structure of the Spiral

Fundamental, Applied  
and Action Research

To show each sequential step and their movement the spiral is divided into four quadrants by two lines perpendicular to each other intersecting at the centre. This also results in four cardinal points.

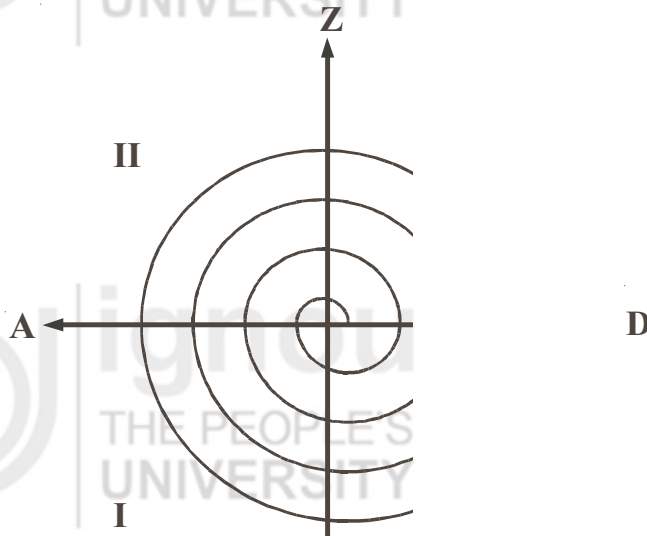


Fig. 5.1: Spiral of Scientific Method

- The spiral moves forward in clockwise direction.
- Lowest end of the vertical line is called nadir – literally means the lowest point.
- Upper end of the vertical line is called Zenith –the highest point.
- Left end of the horizontal line is called Ascendancy i.e., going upwards.
- Right end of the horizontal line is called descendent – means going downwards.

Four sections thus formed by the intersecting lines are called quadrants. First quadrant is on lower-left side (i.e. South-West). Moving clockwise this way the fourth quadrant is on the lower-right (i.e. South-East).

### 5.3.2 Working of the Spiral

At the nadir is the problem to be solved. In this first quadrant (called empirical phase) data is collected empirically and the problem may be refined further. Data may be collected by any means described in section 3.2 of the unit on descriptive research. In experimental method the data is collected by means of many meters, scopes and other instruments. Data may be qualitative or quantitative. In the second quadrant (called hypothesis phase) the data is collected, tabulated, classified and analysed. It is known as data processing. From the analysed data cause-effect inferences are drawn or state-of-the-art i.e. ground situation is assessed. Here hypothesis is drawn by using inductive logic and intuition. In the third quadrant (called deductive phase) laws are deduced with the help of deductive logic. The fourth quadrant is also known as the verification phase. Here the laws formulated in the third quadrant are tested and verified; and further some higher generalisation may be drawn. Statistical techniques may be used for verification and to support or disprove the hypothesis. Chart from Pandey S.K. Sharma is reproduced with certain modifications:

**Table 5.1: Ranganathan's Spiral** (Source: Sharma, 1990)

| Quadrant | Span/Situation      | Phase of Research | Method/Tool                                      |
|----------|---------------------|-------------------|--------------------------------------------------|
| I        | N – A<br>South-West | Empirical         | Experience and observation/<br>literature survey |
| II       | A-Z<br>North-West   | Hypothesizing     | Intuition & Imagination                          |
| III      | Z-D<br>North-East   | Deductive         | Intellection/ Logic/<br>Statistics               |
| IV       | D-N<br>South-East   | Verification      | Applications/ Mathematics                        |

The spiral is not anyhow to do it method but a highly generalised and overview of the research process as observed from a distance. This mostly pertains to research in a major discipline rather than to any individual research problem. In actual practice there cannot be clear dividing lines, as the researcher has to run to and fro many times during the lengthy and mazy process. This however proves that scientific method is equally applicable to social problems. This is to say that scientific method is objective transparent, replicable to solve problems by discovering new information than any specific area of application. Any knowledge discovered by this procedure is scientific. Librarians have successfully applied this method to create library and information science as proved by Pierce Butler in 1930s.

