

10.0 : Objectives

After reading this Unit you will understand:

- the various components of user studies;
- why such studies are conducted;
- how to conduct such studies; and

the importance of these studies in the field of informetrics and scientometrics

10.1 : Introduction

Of the Five Laws of Library Science enunciated by Ranganathan the second, third and the fourth laws, respectively are 'Every Reader his book', 'Every book its reader' and 'Save the time of the reader'. Readers are users of the library. Three laws out of five devoted to reader clearly underline the importance of users in library and information services. They are equally important in the field of scientometric and informetrics as well. Hence, user studies form an important area in informetric and scientometrics in as much as these studies generate important indicators as to the types of documents users use heavily, moderately or scarcely; the various types of services they need, and the urgency with which they need these services; the reasons why particular documents and services available in the library are not being used optimally; the satisfaction level of the users; and so on. User studies also bring into the focus the various categories of users of a particular library or information centre.

10.2 : User Studies

User studies are basically concerned with the users. Analysing the results of these studies we come to know about the extent of use of the various types of documents and services. In the **use studies** we are mainly concerned with the use of the documents and services and not with the users. For example, conducting citation studies we find out the extent of use of the various types of documents knowing little about the types of users making use of those documents.

10.2.1 : Definition

User - In LIS parlance, a user is a person who makes use of documents or services of a library or information centre. For example, in a university library, the users are students, faculty members, administrative and other staff. In a scientific library, mostly scientists are the users.

Study - Here, study means a thorough examination of a subject conducting surveys, examinations, and so on.

User Study - Now, combining the two definitions given above we derive the definition of user study as follows. It is the thorough examination of the users of a library or information centre in terms of their types, the categories of documents and services they use, the urgency with which they need the documents and services, etc., using one or more of the approved methods

10.2.2 : Purpose

The purpose of user studies are:

- i) to identify the various types of users of a particular library or information centre;
- ii) to identify the types of users of an information service or product;
- iii) to identify the types of documents used heavily, moderately or scarcely and the reasons thereof;
- iv) to identify information services and products not at all being used and the reasons thereof;
- v) to measure the satisfaction level of the users;
- vi) to detect the strengths and weaknesses of various collections;
- vii) to frame the collection development policy based on facts; and
- viii) to develop the collection in a scientific way.

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10.3 : Methodology

Various methods are employed to conduct user studies. Some of the well-known methods are: Questionnaire method, Interview method, Dairy method, Observation method, and Library record analysis. We shall now briefly discuss these methods one by one.

10.3.1 : Questionnaire Method

This particular method is most heavily used to elicit required information from the users because of several advantages. The questionnaire can comprise both close-ended and open-ended questions. In the close-ended questions, the respondents are simply to tick the most appropriate item recorded in the questionnaire.

For example, a close-ended question may be like this:

How often do you use the library?

Everyday Quite Often
Sometimes Never

In this question the respondent will tick the item that is most appropriate *for* him. An open-ended question may be like this:

Are you satisfied with the services being provided by the library? If not, give reasons.

Here, the respondent will describe in his own words the reasons for his dissatisfaction. This method can encompass a huge number of respondents spread over a wide area, such as a state, country, region or even the world. The questionnaire can be distributed using e- mail or postal services. The reminder can also be sent using the same mode. In most cases, there is no need for the investigator to personally meet or talk to the respondent. These factors

reduce the cost of eliciting answers very heavily. Moreover, this method helps a respondent to fill in the questionnaire at leisure and express his opinion freely, which he may not do in a face-to-face interview for some reasons or the other. One of the major disadvantages of the method is the response rate, which at times may be as low as 30% and the data may not reflect the actual state of affairs. If this problem can be overcome, then this is really a very good method for data collection.

10.3.2 : Interview Method

This particular method of data collection is very useful where the respondents are by and large local and can be approached easily either through personal visit or through telephone. Take, for example, a school or a college library. In this case all the respondents forming the sample are available within the campus. The investigator can approach all of them, make appointments, and can interview one by one

The interview can be taken in any one of the four styles described below.

Structured - In this, the questions and the answer categories are determined in advance by the investigator.

Standard open-ended - In this, the questions are decided in advance by the investigator but the respondent may answer the questions in his/her own way.

Interview guide approach - In this, the topics to be discussed and the time of meeting are decided first by the investigator in consultation with the respondent. During the meeting, the investigator questions the respondent in his own way and the latter replies also in his own way.

Unstructured - In this, except the topic, nothing else is fixed. This method ensures very high response rate in as much as the investigator can meet the respondent personally and elicit the required information through interview. The accuracy of the replies is also high as the respondent can seek clarification on any of the questions

10.3.3 : Diary Method

In this case the investigator requests the users of a library to record in his diary all such activities as are related to the study being conducted. The user is to record each activity he performs during each of his/her visits to the library during a fixed span of time, which may be one week or more. For example, a scientist may be asked to record the titles of the journals, books and other documents he/she had consulted in the library over a certain period of time. After the period is over, all the diaries are collected and the data recorded are checked. If necessary clarification may be sought from the respondent, and finally the data are analyzed to generate various indicators

10.3.4 : Observation Method

Scientists have for long used this method for, the collection of data. Nowadays, this method is widely used in Social Sciences and other fields as well.

Usually, four types of observation are undertaken by investigators. They are: i) Participant observation, ii) Non-participant observation, iii) Non-controlled observation, and iv) Controlled observation.

Participant observation - In participant observation, the observer actively participates with the activities of the group under study without making other members know that their activities are being closely observed by someone. This makes the members act freely and all their activities can be watched under natural condition.

Non-participant observation - In this case, the observer does not take part in the activities of the group and simply observes them from a distance. Absolute non-participant observation is not desirable as it makes both the

parties uncomfortable. Hence, the observer keeps himself busy with some activities of the group and keeps watch on the activities of other members.

Non-controlled observation - Here, observations are made in natural surroundings, and the activities are performed without being influenced and guided by any external force. In this case, the observer visits the place of the occurrence of the phenomenon to study the situation. The method has a few drawbacks such as that the observer may be biased, he may generalize the situation from a few stray incidents; interpret the data based on his/her limited knowledge, etc. For example, an audit party while visiting a technical library observed twelve copies of a book lying on the shelf and raised an audit objection as to why so many copies of the book were purchased leading to unnecessary wastage of public money. The fact was that the institute to which the library was attached was conducting several short-term courses in a year on the subject treated in the book, and each participant to the course was given a copy to enable him/her follow the lectures properly. The books used to be kept on the shelf when there was no course. Of course, such cases of wrong interpretation are not many. If the observer gets the data verified, the cases of wrong interpretation will be much less.

Controlled observation - To overcome the limitations of the non-controlled observation, controlled observation technique has been devised. In this case, control is exercised on the phenomenon as well as on the observation. For example, in the children's section of a library, the behaviour of the same set of children may be observed for days together to study their reading habit. The phenomenon can be observed by a teacher, a student, or by an electronic device like video camera. This technique affords greater precision and objectivity, and can be carried out time and again under similar conditions.

