Chapter Four

DESIGNING THE STUDY

A successful study must be carefully planned. The research proposal is that plan. The shape of the plan depends on the nature of the research problem and the ingenuity of the student.

Proposal writing requires the research student to plan carefully all the steps of a project and make at least preliminary decisions, such as what is needed and when, in order to carry out the entire project. A budget cannot be proposed without making all those decisions, nor is the research student able to communicate the significance of the proposed project to those who will be reading the proposal without having made some project decisions.

The purpose of the research proposal is to provide the research student an opportunity to formally acquaint the Review Committee of his institution with sufficient information for approval of the topic for research. It also enables the Committee to understand that the student has thoroughly thought through the topic for research and is not simply proposing a subject or a title. The research student, therefore, will have to present the Committee with adequate information for the required decision.

The student is encouraged to select a topic for research that is of personal interest to him, or a topic that may be of benefit in his occupational environment when the thesis or research report is completed. However, the topic must be related to the degree major which the student intends to pursue. A student who majors in English language teaching must select a topic directly related to his field of specialization, and not something in another field of study. If a student proposes to develop some type of manual or handbook as an integral part of his thesis or report, it must be made clear to the Review Committee that the manual or handbook will stand alone as an independent entity.

If the research topic requires that a student utilize confidential information such as company records, or personal, medical, counselling or mental health records or individual examination results, all approvals from proper authorities should ideally be

obtained before submitting a research proposal. If the research involves visits to other institutions, approval must be obtained for such visits. A plan should be presented in the proposal to assure the Review Committee that confidentiality will be maintained and that there is no possible way that any individual could be identified when the report or thesis is completed.

By submitting a formal research proposal for approval before beginning the research project, a student is protected from expending a tremendous amount of effort in researching and writing on a topic that the Review Committee may ultimately not approve. If a proposal is submitted that does not conform to the guidelines of the student's institution or the Review Committee, it will be necessary to return the initial proposal to the student for revision until the required information is provided as stipulated in the guidelines.

The research proposal should be written in the future tense, since it is tentative and is what a research student intends to do in the future after the proposal is approved. If there is any type of document or special statement the research student wishes to present as support for the proposal, it should be included as an Appendix to the proposal.

Before writing a proposal, the research student should ask his institution for the regulations and forms for the submission of project proposals. He ought to follow the format and regulations for submitting a proposal as prescribed by his institution.

THE PROPOSAL GUIDELINES

The materials in a proposal need to be arranged in a way that will best communicate the research student's ideas to the readers (the reviewers) and impress them with the value of the proposed study. The following guidelines and format are by no means sacred. Appropriate adjustments in the format of a proposal may be required, depending on the topic and institutional specifications. The proposed outline covers points that one may want to consider when reviewing or evaluating proposals submitted by others. The text of a research proposal should include the following considerations.

1. **Statement of the Problem**

A plan must have goals or objectives carefully established. Thus, the most important part of the plan is the statement of the problem. The introduction should briefly present the problem that is to be studied. This problem should be stated in precise terms and presented fully so as to leave no doubt about the researcher's goal. The reasons why the study is important, the scope and the major objective of the study must be stated.

The information should be presented in an explicit manner so that even those who are in another field of specialization will be interested in learning more about the research project by reading the rest of the proposal. The information should allow the readers to judge the worth and clarity of the research problem and the appropriateness of the method proposed for solving it. It shows whether the research student understands how to plan a piece of original research.

In order to determine if the statement of the problem has been explicitly presented, the researcher should answer the following questions.

a. Is the problem clearly stated?

b. Is the significance of the problem and contribution to the field of study established?

c. What are the limitations of the research?

2. **Purpose of the Study**

The research student cannot assume that the research problem to be investigated is familiar to those who will evaluate the proposal. For this reason, he should provide more than general information about the study. He should elaborate on the current situation or the current practices, and a description of past attempts to solve the problem.

It is important to state the purpose of the research. This specifically refers to the research student's reasons for

undertaking the study. In thinking about the purpose of the study, the researcher should consider answers to the following questions.

a. What new knowledge will it add?

b. What real importance does the problem appear to have?

c. How will the research contribute to the field of specialization?

d. What are the potential effects of the research project, upon its successful completion, on the immediate target group of subjects, and the broader socioeconomic, sociopolitical, and other ramifications of the project?

3. **Review of the Literature**

The proposal should have a brief review of the literature. This shows that the researcher is familiar with pertinent previous studies and with the main sources of his data. The researcher should, in effect, explain just what is known about the problem. A working bibliography or an annotated bibliography is an important support for this section of the proposal. The working bibliography is not actually required for the proposal, but it certainly helps to strengthen the Review Committee's evaluation of the proposal. It allows the Committee to understand that you have made a diligent attempt to provide as much information as possible. In the preparation of the brief literature review, the research student could use the following questions as a guide.

a. Does the literature review show an understanding of the theories or principles underlying the research topic?

b. Does the review of literature justify the problem being studied?

c. Does the literature review justify the method of study?