## 5.4 TYPES OF RESEARCH

Traditionally on the basis of immediate purpose research is of three types:

- Basic Research
- Applied Research
- Action Research

### 5.4.1 Basic Research

This is also known as pure, fundamental or even theoretical research. It is research for knowledge sake; aim is new knowledge irrespective of any use at the moment of discovery. There may not be any immediate need or application of the new knowledge thus produced; nor it is conducted for any immediate gain or problem solving. It may be done out of curiosity, or to build a theory. Greatest research experiments and expeditions fall in this category of research. Why the man went to moon? In our field the five laws of library science by S. R. Ranganathan were formulated as a theoretical research. It is mostly conducted in academic and related research centres.

### 5.4.2 Applied Research

Research conducted to solve any immediate problem of theory or practice at hand is known as applied research. It is of practical nature. Example are “Action research” “Case Studies”, “Clinical Research”, “Research and Development”, popularly known as R&D. Most of the research in industry, business, military and government departments is of applied or practical nature. For example,

- To design a system to record the receipt of periodicals and to automatically send reminders when due for more than a month.
- To diagnose the very low use of a certain collection in a library.
- To find solution to the decreasing space problems in libraries in 1960s.

Library and information management is a fertile field for applied research.

### ***Pure versus Applied Research***

Whatever be the motive or nature of research the demarcation between the two is superficial, illusory and temporary, if at all it is there. History of science shows that no fast line can be drawn between the two for a longer time. If knowledge is power as Francis Bacon (1561-1626) said long ago, then all knowledge is utilitarian. Both the basic and applied research employs the same methods and techniques.

Moreover experience has shown that only line between the two is of time. What today seems purely theoretical having no direct use (thus dubbed useless by some) may find many applications tomorrow. Look at the history of many discoveries and inventions. X-ray's discovery was accidental and had no use then; now its practical applications are in thousands in every walk of life. Telephone and movies were invented not out of any necessity but for curiosity, if not fun. Thomas Alva Edison could never have thought that invention of moving pictures will bring a revolution to influence the society, and a billion dollar film industry would be based on it. They are an integral part of our culture now. Even the most basic laws such as Newton's laws underpin all astronomical, aeronautical and space expeditions and research. Every research from laboratory ultimately reaches the industry later or sooner. At home we can say the same about the five laws of library science. In the words of Professor Pauline Atherton (Cochrane) these laws put knowledge to work. Every theory finds applications that is why it is paradoxically said that the theory is the most applied knowledge just as every action originates from the thinking in mind i.e. thought is the mother of all actions. Distinction is also hazy in the sense there is always an interaction and alteration of theory and practice. Many problems for theoretical research emerge from practical failures. Similarly a practical research may generate a new theory or modify the existing one. Whatever be its source knowledge is always utilitarian, ultimately.

### **Self Check Exercise**

- 1) Define the features of scientific method of research.
- 2) Explain the movement of research enquiry in the spiral of scientific method.

**Note:** i) Write your answers in the space given below.

- ii) Check your answers with the answers given at the end of the Unit.

.....

.....

.....

.....

### **5.4.3 Action Research**

Developed in 1930s in education, action research is a form of interpretive research to study human actions and social practices with the participation of the researcher. It is an applied research, which is focused on immediate application, not to develop any theory for general applications. Emphasis is on a local problem, which involves the researcher and takes the librarian to jointly seek and find a solution to a library problem. For example, the problem could be as simple as "How to improve upon the existing

circulation of periodicals among the research scientists in the research institution.” Its purpose for our field may be to improve library management and use; and ultimately to improve the skill of the librarian i.e. to change the ways to do things more effectively. It requires identification of practices that need change to meet the needs of the changing use pattern of libraries or meeting new demands of users and to take better decisions. Simply speaking it is common sense and good management, and not any genuine research.

It is applied research whose aim is to provide practical benefits to the client. The researcher is expected to do so methodologically, it is cyclic research to solve problems and generate new knowledge simultaneously. Majola J.H. Oosthaizen gives the following equation and diagram to show its nature:

Action research = Action + Research (knowledge generated). It is to bring out progressive and incremental improvement in practice as it goes through different cycle after cycle.