10.3.5 : Library Records Analysis

Many libraries maintain records relating to the acquisition of books, periodicals, and other documents; circulation of books; inter-library loan; document delivery; queries handled; and so on. Analysis of these records may provide many useful indicators, such as, the rate of growth of the collection; subject-wise growth of the collection; heavily used books and periodicals; strong collection; weak collection; and so on. This method cannot take into account the use of books and other materials within the library premises as they are not getting issued, and hence there is no record.

10.4 : Planning a Survey

Planning is one of the most important factors in conducting a survey. If planning is correctly done, the objectives of the survey can be achieved to a very great extent. Bad planning sometimes vitiates from achieving basic objectives of the study.

10.4.1 : Basic objectives of the Survey

The first step in planning the survey is the defining of the basic objectives in clear terms. Once this is done, deciding the methodology for the survey becomes easier. Moreover, the persons who will be involved in the survey, i.e., the staff and the respondents, may be informed about the objectives for seeking their cooperation. Suppose, the objective of your survey is the determination of the users' needs, then this can be communicated to the users as well as the staff who will be involved in the survey.

10.4.2 : Scope of the Survey

The next step is to determine the scope. Defining the scope will include apart from the users, the place, time, types of documents and services, etc. There are various categories of users in a library. In a college library, there are teachers, students; and the administrative staff. All may be users. Are you going to consider all the users, or only a

particular category or categories for your study? You may consider teachers, students, or both. The next point to consider is the place. It can include the entire country, a state, district, city, or simply the campus of the institution. The third point is the time. You can observe the use of books by students for a week, a fortnight, a month, or for a longer period. The next point is the type of documents. You may consider in your study only the use of books or periodicals or both. Non-book materials can also be the focus of your study. Service is another factor to consider. You can include in the survey the Internet facility provided to find out the extent of its use.

10.4.3 : Methodology for Data Collection

There are several methods for data collection and one that suits the purpose should be selected. Two or more methods may be combined, if necessary. For example, the interview method may be combined with the questionnaire method. Let us say that taking into consideration the cost, labour, pace and extensiveness of data collection, you have opted for the questionnaire method for surveying the needs of the students and teachers of a college library. There are distinctly two categories of users here. Hence, two different questionnaires are required. One combined questionnaire may also serve the purpose, but it may be lengthy and there may be questions which may be asked from one group but not the other and vice versa. Now, let us see how the two questionnaires can be framed.

10.4.4 : Framing of the Questionnaire

As this is a user study, the questionnaire should start with such personal details as Name, Age, Sex, Designation, Class/Year (applicable for a student), present address, permanent address, etc. In use studies such details are usually not required. Sometimes the name of the person may not be asked for if frank expression of opinion is sought.

A user of a library usually needs books, periodicals, and other documents, and services, such as, photocopies of documents, assistance in consulting the catalogue, guidance relating to the location of various collections in the library, career guidance, etc. With the advent of computers, many libraries have computerized their catalogues and got the Internet connection. As such the need for assistance in the use of computerized catalogue as well as the Internet facility has become much more obvious. These are some of the expressed needs. There may be some implied needs. For example, there may be shortage of space in the reading room or quite often there may be long queues at the circulation counter. Every user needs a comfortable seat in the library for reference and study without any disturbance. He/ she also would want a book to be issued with the least delay. In user studies we may also wish to find out as to what extent the needs of users are satisfied.

With these points in mind, the questionnaire for students may be framed as shown below.

QUESTIONNAIRE

Note: This questionnaire is being used to ascertain your actual need as to the use of the library. Please fill in the questionnaire without any hesitation so that we can know your difficulties and problems in the use of the library. Once we know your problems and difficulties, we can try to solve them and make this library really useful for you. All your opinions are welcome and will be kept confidential. Writing of name or signing on the questionnaire is optional. In a multiple-choice question, please tick the item that is most appropriate in your opinion

- 1) Name (optional)
- 2) (a) Age (b) Sex...Male/Female
- 3) In which Class/ Year are you studying?
- 4) (a) Which Course of Study you are pursuing ...Arts/Science/Commerce
(b) Pass/Honours
- 5) Present address

6) Permanent address

7) Do you use the library for books? Yes/No

8) If yes, do you use them in the library? Yes/No

9) Are you permitted to borrow the books for home reading? Yes/No 9).

10) If yes, how many books can you borrow at a time?

11) Is the number of books allowed to be borrowed at a time sufficient? Yes/No

12) If no, how many books would you like to borrow at a time? Please specify.....

13) For how many days can you retain a book with you?

14) Is the period sufficient? Yes/No

15) If no, for how many days do you want to retain a book with you? Please specify.....

16) Do you get the book easily? Yes/No If no, state reasons

.....
.....

17) Apart from textbooks, do you use other type of books, e.g. dictionaries, encyclopedias, fiction, essays, poems, short stories? Yes/No

18) If yes, please specify.

19) How often you do not get the required book at all? Please specify.....

20) Do you read periodicals? Yes/No

21) If yes, please name the periodicals you read most.

.....
.....

22) Do you want some more magazines to be added in the collection? Yes/No

23) If yes, name the magazines.

.....
.....

23) Do you read newspapers? Yes/No

24) If yes, please name the newspapers you read most

.....
.....

25) Do you read any other type of documents? Yes/No

26) If yes, please specify the types of documents you use.

.....
.....
27) Does your library provide inter-library loan service for students? Yes/No

28) If no, do you feel such service will be helpful to you? Yes/No

29) Does your library provide photocopy service? Yes/No

30) If no, do you feel such service is necessary for you? Yes/No

31) Do you need sometimes the assistance of the library staff in the consultation of the catalogue? Yes/No

32) If yes, do you get the assistance easily? Yes/No

33) If no, state the reasons

.....
.....
34) Do you know the locations of each and every collection in your library? Yes/No

35) If no, please state how do you locate the collection?

- By trial and error method
- With the help of a friend
- With the help of a library staff

36) Does your library provide career guidance? Yes/No

37) If no, do you think such a service will be very helpful to you? Yes/No

38) If you fail to locate a document in the library, or a piece of information in a document, does the library staff help you? Yes/No

39) If no, do you feel such a help is very essential? Yes/No

40) Are you aware of usefulness of Internet for your study? Yes/No

41) If yes, do you feel installation of Internet facility in your library will be highly useful for you? Yes/No

42) How often do you visit the library?

- Everyday
- Several times a week
- Several times a fortnight
- Several times a month
- Rarely

43) Do you get a comfortable seat in the reading room whenever you visit the library? Yes/No

44) If no, how long you are to wait to get a seat?

- Less than 15 minutes
- More than 15 minutes
- More than half an hour

45) How long does it take to get a book issued?

- Less than 15 minutes
- More than 15 minutes
- More than-half an hour

46) State the level of your satisfaction as to your use of the library

- Fully satisfied
- Highly satisfied
- Satisfied
- Moderately satisfied
- Not satisfied

The questionnaire can be used for teachers as well by making some changes in the personal details and questions relating to some more services such as bibliography compilation, current awareness service, selective dissemination of information service, etc.