4. **Method of Study**

In this section the research design is presented. The research

student should state what work will be done, in what order, and with what method and instrumentation. It is also necessary for the researcher to state what data will be collected and how they will be analysed. The researcher should ask himself the following questions.

a. Is the method employed adequate for the research study?

b. Has the best available procedure been utilized?

c. Should other procedures also have been used?

A timetable or work schedule for the research project should be included. A chart format is highly recommended, since it will be easier for the research student to use in determining whether he is following his schedule. In order to develop the chart, the work must be divided into tasks, and each task must be clearly defined. The chart may also indicate the submission time of the report (and progress reports, if required).

It is necessary to give a detailed explanation of the exact steps to be taken in gathering data and testing hypotheses. If questionnaires are to be used, for example, then a sample of the questionnaire should be submitted for review. Statistical analysis methodology must be described in detail as must the design of the research experiment itself.

5. **Presentation of Results**

In this section, describe the methods of displaying any data that results from the proposed research. If the project is to be an experimental research project, describe the statistical methods in the analysis of the data in order to accept or to reject the experimental theory.

The research student should describe the manner in which he intends to present the results of his research. He should indicate if there will be charts, tables, graphs, or other attachments such as computer printouts or handbooks. The student may wish to make some projection about what he anticipates the results of the research will indicate.

BRIEF OUTLINE OF THE PROJECT

It is strongly recommended that a brief outline of the project paper or thesis or dissertation be submitted with the proposal to further provide evidence of thorough planning. An example of a brief outline is given in Appendix A.

As with any kind of planning, the research proposal must never be set in concrete. Good research rarely ends as precisely as planned in a proposal. That is because the research student does not know where his investigation will end up. In essence, the student is working his way through a maze with little or no previous knowledge of the correct path to follow. Each time redirection is necessary - the plan may have to be modified.

A research proposal may be reviewed by experts in the field. Reviewers often follow certain guidelines. For example, reviewers may examine research proposals with regard to some or all of the following points:

a. strengths and weaknesses in the approach and content,

b. originality and creativity of the proposed research,

c. evidence of research potential to assess the likelihood for the research student to make an important and original contribution,

d. reasonableness of the budget and time alloted for the research,

e. appropriateness of the research environment, including equipment, and other resources.

Chapter Five

DESIGNING THE RESEARCH

The purpose of research is to apply scientific methods to uncover regularities so that one can explain the occurrence of an event and predict it or one can seek answers to a research problem. The scientific method is a set of procedures and guidelines that make the investigation reliable and the conclusion valid. Blalock and Blalock (1982:8) point out that the important steps in a research project are as follows:

1. the statement of the research problem or issue to be investigated or the theoretical explanation to be tested;
2. the translation of the abstract ideas in this theoretical explanation into concrete, explicitly identifiable ideas;
3. the development of measures of the important variables in the theoretical explanation;
4. the development of a research design to guide the inquiry into the research problem, so that the information gathered truly tests the validity of the explanation to the fullest extent possible;
5. the selection of a set of methods that implement this design;
6. the collection of research data;
7. the analysis of this information in the context of the proposed explanation; and
8. the interpretation of the information, or interaction of the findings of the research with the existing knowledge base.

Through the literature search, the research student becomes familiar with the theoretical perspectives and knowledge gained from past studies on the chosen subject, unless the subject is entirely new. The next step is to formulate hypotheses based on the literature, which will be tested in the research process, and to determine operationally defined measures (empirical measures) of the concept in the hypotheses, before designing the research study.

A research design is a total plan of research that should include decisions as to the unit of analysis, (if different from the unit of observation), the time dimension of the study (longitudinal or one point in the time), the scope of the study in terms of the target population to be studied, the scope of the study in terms of matters to be investigated (which will be mostly determined by the hypotheses selected), the method of sample selection, and the data analysis plan. If hypotheses cannot be developed because of the newness of the subject matter, the research student can attempt to conduct an exploratory study rather than a study to test certain hypotheses.

THE EXPERIMENTAL METHOD

In an experiment, attributes of selected variables (called the independent variables) are manipulated to determine their effects on the target variables (called the dependent variables) under conditions where there is control for other variables or where their effects are kept constant. This method enables the researcher to determine the probable causal relationships between the dependent variables and the independent variables.

Variables in an experiment can be classified into three categories.

a. **Independent variables**
   They are independent of the outcome and, instead, influence the outcome.

b. **Dependent variables**
   They are dependent on the independent variable and the outcome depends on how these (dependent) variables are manipulated.