**Characteristics:** Action research is usually focussed on a single situation, say on a single library:

- It is carried out in a series of cycles one improving upon the previous.
- It is mostly reflective and audit like or evaluative.
- It is concerned with real practice to examine if the practice needs change.
- In each cycle a hypothesis is proposed, tested and next action is planned.
- Method is refined in each cycle by using different method of observation and interpretation.
- It involves many people such as informants, interpreters, planners, administrators and researchers – the list is not exhaustive. Therefore, it also requires communication skills and conflict management. Each cycle may use a different method. In such case the action research may take the following form:

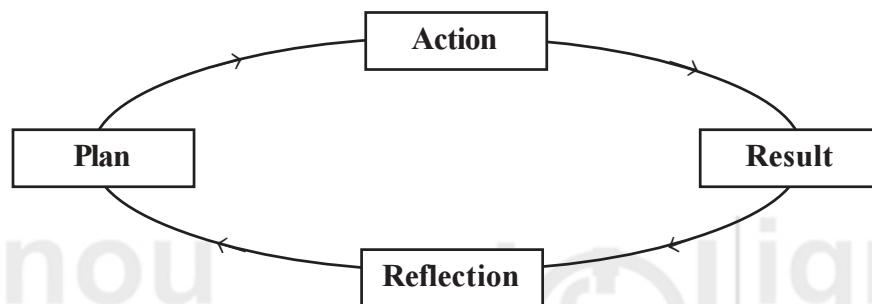


Fig. 5.1: The Cycle of Action Research

- It is like a heuristic method as the next action is based on the previous result. It is not any series of pre-planned methods as it happens in other types of research methods.

**Techniques:** Techniques used range from interviewing, Delphi, face to face dialogue, dialectics, evaluation and feedback analysis. It is a shared vision. To conclude, it is a methodology that is concerned with knowledge and improvement of human action to develop theory and solution in a cyclic manner based on practical experiences. There is no pre conceived plan or stable pattern as the next action emerges from the previous one.

### Self Check Exercise

3) Define action research and the technique it employs.

**Note:** i) Write your answer in the space given below.

ii) Check your answer with the answers given at the end of the Unit.

.....

.....

.....

.....

.....

.....

## 5.5 APPROACHES TO RESEARCH

Research approaches are research methods as distinguished from research techniques. Methods are: Descriptive, Comparative, Exploratory, Diagnostic, Experimental and Historical. These approaches to research are applicable in different situations depending upon the problem. In some cases a combination of two or more approaches may be used. In this section we will study the definition, nature techniques and application of these methods especially in library and information field.

### 5.5.1 Descriptive Research

It is a sort of survey research at a given time to study, understand and report the status of a current situation. In simple words it is concerned with answering the questions. What, Who, When and Where.

It is to collect data by simple or common sense techniques then collate and tabulate it. In a descriptive research hypothesis formation and testing may or may not be involved. In library science in India most of the research is of descriptive type, e.g.:

- A survey of reference service in children libraries in Tamil Nadu.
- A survey of the reading habits of housewives in Dakshin Karnataka.
- A survey of the information needs of geo-scientists in CSIR laboratories.

Its techniques are direct observation and measurement, or through a questionnaire, or interview. Its stages are:

- 1) Area of research is conceived broadly.
- 2) Literature research is done to know the work already done, problems being faced and to concisely formulate the problem.
- 3) What is to be surveyed is clearly demarcated.
- 4) Data is collected, collated, tabulated, and inferred.
- 5) Conclusion is drawn, and reporting is done.

The method is not as simple or straight as it looks.

### 5.5.2 Comparative Research

In essence it is another survey type of research describing two or more entities of the same nature, which are compared and contrasted in terms of certain predefined parameters. Motive may be to isolate best features and shortcomings of each entity under comparison.

The ultimate aim is to compare, contrast and design an idea, system or plan having the best available features after correcting the shortcoming of others. The comparison is mostly descriptive.

For comparison the two entities must belong to the same class. For example, we can make a comparative study of public libraries in two or more cities. Not much purpose will be served by comparing a public with an academic or industrial library. It will be absurd to compare classification with circulation.