10.4.5 : Testing of the Questionnaire

The above questionnaire for college students before distributing copies to the students for eliciting answers it is necessary to test the questionnaire to ensure that; (i) the students understand every question clearly, (ii) no relevant question has been left out, (iii) and the questionnaire is not very lengthy. The investigator may also observe the time taken by the test students to complete the questionnaire, so as to work out the average time needed to fill in the questionnaire.

The steps for the testing of the Questionnaire are as follows:

- 1) **Selection of the Sample** - The sample of respondents of various categories should be more or less of the same proportion as of the original. Suppose, it is decided to take forty students from each class pursuing Pass Course and twenty students from each class pursuing Honours Course for your survey. In that case, if ten students are selected from each class of the Pass Courses, then five students from each class of the Honours Courses should be selected to maintain the same proportion.
- 2) **Distribution of the Questionnaire** - The distribution of the Questionnaire to the sample (population) may be preceded by a brief talk explaining them the purpose. The respondents comprising the sample should be encouraged to ask for clarification if they did not understand any particular question.
- 3) **Checking the Time Required to Fill in the Questionnaire** The time should be reckoned from the distribution of the questionnaire to the receipt of the last filled-in questionnaire. From this an approximate idea can be had of the time required for filling in the questionnaire. If a questionnaire is too lengthy and requires substantial time to fill in, respondents will not be interested to fill in the questionnaire.
- 4) **Checking the Filled-in Questionnaire** - All the filled-in questionnaires should be checked to see whether the respondents have understood each question correctly. If several respondents answered the same question wrongly, then the question should be checked and ambiguity, if any, should be removed. If there is an uncommon word or term in the question, it should be replaced with a common one.

There may be some questions left out completely unanswered. If these questions are consistently toward the end of the questionnaire, then it may be reasonable to conclude that it was due to lack of time. If this is not the case, then the reasons should be found out and the questions should be modified.

Finalization of the Questionnaire - Taking all the factors into account, the questionnaire should be finalized and the required number of copies made for the distribution to the sample population of students.

10.4.6 : Selection of Sample

In a college library, the teachers and students as they are the main users of the library. If the number of teachers is not very large, say, below fifty then all the teachers can form the sample. Usually, the number of students in a college is large. Hence, only a part of the students from each class is to be chosen for the survey. Suppose, there are fifty students in a class and only ten are to be chosen in such a way that different categories are included in that. One can start from the left, and select every fifth student, and that will form the sample. Instead of left, one can start from the right, or from the end, and so on. This type of sampling is called stratified sampling and is useful where the population is heterogeneous.

In sampling, the size of the sample is of paramount importance. If the sample is very large, conducting the survey becomes time consuming, laborious, and costly. It is not the case that with a very large sample, you get better results. The larger the population, the smaller can be the sample in terms of proportion. For example if the population size is 100, you can have forty or fifty respondents in your sample. If the population size is 10,000 you can take just 500 (that is, 5 per cent) respondent for the sample, and that will be adequate

10.4.7 : Distribution of the Questionnaires

If the respondents are located within easily accessible distance, the questionnaire; can be distributed personally or through a courier. If they are dispersed over a wide area, say , a district, state, or a country, then one may have to utilize postal services. It may even be possible for the students to access the questionnaire via a network connection - intranet or the Internet. Always, indicate at the beginning of the questionnaire and/or the covering letter a deadline by which the questionnaire is to be returned. Two-weeks or one month time may be given to return the questionnaire

10.4.8 : Receipt of the Questionnaires

If the respondents are located nearby, follow up operation can start just after the expiry of a week. The respondents may be phoned up or personally met to request the return of the questionnaire at an early date. In the case of mailed questionnaires, the respondents may be reminded fifteen days before the deadline. If the number of returns is less than thirty per cent, vigorous efforts are called for to get more returns, otherwise the data may not be sufficient to project the correct scenario.

10.6 : Analysis of Data

Data can be analyzed in a number of ways. If we collect data using the Questionnaire given above taking college students as sample, then we shall be able to analyse the data in the following ways:

1. According to Age

We can use the data to determine the average age of the students of the first year, second year and third year. We can also have a breakdown according to sex (male, female) and also according to the course of study, i.e. BA,

2. According to Course of Study

Using this data, we can find out the number of students in each course, i.e. BA (Pass Course), BA (Honours Course), etc. and can have the breakdown according to sex.

3. According to Place of Residence

Using the present address, it is possible to find out how many students are residing in hostels, and how many are coming from outside. We can also have a breakup according to courses of study and sex. Using the permanent address, data can be generated as to the number of students coming from various states, and from within the city and the state, we can also have a breakup according to courses of study and sex.

4. Use of Books

Analysis of this data will give us information as to ;

- i) the use of the library for books by students with male, female and course-wise breakup,
- ii) the number of books,;, student can borrow and the number of days the books can be retained,
- iii) whether the number of books allowed to be borrowed, and the number of days they are allowed to be retained is sufficient,
- iv) the type of books the students normally use,
- v) and the frequency of not getting a book.

5) Use of Other Documents

This data yields information as to the use of periodicals, and other documents by students with sex-wise and course-wise breakup.

6) Library Services

Analysis of this data will indicate the types of services such as lending, inter-library loan, photocopy, reference, career guidance, and Internet services being provided by the library, and whether the students need such services.

7) Reading Room

Whether or not a student gets a comfortable seat in the Reading Room easily can be ascertained from the analysis.

8) Waiting Time to Borrow a Document

Long queues at the Issue Counter eats away valuable time of a student. How quickly a student can get a book issued can also be ascertained through the analysis.

9) Satisfaction

Indicators as to the satisfaction of a student with the library service can be generated using this data.

The results of the survey are described in words accompanied by tables and diagrams. The text provides the summary of the results, the tables the detailed data, and the diagrams make the presentation attractive, easily understandable. We discuss here the tabular and the graphical presentations.

10.7.1 : Tabular Presentation

The tabular form is the most common form of presentation of results. The tabular form presents data of a survey which is not usually available in other forms. For example, in Table 3, you get the exact number of students in each course which one may not get from bar charts or pie diagrams. However, attention should be paid to the following basic qualities of a good table.

- 1) **Attractiveness:** In the table, the title, captions, stubs, figures, etc. should be cleanly typed with proper spacing of each cell. Use of gridlines for columns and rows increases the legibility of the table and adds to its elegance. To the extent possible, a table should be simple, and devoid of over-writings and hand-written corrections.
- 2) **Size:** A table should be of manageable size, and this point should always be borne in mind. The number of columns and rows in a table should be just adequate. How the size of a table may be reduced. Here are some guidelines:

Suppose, a study shows that the users of a Science library have used one thousand periodicals during the period of a survey with the frequency ranging from one to more than a hundred. If the frequency of use of every periodical is to be shown, the table will require one thousand rows, occupying about 20 pages in a journal. This is unacceptable. There may be some 30 periodicals whose frequency of use may be more than ten. Show them all in the table. For the rest, just mention the number of periodicals against a given frequency. An example is given below.