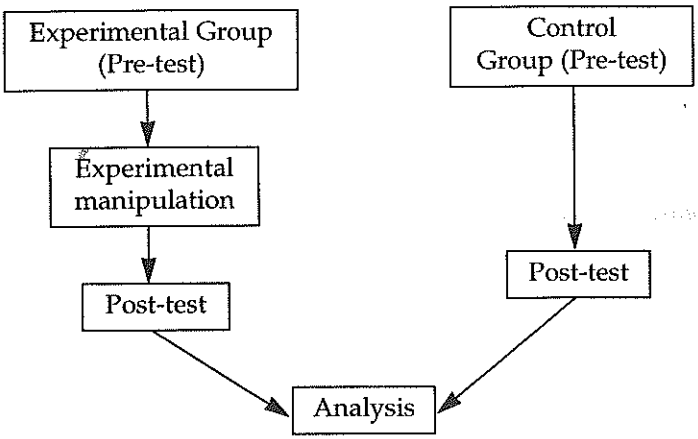
c. **Control variables**
   They need to be controlled, held constant or randomized so that their effects are neutralized.

The fundamental idea is to apply the experimental factor to an experimental group, using, where necessary, one or more control groups in which the experimental factor is not applied. The

experimenter then measures and compares the results to determine what, if any, effect has been produced by the single variable.

Experiments with human beings can be extremely complex particularly because of the many variables involved. In some cases, it may be impossible to isolate a single factor for observation.

One popular design is the pre-test/post-test with control group. The experimental group and the control group are both pre-tested; then the experimental factor is applied to the experimental group alone. Later, both groups are tested again and the differences in results, if any, are tabulated. Significantly different results may then be attributed to the experimental factor.



During the course of this type of research, the investigator attempts to maintain control over all factors that may affect the results of his experiment. In the experiment, observations are made under predetermined and prearranged conditions.

The underlying principle of the experimental method is the ideal. The researcher generally attempts to approach the ideal by utilizing multiple methods for proper sampling, or statistical control of certain variables, or both. The experiment is the most rigorous approach in the scientific method. The experimental method of research provides the best advantage in manipulating some variables and controlling others. This is the most widely used method in the physical sciences.

In the social sciences, some experimental approaches are used in areas such as experimental psychology. Quasi experiments or experiments in natural settings, however, have gained popularity in recent years because of the increasing interest in evaluation research, the purpose of which is to evaluate the effectiveness of a programme, for example, a teaching technique for secondary school students. In an experiment in a natural setting, a researcher can hold constant the variables which are presumed to be non-causal by an appropriate selection of the sample characteristics (for example, age and sex), while manipulating the attributes of the independent variables by appropriate assignment of the sample subjects to the experimental group (those to receive the treatment) and to the control group (those not to receive the treatment). This type of experiment can be used to evaluate the effectiveness of developmental projects in a language program or in an institution of learning. The experimental method of research is usually preferred over the survey method for determining cause-and-effect relationships. In surveys involving correlation, apparent cause-and-effect relationships cannot be regarded as **proved** by the data; interpretation through logical analysis is still necessary and may be extremely difficult.

THE SURVEY METHOD

In collecting data for a survey, the research student either makes direct observations or culls information from a variety of reliable sources, such as a library and other written materials, individuals, or institutions. Besides direct observations, the tools of survey research include interviews, questionnaires, tests, and score cards.

The survey method of research can help to pin down the true facts about a situation or to **suggest** cause-and-effect relationships, but **it cannot reveal what conditions are necessarily ideal.** As a method, it is not prescriptive but only descriptive. When the target of research is a large population of subjects, a sample survey is the appropriate design, unless the population is homogeneous. This is a widely used method in the social sciences since the human population is highly heterogeneous with regard to almost any variable of interest to social scientists. The ultimate goal of a sample survey is to arrive at findings that can be generalized for the entire

population, based on the data obtained from a sample of that population. There are three important considerations in conducting a sample survey :

1. obtaining a sample that will represent the population,
2. obtaining the data from the sample, and
3. making inferences about the population based on the data obtained from the sample.

The first consideration is sampling. It is essential to specify precisely the group of persons or things to be studied. These objects of study are called the units of analysis and each unit of analysis most often is the individual person. The sum total of all the units of analysis is called the population. Each entity from the population that is the ultimate sampling objective is called a sampling element. A sample is therefore a subset or a portion of the total population. A 100 percent sample would be the entire population. Thus a one percent sample would consist of only one out of every 100 entities in the population. A sample is always viewed as an approximation of the whole rather than as a whole in itself.

The second consideration is the data collection procedure. The most commonly used procedures are :

1. mailing a questionnaire to the sample population,
2. interviewing each subject of the research study in person,
3. interviewing each subject on the telephone, and
4. having subjects fill out a questionnaire as a group in the researcher's presence.

The third consideration is making inferences based on statistical analysis of the data. If data are gathered from a sample rather than from the total population, statistical methods are used to make inferences about the population, that is, to estimate the population characteristics based on the characteristics of the sample.

Interviews in a sample survey are aimed at obtaining exact information from the subjects of the study. The researcher strives to obtain this information from the individual respondents through

face-to-face contact. If a great many people must be interviewed, this device can prove exceptionally time-consuming and expensive. For efficiency and objectivity, the researcher should prepare a written schedule of questions in advance and ask these questions in the same way at each interview.

Questionnaires are substitutes for the interviews. They are used mainly to save time and money. The questionnaire method has the weakness of being impersonal, and the construction of good questionnaires is much more complicated than it appears. For these and other reasons, the questionnaire is not ordinarily used except in the absense of a satisfactory alternative method for gathering data.