**Uses and Limitations:** Comparative research is an applied research, which may lead to improvement of the existing systems under comparison, and may help create a model having best of both the worlds. Comparison leads to better understanding and acquaints you of different models and perspectives. In social life it helps to increase tolerance of other viewpoints or methods. Comparative religion has played a great role in social peace and harmony. In our field S.R. Ranganathan's classic Prolegomena to library classification (1967) makes a comparative study of some library classifications to propose an ideal theory of classification. Regarding limitations, it is often said that comparison are odious. Every entity exists in different environment, and its features may not work outside of that, no good drama could be created by comparing Bernard show with Shakespeare or for that reason even with Kalidas.

#### **Self Check Exercise**

4) Define comparative research and its uses in society.

**Note:** i) Write your answer in the space given below.

ii) Check your answer with the answers given at the end of the Unit.

.....  
.....  
.....  
.....

### **5.5.3 Exploratory Research**

Research cannot be done in one go as a single piece. Before a project is undertaken finally, it is always wise to explore the possibility of its successful conclusion. In many cases an idea or problem may initially strike as very interesting to pursue. But soon after starting, the researcher may feel struck due to many reasons as mentioned below:

- dearth of literature and other guiding sources;
- lack of data; and
- serious problem in quantifying or measuring data.

In such situations the researcher simply gropes in the dark. Formally or informally viability of the problem first conceived has to be explored. Exploration may be mental, silent or visible. It is matter of commonsense otherwise researcher may be plunging in the dark, and running the risk of wasting time and money. It is a safeguard against the future failure and frustration.

Before the use of scientific method it is essential to make an exploratory study of the situation. At this stage the researcher has absolute freedom to run his imagination wild, unchecked and move seemingly aimlessly. It is then to follow some seemingly gainful leads exercising ingenuity and some concrete evidence of leading the exploratory research

to some fruitful and tangible conclusion. Indeed, the researcher has to be very judicious. Apart from checking the viability, exploratory research provides more ideas, and alternative techniques. At that stage the problem may be modified. It thus helps to make the problem more concrete, concise and formally worded to finalise and proceed to the real investigation. That is why it is also known as formulative studies. It is to pave the way, see what is there than to predict. A research investigation is a constant process of reformation and alteration, a sort of heuristic approach, till one arrives at some problem for pursuit.

### **Steps**

**It should undergo the following steps:**

- 1) Preliminary review of literature;
- 2) Consulting colleagues and experts to make use of their experience and wisdom;
- 3) Let the problem brew or mature in mind for sometime;
- 4) Make some rudimentary studies by survey or experimental method and identify the variables;
- 5) Cultivate only insights into the hypotheses; do not test them or prove them; and
- 6) Delimit the area, if required.

Such steps may help researchers to follow and discard many ideas and problems which may not materialise in the long run. Negative power is a forceful aid to lead researchers to the right problem. It is important to consider that it is an initial step in a long and tedious research process. Exploratory research is simply to untangle and pave the way; or to map the way for future safe and uninterrupted travel to reach the destination without going astray or stumbling at roadblocks.

### **5.5.4 Diagnostic Research**

It is a fact-finding aspect of clinical practice. It represents the most typical and simple problem solving strategy. Its method includes screening to attain insights into the problem. It consists of the following phases:

- Emergence and identification of the problem;
- Diagnosis of its roots and causes;
- Formulation of possible ways to treat the problem; and
- Suggesting a possible solution.

**Data Collection:** Diagnosis can yield data in four major ways:

- 1) Case history or interviews;
- 2) Clinical observation;
- 3) Informal testing; and
- 4) Formal standardised testing.

**Case study/Interview:** Here the purpose is to understand the life cycle of an individual with focus on the problem and other life events that have influenced not only the individual but the whole family and previous generation. The unit of study may be a person, family, commune or an institution. Adequate data is required for clarifying, sorting and resolving controversial issues.

It requires a skillful but sensitive interview to elicit maximum data without offending the client.

**Clinical Observation:** It is observation of behavior by formal or informal methods. Diagnostic tests provide a microscopic view of the component of some areas of performance. Collected data is employed for causal thinking. By manipulating causes we can vary dependent variables. This method is mostly applied in psychology and other behavioural sciences. In library science it can be used to study the reading habits, bibliotherapy, and user behaviour in the library.