Table 5: Ranked List of Periodicals Used in Ramkrishna Science Centre Library during March 2000

Rank	Name of the Periodical	Frequency of Use
1	*****	123
2	*****	115
3	*****	107
4	*****	101
5	*****	88
6	*****	73
7	*****	67
8	*****	54
9	*****	48
10	*****	33
11	*****	27
12	*****	21
13	*****	19
14	*****	16
15	*****	14
16	*****	14

17	*****	13
18	*****	13
19	*****	12
20	*****	12
21	*****	12
22	*****	1 ₁
23	*****	11
24	*****	11
25	*****	11
26	*****	10
27	*****	10
28	*****	10
29	*****	10
30	*****	10
31-49	19 periodicals	9
50 - 87	38 periodicals	8
88-140	53 periodicals	7
141 -210	70 periodicals	6
211-308	98 periodicals	5
309-441	133 periodicals	4
442-593	152 periodicals	3
594 - 769	176 periodicals	2
770-1000	231 periodicals	1

- 3) **Comparability:** Comparability is an important feature of a table. To ensure comparability, the data in the table should be placed in such a way that they are easily comparable. For example, in Table 3, we can easily compare the number of Pass Course students with the number of Honours Course students in : i) each course in one year or, ii) year by year. We can also compare the same course by course. The number of Pass Course or Honours Course students only year by year or course by course can also be compared easily.
- 4) **Clarity:** In most cases the target users of the tables are laymen though they are prepared by the expert statisticians. Hence, the content of the table should be understandable to a layman.
- 5) **Suitable for the Purpose:** The table should serve the purpose for which it has been prepared. It should neither include anything redundant, nor miss anything relevant.
- 6) **Correctness of Data:** All the data given in the table including the totals should be correct in all respects. In case, there is doubt about the correctness of some data, footnotes to that effect should be provided.
- 7) **Construction:** It is to be constructed in a scientific way as discussed here.

10.7.2 : Graphical Presentation

Data can be presented graphically in a number of ways. Some are mentioned below:

- 1) Unidimensional Diagrams:
 - i) Line diagram
 - ii) Simple Bar Diagram
 - iii) Multiple Bar Diagram
 - iv) Subdivided Bar Diagram
 - v) Deviation Bar Diagram
 - vi) Sliding Bar Diagram
 - vii) Pyramid Diagram
- 2) Two-dimensional or Area Diagrams:
 - i) Rectangles
 - ii) Squares
 - iii) Circles
 - iv) Pie
- 3) Three-dimensional or Volume Diagrams:
 - i) Cubes
 - ii) Cuboids
 - iii) Cylinder Blocks
 - iv) Pyramids

As there are various parts of a table, similarly there are various parts of a diagram. Every diagram should be numbered and given a title. In research papers and many books, the number and the title appear below the diagram. To indicate a diagram, usually we use the abbreviation Fig. before the number such as Fig. 1 - Growth of Student Population of Ramlal College during 1990's.

Some of the basic qualities of a diagram are as follows:

- 1) A diagram should be neat, well-proportioned, attractive, and pleasing to the eye.
- 2) It should be accurate from the geometrical point of view. Suppose, the student population of Ramlal College is double compared to that of the Shyamlal College. If the student population is being represented by bars, then the size of the bar of Ramlal College should be exactly double the size of the bar of the Shyamlal College.
- 3) The size of the diagram should be decided keeping in view the size of the page and easy readability. It should neither be too big nor too small.
- 4) As there are many types of diagrams, the selection of the right type of diagram is important for presenting given data.
- 5) The diagrams may be vertical or horizontal. However, vertical diagrams are preferred as they are easy to follow.
- 6) The diagram must include the tags, and the scales so that the actual figures may be derived from them.
- 7) Unlike tables, we use various colours in diagrams to make it more attractive and easily understandable.

8) To extent possible, a diagram should be simple. Too much detail that complicate the comprehensibility of a diagram should be avoided. A diagram may be split to make it simpler.

Unidimensional Diagrams

- 1) **Line Diagram:** In a line diagram, only lines are drawn to represent the data. The lines may be vertical or horizontal. Compared to bars, lines occupy much less space. When the data to be presented within the bounds of a page is large, the line diagram is preferred to the bar diagram. The line diagrams given at 1B and IC are finding greater acceptance than the one at Fig. IA with the advent of software packages like Excel, SPSS, etc.

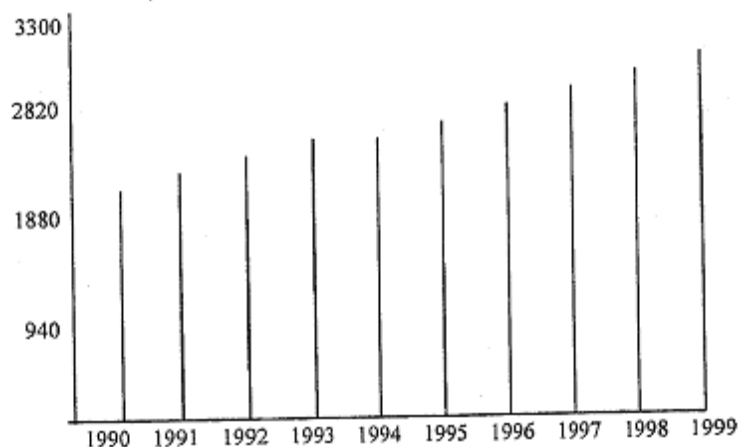
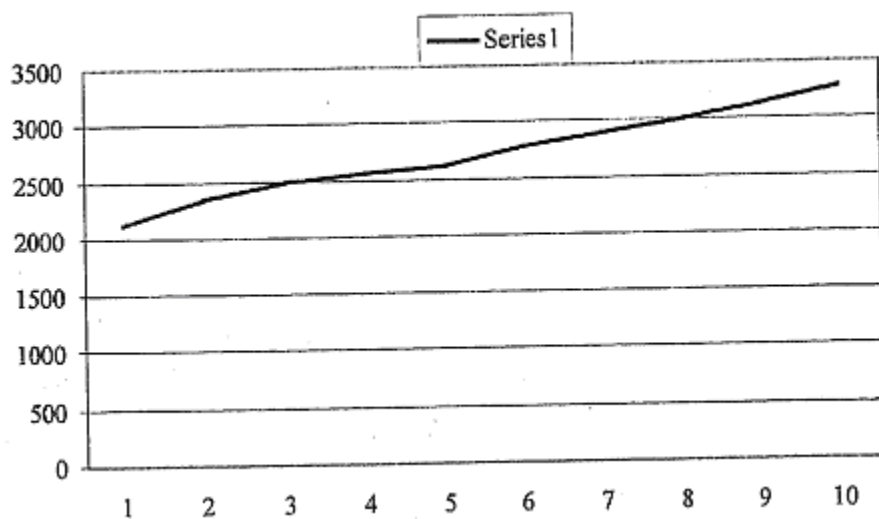
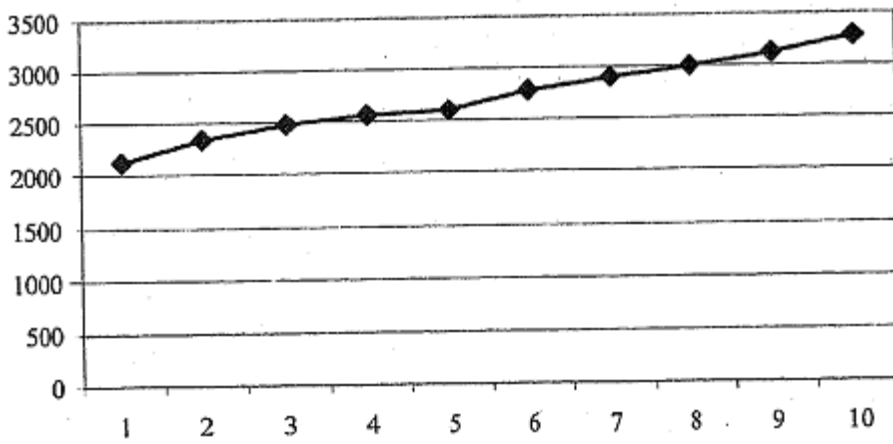