The following are guidelines for the use of questionnaires:

1. Try to get the sponsorship or assistance of a respected organization or institution in the collection of responses.
2. Enclose a covering letter explaining the purpose of the questionnaire.
3. Avoid unusual words and phrases, instead formulate all questions in clear language.
4. Use the closed form in which answers are not given in the respondent's own words but by circling or checking multiple choices.
5. Avoid questions asking for an opinion.
6. Conceal any bias of the reseacher.

Pitfalls are usually found in the survey method that uses questionnaires. Among these pitfalls are the following.

1. The conscious or unconscious bias of the investigator may color his questions. Data from biased questions will support predetermined conclusions, therefore, is it not scientific or viable.
2. Most people like to give answers that please the researcher.
3. The population sample may not be truly representative of the group from whom information is desired.

4. Even when questionnaires go to a representative sampling, those actually completed and returned may come from an unrepresentative sample.
5. Respondents often misread or misinterpret questions.
6. A respondent will not always answer the same questions in the same way if asked on two separate occasions.
7. The quantitative data secured through a questionnaire are only **raw data** which require interpretation. The customary view that such interpretation is easy will be found untrue in most studies.

The last item is the most significant. It is the main reason for avoiding this method unless no other technique is possible. If a questionnaire must be used the researcher should:

a. have the same question repeated with paraphrased wording, (this is to detect the No. 6 effect stated above) and
b. give the questionnaire a test run by administering it to several selected respondents. (This will eliminate ambiguous questions and will permit revisions to further improve the questionnaire.)

Tests, especially standardized tests, whose validity and reliability have been checked and whose effectiveness can thus be justified, are always preferable to tests constructed for a particular survey. Validity refers to the ability to measure what the test claims to measure. Reliability means the consistency between measurements in a series. It is the extent to which a test produces consistent results when administered under similar conditions. Validity and reliability are both difficult and time-consuming to verify. It is generally not recommended that a student attempt to construct his own test if standardized tests can be utilized. There are many standard tests available and it may, therefore, be foolish for a research student to use an unvalidated test. If no standard test is suitable, it is recommended that the student use some other technique for the research.

Scorecards are sometimes used in some surveys where the research student compares his data against some pre-determined set of standards of measurements. Simple statistical calculations of

the data on the scorecards can be used to determine results such as degrees of achievement or underachievement of the respondents.

One caution about the survey method of research is that, with the exception of face-to-face interviews, this method assumes literacy (both in reading and writing) among the target subjects. In some communities, the research student may not be able to use mailed questionnaires with certain sectors of the population because of illiteracy among the subjects. At the same time, telephone interviews may be inappropriate because of the lack of a telephone in many households. A group interview may assume literacy, but the presence of the interviewer will alleviate some of the problems that may be encountered in the interview.

THE FIELD STUDY METHOD

Types of field studies range from participant observation, in which the researcher takes a part in the activities of the subjects, to non-participant observation, in which the researcher is an outside observer, confined to observing activities and asking questions of the subjects.

Conducting a field study in a sample of many communities, for example, will be impractical or almost impossible. The field study method of research is generally chosen when the research student's intention is:

1. to explore the target subject (example, a community or an organization) without having any previous knowledge of it,
2. to study the target subject in depth, and
3. to approach a target subject unapproachable by any other research method.

One of the difficulties with the field study method of research is the lack of standardization of data. Data obtained in a field study generally lack generalizability and are difficult to replicate. Field studies, however, provide initial insights about the research subjects, functioning as exploratory studies, and contribute to the future development of more structured studies in which hypothesis testing can be conducted with standardized data.

The main challenge of the field study method is for the researcher to develop interpersonal skills in order to obtain the trust of his subjects and, at the same time, to prevent personal bias or attachment to the subjects from distorting his observations.

THE CASE STUDY METHOD

The case study method entails the intensive study of a single individual, several individuals, or a group of individuals at one particular point of time or over a period of time. It uncovers in detail what is true about an individual or individuals or a group. Its results are descriptive. Any general conclusions arising from the case study method can be accepted only when:

a. the same causes produce the same effects in a **sufficient number** of cases, or

b. corrective remedies applied as the result of identifying the probable causes of the behaviour **actually prove effective,** or

c. the same causes produce the same effects in a sufficient number of cases **and** corrective remedies applied as the result of identifying the probable causes of the behaviour actually prove effective.

THE DOCUMENTARY RESEARCH METHOD

When studying events and conditions of the past, the research student must find some method other than the survey or experiment. This means the careful collection of available records relating to the subject under investigation and a **thorough** analysis of what these records disclose, together with a synthesis of the conclusions and findings to be derived from them.

The most important steps in the documentary research method include location of the records, their evaluation externally and internally, and their interpretation. External evaluation means every piece of source material used must be accurately identified and carefully tested for authenticity. Internal evaluation means the credibility or trustworthiness of materials must be assured.