### **5.5.5 Social Research**

Social research or surveys are a kind of assessment and evaluation studies to gather data from a large number of cases at a particular time. It is not concerned with individuals as individual but as a part of a large whole. It is cross-sectional. Each statement in the survey portrays a prevailing condition at a given time. These are large or wholesale in nature; huge and vast in size. Purpose is to discover occurrence, distribution and interrelationships of sociological, economic or attitudinal variables in a large segment of population. The scope of surveys can be widened to include economic, religious, anthropological or habitual; or to study the distribution of economic activities. In analysing political, social or economic or consumer preferences or attitudes data is to draw a picture of the conditions prevailing or emerging at that time. It requires expert and careful planning, accurate analysis and imaginative interpretation of the huge mass of data.

Social survey has been made since the beginning of the last century. For example, Alfred Kinsey made two separate but comprehensive surveys of American male and female sexual behaviour of 12,000 respondents each time. These two reports are still considered classic surveys.

These surveys have now been extended to what are called opinion and exit polls to predict the results of general elections. In many cases these surveys make remarkably accurate prediction of the results. These have now also been extended to market and consumer surveys. Business houses now make a survey of consumer preferences regarding particular consumer goods before producing and launching them in the market. Such a type of research has contributed significantly in understanding social attitudes, preferences, traits opinions and composition of a community.

There is no reason these surveys cannot be extended to library surveys. Librarians conduct (social) surveys of the information needs of a particular professional segment of society. These include large-scale survey of libraries, their collection, client services, and technical procedures.

Reading habits of people are a joint field for surveys by librarians, educationist, and literacy experts.

### **Method**

Social research can be conducted by personal interviews, door-to-door surveys, and oral opinions or by mailed (electronic or postal) questionnaires. These are quite extensive and expensive. Even a small error in sampling may lead to wrong results thus making a negative impact. These require astute planning careful conducting, accurate processing and imaginative interpretations. For this purpose, apart from the researchers you need a very informed and aware population of respondents who understand the question

and their responsibility for correct answer.

### Self Check Exercise

- 5) Write brief notes on Diagnostic method of Research.
- 6) What are social surveys; how these can be applied to library studies?

**Note:** i) Write your answers in the space given below.  
ii) Check your answers with the answers given at the end of the Unit.

.....

.....

.....

.....

.....

.....

## 5.6 SUMMARY

In this unit we studied that scientific method is any objective, transparent and repeatable method to discover new knowledge. Every research is essentially scientific. S.R. Ranganathan's spiral of scientific method is a visual picture of the four phases of research, namely, Empirical (data collection) Hypothesising (Inductive logic), Deductive (Deduction of laws) and Verification (Testing of results). Basic research is to discover laws or for simply new addition to knowledge. Applied research is for immediate problem solving. But ultimately distinction is temporary and not real. Every pure or basic research after some time becomes practical. And quite often some theory or laws emerge from practical or applied research. Action research is a sort of applied research to improve prevailing practices. It is conducted jointly by the researcher and the practitioner. Descriptive research is a survey and spatial description of an entity or situation. Comparative method is again descriptive of two or more entities of similar nature to discover their similarities and differences. Aim may be to produce a model. Exploratory research is a preliminary or rudimentary work to gauge and study the viability and pre-test the successful conclusion of research. Diagnostic research is mostly of clinical nature to find facts and to know the root causes of a problem. Social research means longitudinal surveys of a large social segment to study conditions, habits, preferences, attitudes and opinions. Social research can contribute significantly in planning and policy making. It is also useful for market surveys and opinion polls.

## 5.7 ANSWERS TO SELF CHECK EXERCISES

- 1) Scientific method of research is basic to any research. It implies that research follows a systematic and organised approach to conducting research. Data collection is done to establish relations between variables and explain the cause and effect relation. It is further generalised to develop theories.
- 2) The Spiral of Scientific method is divided into four quadrants. The lowest point is called nadir where lies the problem to be solved. In the first quadrant, data collection is done followed by classification, tabulation and analysis of data in the second quadrant. The cause- effect relations are established in the second quadrant and hypotheses are drawn using inductive logic. In the third quadrant deductive logic is

used to formulate laws. These laws are verified in the fourth quadrant and further generalizations are done.