Fig. 1A: Growth of Student Population of Ramlal College during 1990's



1 to 10 in the diagram represent years 1990 to 1999 respectively

Fig. 1B: Growth of Student Population of Randal College during 1990's

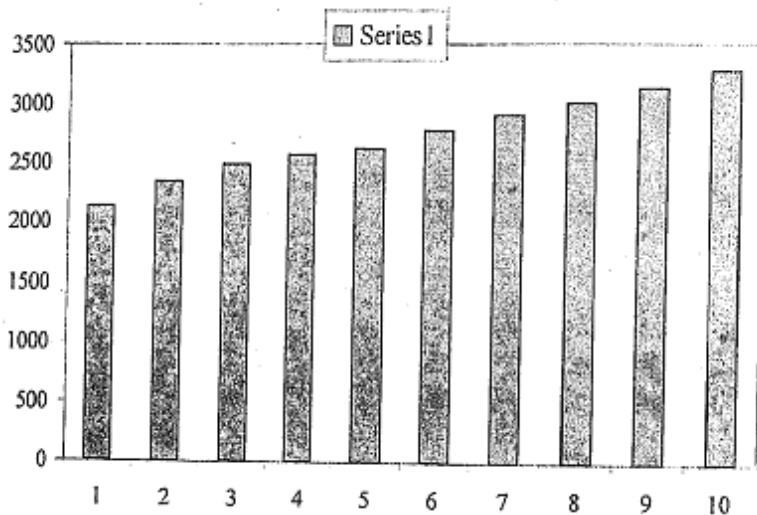


1 to 10 in the diagram represent years 1990 to 1999 respectively

Fig. 1C: Growth of Student Population of Ramlal College during 1990's

- 1) **Bar Diagrams:** A Bar diagram in reality a two-dimensional diagram. Here, we are considering them under uni-dimensional diagrams because only one dimension, i.e., the length, is being taken into account. In two dimensional diagrams we take into account the area which involves both the length and the breadth.

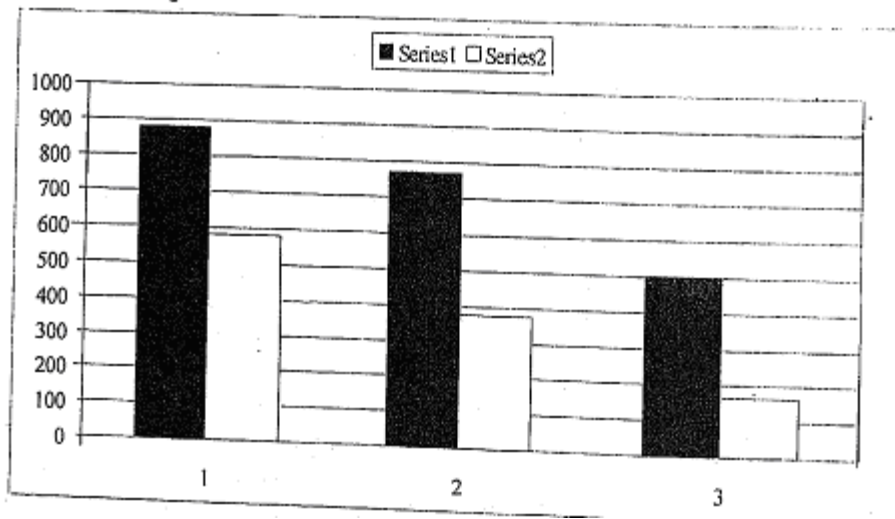
Simple Bar Diagram: Bar diagrams are quite similar to line diagrams. Here the lines are simply replaced with bars. Using the same data used to draw the line diagram in Figs. 1A, 1B, 1C we can draw a bar diagram as shown below:



1 to 10 in the diagram represent years 1990 to 1999 respectively

Fig. 2: Growth of Student Population of Ramlal College during 1990's

Multiple Bar Diagram: Now, we present a multiple bar diagram with the data of Pass Course and Honours Course students of Ramlal College for 1999.



1 = BA students, 2 = B Com students, 3 = B.Sc. students
 Long bar = Pass students Short bar = Hons. Students

Fig. 3: Pass and Hons. Course Students of Ramlal College during 1999

Subdivided Bar Diagram: Now, we shall draw the Subdivided Bar Diagram using the same data as used in Fig. 2

In the X axis, 1, 2, and 3 represent BA, B Corn and B Sc students respectively. The lower portion of each bar indicates Pass Course students and the upper portion Hons. Students.

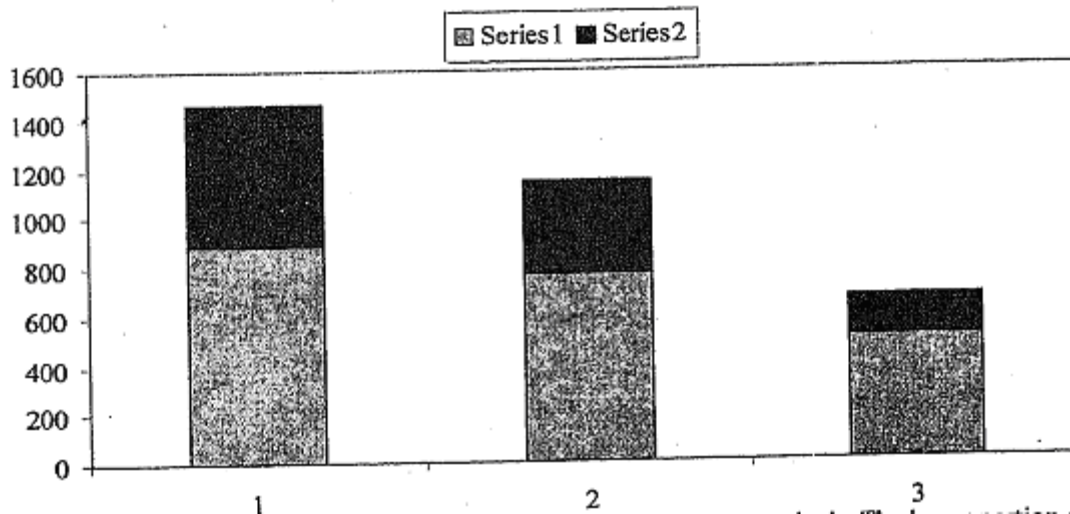


Fig. 4: Pass and Hons. Course Students of Ramlal College during 1999

Deviation Bar Diagram: The Deviation Bar Diagram is used to show the deviation from a given number. Suppose, Ramlal College Library subscribed the following number of periodicals during 1990 - 1998 as given in Table 5.