It must be understood that documentary research is not the same as a literature search. The latter will be necessary to provide the evaluation of the documents.

RECOMMENDED RESEARCH METHODS

The above research methods are highly recommended but are not necessarily the only ones that can be used. The objective of the research investigation is to do original research that will add to the body of knowledge. Most undergraduates, because of their backgrounds, will find non-mathematical analysis better suited to their research needs.

The research student, however, should bear in mind that applied research is concerned mainly with practical applications of theory. Therefore, he should avoid the testing of theories or the use of probabilistic mathematical techniques. With these considerations in mind, a researcher may want to avoid the following types of study:

1. Surveys of opinions, attitudes, morale, etc. Attitudes are very difficult to measure even for the experts chiefly because of the many factors involved. Man is extremely complex and trying to define a **generalized** norm is not a simple job for a research student. Statistical analysis to prove the effectiveness of a device to boost morale or change attitudes needs to be extremely sophisticated to be of any value.

2. Attempts to prove that some variation of an established behavioral science technique is more effective than the original or other "proven" techniques. The research student rarely has the resources or the skills to do an adequate job. The recommended approach is that of the case study described previously. The real advantage of the case study is that the researcher is dealing with human beings in their natural environment and not with cold, unnatural numbers.

The credibility of results obtained from a research investigation depends heavily on the credibility of the method used. A wrong choice of methodology can invalidate the work. It is important, therefore, to carefully consider the methods of data collection or the methods of observation.

Design decisions and analytical tools in any research project depend on:

a. the purposes of the research study,

b. the nature of the research problem, and

c. the alternatives appropriate for its investigation.

The chief issue is, how extensive and of what sort must the method be in order to solve the particular problem being investigated. In this chapter are explanations of the most commonly used methods of investigation: the experiment, survey, field study and case study. Another method of research is documentary investigation. Some research studies may require a combination of two or more of these methods.

Chapter Six

DATA COLLECTION

During the design stage of the study, the research student must make plans as to the types of statistical analysis to be used to test hypotheses or to find solutions to the research problems. The student also needs to decide in what form the collected data ought to be, in order to use certain statistical tests. These decisions, if made in advance, will determine what questions are to be asked and in what way the answers should be collected, for example, using the categorical or continuum method. These decisions are necessary to decide on the data collection procedure.

DATA COLLECTION PROCEDURE

Because there are two distinct steps involved in doing a research study, namely collecting the data and manipulating the data, the data collection procedure is frequently divided into (1) The methods section and (2) the results section. The methods section describes how the data should be collected for the research project while the results section will describe the display of data and data manipulation. By indicating both how to collect data and how to manipulate the collected data, the procedure described will ensure that the experiment will be replicable. Any research student with the time, resources, and background knowledge should be able to duplicate the study and verify the findings by reading the procedure section of a research report.

The methods section - This section is a chronologically ordered, step-by-step description of the process that will be used to obtain the research data. It is essential for the research student to evaluate his instruments of measurement for gathering data thoroughly before selecting them to be used in data elicitation. He should not select those instruments of measurement which he is not qualified to administer or score. It is equally important for the student to select those instruments of reasonable reliability so that true differences are not hidden by the errors in the instruments used to elicit the data.

The results section - This section describes the research

student's manipulation of the data obtained from the process described in the methods section. It gives the results from such manipulation. The results section may give various statistical analyses of the data, such as the means and standard deviations of the treatment groups. The presentation and interpretation of results should be clear and appropriate to the research project being undertaken. The research student has to ensure that these results are interpreted, not merely reported, and that the interpretations are sound.

ERRORS IN DATA COLLECTION

Before the data collection is begun, regardless of the method chosen, it is critical for the research student to minimize the possibility of errors in the data by a careful selection of the instruments of measurement (for example, scale or questions). There are two types of errors which might be found in the data; one type is due to the unreliability of data, and the other is due to the questionable validity of the instruments of measurement selected for the research.

The unreliability of data collected involves random errors in measurements. In other words, the researcher or the person taking measurements is not obtaining correct readings from the research instruments. This type of error makes the reliability of the data questionable. Random errors may occur because of the carelessness of the researcher in observing or in reading the instruments, or in misunderstanding the respondent or even the data processing. These errors in a variable are generally expected to be uncorrelated with all other variables. Multiple measurements of a variable will provide a safeguard against this type of error. It is also possible to correct the collected data for unreliability by using multiple measurements.

Non-random, or systematic, errors occur because of a built-in bias in the instrument or in the observer. This type of error raises a serious question as to the validity of the data, that is, whether the instrument of measurement selected is indeed a proper measure for the theoretical concept or for the research purpose. Highly reliable measurements for a particular concept need not always be valid; for

example, accurate readings may be taken from a wrong instrument. Great care must be taken in the selection of instruments of measurement so that they will provide valid measures.

Obtaining opinions from other researchers as to the validity of instruments will be helpful in minimizing validity problems. Through practice and logical thinking, the research student can develop the capability of selecting valid operational measures for most theoretical concepts or research problems.