- 3) Action research is applied research done to immediately improve upon an existing situation. Mathematically stated, action research = action + research (knowledge generated). It is useful for libraries where research needs to be done to improve upon the existing services for the benefit of users.
- 4) Comparative research is a survey research comparing two entities, phenomena, or processes with a view two design and provides a new one having the best features of the two compared. In social life, it helps to create an understanding of different viewpoints. Comparative religion is one of the examples that have helped to create an understanding and respect towards different religions.
- 5) Diagnostic research is a problem solving study involving pinpointing the reasons for the problem and suggesting solutions for the same. The steps involved in it are:
  - 1) Emergence and identification of the problem.
  - 2) Diagnosis of its roots and causes.
  - 3) Formulation of possible ways to treat the problem.
  - 4) Suggesting a possible solution.
- 6) Social surveys are descriptive cross- sectional studies done to know the present status of the different aspects of the society. These may cover sociological, economic, political, religious, anthropological, or attitudinal aspects. These may be done in libraries also to present, and evaluate the status of libraries. It may be with regard to the collection, services, staff, or users, etc.

---

## **5.8 KEYWORDS**

---

|                             |   |                                                                                                                                                                                  |
|-----------------------------|---|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Action Research</b>      | : | A type of practical and collaborative research to improve a method of practice.                                                                                                  |
| <b>Applied Research</b>     | : | Distinguished from basic or pure research, any research undertaken to solve immediate or practical problems.                                                                     |
| <b>Basic Research</b>       | : | Distinguished from applied research, any research undertaken purely for sake of knowledge without any immediate gain or use.                                                     |
| <b>Comparative Research</b> | : | A type of descriptive research to compare two or more similar entities to highlight similarities and differences. Ultimate utility may be to prepare a model with best features. |
| <b>Data Processing</b>      | : | The act of collating, tabulating, classifying and drawing inferences from the gathered data.                                                                                     |
| <b>Descriptive Research</b> | : | A spatial survey of an entity or a family of entities to study the existing status and state-of-the art.                                                                         |
| <b>Diagnostic Research</b>  | : | A type of clinical method to investigate the root causes of a problem.                                                                                                           |
| <b>Exploratory Research</b> | : | A rudimentary or preliminary work to study the viability of the research problem for its successful                                                                              |

completion and useful results.

**Fundamental, Applied  
and Action Research**

**Nadir** : The lowest point on the spiral of scientific method where the problem for research is identified and formally formulated.

**Quadrant** : One of the four equal sectors or areas into which the spiral of scientific method is divided. There are in all four quadrants produced by two intersecting lines drawn through the centre of the spiral. In each quadrant an important phase of research is completed.

**Scientific Method** : Any objective, transparent and repeatable method based on direct and systematic observation of phenomena to study cause-effect relation between two or more variables.

**Social Research** : Large scale social surveys from a large number of cases to discover the distribution and interrelationships of social and attitudinal variables.

**Spiral of Scientific Method** : A visual path of the research process through its various phases starting from data collection to formulation of theory.

**Zenith** : Highest point in the spiral of scientific method.

---

## **5.9 REFERENCES AND FURTHER READING**

---

Best, John W. (1978). *Research in Education*, 3<sup>rd</sup> ed. New Delhi: Prentice-Hall of India. Pp.119-121.

Krishan Kumar (1992). *Research Methods in Library and Information Science*. New Delhi: Vikas. Pp. 90-105.

Kumar, P.S.G. (2004). *Research Methods and Statistical Techniques*. Delhi: B.R. Publishing. Pp. 243-249.

Sharma, Pandey S.K. (1990). *Universe of Knowledge and Research Methodology*. Delhi: Ken Publications. Pp.109-121.

Williamson, Kirsty. (2000). *Research Methods for Students and Professionals: Information Management and Systems*. Wagga Wagga, NSW, (Australia): Charles Sturt University. Pp.141-158.