Table 5: Change in the number of Periodicals subscribed by the Ramlal College Library during 1990 - 1998.

Year	1990	1991	1992	1993	1994	1995	1996	1997	1998
Periodicals	940	955	975	990	1005	1015	1040	1050	1080

The figure given below shows the deviation from the number 1000 in both the sides of the base line. In this figure, the base line is vertical. The base line can be drawn horizontally also.

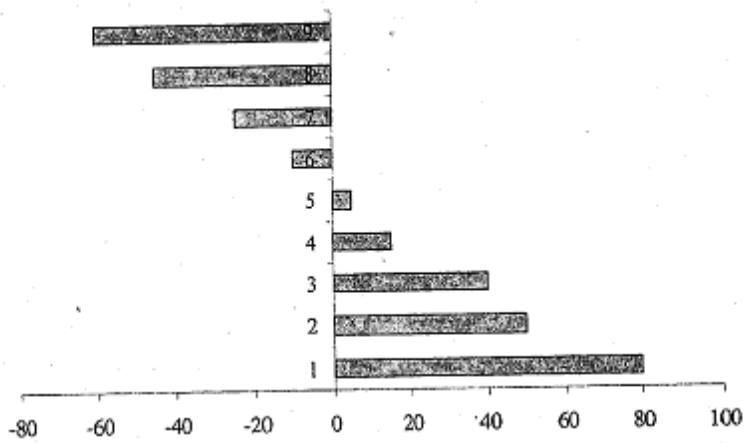


Fig. 5: Change in the number of Periodicals subscribed by Ramlal College Library during 1990's

Sliding Bar Diagram: Sliding bars are used to show the ratio of change in two parts of the unit. The total of the unit is always 100. Suppose, the male female breakup of the BA students of Ramlal College during 1999 is as follows.

Table 6: Percentage of Male and Female Students of BA Class of Ramlal College in 1999

Subject	Percentage of Students	
	Male	Female
Economics	80	20
Geography	68	32
History	62	38
Philosophy	56	44
Psychology	51	49
Sociology	45	55

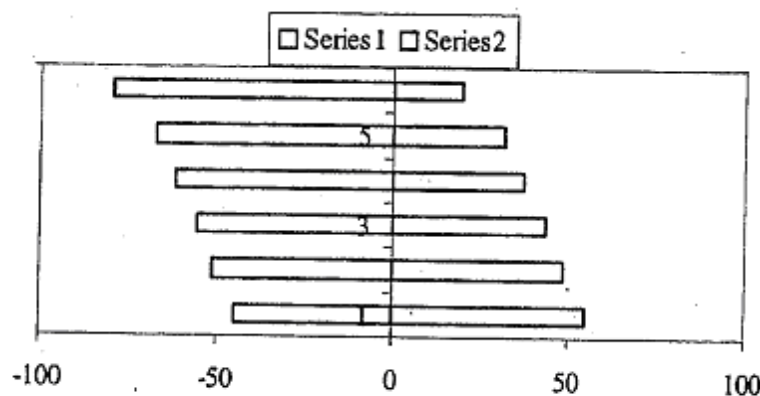


Fig. 6: Male Female Ratio of Arts Students of Ramlal College in 1999

Fig. 6 presents the sliding ratio of the male female students of Ramlal College in 1999

Pyramid Diagram: The uni-dimensional Pyramid Diagram is usually used to show the distribution of male and female by age group. The male and female population of USA in 1950 were as follows:

Table 7: Population of USA by Sex and Age Group in 1950

Age Group	Female (in millions)	Male (in millions)
75 and above	2.1	1.7
70 -74	1.8	1.6
65-69	2.7	2.4
60-64	3.0	3.0
55-59	3.6	3.6
50-54	4.2	4.0
45-49	4.5	4.5
40-44	5.0	5.0
35-39	5.7	5.5
30-34	5.9	5.7
25-29	6.2	6.0
20-24	5.9	5.5
15-19	5.4	5.3
10;14	5.7	5.7
-9	6.4	6.8
Below 5	8.0	8.3

Figure 7 presents the data in pyramidal form. In informetric studies this form of presentation can be employed while studying a particular population, say, scientists, by sex and age group.

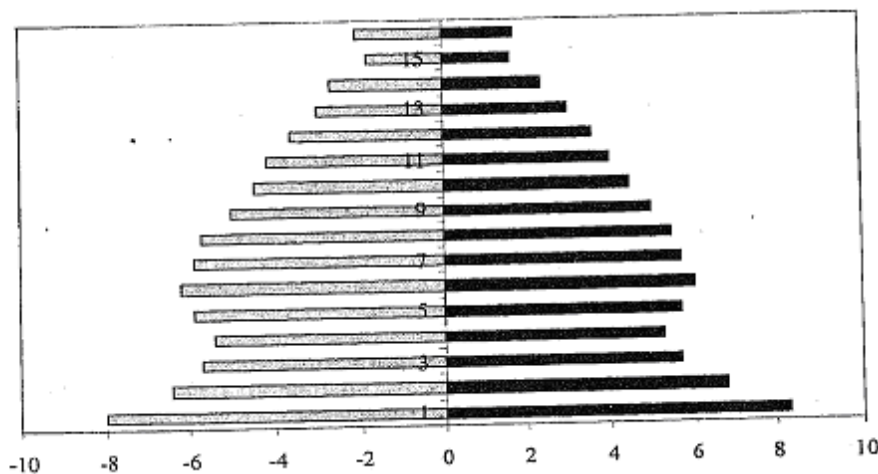


Fig 7: Population of USA in 1950

Two-dimensional Diagrams

These diagrams are also known as area diagrams, as we take both the dimensions, the length and the breadth, that is, the area into account.

- 1) **Rectangle:** Suppose, we intend to represent by rectangles the BA, BCom, and BSc students of Ramlal College of the year 1999 with rectangles. We can do it the following way. The number of students in these three classes respectively are: 1463, 1148, and 669. If 1" in our scale represents 1000, then the rectangles with the sides as 1" x 1.46", 1" x 1.15", and 1" x 0.67" will represent the figures of the three classes. The rectangles in Fig. 8 approximately represent the number of students in each class.