DATA ANALYSIS

The following discussion will be limited to quantitative data analysis, since qualitative data depend primarily on the ingenuity of each researcher for a meaningful presentation. That is to say, there are generally standardized methods for presenting qualitative data. The discussion on data analysis will emphasize on the use of computers in the analysis of quantitative data. It is important for a researcher to become familiar with computer capabilities and the availability of statistical software.

After data collection, the raw data need to be properly coded; that is, numerical values need to be assigned, if this has not been done already, and missing values should be assigned to those cases where certain data are missing. All of this should be done according to the conventions of the particular statistical software being used by the researcher, before the data can be put into a computer.

Generally, there are three options for computer processing of quantitative data:

1. the batch system using the main-frame computer,
2. the interactive terminal of the main-frame computer, and
3. the micro-computer.

In the first option, the raw data collected are key-punched onto IBM cards and then fed into the main-frame computer for analyses. In the second option, the raw data are fed directly from data sheets or questionnaires through the key-board of the interactive terminal; the data are then sent to the main-frame computer from that

terminal for analyses. In the second option, it is also possible for the data to be put on IBM cards or on a magnetic tape or disk in the main-frame computer after being sent from the interactive terminal. The third option, which is becoming increasingly popular, involves feeding the data into a micro-computer, a self-contained unit.

The research student must be certain that the appropriate statistical techniques are utilized to analyze the data for the purpose of solving a research problem or for the description of findings or for the purpose of hypothesis testing. A few basic courses in statistics can provide a researcher with reasonable familiarity with the most popularly used statistical techniques.

The researcher should not hesitate to seek advice from trained statisticians before making a final selection of statistical techniques in order to avoid misuse or abuse of statistics and data collected. It is strongly recommended that the researcher obtain advice prior to data collection instead of just before data analysis. A statistician can determine, before the researcher finalizes a data collection plan, whether the data to be collected with the selected instruments of measurement will be the type of data which are suitable for the statistical techniques to be used in testing the hypotheses or in solving the research problems. Once data are collected, it may be too late to modify the form of the data to meet the research student's assumptions.

For the research student, there are a number of statistical software packages available for main-frame computers. The Statistical Analysis System or SAS and the Statistical Package for Social Sciences or SPSS are probably the most popular for most researchers in the fields of language education and social sciences. Although both SAS and SPSS are very expensive, they are extremely powerful packages. An individual researcher must decide whether such packages, along with expensive main-frame computers, are needed for the types of data analysis and for the size of data he is likely to deal with in future research activities.

The availability of main-frame statistical software may be very limited because of high cost, and because of the scarcity of trained persons who can make the best use of them. For these reasons, micro-computers are becoming more popular among researchers in both developed and developing countries. First, micro-computers

are usually much cheaper than main-frame computers. Second, the software of micro-computers, in disk or cassette form, is much cheaper and easier to transport from one location to another, along with the micro-computer itself. Rapid progress is being made in the capability and availability of a wide range of software for microcomputers. The capability of a micro-computer and the software available with it may be sufficient for most research activities of most individuals.

LACK OF COMPUTER FACILITIES

Research has been conducted for many years without computers and other modern tools. If a particular place of work does not have computer facilities, this does **not** mean that all the researchers there will not be able to conduct good research activities. Without computer facilities or without sophisticated laboratory facilities, conducting high quality research may be a real challenge. It is, however, the researcher himself who holds the key to the direction of research activities. Research may have to be conducted within the facilities available in the researcher's home institution, or it might be done with some assistance from the contacts established outside the home institution.

Chapter Seven

WRITING THE RESEARCH REPORT

By the time the student has acquired a broad background of understanding in which his research lies and he has completed enough of his research project to give serious consideration to the preparation of his formal report, it is likely that his main task will be the working out of a suitable organization. A clearly conceived outline plan will be highly beneficial in the preparation of the initial draft of the research report.

The writing of the research report is an opportunity for the research student to demonstrate his ability to isolate a topic or a problem to be studied in some detail, to develop a plan of research to be executed, to present the findings, to draw some viable conclusions, and possibly to make some recommendations. In the case of research students at the universities, a topic or a problem should be selected that will be an original piece of research which can add to the existing body of knowledge in a specific subject area.

ORGANIZATION OF THE RESEARCH REPORT

Prior to writing the final research report, the research student should visit the nearest library of a university that offers degree or diploma programmes in his area of research interest. He should check with the librarian to determine the location of the bound copies of graduation exercises, theses and dissertations. It is suggested that the student review a number of the bound reports in the student's field of specialization to get a feeling for how they are generally organized. However, the directions given in the student's university or college manual on research writing and manuscript preparation will supersede all other universities' research writing formats. Sometimes, the student's manual may illustrate a sample of a typical research report which shows most of the typical pages, but not every page in the complete research report. Usually, that manual will serve as the student's primary set of directions as to how the organization of the material is to take shape. A style sheet, such as the **MLA Style Sheet** or other books such as the *MLA Handbook for Writers of Research Papers* (New York: The Modern

Language Association of America, 1992) or *Form and Style in Thesis Writing* (by William G. Campbell and Stephen V. Ballou, Boston: Houghton Mifflin Company, 1992) will be the secondary sources of instructions to answer any questions not covered in the student's manual.

No two research projects are precisely alike; thus, no possibility exists of providing a universal outline for all research reports. A formal research report, however, consists of three categories of materials: the preliminaries, the text, and the reference materials. The internal arrangement within each part is determined by the student in consultation with his research advisor.

1. **The Preliminaries** - Usually, the preliminaries are to be organized and placed in the order in which they are listed below.

   a. **Title page**
   This is the page where the complete title of the research report is placed together with the full name of the research student. Usually the name of the academic or research institution to which the student is affiliated is mentioned at the bottom of the page. Below this name is printed the year the report is submitted.

   b. **Blank page, or Copyright page**
   A blank sheet of paper is usually the second page of the preliminaries. If the research student wishes to make a copyright statement, it is placed on this page.

   c. **Signature page**
   This is also known as the approval page which bears the signature of the advisor appointed to supervise the student's research project.

   d. **Dedication page**
   This page is optional but if a student wishes to dedicate his work to someone, it is done on this page.

   e. **Acknowledgement page**
   This page is usually meant for the student to give recognition to any individuals or groups that have been of special assistance to him in his conduct of the research project.

f. **Table of Contents**
An examination of the table of contents provides the reader with a convenient overview of the research report or thesis, and with a grasp of its organization. It includes the chapter title and major sub-divisions of the individual chapters.

g. **List of Tables**
The tables in the report are individually identified by table numbers. In the list of tables, the format is essentially the same as for the table of contents.

h. **List of Figures**
The format for this list is the same as for the list of tables. Here, however, the words "illustrations" or "plates" may sometimes be preferred to the word "Figures" because of the type of materials exhibited. A research report or thesis may have none, one, two, or all three types: figures, illustrations, plates.

i. **Abstract or Synopsis**
An abstract or a synopsis is a condensed statement that should provide the reader with enough information to understand what the entire research report contains. This abstract should consist of (i) a statement of the purpose and objectives, or a short statement of the research problem, hypothesis, or the thesis question to be answered; (ii) a brief description of the methods and procedures employed in gathering the data; (iii) a condensed summary of the findings or results of the study. The abstract is written in the third person, past tense and should use the term "the researcher" if the research student refers to himself. No attempts should be made to write an abstract until the research project is completely finished.

2. **The text** - The research student is encouraged to organize his formal report in the classic 5 - chapter method, but is given creative freedom to organize the chapters in another manner if the classic method does not allow the student to make the best possible presentation of his research. However, all work must begin with Chapter One and must conclude with a summary or conclusion chapter. Chapter Two may be

integrated with Chapter One if there does not appear to be adequate enough references to justify a separate chapter for a "Review of the literature". Regardless of chapter organization, a definite system of documentation of all information sources must be used in which the research student will refer the reader to the required "Bibliography" or "References" located at the end of the research report.

The documentation of sources of information gathered in the research is vital to any research report, thesis, or dissertation. The student must select and use any one of the following systems:

a. The footnote-bibliography format

b. The references cited format

c. The author-and-number format

d. The author-and-year format.

The most common system used in a thesis or a dissertation is the author-and-year format. Care should be taken not to mix any of the formats since it could cause confusion for the reader. Whatever documentation system is selected must be used consistently throughout the research report, thesis, or dissertation.

3. **The Reference Materials** - These are generally located at the end of a thesis, dissertation, or research report and they can come in the form of a "Bibliography" or "References". Sometimes appendices are added to this part of the formal report. An appendix item must be discussed in general in the results or interpretation of data chapter, and the reader is referred to the appendix for more details.

The bibliography will include, as a minimum, all references cited in the research report. The appendix or appendices will come after the bibliography. In order to provide for desirable continuity in the main body of the report, it is customary to place certain miscellaneous materials in one or more appendices. Text, forms, raw data or other supporting materials usually form the appendices, whereas the main

body of the report, say Chapter Three, tells in general what was done. The appendix materials permit the reader to make an independent analysis if he wishes. The basic question to be answered in deciding whether or not certain materials should be included in the appendix is:

> Can all the details of the research study be thoroughly understood without this information?

If they can, the material may safely be omitted. The appendix is separated from the bibliography by a page bearing the word "Appendix" or "Appendices".

TECHNICAL AND MECHANICAL PROBLEMS OF REPORT WRITING

• *STYLE OF WRITING*

The style of writing used in the thesis or research report is classified as formal English in contrast to informal English which is the style of language used in personal and familiar communication. Formal English is dignified expression and, as such, possesses certain characteristics which the research student must observe. Three aspects of this type of writing are particularly important.