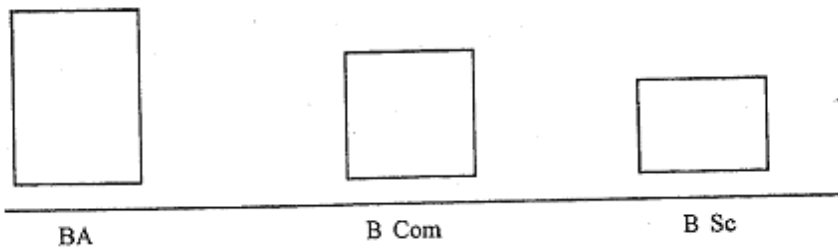


Fig. 8: Undergraduate Students of Ramlal College , 1999

- 2) **Square:** The rectangles in Fig. 8 can also be shown in the form of squares. For drawing the squares, the square roots of all the numbers are computed. In our case, the square roots of the three numbers, 1463, 1148, and 669 are respectively 38.2, 33.9, and 25.9. If we select such a scale where 1" represents 30, then one side of the three squares will respectively be 1.27, 1.13, and 0.86. The squares in Fig. 9, approximately presents the comparative data. Normally, a square diagram may be used when the ratio of the highest value and the lowest value in the set is more than 10:1.

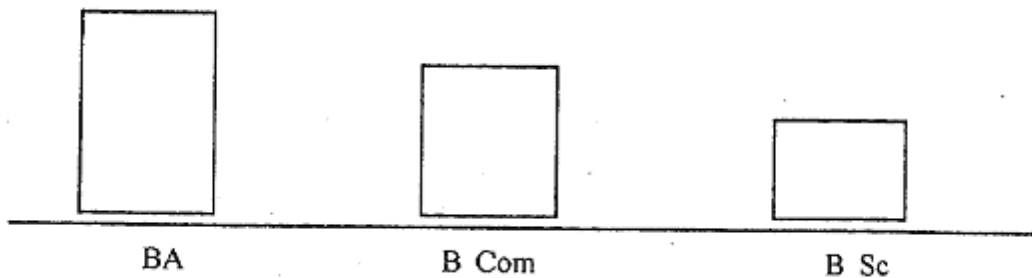
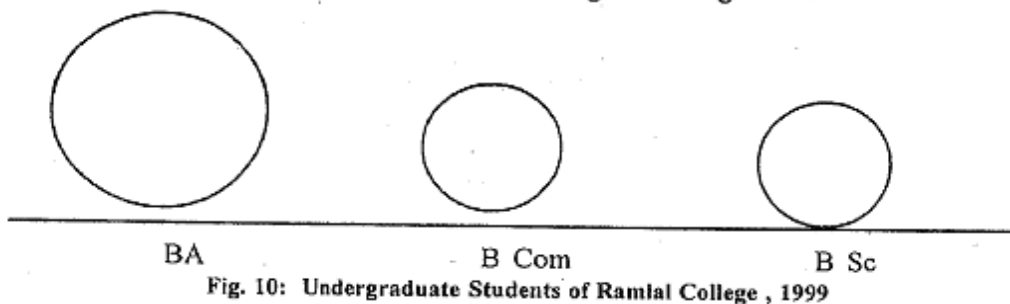


Fig. 9: Undergraduate Students of Ramlal College, 1999

- 3) **Circle :** Now, we shall present the same data in the form of circles in Fig. 10. The area of a circle is given by the formula $7\pi r^2$. Applying this formula and to the 1463, 1148, and 669, we get the values of the three radii as 21.6, 19.1, and 14.6. Using a suitable scale, we can draw the circles as given in Fig 10.



4) **Pie Chart** :Here, a circle is divided on the basis of values of angles. The angle value of the subset is given by the following formula:

$$\text{Angle value of students} = \frac{\text{Value of subset} \times 360}{\text{Total value}}$$

The angle values of the number of BA, B Com, and B.Sc. students of Ramlal College of the year 1999 are given by:

$$\text{Angle value of BA students} = \frac{1463}{3270} \times 360 = 161.1$$

$$\text{Angle value of B.Com. students} = \frac{1148}{3270} \times 360 = 126.4$$

$$\text{Angle value of B.Sc. students} = \frac{669}{3270} \times 360 = 73.5$$

With these values, we can draw the circle (pie diagram) as in Fig. 11

1 = BA students, 2 = B Com Students, 3 = B Sc students

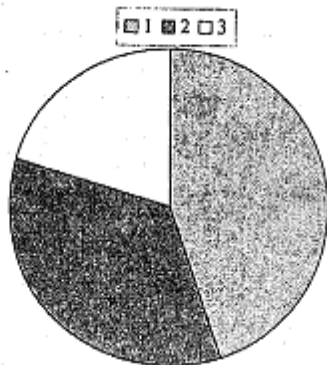


Fig. 11: Undergraduate Students of Ramlal College, 1999

This diagram can also be presented in an exploded form as shown in Fig. 12

1 = BA students, 2= B Com Students, 3 = B Sc students

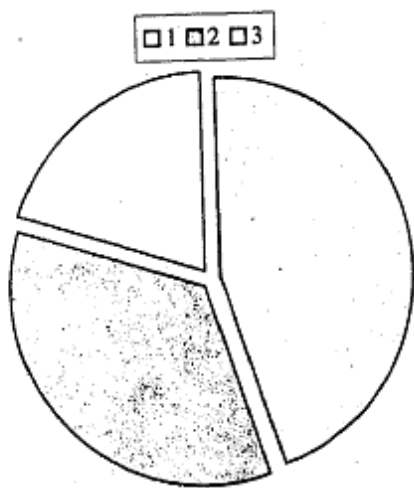


Fig. 12: Undergraduate Students of Ramlal College, 1999

Three Dimensional or Volume Diagrams

Volume diagrams are normally used when the ratio between the highest and lowest values is more than 100 : 1. To draw these diagrams, cube roots of the measurements are computed, and then the sides of each cube is taken in proportion to the cube roots. The volumes can also be presented in the forms of cuboids, cylinder blocks, pyramids, and so on working out the values using the required mathematical formula. Presenting here are the diagrams with the values 1728 and 64.