1. **Person** - The research report should be written in third person rather than first or second. That is, instead of saying, "I found that..." and "you will note that ..." the preferred form would be "The researcher (or experimenter, investigator, etc.) found that ..." and "The reader will observe that ..." However, the frequent use of "the researcher" (or some such apt synonym) soon becomes annoying. The simplest and most effective way to avoid an overuse of such expressions is to report procedures, methods, and findings much as one would state facts, such as, "An analysis of Table 12 reveals that..." "The next problem to be solved was that of..." Although there may be times when the research student feels that it is impossible to avoid expressions like "the researcher", it would be wise to recast the sentence into a direct, factual expression whenever it is possible.

2. **Shortened expressions** - Contractions such as "didn't" (for did not) and "wasn't (for was not) are characteristic of informal English while complete constructions are characteristic of formal English. Clipped words such as "gym", "exam", etc. should not be used, and only standard abbreviations are acceptable. Omitting the relative pronoun in a statement such as "Professor Lim found a relationship existed between X and Y" is another example of a shortened expression used in informal English. Formal English would include the pronoun as "Professor Lim found that a relationship existed between X and Y."

3. **Diction** - Idioms like "learn by heart" and colloqualisms such as "it was time to carry our project X" or "it was necessary to contact all students" are good examples of informal English, but they do not fit the style of formal English used in report writing. Expressions which are labeled as "slang", "dialect", or "obsolete" are to be studiously avoided. The research student should consult a reputable, up-to-date dictionary to determine whether a doubtful word falls into one of these classifications.

It is often necessary to employ technical expressions which have specific meanings in a certain field of study. A thesis on music would use the word "mode" in a different way than one in grammar or one in which the term is used in a statistical sense. While the research student should not try to use a great number of technical terms to impress the reader, it is often impossible to avoid the use of a specific term which is needed to present a specific point. Checking the term in a dictionary will help to determine whether its use is a standard one.

• *SPELLING*

Two problems in spelling often arise in the preparation of a thesis or research report. The first concerns the use of simplified spelling, such as "thru" for "through", "tho" for "though", and "thoro" for "thorough". Even though these simplified forms are accepted in many dictionaries, the complete form of each word is preferred since a research report is written in formal English.

A second problem arises when one finds two spellings of a word both of which are accepted by a standard dictionary. If the two forms, such as "judgment" and "judgement", are placed together in the dictionary, the preferred form is usually listed first. If the two forms are treated as separate entries, all the detailed facts about the word are placed beside the preferred form. This problem of dual spelling is more complicated today because of the distinction that now exists between American and British English. For example, "counselor" and "counseling" are American spellings, and "counsellor" and "counselling" are British spellings. Some dictionaries do not make this distinction clear, but the American spelling is usually placed first in dictionaries published in the United States.

• *FOREIGN WORDS AND PHRASES*

Ordinarily a foreign word or phrase should be used only when it expresses an idea that English cannot express quite as well. Some foreign words and phrases have become standard expressions in American English. This is especially true of Latin abbreviations such as e.g. (exempli gratia - for example) i.e. (id est - that is) and etc. (et cetera - and so forth). Frequent use has "anglicized" these expressions, and they should not be underlined as one does with less commonly used foreign words and phrases.

In this connection, the research student should be aware of the fact that some Latin forms have changed because their frequent use has "anglicized" them. Formerly, the Latin form "datum" was used only in the singular and the form "data" in the plural. Since modern dictionaries now state that "data" may be used in the singular as a collective, as, "this data provides sufficient proof", such usage is acceptable in research report, or thesis writing.

Also, many Latin plurals are being supplanted by the standard American inflection of adding an "s" to form the plural of a noun. The following plurals are now listed as preferred to the Latin forms: appendices, curriculums, formulas, maximums, memorandums, syllabuses. These illustrations indicate the necessity of having a reputable, up-to-date dictionary for anyone who is preparing a thesis or research report.

• *CAPITALIZATION*

There are several common difficulties in capitalization which are encountered by student writers. Some newspapers follow a "down" style of capitalization which means that the use of capital letters is minimized. Examples of this would be "Green lane high school" and "Malacca river". The more formal use, which is found in books and some magazines, would be to capitalize as follows: "Green Lane High School" and "Malacca River". This latter form is preferred in report writing.

The capitalization of titles of books and magazine articles often causes difficulty. The most commonly accepted rule is to capitalize the first word in the title and all proper nouns.

When the student finds it necessary to make reference to the title of a book or article that was originally written in a foreign language, the advisable form would be that which follows the national practices of that language rather than the rule that applies in English.

• *PUNCTUATION*

The chief problem encountered by the research student in punctuating his research report often does not concern the great number of rules that must be kept in mind. Difficulties arise when he must make a choice between two or more punctuation possibilities. A simple example is that of punctuating words in a series, such as, "red, white and blue" compared to "red, white, and blue."

Modern authorities in language would interpret these examples as illustrations of **open** and **close** punctuations. Using no commas between "white" and "blue" would be **open** punctuation. In the **open** style the tendency is to omit punctuation wherever possible unless it is absolutely necessary for clearness, as in the following example: "Three separate experimental groups were created which contained boys, girls and both boys and girls."

On the other hand, close punctuation is more formal. It follows a conservative style and contains more punctuation marks. It is more frequently used in writing the research report because the