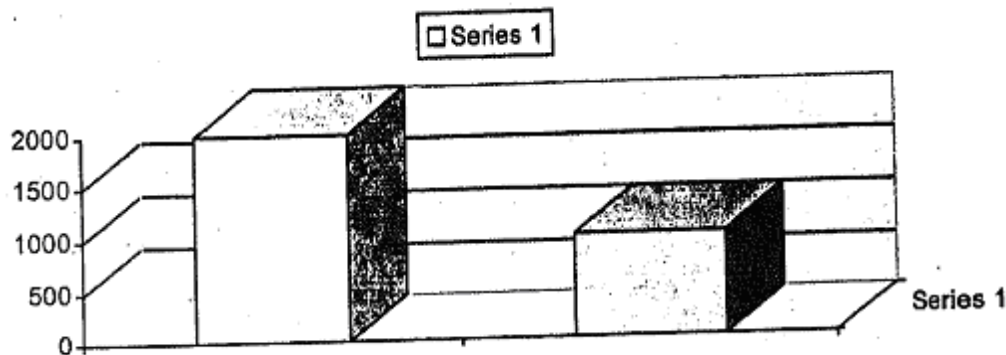


Fig. 13: Presentation in the form of a cube

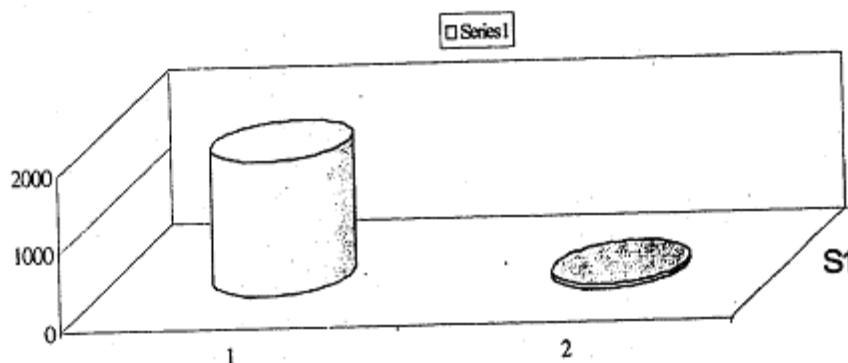


Fig. 14: Presentation in the form of cylinder

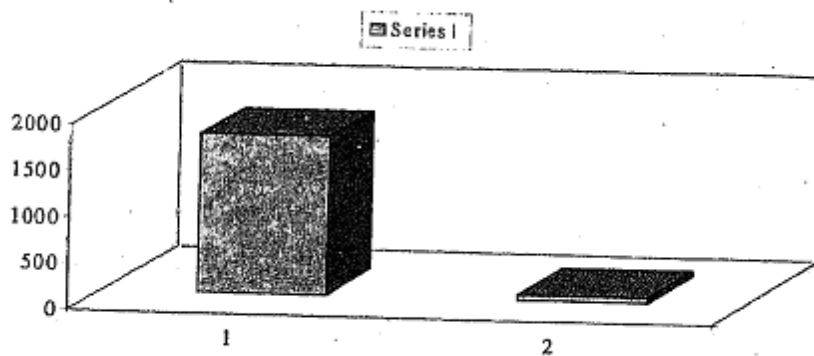


Fig. 15: Presentation in the form of cuboids

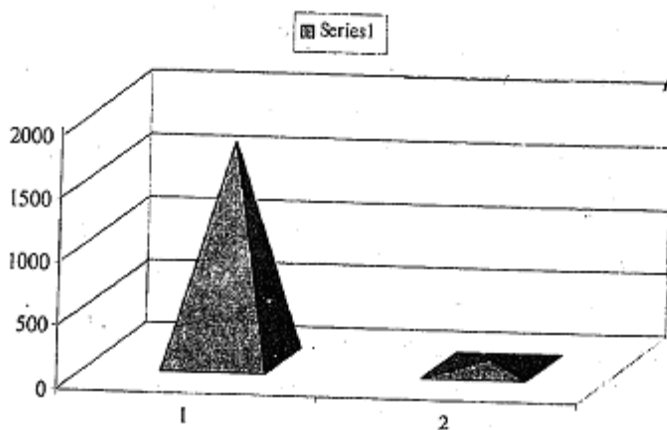


Fig. 16: Presentation in the form of a pyramid

10.8 : Important User Studies

The origin of user studies can be traced back to the 1940s. Since then numerous user studies have been conducted all over the world. Sridhar in his *User Research* has provided a chronological bird's eye view of the literature for the period 1940's to 1980's. Devarajan in his *Library Information User and User Studies* has also provided a survey and analysis of user studies reported in *LISA* during 1969 to 1989.

Here, because of the limitation of length of the course material we are just describing briefly three surveys.

One of the first user studies in the field of scientometrics was by Herman H Fussier in 1949. His study appeared in two installments in *Library Quarterly* of the same year. The study comprised two parts - the first part discussed 'the importance of the literature of various subject fields to research in chemistry and physics' and the second 'the temporal span of literature, the principal forms of the literature, the national origins of the literature used in the United States', and some of the more important serial titles. He advanced the idea of 'key' journals and concluded his investigation with the remark: 'the distribution of literature as revealed in the study, indicates that provision of a substantial proportion of the references in a research field is possible through a small number of journals if they are properly selected but that the provision of the entire necessary research literature for a field will require a very large

number of titles, many of which will be needed elsewhere in a university or in a large research organization'

One of the more important user studies in the field of scientometrics was conducted by the Advisory Council of Scientific Policy, U K in the 1960s. The survey was initiated by B H Flowers and conducted through questionnaire mailed to as many as 6,195 scientists comprising physicists and chemists in the ratio 1:2. The sample was drawn from membership lists of UK-based Chemical Society, Institute of Physics, and Physical Society. The survey yielded around 3,000 responses. The major findings of the survey were as follows:

- i) Pure scientists are more dependent on literature compared to industrial scientists and technologists.
- ii) Abstracts are widely used both for keeping up to date and obtaining specific information.
- iii) Patents are not used much by the physicists and chemists. As such there is not much justification of their inclusion in the abstracting journals devoted to pure sciences.
- iv) Scientists expressed strong desire for more reviews and for a system of grading references in the original papers according to their utility.
- v) The libraries seem to be playing, by and large, a little more than a passive role in the research process, although they are fairly well regarded as a general source of information.

A very important study was conducted by the University of Bath during 1967 to 1970 with a large number of social scientists as the sample. The study is popularly known as INFROSS (Information

Requirements of the Social Scientists). The objective of the study was to gain an overall insight into the varied information requirements of social scientists. Four specific groups were studied: i) researchers in social sciences; ii) social scientists in government departments; iii) college of education lecturers and school teachers; and iv) social workers. The project was supported by the Office for Scientific and Technical Information (later the British Library Research and Development Department). The results of the study were published in the form of reports. This project was succeeded by DISISS (Design of Information Services in the Social Sciences) and carried out between 1971 and 1975 with funding from the British Library Research and Development Department.

. 10.9 : Application of User Studies

The results obtained through user studies can be applied in a number of activities. Some of the activities are as follows:

- i) Collection development

Through user studies we come to know the actual requirements of the users in terms of books, periodicals, non-book materials, and so on. Knowing this, we can take steps to fill in the gaps, strengthen the collection which is weak, and develop the collection in such-a way that it becomes a really useful collection for the users.

We can stop subscribing to periodicals that are not used or little used. We can discard the items that are no more

useful to the users. We can also have a check on the acquisition of non-book materials.

ii) Improvement in the services.

A library provides a number of services to its readers. In case some services are found to be unsatisfactory, measures can be taken to improve the services.

iii) Introduction of new services

If users demand for new services, the matter may be brought to the notice of the authorities, for introduction of those services,

iv) Design of information systems and services

Once the varied requirements of the users and their problems in the use of services are identified, steps may be taken to design the information services and systems so as to meet the requirements and overcome the problems.

10.10 : Summary

In this Unit, we have discussed the definition and purpose of user studies. The section on methodology deals with various methods: questionnaire, interview and observation, and library record analysis. The section on planning a survey includes the basic objective and scope of the survey, methodology for data collection, framing of the questionnaire along with an example, steps in testing' of the questionnaire, selection of the sample, distribution and receipt of the questionnaire. The classification and tabulation of data, wherein the salient aspects of classification, and the details of the preparation of a table, starting from simple to complex, are described. The diverse ways of data analysis and the presentation of results in tabular and graphical forms are discussed together with a number of examples for uni-dimensional, two-dimensional, and three dimensional graphical presentation. Examples of some important user studies and the application of user studies highlighted in the final two sections.